

AZA Ungulate TAGs Mixed-Species Manual 2017



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**ASSOCIATION
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AZA Ungulate TAGs Mixed-Species Manual

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INTRODUCTION

BACKGROUND INFORMATION

Mixed-species exhibits can help maximize space use, increase holding capacity without adding exhibit acreage, and improve the sustainability of populations in zoos. Furthermore, these exhibits provide enrichment for the animals and create a more dynamic guest experience with additional opportunities for educational messaging. In an effort to document mixed-species exhibits involving ungulates, several previous surveys have been completed, including the 1997/1998 Mixed Antelope Exhibits Survey, the 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure, and the Cervid Mixed-Species Table that was included in the 2014 Cervid RCP.

At the 2014 AZA Mid-Year meeting, an idea was hatched to create an updated and expanded survey to document mixed-species exhibits that include animals from all ungulate TAGs. With this new manual, the AZA Ungulate TAGs and Disney's Animal Kingdom® have set out to answer the many questions surrounding ungulates in mixed-species enclosures. We've compiled information regarding best practices, combinations of species that have worked well, and mixes that have not been successful. Through the participation of 131 zoological institutions housing ungulates in mixed-species enclosures, we've created a reference that can be used for collection- and exhibit-planning.

This manual contains information from over 650 mixed-species ungulate exhibits, including current successful exhibits, historical successful exhibits, and unsuccessful attempts at creating mixed-species combinations. In addition to exhibits containing only ungulate species, we've also included information about non-ungulate species mixed with ungulates. Information was submitted by all levels of staff at participating institutions, who helped us to collect details on the animals, exhibit design, and management of current and historical exhibits, as well as changes over time of currently existing mixes.

We hope this manual will be a useful guide for setting up successful ungulate mixes in dynamic new exhibits, improving existing exhibits by adding new species, managing animal mixes appropriately and successfully given specific exhibit characteristics, and avoiding mixes or situations that might not be as successful.

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HOW TO USE THIS MANUAL

- 1) There are three tables listing **successful** current (as of 2015 or 2016) and historical mixed-species exhibits involving ungulates:
 - a. The first table, “Table of Successful Mixed Ungulate Groups,” summarizes all ungulate groups that include multiple ungulate species. It is organized alphabetically by TAG, then by subgroups within the TAGs, and finally by common name of the animals included in each subgroup. This table may be useful if you are planning to create a mixed-species ungulate exhibit or introduce ungulates into an exhibit already containing ungulates.
 - b. The second table, “Successful Groups of Ungulates Mixed with Non-Ungulates (Sorted by Ungulates),” summarizes data for exhibits that mixed ungulates with non-ungulates. The second table has the same organization as the first table and may be useful if you plan to introduce non-ungulates to an existing ungulate group.
 - c. The third table, “Successful Groups of Ungulates Mixed with Non-Ungulates (Sorted by Non-Ungulates),” is organized by non-ungulate taxa (birds, mammals, reptiles, and fish) and then by common names within those taxa. It may be useful if you plan to introduce ungulates to a non-ungulate exhibit.
 - d. Each table lists the institution that housed each mixed-species group. Information from our survey was incorporated into these tables, and each institution name serves as a link to bring you to a detailed profile of that exhibit (see item 2). You will also see a list of all institutions preceding the tables with links to all exhibit profiles for each institution.
 - e. We have also combined all information from the 1997/1998 Mixed Antelope Exhibits Survey, the 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure, and the Cervid Mixed-Species Table that was included in the 2014 Cervid RCP incorporated into each table in this handbook. For further details on these exhibits (a superscripted number specific to the applicable survey document will follow the institution name), please see the appropriate cited document.
- 2) Detailed profiles of the current (as of 2015 or 2016) and historical successful groups listed alphabetically by institution can be found after these tables. For each institution, current groups are listed before historical groups. Each exhibit profile includes details on species composition, length of time the group has been or was mixed, exhibit size and characteristics/ accommodations, general and reproductive management, management challenges, items contributing to the group’s success, and changes in the exhibit over time.
- 3) The fourth table, “Table of Unsuccessful Mixed-Species Groups,” summarizes data for exhibits in which attempts to mix ungulates with other ungulates and/or non-ungulates were **unsuccessful**. This table has the same organization as the first and second tables of successful mixes. Please review this table with caution and be sure to reference specific profiles for each unsuccessful group (see item 4 below). Several mixes were deemed unsuccessful based on individual animal temperaments or specific exhibit limitations, rather than incompatibility of species.
- 4) Profiles of unsuccessful mixed-species groups are also listed alphabetically by institution. These include details on group composition, exhibit size, general and reproductive management, and any additional information regarding why the groups were unsuccessful.
- 5) We have provided a categorized figure that includes details about what makes ungulate mixed-species exhibits particularly unique, popular with guests, or successful.

QUALITIES OF UNIQUE, POPULAR, AND SUCCESSFUL MIXED-SPECIES EXHIBITS

At the end of the Ungulate TAG survey we posed the following question:

“Are there any ungulate mixed-species exhibits that you consider to be particularly unique, popular with guests, or successful and, if so, why?”

We received 73 responses, some of which mentioned particular species mixes, and some that detailed specific characteristics of successful exhibits. The majority of successful mixes that were described contained African species. Responses detailing exhibit characteristics were grouped into a set of categories based on their content. The following figure summarizes these responses, with the most popular key words shown largest.



LINKS TO SUCCESSFUL MIXED-SPECIES EXHIBIT SUMMARIES BY INSTITUTION

Abilene Zoological Gardens
Adventure Aquarium
Africam Safari Park
Albuquerque Biological Park
Alexandria Zoological Park
Amarillo Zoo
Aquarium & Rainforest at Moody Gardens, Inc.
Arizona-Sonora Desert Museum
Audubon Zoo
B. Bryan Preserve
Bergen County Zoological Park
Binder Park Zoo
Birmingham Zoo
Blank Park Zoo
BREC's Baton Rouge Zoo
Brevard Zoo
Bronx Zoo
Brookgreen Gardens
Buffalo Zoo
Busch Gardens Tampa Bay
Buttonwood Park Zoo
Caldwell Zoo
Calgary Zoo, Botanical Garden & Prehistoric Park
Cameron Park Zoo
Cape May County Park Zoo
Capron Park Zoo
Chattanooga Zoo at Warner Park
Chehaw Wild Animal Park
Cheyenne Mountain Zoo
Chicago Zoological Society – Brookfield Zoo
Cincinnati Zoo & Botanical Gardens
Cleveland Metroparks Zoo
Columbus Zoo and Aquarium
Como Zoo and Conservatory
Connecticut's Beardsley Zoo
Cosley Zoo
Dallas Zoo
Denver Zoological Gardens
Detroit Zoo
Dickerson Park Zoo
Disney's Animal Kingdom
Disney's Animal Kingdom Lodge
Ellen Trout Zoo
Fort Wayne Children's Zoo
Fort Worth Zoo
Fossil Rim Wildlife Center
Fresno Chaffee Zoo
Gladys Porter Zoo
Great Plains Zoo & Delbridge Museum of National
History
Happy Hollow Zoo
Henry Vilas Zoo
Honolulu Zoo
Houston Zoo, Inc.
Idaho Falls Zoo at Tautphaus Park
Indianapolis Zoological Society, Inc.
Jackson Zoological Park
Jacksonville Zoo and Gardens
John Ball Zoological Gardens
Kansas City Zoo
Knoxville Zoological Gardens
Lee G. Simmons Conservation Park and Wildlife
Safari
Lee Richardson Zoo
Lehigh Valley Zoo
Lincoln Park Zoo
Lion Country Safari
The Living Desert
Living Desert Zoo & Gardens State Park
Los Angeles Zoo and Botanical Garden
The Maryland Zoo in Baltimore
Memphis Zoo
Mesker Park Zoo & Botanical Garden
Milwaukee County Zoological Gardens
Minnesota Zoological Garden
Nashville Zoo at Grassmere
North Carolina Zoological Park
Northeastern Wisconsin (NEW) Zoo
Northwest Trek Wildlife Park
Oakland Zoo

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Oglebay's Good Zoo	Santa Fe College Teaching Zoo
Oklahoma City Zoological Park	Sedgwick County Zoo
Omaha's Henry Doorly Zoo and Aquarium	Sequoia Park Zoo
Oregon Zoo	Smithsonian National Zoological Park
Parc Safari	Staten Island Zoo
Peoria Zoo	Sunset Zoo
Philadelphia Zoo	Tampa's Lowry Park Zoo
Phoenix Zoo	Toledo Zoo
Pittsburg Zoo & PPG Aquarium	Topeka Zoo
Point Defiance Zoo & Aquarium	Toronto Zoo
Potter Park Zoological Gardens	Trevor Zoo
Prospect Park Zoo	Tulsa Zoo
Pueblo Zoo	Turtle Back Zoo
Racine Zoological Gardens	Utah's Hogle Zoo
Reid Park Zoo	Virginia Living Museum
Riverbanks Zoo & Garden	Virginia Zoo
Roger Williams Park Zoo	White Oak Conservation Center
Rolling Hills Wildlife Adventure	Wildlife Safari
Roosevelt Park Zoo	The Wilds
Rosamond Gifford Zoo at Burnet Park	Woodland Park Zoo
Sacramento Zoo	Zoo Atlanta
Safari West Wildlife Preserve	Zoo Boise
Saint Louis Zoo	Zoo de Granby
Salisbury Zoological Park	Zoo Miami
San Diego Zoo	Zoo New England
San Diego Zoo Safari Park	ZooAmerica North American Wildlife Park
San Francisco Zoological Gardens	
Santa Barbara Zoological Gardens	

TABLE OF SUCCESSFUL MIXED UNGULATE GROUPS

The table below lists all ungulate species that have been mixed successfully with other ungulate species at AZA institutions. This table is organized alphabetically by TAG, then by subgroups within the TAGs, and finally by common name of the animals included in each subgroup.

The best way to use this table is to search for a specific species in the left-hand column and then find which species it has been successfully mixed with by looking in the corresponding middle column; in the right hand column is a list of all institutions that have successfully managed those species together. Please note that a “→” after an institution name means that the list for that specific mix continues on the next page. All institution names have been linked to the corresponding exhibit templates that are provided in this manual; you can click on the institution link to read more about the mixed-species exhibit and its management. Please note, after clicking the link, if you do not see the species you are looking for at the top of the exhibit summary page, scroll down to the "Group/Exhibit Changes Over Time" section.

Next to several institution names, you will find an asterisk (*). These asterisks mean that the subspecies for one or both of the species in the mix was provided for that specific institution.

Information from three past surveys has also been incorporated into this table: information from the 1997/1998 Mixed Antelope Exhibits Survey has a ¹ after the institution name, information from the 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure has a ² after the institution name, and information from the Cervid Mixed-Species Table that was included in the 2014 Cervid RCP did not include institution names, so in the institution column you will see “Cervid Mixed-Species Table³”. These entries do not have links throughout the table; however, the results from these three surveys have been posted on the AZA Ungulates website, and can be accessed by clicking on the links below.

¹ 1997/1998 Mixed Antelope Exhibits Survey

² 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure

³ Cervid Mixed-Species Table that was included in the 2014 Cervid RCP

Ungulate Species	Ungulate Species Mixes (Current and Historic)	Institutions
Antelope and Giraffe		
<i>Aridland Antelope and Gazelles</i>		
Addax (<i>Addax nasomaculatus</i>)	Antelope, Roan (<i>Hippotragus equinus</i>)	Buffalo Zoo; Fossil Rim Wildlife Center; Safari West
	Antelope, Sable (<i>Hippotragus niger</i>)	Fossil Rim Wildlife Center; Fossil Rim Wildlife Center
	Ass, African Wild (<i>Equus africanus</i>)	Dallas Zoo*; Disney’s Animal Kingdom*
	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	Gulf Breeze Zoo ¹
	Blackbuck (<i>Antilope cervicapra</i>)	Fossil Rim Wildlife Center; Gulf Breeze Zoo ¹
	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)	Minnesota Zoo; Safari West; Wildlife Safari

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<p>Addax (<i>Addax nasomaculatus</i>)</p>	<p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Llama (<i>Lama glama</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Detroit Zoo^{1*}; Disney's Animal Kingdom; Fossil Rim Wildlife Center*; Safari West</p> <p>Disney's Animal Kingdom; Gulf Breeze Zoo¹; San Diego Zoo Safari Park¹; Wildlife Safari</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center</p> <p>Busch Gardens*; Fresno Chaffee Zoo; Gulf Breeze Zoo¹; Wildlife Safari</p> <p>Dallas Zoo; Fossil Rim Wildlife Center; San Diego Zoo Safari Park</p> <p>Detroit Zoo^{1*}</p> <p>Safari West</p> <p>San Diego Zoo Safari Park¹</p> <p>Fresno Chaffee Zoo</p> <p>Dallas Zoo; Fossil Rim Wildlife Center; Wildlife Safari</p> <p>Blank Park Zoo*; Busch Gardens*; Disney's Animal Kingdom*; Fresno Chaffee Zoo*; Minnesota Zoo*; Omaha's Henry Doorly Zoo & Aquarium*; Safari West*; Wildlife Safari</p> <p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center</p> <p>Busch Gardens; Disney's Animal Kingdom; Fresno Chaffee Zoo</p> <p>Fossil Rim Wildlife Center¹; Fresno Chaffee Zoo; Safari West</p> <p>Blank Park Zoo; Disney's Animal Kingdom</p> <p>Gulf Breeze Zoo¹</p> <p>Gulf Breeze Zoo¹</p> <p>Safari West</p> <p>Fossil Rim Wildlife Center; Saint Louis Zoo</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; Gulf Breeze Zoo¹ →</p>
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<p>Addax (<i>Addax nasomaculatus</i>)</p>	<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Omaha's Henry Doorly Zoo & Aquarium; San Diego Zoo Safari Park¹; Wildlife Safari</p> <p>Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Fresno Chaffee Zoo*; Wildlife Safari*</p> <p>Gulf Breeze Zoo¹</p> <p>Disney's Animal Kingdom; Fresno Chaffee Zoo</p> <p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center; Gulf Breeze Zoo¹; Wildlife Safari</p> <p>Fossil Rim Wildlife Center; Fresno Chaffee Zoo; Minnesota Zoo; Wildlife Safari</p> <p>Busch Gardens; Dallas Zoo; Dallas Zoo</p> <p>Fossil Rim Wildlife Center*</p> <p>Disney's Animal Kingdom; Kansas City Zoo*; Wildlife Safari</p>
<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Dik-dik, Kirk's (<i>Madoqua kirkii</i>)</p> <p>Duiker, Maxwell's (<i>Philantomba maxwellii</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Gazelle, Dorca's (<i>Gazella dorcas</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p>	<p>Dallas Zoo; Fossil Rim Wildlife Center; San Diego Zoo Safari Park</p> <p>Fossil Rim Wildlife Center; Jackson Zoo</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center; Montgomery Zoo¹; North Carolina Zoo; Pittsburgh Zoo; White Oak Conservation Center</p> <p>Binder Park Zoo; Pittsburgh Zoo*</p> <p>Africam Safari Park; San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park¹; Toledo Zoo</p> <p>Fossil Rim Wildlife Center</p> <p>Memphis Zoo¹; Phoenix Zoo</p> <p>San Diego Zoo Safari Park¹*</p> <p>Africam Safari Park; Oakland Zoo¹</p> <p>White Oak Conservation Center</p> <p>Sacramento Zoo</p> <p>Sacramento Zoo</p>

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<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Columbus Zoo; Dallas Zoo; Living Desert; Montgomery Zoo^{1*}; San Diego Zoo Safari Park¹; White Oak Conservation Center¹</p>
	<p>Gazelle, Speke's (<i>Gazella spekei</i>)</p>	<p>Indianapolis Zoo; Saint Louis Zoo</p>
	<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Africam Safari Park; Columbus Zoo; Fort Wayne Children's Zoo; Indianapolis Zoo; North Carolina Zoo; Pittsburgh Zoo</p>
	<p>Gemsbok (<i>Oryx gazella</i>)</p>	<p>Dallas Zoo; Montgomery Zoo¹; Riverbanks Zoo¹</p>
	<p>Gerenuk (<i>Litocranius walleri</i>)</p>	<p>Saint Louis Zoo</p>
	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Africam Safari Park*; Binder Park Zoo*; Columbus Zoo*; Gladys Porter Zoo*; Indianapolis Zoo*; Oakland Zoo¹; Rolling Hills Wildlife Adventure; Saint Louis Zoo*; Toledo Zoo*</p>
	<p>Guanaco (<i>Lama guanicoe</i>)</p>	<p>Fossil Rim Wildlife Center</p>
	<p>Impala (<i>Aepyceros melampus</i>)</p>	<p>Africam Safari Park; Binder Park Zoo; Toledo Zoo</p>
	<p>Klipspringer (<i>Oreotragus oreotragus</i>)</p>	<p>Jackson Zoo</p>
	<p>Kudu (<i>Tragelaphus sp.</i>)</p>	<p>Montgomery Zoo¹; Oakland Zoo</p>
	<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>Binder Park Zoo; Columbus Zoo; Fossil Rim Wildlife Center; Indianapolis Zoo; North Carolina Zoo; Toledo Zoo; Zoo Miami</p>
	<p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p>	<p>The Maryland Zoo; White Oak Conservation Center</p>
	<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Memphis Zoo¹; North Carolina Zoo; White Oak Conservation Center</p>
	<p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p>	<p>Fossil Rim Wildlife Center</p>
	<p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p>	<p>North Carolina Zoo*</p>
	<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Dallas Zoo; National Zoo; San Diego Zoo Safari Park¹; White Oak Conservation Center¹</p>
	<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>North Carolina Zoo*</p>
	<p>Sitatunga (<i>Tragelaphus spekii</i>)</p>	<p>North Carolina Zoo</p>
	<p>Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Jackson Zoo; Pittsburgh Zoo</p>
	<p>Warthog, Common (<i>Phacochoerus africanus</i>)</p>	<p>Toledo Zoo</p>
	<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Africam Safari Park; Binder Park Zoo; North Carolina Zoo</p>

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<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Africam Safari Park; Columbus Zoo; Fort Wayne Children's Zoo*; Toledo Zoo Binder Park Zoo*; Columbus Zoo*; Fort Wayne Children's Zoo*; Indianapolis Zoo*; Pittsburgh Zoo*; Toledo Zoo* Fossil Rim Wildlife Center*</p>
<p>Gazelle, Cuvier's (<i>Gazella cuvieri</i>)</p>	<p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Soemmerring's (<i>Gazella soemmerringii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Warthog, Common (<i>Phacochoerus africanus</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Roger Williams Park Zoo Living Desert¹ San Diego Zoo²</p> <p>The Living Desert* Saint Louis Zoo Saint Louis Zoo; San Diego Zoo² San Diego Zoo^{2*}</p>
<p>Gazelle, Dorca's (<i>Gazella dorcas</i>)</p>	<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p>	<p>Sacramento Zoo Sacramento Zoo</p>
<p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Barasingha, Indian (<i>Rucervus duvaucelii</i>) Bharal (<i>Pseudois nayaur</i>) Blackbuck (<i>Antilope cervicapra</i>) Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-lipped (<i>Cervus albirostris</i>) Elk, American (<i>Cervus canadensis</i>) Gaur (<i>Bos gaurus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Dorca's (<i>Gazella dorcas</i>) Gazelle, Soemmerring's (<i>Gazella soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Lechwe (<i>Kobus leche</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>) Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p>	<p>Detroit Zoo^{1*} San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* Detroit Zoo^{1*}; White Oak Conservation Center White Oak Conservation Center* Detroit Zoo^{1*} San Diego Zoo Safari Park* Detroit Zoo^{1*} San Diego Zoo Safari Park* San Diego Zoo Safari Park* Detroit Zoo^{1*} San Diego Zoo Safari Park* San Diego Zoo Safari Park* Sacramento Zoo Sacramento Zoo San Diego Zoo Safari Park^{1*}</p> <p>San Diego Zoo Safari Park^{1*} White Oak Conservation Center* San Diego Zoo Safari Park* Living Desert^{1*}; San Diego Zoo Safari Park^{1*} San Diego Zoo Safari Park* San Diego Zoo Safari Park*</p>

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<p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p>	<p>Rusa, Javan (<i>Rusa timorensis</i>) Saiga (<i>Saiga tatarica</i>) Sheep, Wild (<i>Ovis orientalis</i>) Tur (<i>Capra cylindricornis</i>)</p>	<p>San Diego Zoo Safari Park* San Diego Zoo Safari Park^{1*} San Diego Zoo Safari Park* San Diego Zoo Safari Park^{1*}</p>
<p>Gazelle, Grant's (<i>Nanger granti</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>) Hog, Red River (<i>Potamochoerus porcus</i>) Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p>	<p>Safari West Safari West Busch Gardens Memphis Zoo; Safari West</p> <p>Dickerson Park^{1*}; Safari West San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park Disney's Animal Kingdom² Virginia Zoo</p> <p>Oklahoma City Zoo</p> <p>North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>North Carolina Zoo Birmingham Zoo^{1*}; Disney's Animal Kingdom²; Minnesota Zoo*; Safari West*; San Diego Zoo Safari Park*; Virginia Zoo*; Woodland Park Zoo*; Zoo Miami*</p> <p>North Carolina Zoo</p> <p>Disney's Animal Kingdom² North Carolina Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>Busch Gardens; Dickerson Park¹; North Carolina Zoo; Riverbanks Zoo¹; Safari West North Carolina Zoo*</p>

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<p>Gazelle, Grant's (<i>Nanger granti</i>)</p>	<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>) Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom²; Safari West</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Woodland Park Zoo*</p> <p>San Diego Zoo Safari Park*</p> <p>Busch Gardens*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>North Carolina Zoo</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom²; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Busch Gardens; Dickerson Park¹; Minnesota Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Minnesota Zoo</p> <p>Busch Gardens*; Tulsa Zoo*; Woodland Park Zoo; Zoo Miami*</p>
<p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p>	<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>) Kob (<i>Kobus kob</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>

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<p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p>	<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p>
<p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Cuvier's (<i>Gazella cuvier</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Goat, Domestic (<i>Capra aegagrus hircus</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park</p> <p>Dallas Zoo; San Diego Zoo Safari Park*</p> <p>Montgomery Zoo¹</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park¹</p> <p>Dallas Zoo; San Diego Zoo Safari Park*</p> <p>White Oak Conservation Center</p> <p>Columbus Zoo; Dallas Zoo; The Living Desert; Montgomery Zoo¹; San Diego Zoo Safari Park¹; White Oak Conservation Center¹</p> <p>Living Desert^{1*}</p> <p>Columbus Zoo</p> <p>Montgomery Zoo¹; San Diego Zoo Safari Park</p> <p>Columbus Zoo*; San Diego Zoo Safari Park*</p> <p>Dallas Zoo*</p> <p>St. Catherine's Wildlife¹</p> <p>Columbus Zoo; Montgomery Zoo¹</p> <p>Bronx Zoo</p> <p>Dallas Zoo; Detroit Zoo^{1*}; San Diego Zoo Safari Park¹; White Oak Conservation Center¹</p> <p>San Diego Zoo Safari Park*</p> <p>Sedgwick County Zoo</p> <p>San Diego Zoo Safari Park</p> <p>Columbus Zoo</p>

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<p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>San Diego Zoo Safari Park* Cleveland Metroparks Zoo*; Columbus Zoo*; Dallas Zoo; Montgomery Zoo^{1*}</p>
<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>) Camel, Dromedary (<i>Camelus dromedarius</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Cuvier's (<i>Gazella cuvier</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>) Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hartebeest (<i>Alcelaphus buselaphus</i>) Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>) Lechwe (<i>Kobus leche</i>) Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>) Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>) Warthog, Common (<i>Phacochoerus africanus</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quaggai</i>)</p>	<p>San Diego Zoo Safari Park¹ Africam Safari Park Africam Safari Park Africam Safari Park; San Diego Zoo Safari Park¹ San Diego Zoo² San Diego Zoo Safari Park^{1*} Oklahoma City Zoo Saint Louis Zoo San Diego Zoo Safari Park¹ San Diego Zoo Safari Park¹ Saint Louis Zoo Saint Louis Zoo*; San Diego Zoo* San Diego Zoo Safari Park^{1*} Africam Safari Park; Caldwell Zoo Caldwell Zoo; San Diego Zoo Safari Park¹ Saint Louis Zoo; Saint Louis Zoo San Diego Zoo Safari Park¹ Africam Safari Park; San Diego Zoo Safari Park¹ San Diego Zoo Safari Park¹ Africam Safari Park; San Diego Zoo Safari Park¹ Caldwell Zoo Caldwell Zoo; San Diego Zoo² San Diego Zoo Safari Park¹ Africam Safari Park; Caldwell Zoo; San Diego Zoo Safari Park¹ Caldwell Zoo San Diego Zoo^{2*}</p>
<p>Gazelle, Speke's (<i>Gazella spekei</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Banteng (<i>Bos javanicus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Fresno Chaffee Zoo Saint Louis Zoo Saint Louis Zoo</p> <p>Oregon Zoo Fresno Chaffee Zoo Fresno Chaffee Zoo; Fresno Chaffee Zoo Indianapolis Zoo; Saint Louis Zoo</p>

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<p>Gazelle, Speke's (<i>Gazella spekei</i>)</p>	<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>) Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>) Steenbok (<i>Raphicerus campestris</i>) Suni (<i>Neotragus moschatus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Saint Louis Zoo</p> <p>Milwaukee County Zoo Oregon Zoo; Saint Louis Zoo Fresno Chaffee Zoo*; Fresno Chaffee Zoo*; Indianapolis Zoo*; Oregon Zoo* Fresno Chaffee Zoo; Milwaukee County Zoo Fresno Chaffee Zoo Saint Louis Zoo; Saint Louis Zoo; Saint Louis Zoo; San Diego Zoo Saint Louis Zoo Fresno Chaffee Zoo*; Phoenix Zoo*; Reid Park Zoo* Fresno Chaffee Zoo Saint Louis Zoo Saint Louis Zoo Fresno Chaffee Zoo</p> <p>Pueblo Zoo Oregon Zoo</p>
<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p>	<p>Disney's Animal Kingdom; San Diego Zoo Safari Park¹; Wildlife Safari¹</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center¹; Jacksonville Zoo¹; Kansas City Zoo; Kansas City Zoo Fossil Rim Wildlife Center¹ Albuquerque Biological Park; Disney's Animal Kingdom; North Carolina Zoo; Pittsburgh Zoo Binder Park Zoo; Fossil Rim Wildlife Center^{1*}; North Carolina Zoo*; Pittsburgh Zoo* San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park Africam Safari Park Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom; Indianapolis Zoo¹; Phoenix Zoo Kansas City Zoo Dallas Zoo</p>

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<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Africam Safari Park; Audubon Zoo; Dallas Zoo; Disney's Animal Kingdom; Kansas City Zoo; Phoenix Zoo; San Diego Zoo Safari Park¹; Wildlife Safari¹; Zoo de Granby</p>
	<p>Elephant, African Bush (<i>Loxodonta africana</i>)</p>	<p>Kansas City Zoo</p>
	<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Africam Safari Park; Columbus Zoo; Fort Wayne Children's Zoo; Indianapolis Zoo; North Carolina Zoo; Pittsburgh Zoo</p>
	<p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p>	<p>San Diego Zoo Safari Park^{1*}</p>
	<p>Gazelle, Grant's (<i>Nanger granti</i>)</p>	<p>North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p>
	<p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Columbus Zoo; San Diego Zoo Safari Park¹</p>
	<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p>	<p>San Diego Zoo Safari Park¹</p>
	<p>Gazelle, Speke's (<i>Gazella spekei</i>)</p>	<p>Milwaukee County Zoo</p>
	<p>Gemsbok (<i>Oryx gazella</i>)</p>	<p>North Carolina Zoo; Wildlife Safari¹</p>
	<p>Gerenuk (<i>Litocranius walleri</i>)</p>	<p>Albuquerque Biological Park; Dallas Zoo; Peoria Zoo*; Phoenix Zoo</p>
	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Africam Safari Park*; Binder Park Zoo*; Baton Rouge Zoo*; Brevard Zoo*; Cleveland Metropark Zoo*; Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Baton Rouge Zoo^{1*}; Indianapolis Zoo*; Kansas City Zoo*; Kansas City Zoo*; Knoxville Zoo*; Peoria Zoo*; Phoenix Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Toledo Zoo*; Zoo de Granby*; Zoo Atlanta^{1*}</p>
	<p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p>	<p>North Carolina Zoo</p>
	<p>Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)</p>	<p>San Diego Zoo Safari Park¹</p>

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<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom Africam Safari Park; Binder Park Zoo; Brevard Zoo; Cincinnati Zoo and Botanical Garden; Dallas Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; Milwaukee County Zoo; North Carolina Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Zoo Atlanta¹ San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Binder Park Zoo; Columbus Zoo; Dallas Zoo; Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; Knoxville Zoo; North Carolina Zoo; Toledo Zoo; Toronto Zoo Bronx Zoo; Cincinnati Zoo and Botanical Garden; Dallas Zoo North Carolina Zoo* Kansas City Zoo; Kansas City Zoo; North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park Disney's Animal Kingdom; North Carolina Zoo Disney's Animal Kingdom San Diego Zoo Safari Park¹ Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Fossil Rim Wildlife Center¹; San Diego Zoo Safari Park* North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
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<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>) Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Mesker Park Zoo; North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Utah's Hogle Zoo¹</p> <p>North Carolina Zoo; Utah's Hogle Zoo¹</p> <p>Disney's Animal Kingdom</p> <p>San Antonio Zoo¹; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Binder Park Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom; Knoxville Zoo; North Carolina Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Utah's Hogle Zoo¹; Wildlife Safari¹</p> <p>Africam Safari Park; Audubon Zoo; Columbus Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Toledo Zoo; Wildlife Safari¹</p> <p>Kansas City Zoo; San Antonio Zoo¹; Zoo Atlanta¹</p> <p>Disney's Animal Kingdom* Audubon Zoo*; Binder Park Zoo*; Columbus Zoo*; Disney's Animal Kingdom*; Fort Wayne Children's Zoo*; Kansas City Zoo*; Kansas City Zoo*; Pittsburgh Zoo*; Toledo Zoo*; Zoo de Granby*</p>
<p>Gemsbok (<i>Oryx gazella</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Ass, African Wild (<i>Equus africanus</i>) Blackbuck (<i>Antelope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p>	<p>Dallas Zoo; Fossil Rim Wildlife Center; Wildlife Safari</p> <p>Fossil Rim Wildlife Center; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari¹</p> <p>Dallas Zoo*</p> <p>Fossil Rim Wildlife Center¹</p> <p>Montgomery Zoo¹; Wildlife Safari</p>

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Gemsbok (<i>Oryx gazella</i>)	Bontebok (<i>Damaliscus pygargus</i>)	Baton Rouge Zoo ^{1*} ; Nashville Zoo at Grassmere; North Carolina Zoo*; San Diego Zoo Safari Park*
	Buffalo, Cape (<i>Syncerus caffer</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park
	Cattle, Ankole (Watusi) (<i>Bos taurus</i>)	Lion Country Safari; Wildlife Safari
	Deer, Axis (<i>Axis axis</i>)	Fossil Rim Wildlife Center
	Deer, Fallow (<i>Dama dama</i>)	Fossil Rim Wildlife Center
	Deer, White-tailed (<i>Odocoileus virginianus</i>)	Fossil Rim Wildlife Center
	Eland, Common (<i>Taurotragus oryx</i>)	Baton Rouge Zoo ¹ ; Lion Country Safari; Nashville Zoo at Grassmere; Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Wildlife Safari
	Gazelle, Addra (Dama) (<i>Nanger dama</i>)	Dallas Zoo; Montgomery Zoo ¹ ; Riverbanks Zoo ¹
	Gazelle, Grant's (<i>Nanger granti</i>)	North Carolina Zoo
	Gazelle, Slender-horned (<i>Gazella leptoceros</i>)	Montgomery Zoo ¹ ; San Diego Zoo Safari Park
	Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)	San Diego Zoo Safari Park ¹
	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	North Carolina Zoo; Wildlife Safari ¹
	Giraffe (<i>Giraffa camelopardalis</i>)	Minnesota Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Wildlife Safari
	Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)	North Carolina Zoo; San Diego Zoo Safari Park ^{1*}
	Impala (<i>Aepyceros melampus</i>)	Lion Country Safari; North Carolina Zoo
	Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Montgomery Zoo ¹ ; North Carolina Zoo; San Diego Zoo Safari Park ¹
	Lechwe (<i>Kobus leche</i>)	North Carolina Zoo*; San Diego Zoo Safari Park ¹
	Lechwe, Nile (<i>Kobus megaceros</i>)	Lion Country Safari; North Carolina Zoo
	Nyala (<i>Tragelaphus angasii</i>)	North Carolina Zoo; San Diego Zoo Safari Park ¹
	Oryx, Scimitar-horned (<i>Oryx dammah</i>)	Wildlife Safari
	Rhinoceros, Black (<i>Diceros bicornis</i>)	San Diego Zoo Safari Park*

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<p>Gemsbok (<i>Oryx gazella</i>)</p>	<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Wildlife Safari*</p> <p>North Carolina Zoo Nashville Zoo at Grassmere; North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Fossil Rim Wildlife Center; Lion Country Safari; North Carolina Zoo*; Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari</p> <p>Lion Country Safari; Minnesota Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari</p> <p>Minnesota Zoo*; San Diego Zoo Safari Park*</p> <p>Nashville Zoo at Grassmere*; Safari West; Wildlife Safari</p>
<p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Red (<i>Cervus elaphus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>Fossil Rim Wildlife Center; Saint Louis Zoo</p> <p>Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Knoxville Zoo*</p> <p>Fossil Rim Wildlife Center Living Desert¹; San Diego Zoo Safari Park¹*</p> <p>Bronx Zoo San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park¹ Fossil Rim Wildlife Center*; Knoxville Zoo*</p> <p>Fossil Rim Wildlife Center Knoxville Zoo</p>

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<p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p>	<p>Zebra, Plains (<i>Equus quagga</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Fossil Rim Wildlife Center; Knoxville Zoo*</p> <p>Fossil Rim Wildlife Center*; Fossil Rim Wildlife Center*</p>
<p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p>	<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bison, American (<i>Bison bison</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Elephant, African Bush (<i>Loxodonta africana</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p>	<p>San Diego Zoo Safari Park^{1*}</p> <p>Kansas City Zoo; Kansas City Zoo; The Wilds*</p> <p>The Wilds*</p> <p>North Carolina Zoo*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo; San Diego Zoo Safari Park^{1*}; The Wilds*</p> <p>Kansas City Zoo</p> <p>North Carolina Zoo*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*;</p> <p>Woodland Park Zoo*</p> <p>San Diego Zoo Safari Park^{1*}</p> <p>Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Kansas City Zoo*; Kansas City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Woodland Park Zoo*</p> <p>San Diego Zoo Safari Park^{1*}</p> <p>Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; North Carolina Zoo*</p> <p>San Diego Zoo Safari Park^{1*}</p> <p>Kansas City Zoo; Kansas City Zoo; North Carolina Zoo*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park^{1*}</p>

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<p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p>	<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds* North Carolina Zoo*; San Diego Zoo Safari Park; San Diego Zoo Safari Park* San Diego Zoo Safari Park* North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Kansas City Zoo; San Diego Zoo Safari Park^{1*} Kansas City Zoo*; Kansas City Zoo*; Woodland Park Zoo*</p>
<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)</p> <p>Ass, African Wild (<i>Equus africanus</i>)</p> <p>Banteng (<i>Bos javanicus</i>)</p> <p>Blackbuck (<i>Antelope cervicapra</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p>	<p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; Gulf Breeze Zoo¹; Omaha's Henry Doorly Zoo & Aquarium; San Diego Zoo Safari Park¹; Wildlife Safari Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park* Fossil Rim Wildlife Center¹ Gulf Breeze Zoo¹ Disney's Animal Kingdom White Oak Conservation Center*; The Wilds Fossil Rim Wildlife Center; Gulf Breeze Zoo¹ Wildlife Safari Fossil Rim Wildlife Center*; San Diego Zoo Safari Park; San Diego Zoo Safari Park^{1*}; White Oak Conservation Center Parc Safari; Rolling Hills Wildlife Adventure Brevard Zoo Busch Gardens; Cape May County Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Gulf Breeze Zoo¹; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari Fossil Rim Wildlife Center</p>

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<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Deer, Red (<i>Cervus elaphus</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>) Gazelle, Slender-horned Gazelle, Thompson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>) Giraffe (<i>Giraffa camelopardalis</i>) Guanaco (<i>Lama guanicoe</i>) Impala (<i>Aepyceros melampus</i>) Kob (<i>Kobus kob</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Llama (<i>Lama glama</i>) Nyala (<i>Tragelaphus angasii</i>) Rhinoceros, Black (<i>Diceros bicornis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>San Diego Zoo Safari Park* Fossil Rim Wildlife Center San Francisco Zoo Kansas City Zoo; Gulf Breeze Zoo¹; Wildlife Safari Dallas Zoo; National Zoo; San Diego Zoo Safari Park¹; White Oak Conservation Center¹ San Diego Zoo Safari Park Dallas Zoo; Detroit Zoo¹; San Diego Zoo Safari Park¹; White Oak Conservation Center¹ Fossil Rim Wildlife Center¹ Wildlife Safari Disney's Animal Kingdom*; Disney's Animal Kingdom*; Omaha's Henry Doorly Zoo & Aquarium*; San Francisco Zoo*; Wildlife Safari Fossil Rim Wildlife Center Busch Gardens; Disney's Animal Kingdom; Disney's Animal Kingdom San Diego Zoo Safari Park* Parc Safari; San Francisco Zoo; San Diego Zoo Safari Park* Disney's Animal Kingdom; Kansas City Zoo Lion Country Safari Gulf Breeze Zoo¹ Busch Gardens; Disney's Animal Kingdom San Diego Zoo Safari Park* Fossil Rim Wildlife Center*; Wildlife Safari* Gulf Breeze Zoo¹; San Diego Zoo Safari Park* Disney's Animal Kingdom; Kansas City Zoo Fossil Rim Wildlife Center; Gulf Breeze Zoo¹; Wildlife Safari Disney's Animal Kingdom; Fossil Rim Wildlife Center; Gulf Breeze Zoo¹; Lion Country Safari; San Diego Zoo Safari Park*; Wildlife Safari</p>
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Oryx, Scimitar-horned (<i>Oryx dammah</i>)	Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)	Disney's Animal Kingdom* Memphis Zoo*; San Francisco Zoo*; Wildlife Safari
Saiga (<i>Saiga tatarica</i>)	Barasingha, Indian (<i>Rucervus duvaucelii</i>) Blackbuck (<i>Antilope cervicapra</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Elk (<i>Cervus canadensis</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>) Gaur (<i>Bos gaurus</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Pig, Bornean Bearded (<i>Sus barbatus</i>) Rhinoceros, Greater One-horned (Rhinoceros unicornis) Rusa, Javan (<i>Rusa timorensis</i>) Sheep, Wild (<i>Ovis orientalis</i>) Tur (<i>Capra cylindricornis</i>)	San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park ^{1*} San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park ^{1*} San Diego Zoo Safari Park ^{1*} San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park ^{1*} San Diego Zoo Safari Park ^{1*} San Diego Zoo Safari Park ^{1*}
Forest Woodland		
Antelope, Roan (<i>Hippotragus equinus</i>)	Addax (<i>Addax nasomaculatus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Banteng (<i>Bos javanicus</i>) Blackbuck (<i>Antilope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Deer, Fallow (<i>Dama dama</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Eland, Giant (<i>Taurotragus derbianus</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)	Buffalo Zoo; Fossil Rim Wildlife Center; Safari West B. Bryan Preserve; B. Bryan Preserve White Oak Conservation Center* Fossil Rim Wildlife Center Safari West; White Oak Conservation Center; White Oak Conservation Center Fossil Rim Wildlife Center*; Safari West Disney's Animal Kingdom; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park* Fossil Rim Wildlife Center Fossil Rim Wildlife Center Baton Rouge Zoo San Diego Zoo Safari Park ¹ White Oak Conservation Center Safari West; San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park; San Diego Zoo Safari Park*

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<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p>	<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, East African (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Disney's Animal Kingdom; San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom*; Disney's Animal Kingdom*; Safari West*</p> <p>Fossil Rim Wildlife Center</p> <p>Disney's Animal Kingdom; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom; San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park¹</p> <p>Baton Rouge Zoo; White Oak Conservation Center</p> <p>Disney's Animal Kingdom; Safari West</p> <p>San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center*; San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park*</p> <p>B. Bryan Preserve; White Oak Conservation Center</p> <p>B. Bryan Preserve*; B. Bryan Preserve*; Disney's Animal Kingdom*</p> <p>Disney's Animal Kingdom</p>
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<p>Antelope, Sable (<i>Hippotragus niger</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Bison, American (<i>Bison bison</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Sommering's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Hartebeest (<i>Alcelaphus buselaphus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center</p> <p>B. Bryan Preserve; B. Bryan Preserve</p> <p>Fossil Rim Wildlife Center¹</p> <p>The Wilds</p> <p>San Diego Zoo Safari Park*; Fossil Rim Wildlife Center^{1*}</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center</p> <p>Dallas Zoo; Disney's Animal Kingdom; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; The Wilds</p> <p>Fossil Rim Wildlife Center; Jackson Zoo</p> <p>Busch Gardens</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center¹; Jacksonville Zoo¹; Kansas City Zoo; Kansas City Zoo</p> <p>Fossil Rim Wildlife Center; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom*; Kansas City Zoo*; Kansas City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center</p> <p>San Diego Zoo Safari Park¹</p> <p>Kansas City Zoo; Kansas City Zoo</p> <p>Jackson Zoo</p> <p>Busch Gardens; Kansas City Zoo; Kansas City Zoo; San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park¹</p> <p>Kansas City Zoo; Kansas City Zoo</p> <p>→</p>
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<p>Antelope, Sable (<i>Hippotragus niger</i>)</p>	<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Llama (<i>Lama glama</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Warthog, Common (<i>Phacocoerus africanus</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Lee G. Simmons Conservation Park and Wildlife Safari</p> <p>San Diego Zoo Safari Park¹</p> <p>Lee G. Simmons Conservation Park and Wildlife Safari</p> <p>Fossil Rim Wildlife Center</p> <p>Kansas City Zoo; Kansas City Zoo; The Wilds*</p> <p>Fossil Rim Wildlife Center¹</p> <p>San Diego Zoo Safari Park*</p> <p>Busch Gardens*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds*</p> <p>Disney's Animal Kingdom; Jackson Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo^{2*}</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Busch Gardens; Disney's Animal Kingdom; San Diego Zoo Safari Park</p> <p>Kansas City Zoo</p> <p>B. Bryan Preserve; Cheyenne Mountain Zoo</p> <p>B. Bryan Preserve*; Fossil Rim Wildlife Center*; San Diego Zoo Safari Park*</p> <p>B. Bryan Preserve*; Busch Gardens*; Kansas City Zoo*; Kansas City Zoo*</p>
<p>Blackbuck (<i>Antelope cervicapra</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)</p> <p>Banteng (<i>Bos javanicus</i>)</p> <p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Bharal (<i>Pseudois nayaur</i>)</p>	<p>Fossil Rim Wildlife Center; Gulf Breeze Zoo¹</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center¹</p> <p>Gulf Breeze Zoo¹</p> <p>Disney's Animal Kingdom; Montgomery Zoo¹; San Diego Zoo Safari Park</p> <p>Bronx Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p>

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<p>Blackbuck (<i>Antilope cervicapra</i>)</p>	<p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Eld's (<i>Rucervus eldii</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Hog (<i>Axis porcinus</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Gayal (<i>Bos frontalis</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Goat, Wild (<i>Capra aegagrus</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Llama (<i>Lama glama</i>)</p> <p>Muntjac, Reeve's (<i>Muntiacus reevesi</i>)</p>	<p>Africam Safari Park; Disney's Animal Kingdom; Lion Country Safari</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center*</p> <p>Gulf Breeze Zoo¹</p> <p>Africam Safari Park; Bronx Zoo; Los Angeles Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom; San Diego Zoo Safari Park</p> <p>Fossil Rim Wildlife Center; Wildlife Safari</p> <p>San Diego Zoo Safari Park</p> <p>Africam Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Columbus Zoo¹; Montgomery Zoo¹; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; Wildlife Safari</p> <p>Fossil Rim Wildlife Center</p> <p>Gulf Breeze Zoo¹</p> <p>San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Los Angeles Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>Fossil Rim Wildlife Center</p> <p>San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center¹</p> <p>San Diego Zoo Safari Park¹</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center</p> <p>Gulf Breeze Zoo^{1*}</p> <p>Gulf Breeze Zoo¹</p> <p>Columbus Zoo¹; Montgomery Zoo¹; San Diego Zoo Safari Park¹</p>
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<p>Blackbuck (<i>Antelope cervicapra</i>)</p>	<p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>) Pig, Wild (<i>Sus scrofa</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>) Rusa, Javan (<i>Rusa timorensis</i>) Saiga (Saiga tatarica) Sheep, Wild (<i>Ovis orientalis</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>) Tapir, Malayan (<i>Acrocodia indica</i>) Tur (<i>Capra caucasica</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Yak (<i>Bos grunniens</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Africam Safari Park; Columbus Zoo¹; El Paso Zoo¹; Lion Country Safari; Montgomery Zoo¹; San Diego Zoo Safari Park; Wildlife Safari; San Diego Zoo Safari Park Fossil Rim Wildlife Center; Gulf Breeze Zoo^{1*}</p> <p>San Diego Zoo Safari Park San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Fossil Rim Wildlife Center* San Diego Zoo Safari Park San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Gulf Breeze Zoo¹ Africam Safari Park San Diego Zoo Safari Park¹</p> <p>Fossil Rim Wildlife Center; Gulf Breeze Zoo^{1*}</p> <p>Fossil Rim Wildlife Center; Gulf Breeze Zoo¹ Wildlife Safari Gulf Breeze Zoo^{1*}</p>
<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Banteng (<i>Bos javanicus</i>)</p> <p>Blackbuck (<i>Antelope cervicapra</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Duiker (<i>Cephalophus sp.</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p>	<p>Minnesota Zoo; Safari West; Wildlife Safari</p> <p>Safari West; White Oak Conservation Center; White Oak Conservation Center White Oak Conservation Center*</p> <p>Fossil Rim Wildlife Center Pittsburgh Zoo*; Safari West Disney's Animal Kingdom; Wildlife Safari</p> <p>John Ball Zoo; Zoo Miami¹ Virginia Zoo Caldwell Zoo; Chehaw Wild Animal Park; Cincinnati Zoo¹; Columbus Zoo¹; Gladys Porter Zoo; Houston Zoo →</p>

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<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p>	<p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>)</p>	<p>Los Angeles Zoo; Saint Louis Zoo; Saint Louis Zoo¹; San Diego Zoo Safari Park¹</p> <p>Milwaukee County Zoo¹; Pittsburgh Zoo; Wildlife Safari White Oak Conservation Center Fossil Rim Wildlife Center; Montgomery Zoo¹; North Carolina Zoo; Pittsburgh Zoo; White Oak Conservation Center Memphis Zoo; Safari West San Diego Zoo Safari Park Montgomery Zoo¹ Saint Louis Zoo Albuquerque Biological Park; Disney's Animal Kingdom; North Carolina Zoo; Pittsburgh Zoo Montgomery Zoo¹; Wildlife Safari</p> <p>Albuquerque Biological Park; Columbus Zoo¹</p> <p>Disney's Animal Kingdom*; Great Plains Zoo*; Minnesota Zoo*; North Carolina Zoo*; Safari West*; Wildlife Safari Baton Rouge Zoo; Disney's Animal Kingdom; Los Angeles Zoo; Sacramento Zoo; Zoo New England Caldwell Zoo¹</p> <p>Caldwell Zoo¹; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Milwaukee County Zoo¹; Montgomery Zoo¹; North Carolina Zoo; Safari West Columbus Zoo¹; Saint Louis Zoo San Diego Zoo Safari Park North Carolina Zoo; White Oak Conservation Center</p> <p>Disney's Animal Kingdom; Safari West</p> <p>North Carolina Zoo* Wildlife Safari</p> <p>North Carolina Zoo*; Wildlife Safari*</p> <p>North Carolina Zoo</p> <p>Baton Rouge Zoo</p>
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<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p>	<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Dallas Zoo; Disney's Animal Kingdom; Fort Worth Zoo; Milwaukee County Zoo¹; North Carolina Zoo; Wildlife Safari Minnesota Zoo; Wildlife Safari</p> <p>Great Plains Zoo</p> <p>Cape May County Zoo*; North Carolina Zoo; Pittsburgh Zoo*; Wildlife Safari</p> <p>Disney's Animal Kingdom*</p>
<p>Bushbuck, Kewel (<i>Tragelaphus scriptus</i>)</p>	<p>Deer, Pampas (<i>Ozotoceros bezoarticus</i>)</p> <p>Duiker, Black (<i>Cephalophus niger</i>)</p> <p>Munjac</p>	<p>San Diego Zoo Safari Park¹</p> <p>Los Angeles Zoo</p> <p>San Diego Zoo Safari Park¹</p>
<p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Bison, American (<i>Bison bison</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Camel, Bactrian (<i>Camelus bactrianus</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Elephant, African Bush (<i>Loxodonta africana</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Busch Gardens*; Fresno Chaffee Zoo; Wildlife Safari</p> <p>Dallas Zoo; Disney's Animal Kingdom; San Diego Zoo Safari Park; San Diego Zoo Safari Park; The Wilds</p> <p>Milwaukee County Zoo¹; Pittsburgh Zoo; Wildlife Safari</p> <p>Baton Rouge Zoo^{1*}; Dallas Zoo; Dallas Zoo; Nashville Zoo at Grassmere; San Diego Zoo Safari Park*</p> <p>The Wilds</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Fresno Chaffee Zoo</p> <p>Africam Safari Park; Africam Safari Park</p> <p>Africam Safari Park; Disney's Animal Kingdom; Lion Country Safari; Phoenix Zoo; Wildlife Safari</p> <p>Detroit Zoo</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo</p> <p>Africam Safari Park; Oakland Zoo¹; Okaland Zoo^{1*}</p> <p>Africam Safari Park; San Diego Zoo Safari Park^{1*}</p> <p>Dallas Zoo; San Diego Zoo Safari Park*</p>

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<p>Eland, Common (<i>Taurotragus oryx</i>)</p>	Gazelle, Speke's (<i>Gazella spekei</i>)	Fresno Chaffee Zoo; Fresno Chaffee Zoo
	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Africam Safari Park; Audubon Zoo; Dallas Zoo; Disney's Animal Kingdom; Indianapolis Zoo ¹ ; Kansas City Zoo; Phoenix Zoo; Wildlife Safari ¹ ; Zoo de Granby
	Gemsbok (<i>Oryx gazella</i>)	Lion Country Safari; Nashville Zoo at Grassmere; Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Wildlife Safari
	Gerenuk (<i>Litocranius walleri</i>)	Baton Rouge Zoo ¹ ; Dallas Zoo; Phoenix Zoo
	Giraffe (<i>Giraffa camelopardalis</i>)	Africam Safari Park*; Busch Gardens*; Disney's Animal Kingdom*; Fresno Chaffee Zoo*; Fresno Chaffee Zoo*; Knoxville Zoo*; Oakland Zoo*; Phoenix Zoo*; Riverbanks Zoo ¹ ; San Diego Zoo Safari Park*; The Wilds; Wildlife Safari; Zoo de Granby*
	Goat, Domestic (<i>Capra aegagrus hircus</i>)	Dallas Zoo*
	Impala (<i>Aepyceros melampus</i>)	Africam Safari Park; Africam Safari Park; Busch Gardens*; Chehaw Wild Animal Park; Fresno Chaffee Zoo; Kansas City Zoo; Lion Country Safari
	Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Dallas Zoo; Fresno Chaffee Zoo; Indianapolis Zoo ¹ ; Kansas City Zoo; Knoxville Zoo*; Knoxville Zoo ¹ ; Milwaukee County Zoo; San Diego Zoo Safari Park ¹ *
	Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Detroit Zoo; Kansas City Zoo
	Lechwe, Nile (<i>Kobus megaceros</i>)	Mesker Park Zoo; San Diego Zoo Safari Park ¹
	Nyala (<i>Tragelaphus angasii</i>)	Africam Safari Park; Chehaw Wild Animal Park; Sacramento Zoo; San Diego Zoo Safari Park ¹ *
Oryx, Arabian (<i>Oryx leucoryx</i>)	Knoxville Zoo*	
Oryx, East African (Beisa) (<i>Oryx beisa</i>)	Kansas City Zoo; The Wilds*	

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<p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>) Rhinoceros, Black (<i>Diceros bicornis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Black (White-tailed) (<i>Connochaetes gnou</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Kansas City Zoo; Wildlife Safari San Diego Zoo Safari Park* Fresno Chaffee Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds*; Wildlife Safari*</p> <p>Africam Safari Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; Kansas City Zoo; Nashville Zoo at Grassmere; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Indianapolis Zoo*</p> <p>Africam Safari Park; Disney's Animal Kingdom; Lion Country Safari; Mesker Park Zoo; Milwaukee County Zoo; Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Wildlife Safari San Diego Zoo Safari Park¹*</p> <p>Africam Safari Park; Africam Safari Park; Chehaw Wild Animal Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; Lion Country Safari; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari Busch Gardens*; Dallas Zoo; Sacramento Zoo; The Wilds San Diego Zoo Safari Park* Chehaw Wild Animal Park; Cincinnati Zoo and Botanical Garden*; Dallas Zoo; Kansas City Zoo*; Knoxville Zoo*; Milwaukee County Zoo; Nashville Zoo at Grassmere*; Pittsburgh Zoo*; Safari West; Wildlife Safari; Zoo de Granby*</p>
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<p>Eland, Giant (<i>Taurotragus derbianus</i>)</p>	<p>Antelope, Roan (<i>Hippotragus equinus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>White Oak Conservation Center White Oak Conservation Center</p> <p>White Oak Conservation Center White Oak Conservation Center Houston Zoo White Oak Conservation Center Houston Zoo*</p>
<p>Gerenuk (<i>Litocranius walleri</i>)</p>	<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Dik-dik, Guenther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Albuquerque Biological Park; Columbus Zoo¹ Phoenix Zoo Saint Louis Zoo Phoenix Zoo Columbus Zoo¹; Dallas Zoo; Houston Zoo; Zoo Miami^{1*} Dallas Zoo; Phoenix Zoo</p> <p>Saint Louis Zoo Saint Louis Zoo</p> <p>Oregon Zoo; Saint Louis Zoo Albuquerque Biological Park; Dallas Zoo; Peoria Zoo*; Phoenix Zoo Cameron Park Zoo*; Los Angeles Zoo*; Peoria Zoo*; Phoenix Zoo*; Saint Louis Zoo*; Cameron Park Zoo*; Dallas Zoo Dallas Zoo; Fort Worth Zoo; Los Angeles Zoo¹; Saint Louis Zoo Denver Zoological Gardens; Saint Louis Zoo Oregon Zoo</p>
<p>Impala (<i>Aepyceros melampus</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Ass, African Wild (<i>Equus africanus</i>) Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Busch Gardens; Disney's Animal Kingdom; Fresno Chaffee Zoo Disney's Animal Kingdom; Disney's Animal Kingdom; San Diego Zoo Safari Park¹ Kansas City Zoo; Kansas City Zoo Lion Country Safari Disney's Animal Kingdom* Binder Park Zoo; Dallas Zoo; North Carolina Zoo¹</p>

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Impala (<i>Aepyceros melampus</i>)	Buffalo, Cape (<i>Syncerus caffer</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Buffalo, Water (<i>Bubalus bubalis</i>)	Lion Country Safari
	Camel, Dromedary (<i>Camelus dromedarius</i>)	Africam Safari Park; Africam Safari Park
	Cattle, Ankole (Watusi) (<i>Bos taurus</i>)	Africam Safari Park; Busch Gardens; Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom; Lion Country Safari; Toledo Zoo
	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Kansas City Zoo
	Eland, Common (<i>Taurotragus oryx</i>)	Africam Safari Park; Africam Safari Park; Busch Gardens*; Chehaw Wild Animal Park; Fresno Chaffee Zoo; Kansas City Zoo; Lion Country Safari; San Diego Zoo Safari Park ¹
	Elephant, African Bush (<i>Loxodonta africana</i>)	Dallas Zoo; Kansas City Zoo; Tampa's Lowry Park Zoo
	Gazelle, Addra (Dama) (<i>Nanger dama</i>)	Africam Safari Park; Binder Park Zoo; Toledo Zoo
	Gazelle, Grant's (<i>Nanger granti</i>)	North Carolina Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)	Africam Safari Park; Caldwell Zoo
Gazelle, Speke's (<i>Gazella spekei</i>)	Fresno Chaffee Zoo; Milwaukee County Zoo	
Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Africam Safari Park; Binder Park Zoo; Brevard Zoo; Cincinnati Zoo and Botanical Garden; Dallas Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Jacksonville Zoo ¹ ; Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; Milwaukee County Zoo; North Carolina Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Zoo Atlanta ¹	
Gemsbok (<i>Oryx gazella</i>)	Lion Country Safari; North Carolina Zoo	

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Impala (<i>Aepyceros melampus</i>)	Oryx, East African (Beisa) (<i>Oryx beisa</i>)	Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Oryx, Scimitar-horned (<i>Oryx dammah</i>)	Busch Gardens; Disney's Animal Kingdom; Disney's Animal Kingdom
	Rhinoceros, Black (<i>Diceros bicornis</i>)	San Diego Zoo Safari Park*
	Rhinoceros, White (<i>Ceratotherium simum</i>)	Fresno Chaffee Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Sitatunga (<i>Tragelaphus spekii</i>)	North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Springbok (<i>Antidorcas marsupialis</i>)	Africam Safari Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; North Carolina Zoo
	Steenbok (<i>Raphicerus campestris</i>)	Disney's Animal Kingdom
	Topi (<i>Damaliscus korrigum jimela</i>)	Caldwell Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Warthog, Common (<i>Phacochoerus africanus</i>)	Caldwell Zoo; Toledo Zoo
	Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	Africam Safari Park; Binder Park Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Lion Country Safari; Lion Country Safari; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)	Africam Safari Park; Africam Safari Park; Caldwell Zoo; Chehaw Wild Animal Park; Disney's Animal Kingdom; Disney's Animal Kingdom; Fresno Chaffee Zoo; Lion Country Safari; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Toledo Zoo	
Zebra (<i>Equus sp.</i>)	Kansas City Zoo	
Zebra, Grevy's (<i>Equus grevyi</i>)	Busch Gardens; Caldwell Zoo	
Zebra, Mountain (<i>Equus zebra</i>)	Disney's Animal Kingdom*	
Zebra, Plains (<i>Equus quagga</i>)	Binder Park Zoo*; Chehaw Wild Animal Park; Dallas Zoo →	

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Impala (<i>Aepyceros melampus</i>)	Zebra, Plains (<i>Equus quagga</i>)	Disney's Animal Kingdom; Kansas City Zoo*; Kansas City Zoo*; Kansas City Zoo*; Toledo Zoo*
Kudu (<i>Tragelaphus sp.</i>)	Gazelle, Addra (Dama) (<i>Nanger dama</i>)	Oakland Zoo
Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Blackbuck (<i>Antilope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Elephant, African Bush (<i>Loxodonta africana</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Grant's (<i>Nanger granti</i>)	Fossil Rim Wildlife Center ¹ ; Fresno Chaffee Zoo; Safari West Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park* Busch Gardens; Fossil Rim Wildlife Center ¹ ; Kansas City Zoo; Kansas City Zoo Lion Country Safari Fossil Rim Wildlife Center Disney's Animal Kingdom; Fossil Rim Wildlife Center; Milwaukee County Zoo ¹ ; Montgomery Zoo ¹ ; North Carolina Zoo; Safari West Binder Park Zoo; Dallas Zoo; Dickerson Park Zoo ^{1*} ; Jacksonville Zoo and Gardens; Mesker Park Zoo ^{1*} ; North Carolina Zoo*; Safari West; Detroit Zoo ^{1*} ; San Diego Zoo Safari Park ^{1*} Lion Country Safari; Parc Safari Mesker Park Zoo ¹ ; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Toledo Zoo Kansas City Zoo Dallas Zoo; Los Angeles Zoo ¹ ; San Francisco Zoo Dallas Zoo; Fresno Chaffee Zoo; Indianapolis Zoo ¹ ; Kansas City Zoo; Knoxville Zoo*; Milwaukee County Zoo Dallas Zoo; Kansas City Zoo Binder Park Zoo; Columbus Zoo; Fossil Rim Wildlife Center; Indianapolis Zoo; Montgomery Zoo ¹ ; North Carolina Zoo; Toledo Zoo; Zoo Miami Busch Gardens; Dickerson Park Zoo ¹ ; North Carolina Zoo; Riverbanks Zoo ¹ ; Safari West

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Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Gazelle, Slender-horned (<i>Gazella leptoceros</i>)	Columbus Zoo; Montgomery Zoo ¹
	Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)	Caldwell Zoo; San Diego Zoo Safari Park ¹
	Gazelle, Speke's (<i>Gazella spekei</i>)	Fresno Chaffee Zoo
	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Binder Park Zoo; Columbus Zoo; Dallas Zoo; Jacksonville Zoo ¹ ; Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; Knoxville Zoo; North Carolina Zoo; Toledo Zoo; Toronto Zoo
	Gemsbok (<i>Oryx gazella</i>)	Fossil Rim Wildlife Center ¹ ; Montgomery Zoo ¹ ; North Carolina Zoo; San Diego Zoo Safari Park ¹
	Gerenuk (<i>Litocranius walleri</i>)	Cameron Park Zoo*; Dallas Zoo
	Giraffe (<i>Giraffa camelopardalis</i>)	Binder Park Zoo*; Cameron Park Zoo*; Columbus Zoo*; Dallas Zoo*; Fresno Chaffee Zoo*; Jacksonville Zoo and Gardens*; Kansas City Zoo*; Kansas City Zoo*; Kansas City Zoo; Knoxville Zoo*; Knoxville Zoo*; Lion Country Safari; The Living Desert*; Safari West*; San Diego Zoo Safari Park ¹ *; San Francisco Zoo*; Toledo Zoo*; Toledo Zoo
	Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)	North Carolina Zoo
	Hog, Red River (<i>Potamochoerus porcus</i>)	San Diego Zoo Safari Park*
Impala (<i>Aepyceros melampus</i>)	Binder Park Zoo; Caldwell Zoo; Dallas Zoo; Dickerson Park Zoo; Fresno Chaffee Zoo; Jacksonville Zoo ¹ ; Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; Lion Country Safari; North Carolina Zoo; San Antonio Zoo ¹ ; Toledo Zoo; Toledo Zoo ¹ ; Toronto Zoo	
Klipspringer (<i>Oreotragus oreotragus</i>)	Jacksonville Zoo and Gardens	
Kob (<i>Kobus kob</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*	
Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Dallas Zoo	

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<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Los Angeles Zoo*; North Carolina Zoo</p> <p>Dallas Zoo; Kansas City Zoo; Kansas City Zoo; Lion Country Safari; North Carolina Zoo</p> <p>Lion Country Safari; North Carolina Zoo; Houston Zoological Gardens¹; Reid Park Zoo¹; Safari West; San Diego Zoo Safari Park¹</p> <p>Knoxville Zoo</p> <p>Kansas City Zoo; Kansas City Zoo; Kansas City Zoo; North Carolina Zoo*</p> <p>Parc Safari; San Francisco Zoo; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Busch Gardens*; Fresno Chaffee Zoo*; Houston Zoo*; Jacksonville Zoo and Gardens*; North Carolina Zoo*</p> <p>North Carolina Zoo; San Diego Zoo Safari Park*</p> <p>Cameron Park Zoo; Fresno Chaffee Zoo; Los Angeles Zoo; Mesker Park Zoo; North Carolina Zoo; San Diego Zoo Safari Park</p> <p>Caldwell Zoo</p> <p>Caldwell Zoo; Toledo Zoo</p> <p>Binder Park Zoo; Fossil Rim Wildlife Center¹; Knoxville Zoo; Lion Country Safari; Milwaukee County Zoo; North Carolina Zoo*; Oklahoma City Zoo; San Diego Zoo Safari Park¹</p> <p>Busch Gardens; Caldwell Zoo; Columbus Zoo; Fresno Chaffee Zoo; Indianapolis Zoo; San Diego Zoo Safari Park*; Toledo Zoo</p> <p>Kansas City Zoo</p> <p>Caldwell Zoo; Detroit Zoo¹</p> <p>Binder Park Zoo*; Busch Gardens*; Columbus Zoo*; Dallas Zoo; Indianapolis Zoo* →</p>
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Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Zebra, Plains (<i>Equus quagga</i>)	Kansas City Zoo*; Kansas City Zoo*; Knoxville Zoo*; Milwaukee County Zoo; San Francisco Zoo*; Toledo Zoo*
Kudu, Lesser (<i>Tragelaphus imberbis</i>)	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Ass, African Wild (<i>Equus africanus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Duiker, Bay (<i>Cephalophus dorsalis</i>)</p> <p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Cuvier's (<i>Gazella cuvieri</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Suni (<i>Neotragus moschatus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Blank Park Zoo; Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>Saint Louis Zoo</p> <p>Disney's Animal Kingdom</p> <p>Detroit Zoo</p> <p>San Diego Zoo Safari Park¹</p> <p>Columbus Zoo¹ ; Los Angeles Zoo</p> <p>Detroit Zoo; Kansas City Zoo</p> <p>White Oak Conservation Center</p> <p>The Maryland Zoo; White Oak Conservation Center</p> <p>Saint Louis Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo; Saint Louis Zoo; San Diego Zoo</p> <p>Bronx Zoo; Cincinnati Zoo and Botanical Garden; Dallas Zoo</p> <p>Columbus Zoo¹; Dallas Zoo; Fort Worth Zoo; Saint Louis Zoo</p> <p>Blank Park Zoo*; Disney's Animal Kingdom*; Los Angeles Zoo*; Saint Louis Zoo*; San Diego Zoo Safari Park¹*; Zoo Atlanta*</p> <p>Cincinnati Zoo and Botanical Garden; Disney's Animal Kingdom</p> <p>Dallas Zoo</p> <p>White Oak Conservation Center</p> <p>Disney's Animal Kingdom; Kansas City Zoo</p> <p>Disney's Animal Kingdom; Kansas City Zoo</p> <p>Los Angeles Zoo*</p> <p>Saint Louis Zoo</p> <p>Detroit Zoo</p> <p>Como Zoo*; Como Zoo*; Kansas City Zoo*; Zoo Atlanta</p>

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<p>Nyala (<i>Tragelaphus angasii</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>)</p>	<p>Safari West Disney's Animal Kingdom; Safari West</p>
	<p>Antelope, Sable (<i>Hippotragus niger</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>San Diego Zoo Safari Park¹ Disney's Animal Kingdom; Safari West North Carolina Zoo*; Safari West; San Diego Zoo Safari Park¹</p>
	<p>Camel, Dromedary (<i>Camelus dromedarius</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p>	<p>Africam Safari Park Africam Safari Park; Busch Gardens; Disney's Animal Kingdom; Disney's Animal Kingdom</p>
	<p>Duiker, Bay (<i>Cephalophus dorsalis</i>)</p>	<p>San Diego Zoo Safari Park¹; Tampa's Lowry Park Zoo</p>
	<p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Bronx Zoo; Saint Louis Zoo Africam Safari Park; Chehaw Wild Animal Park; Sacramento Zoo; San Diego Zoo Safari Park¹</p>
	<p>Gazelle, Grant's (<i>Nanger granti</i>)</p>	<p>Disney's Animal Kingdom²; Safari West</p>
	<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Africam Safari Park; San Diego Zoo Safari Park¹ Saint Louis Zoo Disney's Animal Kingdom; North Carolina Zoo</p>
	<p>Gemsbok (<i>Oryx gazella</i>)</p>	<p>North Carolina Zoo; San Diego Zoo Safari Park¹</p>
	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Disney's Animal Kingdom*; Lion Country Safari; Safari West*; San Diego Zoo Safari Park¹*; Utah's Hogle Zoo*</p>
	<p>Hartebeest (<i>Alcelaphus buselaphus</i>)</p>	<p>North Carolina Zoo¹, San Diego Zoo Safari Park¹</p>
	<p>Hog, Red River (<i>Potamochoerus porcus</i>) Impala (<i>Aepyceros melampus</i>)</p>	<p>Disney's Animal Kingdom Africam Safari Park; Baton Rouge Zoo¹; Busch Gardens; Chehaw Wild Animal Park; Disney's Animal Kingdom; Disney's Animal Kingdom</p>
	<p>Klipspringer (<i>Oreotragus oreotragus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>San Diego Zoo Safari Park¹ Houston Zoo¹; Lion Country Safari; North Carolina Zoo; Reid Park Zoo¹; Safari West</p>
	<p>Lechwe (<i>Kobus leche</i>)</p>	<p>San Diego Zoo Safari Park¹</p>

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<p>Nyala (<i>Tragelaphus angasii</i>)</p>	<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Baton Rouge Zoo; North Carolina Zoo</p> <p>Disney's Animal Kingdom</p> <p>Busch Gardens; Disney's Animal Kingdom</p> <p>North Carolina Zoo¹</p> <p>Africam Safari Park; North Carolina Zoo¹; San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; North Carolina Zoo*</p> <p>Africam Safari Park; Chehaw Wild Animal Park; Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom*; Utah's Hogle Zoo*</p> <p>Baton Rouge Zoo; Chehaw Wild Animal Park; North Carolina Zoo^{1*}</p>
<p>Nilgai (<i>Boselaphus tragocamelus</i>)</p>	<p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Hog (<i>Axis porcinus</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Lion Country Safari; Columbus Zoo¹; El Paso Zoo¹; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari</p> <p>Africam Safari Park; Lion Country Safari; Lion Country Safari</p> <p>Africam Safari Park; Mesker Park Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Wildlife Safari</p> <p>Bronx Zoo</p> <p>Africam Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Bronx Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Bronx Zoo*; Columbus Zoo¹; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; Wildlife Safari</p>

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<p>Nilgai (<i>Boselaphus tragocamelus</i>)</p>	<p>Elk, American (<i>Cervus canadensis</i>) Gaur (<i>Bos gaurus</i>)</p> <p>Gayal (<i>Bos frontalis</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>) Goat, Wild (<i>Capra aegagrus</i>) Kulan (<i>Equus hemionus kulan</i>) Muntjac (<i>Muntiacus sp.</i>)</p> <p>Muntjac, Indian (<i>Muntiacus muntjak</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Pig, Bornean Bearded (<i>Sus barbatus</i>) Pig, Wild (<i>Sus scrofa</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Rusa, Javan (<i>Rusa timorensis</i>) Saiga (<i>Saiga tatarica</i>) Sheep, Wild (<i>Ovis orientalis</i>)</p> <p>Sheep, Mouflon (<i>Ovis aries</i>) Tapir, Malayan (<i>Acrocodia indica</i>) Tur (<i>Capra cylindricornis</i>) Yak (<i>Bos grunniens</i>)</p>	<p>San Diego Zoo Safari Park* Africam Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park San Diego Zoo Safari Park San Diego Zoo Safari Park¹ Lion Country Safari San Diego Zoo Safari Park¹; Tampa's Lowry Park Zoo Bronx Zoo Columbus Zoo¹; Mesker Park Zoo San Diego Zoo Safari Park San Diego Zoo Safari Park¹ San Diego Zoo Safari Park; San Diego Zoo Safari Park; Tampa's Lowry Park Zoo San Diego Zoo Safari Park San Diego Zoo Safari Park¹ San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park¹ Africam Safari Park San Diego Zoo Safari Park¹ Wildlife Safari</p>
<p>Sitatunga (<i>Tragelaphus spekii</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Blackbuck (<i>Antilope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Duiker, Blue (<i>Philantomba monticola</i>) Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Gulf Breeze Zoo¹ San Diego Zoo Safari Park* Gulf Breeze Zoo¹; Gulf Breeze Zoo¹; North Carolina Zoo</p> <p>North Carolina Zoo^{1*} San Diego Zoo Safari Park; San Diego Zoo Safari Park* Gulf Breeze Zoo¹; San Diego Zoo Safari Park* Virginia Zoo¹ Gulf Breeze Zoo¹; San Diego Zoo Safari Park¹ North Carolina Zoo North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park¹</p>

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Sitatunga (<i>Tragelaphus spekii</i>)	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Jacksonville Zoo ¹ ; Mesker Park Zoo; North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Utah's Hogle Zoo ¹
	Gemsbok (<i>Oryx gazella</i>)	North Carolina Zoo
	Giraffe (<i>Giraffa camelopardalis</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Hartebeest, Cape (Red) (<i>Alcelaphus buselaphus caama</i>)	North Carolina Zoo ¹
	Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)	North Carolina Zoo
	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	San Diego Zoo Safari Park ¹
	Hog, Red River (<i>Potamochoerus porcus</i>)	National Zoo; San Diego Zoo Safari Park*
	Impala (<i>Aepyceros melampus</i>)	North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Kob (<i>Kobus kob</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	North Carolina Zoo; San Diego Zoo Safari Park*
	Llama (<i>Lama glama</i>)	Gulf Breeze Zoo ¹
	Lechwe (<i>Kobus leche</i>)	Gulf Breeze Zoo ¹ ; North Carolina Zoo*; San Diego Zoo Safari Park ¹
	Lechwe, Nile (<i>Kobus megaceros</i>)	North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Nyala (<i>Tragelaphus angasii</i>)	North Carolina Zoo ¹
	Oryx, East African (Beisa) (<i>Oryx beisa</i>)	North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Oryx, Scimitar-horned (<i>Oryx dammah</i>)	Gulf Breeze Zoo ¹ ; San Diego Zoo Safari Park*
	Rhinoceros, Black (<i>Diceros bicornis</i>)	San Diego Zoo Safari Park*
Rhinoceros, White (<i>Ceratotherium simum</i>)	Jacksonville Zoo ^{1*} ; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*	
Springbok (<i>Antidorcas marsupialis</i>)	North Carolina Zoo; San Diego Zoo Safari Park*; Utah's Hogle Zoo ¹	
Topi (<i>Damaliscus korrigum jimela</i>)	San Diego Zoo Safari Park*	
Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	Gulf Breeze Zoo ¹ ; North Carolina Zoo* →	

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<p>Sitatunga (<i>Tragelaphus spekii</i>)</p>	<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Utah's Hogle Zoo¹</p> <p>Gulf Breeze Zoo¹; Jacksonville Zoo¹; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Brookfield Zoo¹; Gulf Breeze Zoo¹; San Diego Zoo Safari Park¹</p>
<p>Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Ass, African Wild (<i>Equus africanus</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p>	<p>Disney's Animal Kingdom; Fresno Chaffee Zoo; Lee Richardson Zoo¹</p> <p>San Diego Zoo Safari Park* Disney's Animal Kingdom; Jackson Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom* Denver Zoological Gardens*; Nashville Zoo at Grassmere; North Carolina Zoo^{1*}; San Diego Zoo Safari Park^{1*}</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Africam Safari Park Africam Safari Park; Disney's Animal Kingdom; Disney's Animal Kingdom; San Diego Zoo Safari Park*</p> <p>Los Angeles Zoo</p> <p>Africam Safari Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; Kansas City Zoo; Nashville Zoo at Grassmere; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Jackson Zoo; Pittsburgh Zoo North Carolina Zoo Africam Safari Park</p> <p>Fresno Chaffee Zoo North Carolina Zoo; Utah's Hogle Zoo¹</p> <p>Nashville Zoo at Grassmere; North Carolina Zoo; San Diego Zoo Safari Park →</p>

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Springbok (<i>Antidorcas marsupialis</i>)	<p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hartebeest (<i>Alcelaphus buselaphus</i>)</p> <p>Hartebeest, Cape (Red) (<i>Alcelaphus buselaphus caama</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Cameron Park Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Fresno Chaffee Zoo*; Los Angeles Zoo¹; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Woodland Park Zoo¹*</p> <p>San Diego Zoo Safari Park¹*</p> <p>North Carolina Zoo¹</p> <p>North Carolina Zoo</p> <p>Africam Safari Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; North Carolina Zoo Jackson Zoo</p> <p>Cameron Park Zoo; Fresno Chaffee Zoo; Los Angeles Zoo; Mesker Park Zoo; North Carolina Zoo; Riverbanks Zoo¹; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom; Kansas City Zoo</p> <p>San Diego Zoo Safari Park*</p> <p>Los Angeles Zoo</p> <p>Los Angeles Zoo*; North Carolina Zoo*; San Diego Zoo Safari Park¹*</p> <p>Santa Fe College Teaching Zoo</p> <p>Africam Safari Park; North Carolina Zoo¹; San Diego Zoo Safari Park¹*</p> <p>Disney's Animal Kingdom; Kansas City Zoo</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Fresno Chaffee Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Tulsa Zoo*</p>
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<p>Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>North Carolina Zoo; San Diego Zoo Safari Park*; Utah's Hogle Zoo¹</p> <p>San Diego Zoo</p> <p>Disney's Animal Kingdom; North Carolina Zoo*; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Utah's Hogle Zoo¹</p> <p>Africam Safari Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Nashville Zoo at Grassmere*; Pittsburgh Zoo*; San Diego Zoo*</p>
Hartebeest		
<p>Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)</p> <p>Banteng (<i>Bos javanicus</i>)</p> <p>Blackbuck (<i>Antelope cervicapra</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Detroit Zoo^{1*}; Disney's Animal Kingdom; Fossil Rim Wildlife Center*; Safari West</p> <p>Fossil Rim Wildlife Center*; Safari West</p> <p>Fossil Rim Wildlife Center^{1*}; San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center</p> <p>White Oak Conservation Center; White Oak Conservation Center</p> <p>Fossil Rim Wildlife Center*</p> <p>Pittsburgh Zoo*; Safari West*</p> <p>San Diego Zoo Safari Park*; White Oak Conservation Center*</p> <p>Mesker Park Zoo^{1*}; San Diego Zoo Safari Park</p> <p>Fossil Rim Wildlife Center^{1*}</p> <p>Fossil Rim Wildlife Center*</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center; San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center*</p> <p>Baton Rouge Zoo^{1*}; Dallas Zoo; Dallas Zoo; Nashville Zoo at Grassmere; San Diego Zoo Safari Park*</p>

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<p>Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Eland, Giant (<i>Taurotragus derbianus</i>) Gazella, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>) Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Goat, Domestic (<i>Capra aegagrus hircus</i>) Guanaco (<i>Lama guanicoe</i>) Hartebeest (<i>Alcelaphus buselaphus</i>) Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>) Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>White Oak Conservation Center Binder Park Zoo; Pittsburgh Zoo*</p> <p>White Oak Conservation Center Dickerson Park^{1*}; North Carolina Zoo^{1*}; Safari West San Diego Zoo Safari Park Dallas Zoo; Detroit Zoo^{1*}; San Diego Zoo Safari Park*</p> <p>Oregon Zoo Binder Park Zoo; Fossil Rim Wildlife Center^{1*}; North Carolina Zoo*; Pittsburgh Zoo* Baton Rouge Zoo^{1*}; Nashville Zoo at Grassmere; North Carolina Zoo*; San Diego Zoo Safari Park*</p> <p>Binder Park Zoo*; Fossil Rim Wildlife Center*; Safari West*; San Diego Zoo Safari Park* Dallas Zoo*</p> <p>Fossil Rim Wildlife Center* North Carolina Zoo^{1*} Binder Park Zoo; Dallas Zoo; North Carolina Zoo^{1*}</p> <p>Binder Park Zoo; Dallas Zoo; Detroit Zoo^{1*}; Dickerson Park^{1*}; Jacksonville Zoo and Gardens; Mesker Park Zoo^{1*}; North Carolina Zoo*; Safari West White Oak Conservation Center*</p> <p>North Carolina Zoo* North Carolina Zoo*; North Carolina Zoo^{1*}; Safari West Fossil Rim Wildlife Center*; San Diego Zoo Safari Park; White Oak Conservation Center Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Jacksonville Zoo and Gardens*; San Diego Zoo Safari Park* North Carolina Zoo^{1*} Denver Zoological Gardens*; Nashville Zoo at Grassmere; North Carolina Zoo^{1*}</p>
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<p>Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Binder Park Zoo; Fossil Rim Wildlife Center*; North Carolina Zoo*; San Diego Zoo Safari Park*</p> <p>Dickerson Park^{1*}; Fossil Rim Wildlife Center*; Fossil Rim Wildlife Center</p> <p>Detroit Zoo^{1*} ; White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center</p> <p>San Diego Zoo Safari Park* Binder Park Zoo*; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Nashville Zoo at Grassmere*; Pittsburgh Zoo*</p>
<p>Hartebeest, Cape (Red) (<i>Alcelaphus buselaphus caama</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>) Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Sommering's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>San Diego Zoo Safari Park¹ North Carolina Zoo^{1*}; San Diego Zoo Safari Park^{1*}</p> <p>San Diego Zoo Safari Park¹ North Carolina Zoo¹</p> <p>San Diego Zoo Safari Park¹ North Carolina Zoo¹</p> <p>North Carolina Zoo¹; San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park¹ North Carolina Zoo¹</p> <p>North Carolina Zoo¹; San Diego Zoo Safari Park¹</p> <p>North Carolina Zoo^{1*}; San Diego Zoo Safari Park¹</p> <p>North Carolina Zoo¹; San Diego Zoo Safari Park¹</p> <p>North Carolina Zoo¹; San Diego Zoo Safari Park¹</p> <p>North Carolina Zoo^{1*}; San Diego Zoo Safari Park¹</p>
<p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p>	<p>Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Impala (<i>Aepyceros melampus</i>) Lechwe (<i>Kobus leche</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Sitatunga (<i>Tragelaphus spekii</i>)</p>	<p>North Carolina Zoo St. Catherine's Wildlife¹</p> <p>North Carolina Zoo North Carolina Zoo* Lion Country Safari* North Carolina Zoo</p>

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<p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p>	<p>Springbok (<i>Antidorcas marsupialis</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>North Carolina Zoo North Carolina Zoo* Lion Country Safari Lion Country Safari</p>
<p>Topi (<i>Damaliscus korrigum jimela</i>)</p>	<p>Antelope, Roan (<i>Hippotragus equinus</i>) Buffalo, Cape (<i>Syncerus caffer</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Soemerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Hippopotimus, Pygmy (<i>Choeropsis liberiensis</i>) Impala (<i>Aepyceros melampus</i>) Kob (<i>Kobus kob</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Oryx, East African (Beisa) (<i>Oryx beisa</i>) Rhinoceros, Black (<i>Diceros bicornis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Sitatunga (<i>Tragelaphus spekii</i>) Warthog, Common (<i>Phacochoerus africanus</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>San Diego Zoo Safari Park¹ San Diego Zoo Safari Park Indianapolis Zoo*; San Diego Zoo Safari Park¹ San Diego Zoo Safari Park; San Diego Zoo Safari Park* San Diego Zoo Safari Park¹ Caldwell Zoo San Antonio Zoo¹; San Diego Zoo Safari Park; San Diego Zoo Safari Park* Brookfield Zoo¹; Columbus Zoo^{1*}; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park¹ Caldwell Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Caldwell Zoo San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park* Caldwell Zoo San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Caldwell Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Caldwell Zoo; San Antonio Zoo¹ Columbus Zoo^{1*}</p>

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<p>Wildebeest, Black (White-tailed) <i>(Connochaetes gnou)</i></p>	Antelope, Sable (<i>Hippotragus niger</i>)	San Diego Zoo Safari Park ¹
	Bontebok (<i>Damaliscus pygargus</i>)	San Diego Zoo Safari Park ^{1*}
	Eland, Common (<i>Taurotragus oryx</i>)	San Diego Zoo Safari Park ¹
	Gazelle, Sommerring's (<i>Nanger soemmerringii</i>)	San Diego Zoo Safari Park ¹
	Gemsbok (<i>Oryx gazella</i>)	San Diego Zoo Safari Park ¹
	Giraffe (<i>Giraffa camelopardalis</i>)	San Diego Zoo Safari Park ¹
	Hartebeest, Red (<i>Alcelaphus caama</i>)	San Diego Zoo Safari Park ¹
	Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	San Diego Zoo Safari Park ¹
	Lechwe (<i>Kobus megaceros</i>)	San Diego Zoo Safari Park ¹
	Nyala (<i>Tragelaphus angasii</i>)	San Diego Zoo Safari Park ¹
	Springbok (<i>Antidorcas marsupialis</i>)	San Diego Zoo Safari Park ¹
Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	San Diego Zoo Safari Park ¹	
<p>Wildebeest, Blue (White-bearded) <i>(Connochaetes taurinus)</i></p>	Addax (<i>Addax nasomaculatus</i>)	Fossil Rim Wildlife Center; Fresno Chaffee Zoo; Gulf Breeze Zoo ^{1*} ; Minnesota Zoo; Wildlife Safari
	Antelope, Roan (<i>Hippotragus equinus</i>)	Disney's Animal Kingdom; Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park [*]
	Antelope, Sable (<i>Hippotragus niger</i>)	Busch Gardens; Disney's Animal Kingdom; San Diego Zoo Safari Park
	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	Fossil Rim Wildlife Center; Gulf Breeze Zoo ^{1*}
	Blackbuck (<i>Antelope cervicapra</i>)	Fossil Rim Wildlife Center; Gulf Breeze Zoo ^{1*}
	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)	Minnesota Zoo; Wildlife Safari
	Bontebok (<i>Damaliscus pygargus</i>)	Dickerson Park Zoo ^{1*} ; Fossil Rim Wildlife Center [*] ; Fossil Rim Wildlife Center
	Buffalo, Cape (<i>Syncerus caffer</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park →

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<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Buffalo, Cape (<i>Syncerus caffer</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p>
	<p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p>	<p>Africam Safari Park; Africam Safari Park</p>
	<p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p>	<p>Africam Safari Park; Disney's Animal Kingdom; Disney's Animal Kingdom; Gulf Breeze Zoo^{1*}; Lion Country Safari; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Toledo Zoo; Wildlife Safari</p>
	<p>Deer, Fallow (<i>Dama dama</i>)</p>	<p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center</p>
	<p>Deer, Red (<i>Cervus elaphus</i>)</p>	<p>Fossil Rim Wildlife Center</p>
	<p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p>	<p>Fossil Rim Wildlife Center</p>
	<p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Africam Safari Park; Africam Safari Park; Chehaw Wild Animal Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; Gulf Breeze Zoo^{1*}; Lion Country Safari; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari</p>
	<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Africam Safari Park; Columbus Zoo; Fort Wayne Children's Zoo*; Toledo Zoo</p>
	<p>Gazelle, Grant's (<i>Nanger granti</i>)</p>	<p>Busch Gardens; Dickerson Park Zoo¹; Minnesota Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p>
	<p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p>	<p>San Diego Zoo Safari Park*</p>
	<p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Columbus Zoo; San Diego Zoo Safari Park^{1*}</p>
	<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p>	<p>Africam Safari Park; Caldwell Zoo</p>
	<p>Gazelle, Speke's (<i>Gazella spekei</i>)</p>	<p>Fresno Chaffee Zoo</p>
<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Africam Safari Park; Audubon Zoo; Columbus Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Jacksonville Zoo¹; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Toledo Zoo</p>	

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<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus</i>)</p> <p>Hippopotimus, Pygmy (<i>Choeropsis liberiensis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Llama (<i>Lama glama</i>)</p>	<p>Lion Country Safari; Minnesota Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari</p> <p>Africam Safari Park*; Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Fresno Chaffee Zoo*; Fossil Rim Wildlife Center*; Minnesota Zoo*; Minnesota Zoo*; Minnesota Zoo*; San Diego Zoo Safari Park*; Toledo Zoo*; Wildlife Safari</p> <p>Fossil Rim Wildlife Center</p> <p>Lion Country Safari*</p> <p>San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom; San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Africam Safari Park; Caldwell Zoo; Chehaw Wild Animal Park; Disney's Animal Kingdom; Disney's Animal Kingdom; Fresno Chaffee Zoo; Lion Country Safari; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Toledo Zoo</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Busch Gardens; Caldwell Zoo; Columbus Zoo; Dickerson Park Zoo¹; Fresno Chaffee Zoo; Indianapolis Zoo; San Diego Zoo Safari Park*; Toledo Zoo</p> <p>Gulf Breeze Zoo^{1*}</p>
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<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Gulf Breeze Zoo^{1*}; Lion Country Safari; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p>
	<p>Nyala (<i>Tragelaphus angasii</i>)</p>	<p>Africam Safari Park; Chehaw Wild Animal Park; Disney's Animal Kingdom</p>
	<p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
	<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; Gulf Breeze Zoo^{1*}; Lion Country Safari; San Diego Zoo Safari Park*; Wildlife Safari</p>
	<p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
	<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Audubon Zoo*; Busch Gardens*; Fossil Rim Wildlife Center*; Fresno Chaffee Zoo; Jacksonville Zoo¹; Lion Country Safari*; San Diego Zoo Safari Park*; Wildlife Safari*</p>
	<p>Sitatunga (<i>Tragelaphus spekii</i>)</p>	<p>Gulf Breeze Zoo^{1*}; Jacksonville Zoo¹; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p>
	<p>Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Africam Safari Park; Disney's Animal Kingdom; Fresno Chaffee Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p>
	<p>Suni (<i>Neotragus moschatus</i>) Topi (<i>Damaliscus korrigum jimela</i>)</p>	<p>San Diego Zoo Safari Park¹ Caldwell Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p>
	<p>Warthog, Common (<i>Phacochoerus africanus</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Caldwell Zoo; Toledo Zoo Africam Safari Park; Disney's Animal Kingdom; Disney's Animal Kingdom; Fossil Rim Wildlife Center →</p>

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<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Gulf Breeze Zoo^{1*}; Lion Country Safari; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; Wildlife Safari Caldwell Zoo; Minnesota Zoo; San Diego Zoo Safari Park Disney's Animal Kingdom*; Minnesota Zoo* Audubon Zoo*; Busch Gardens*; Chehaw Wild Animal Park; Columbus Zoo; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Fossil Rim Wildlife Center; Indianapolis Zoo*; Lion Country Safari; Roger Williams Park Zoo; Toledo Zoo*; Wildlife Safari; Zoo New England*</p>
Small Antelope		
<p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p>	<p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Elephant, African Bush (<i>Loxodonta africana</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Kansas City Zoo</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo</p> <p>Saint Louis Zoo</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo*</p>
<p>Dik-dik, Kirk's (<i>Madoqua kirkii</i>)</p>	<p>Duiker, Bay (<i>Cephalophus dorsalis</i>)</p> <p>Duiker, Blue (<i>Philantomba monticola</i>)</p> <p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Ellen Trout Zoo¹</p> <p>Dallas Zoo</p> <p>Kansas City Zoo</p> <p>Memphis Zoo¹; Phoenix Zoo</p> <p>Phoenix Zoo</p> <p>Phoenix Zoo¹</p>
<p>Duiker (sp.)</p>	<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p>	<p>John Ball Zoo; Zoo Miami^{1*}</p> <p>Zoo Miami^{1*}</p>
<p>Duiker, Bay (<i>Cephalophus dorsalis</i>)</p>	<p>Dik-dik, Kirk's (<i>Madoqua kirkii</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p>	<p>Ellen Trout Zoo¹</p> <p>San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park¹</p> <p>San Diego Zoo Safari Park¹; Tampa's Lowry Park Zoo</p> <p>Tampa's Lowry Park Zoo</p>

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Duiker, Black (<i>Cephalophus niger</i>)	Bushbuck, Kewel (<i>Tragelaphus scriptus</i>) Okapi (<i>Okapia johnstoni</i>)	Los Angeles Zoo Columbus Zoo; Los Angeles Zoo; San Diego Zoo
Duiker, Blue (<i>Philantomba monticola</i>)	Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Sitatunga (<i>Tragelaphus spekii</i>)	Dallas Zoo Virginia Zoo ¹
Duiker, Maxwell's (<i>Philantomba maxwellii</i>)	Gazelle, Addra (Dama) (<i>Nanger dama</i>) Okapi (<i>Okapia johnstoni</i>)	San Diego Zoo Safari Park ¹ San Diego Zoo Safari Park ¹
Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Duiker, Zebra (<i>Cephalophus zebra</i>) Gazelle, Cuvier's (<i>Gazella cuvieri</i>) Nyala (<i>Tragelaphus angasii</i>) Okapi (<i>Okapia johnstoni</i>) Steenbok (<i>Raphicerus campestris</i>)	Virginia Zoo Kansas City Zoo Los Angeles Zoo Roger Williams Park Zoo Bronx Zoo; Saint Louis Zoo Saint Louis Zoo Saint Louis Zoo
Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)	Antelope, Roan (<i>Hippotragus equinus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>) Klipspringer (<i>Oreotragus oreotragus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Okapi (<i>Okapia johnstoni</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Springbok (<i>Antidorcas marsupialis</i>) Zebra, Plains (<i>Equus quagga</i>)	Baton Rouge Zoo Caldwell Zoo; Chehaw Wild Animal Park; Cincinnati Zoo ¹ ; Columbus Zoo ¹ ; Gladys Porter Zoo; Houston Zoo; Los Angeles Zoo; Saint Louis Zoo; San Diego Zoo Safari Park ¹ Virginia Zoo Dallas Zoo Columbus Zoo ¹ ; Dallas Zoo; Houston Zoo San Francisco Zoo*; Virginia Zoo* Brevard Zoo Dallas Zoo; Los Angeles Zoo ¹ ; San Francisco Zoo Columbus Zoo ¹ ; Los Angeles Zoo Baton Rouge Zoo; Los Angeles Zoo Cincinnati Zoo and Botanical Garden; Columbus Zoo; Dallas Zoo; Disney's Animal Kingdom; Houston Zoo; Houston Zoo; Oklahoma City Zoo; Omaha's Henry Doorly Zoo; San Diego Zoo Safari Park ¹ San Francisco Zoo Los Angeles Zoo San Francisco Zoo*

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Duiker, Zebra (<i>Cephalophus zebra</i>)	Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Los Angeles Zoo
Klipspringer (<i>Oreotragus oreotragus</i>)	Antelope, Sable (<i>Hippotragus niger</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Giraffe (<i>Giraffa camelopardalis</i>) Ibex, Nubian (<i>Capra nubiana</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Nyala (<i>Tragelaphus angasii</i>) Pudu, Southern (<i>Pudu puda</i>) Springbok (<i>Antidorcas marsupialis</i>) Zebra, Grevy's (<i>Equus grevyi</i>)	Jackson Zoo Jacksonville Zoo and Gardens Brevard Zoo Jackson Zoo Jacksonville Zoo and Gardens* Los Angeles Zoo Jacksonville Zoo and Gardens San Diego Zoo Safari Park ¹ Jacksonville Zoo and Gardens Jackson Zoo Jackson Zoo; Omaha's Henry Doorly Zoo & Aquarium
Steenbok (<i>Raphicerus campestris</i>)	Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gerenuk (<i>Litocranius walleri</i>) Hog, Red River (<i>Potamochoerus porcus</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Nyala (<i>Tragelaphus angasii</i>) Okapi (<i>Okapia johnstoni</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	Disney's Animal Kingdom Saint Louis Zoo Saint Louis Zoo Disney's Animal Kingdom Denver Zoological Gardens; Saint Louis Zoo Disney's Animal Kingdom Disney's Animal Kingdom Los Angeles Zoo* Disney's Animal Kingdom Disney's Animal Kingdom; Saint Louis Zoo Disney's Animal Kingdom
Suni (<i>Neotragus moschatus</i>)	Bontebok (<i>Damaliscus pygargus</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>)	San Diego Zoo Safari Park ^{1*} Saint Louis Zoo Saint Louis Zoo
Waterbuck		
Kob (<i>Kobus kob</i>)	Antelope, Roan (<i>Hippotragus equinus</i>) Buffalo, Cape (<i>Syncerus caffer</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Eland, Giant (<i>Taurotragus derbianus</i>) Gazelle, Grant's (<i>Nanger granti</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park ^{1*} San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*

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Lechwe (<i>Kobus leche</i>)	<p>Blackbuck (<i>Antilope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Camel, Bactrian (<i>Camelus bactrianus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Deer, Sika (<i>Cervus nippon</i>) Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>) Hartebeest, Cape (Red) (<i>Alcelaphus buselaphus caama</i>) Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Llama (<i>Lama glama</i>) Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>) Rusa, Javan (<i>Rusa timorensis</i>) Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Gulf Breeze Zoo^{1*} San Diego Zoo Safari Park*</p> <p>North Carolina Zoo^{1*}; San Diego Zoo Safari Park^{1*}; White Oak Conservation Center*</p> <p>San Diego Zoo Safari Park^{1*}; White Oak Conservation Center*</p> <p>San Diego Zoo Safari Park^{1*} Gulf Breeze Zoo^{1*}</p> <p>San Diego Zoo Safari Park^{1*} Gulf Breeze Zoo^{1*}; San Diego Zoo Safari Park^{1*}</p> <p>White Oak Conservation Center*</p> <p>North Carolina Zoo*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park^{1*} San Diego Zoo Safari Park^{1*}</p> <p>North Carolina Zoo*</p> <p>North Carolina Zoo*; San Diego Zoo Safari Park^{1*}</p> <p>San Diego Zoo Safari Park^{1*} North Carolina Zoo^{1*}</p> <p>North Carolina Zoo*; San Diego Zoo Safari Park^{1*}</p> <p>North Carolina Zoo*</p> <p>Los Angeles Zoo*; North Carolina Zoo*; San Diego Zoo Safari Park^{1*}</p> <p>Gulf Breeze Zoo^{1*} North Carolina Zoo^{1*}; San Diego Zoo Safari Park^{1*}</p> <p>Gulf Breeze Zoo^{1*} San Diego Zoo Safari Park^{1*}</p> <p>Gulf Breeze Zoo^{1*}; North Carolina Zoo*</p> <p>Los Angeles Zoo*; North Carolina Zoo*; San Diego Zoo Safari Park^{1*}</p> <p>Gulf Breeze Zoo^{1*}; North Carolina Zoo*; San Diego Zoo Safari Park^{1*}</p>
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Lechwe (<i>Kobus leche</i>)	Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra (<i>Equus sp.</i>)	Gulf Breeze Zoo ^{1*} ; San Diego Zoo Safari Park ^{1*} Gulf Breeze Zoo ^{1*} ; San Diego Zoo Safari Park ^{1*}
Lechwe, Nile (<i>Kobus megaceros</i>)	Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Banteng (<i>Bos javanicus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Buffalo, Cape (<i>Syncerus caffer</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Eland, Giant (<i>Taurotragus derbianus</i>) Elephant, African Bush (<i>Loxodonta africana</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>)	Baton Rouge Zoo; San Diego Zoo Safari Park ¹ ; White Oak Conservation Center Kansas City Zoo; Kansas City Zoo; Lee G. Simmons Conservation Park and Wildlife Safari Lion Country Safari White Oak Conservation Center* North Carolina Zoo; White Oak Conservation Center North Carolina Zoo* San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park Lion Country Safari San Diego Zoo Safari Park Los Angeles Zoo ¹ Baton Rouge Zoo; Los Angeles Zoo Mesker Park Zoo; San Diego Zoo Safari Park ¹ White Oak Conservation Center; White Oak Conservation Center Dallas Zoo Los Angeles Zoo ¹ ; North Carolina Zoo; White Oak Conservation Center San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park ¹ Kansas City Zoo; Kansas City Zoo; North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park Lion Country Safari; North Carolina Zoo

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<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Llama (<i>Lama glama</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Dallas Zoo*; Kansas City Zoo*; Kansas City Zoo*; Oklahoma City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park^{1*}</p> <p>Kansas City Zoo; Kansas City Zoo; Lion Country Safari; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>Dallas Zoo; Kansas City Zoo; Kansas City Zoo; Lion Country Safari; North Carolina Zoo</p> <p>White Oak Conservation Center</p> <p>San Diego Zoo Safari Park^{1*}</p> <p>Lee G. Simmons Conservation Park and Wildlife Safari</p> <p>Baton Rouge Zoo; North Carolina Zoo</p> <p>Kansas City Zoo; Kansas City Zoo; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Lion Country Safari</p> <p>San Diego Zoo Safari Park*</p> <p>North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>North Carolina Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Los Angeles Zoo</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Lion Country Safari; Mesker Park Zoo; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p>
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<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Lion Country Safari; San Diego Zoo Safari Park; Kansas City Zoo</p> <p>San Diego Zoo Safari Park; White Oak Conservation Center</p> <p>Baton Rouge Zoo; Dallas Zoo; Kansas City Zoo*; Kansas City Zoo</p>
<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)</p> <p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Blackbuck (<i>Antelope cervicapra</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p>	<p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center; Gulf Breeze Zoo^{1*}; Wildlife Safari</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park^{1*}</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari¹</p> <p>Gulf Breeze Zoo^{1*}; Lion Country Safari</p> <p>Gulf Breeze Zoo^{1*};</p> <p>Fossil Rim Wildlife Center; Gulf Breeze Zoo^{1*}</p> <p>Dallas Zoo; Disney's Animal Kingdom; Forth Worth Zoo; Milwaukee County Zoo¹; North Carolina Zoo; Wildlife Safari</p> <p>Binder Park Zoo; Fossil Rim Wildlife Center*; North Carolina Zoo*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>Lion Country Safari</p> <p>Africam Safari Park</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom; Gulf Breeze Zoo^{1*}; Lion Country Safari; San Diego Zoo Safari Park*; Wildlife Safari</p> <p>Fossil Rim Wildlife Center; Gulf Breeze Zoo^{1*}</p>

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Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	Deer, Fallow (<i>Dama dama</i>)	Fossil Rim Wildlife Center; Fossil Rim Wildlife Center
	Deer, White-tailed (<i>Odocoileus virginianus</i>)	Fossil Rim Wildlife Center; Fossil Rim Wildlife Center; Gulf Breeze Zoo ^{1*}
	Eland, Common (<i>Taurotragus oryx</i>)	Africam Safari Park; Disney's Animal Kingdom; Gulf Breeze Zoo ^{1*} ; Lion Country Safari; Mesker Park Zoo; Milwaukee County Zoo; Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; Wildlife Safari
	Gazelle, Addra (Dama) (<i>Nanger dama</i>)	Africam Safari Park; Binder Park Zoo; North Carolina Zoo
	Gazelle, Grant's (<i>Nanger granti</i>)	Disney's Animal Kingdom ² ; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Gazelle, Slender-horned (<i>Gazella leptoceros</i>)	San Diego Zoo Safari Park
	Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)	San Diego Zoo Safari Park ¹
	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Africam Safari Park; Binder Park Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom; Knoxville Zoo; North Carolina Zoo*; San Diego Zoo Safari Park*; Utah's Hogle Zoo ¹ ; Wildlife Safari ¹
	Gemsbok (<i>Oryx gazella</i>)	Fossil Rim Wildlife Center; Lion Country Safari; North Carolina Zoo*; Safari West; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari
Giraffe (<i>Giraffa camelopardalis</i>)	Africam Safari Park*; Binder Park Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Knoxville Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* →	

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<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Hartebeest, Cape (Red) (<i>Alcelaphus buselaphus caama</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p> <p>Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Llama (<i>Lama glama</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Wildlife Safari</p> <p>Fossil Rim Wildlife Center</p> <p>San Diego Zoo Safari Park^{1*}</p> <p>North Carolina Zoo*</p> <p>San Diego Zoo Safari Park^{1*}</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom</p> <p>Africam Safari Park; Binder Park Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Lion Country Safari; Lion Country Safari; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Binder Park Zoo; Knoxville Zoo; Lion Country Safari; Milwaukee County Zoo; North Carolina Zoo*; Oklahoma City Zoo; San Diego Zoo Safari Park¹</p> <p>Gulf Breeze Zoo^{1*}; Gulf Breeze Zoo^{1*}; North Carolina Zoo*; San Diego Zoo Safari Park^{1*}</p> <p>Lion Country Safari; Mesker Park Zoo; North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom; North Carolina Zoo*; San Diego Zoo Safari Park¹</p> <p>Disney's Animal Kingdom</p> <p>North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
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Giraffe		
Giraffe (<i>Giraffa camelopardalis</i>)	Addax (<i>Addax nasomaculatus</i>)	Blank Park Zoo*; Busch Gardens*; Disney's Animal Kingdom*; Fresno Chaffee Zoo*; Minnesota Zoo*; Omaha's Henry Doorly Zoo & Aquarium*; Safari West; Wildlife Safari
	Antelope, Roan (<i>Hippotragus equinus</i>)	Disney's Animal Kingdom*; Disney's Animal Kingdom*; Safari West
	Antelope, Sable (<i>Hippotragus niger</i>)	Disney's Animal Kingdom*; Kansas City Zoo*; Kansas City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	Fossil Rim Wildlife Center*
	Ass, African Wild (<i>Equus africanus</i>)	Disney's Animal Kingdom*
	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)	Disney's Animal Kingdom*; Great Plains Zoo*; Minnesota Zoo*; North Carolina Zoo*; Safari West; Wildlife Safari
	Bontebok (<i>Damaliscus pygargus</i>)	Binder Park Zoo*; Fossil Rim Wildlife Center; Safari West; San Diego Zoo Safari Park*
	Buffalo, Cape (<i>Syncerus caffer</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Camel, Bactrian (<i>Camelus bactrianus</i>)	Fresno Chaffee Zoo
	Camel, Dromedary (<i>Camelus dromedarius</i>)	Africam Safari Park
	Cattle, Ankole (Watusi) (<i>Bos taurus</i>)	Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Phoenix Zoo*; Toledo Zoo*; Wildlife Safari
	Deer, Fallow (<i>Dama dama</i>)	Fossil Rim Wildlife Center*
	Deer, Pere David's (<i>Elaphurus davidianus</i>)	The Wilds*
	Deer, Red (<i>Cervus elaphus</i>)	Fossil Rim Wildlife Center*; The Wilds*
	Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)	San Francisco Zoo*; Virginia Zoo*
	Eland, Common (<i>Taurotragus oryx</i>)	Africam Safari Park*; Busch Gardens*; Disney's Animal Kingdom* →

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<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Elephant, African Bush (<i>Loxodonta africana</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Cuvier's (<i>Gazella cuvieri</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Fresno Chaffee Zoo*; Fresno Chaffee Zoo*; Knoxville Zoo*; Oakland Zoo*; Phoenix Zoo*; San Diego Zoo Safari Park*; Wildlife Safari; The Wilds; Zoo de Granby*</p> <p>Dallas Zoo*</p> <p>Africam Safari Park*; Binder Park Zoo*; Columbus Zoo*; Gladys Porter Zoo*; Indianapolis Zoo*; Rolling Hills Wildlife Adventure; Saint Louis Zoo*; Toledo Zoo*</p> <p>The Living Desert*</p> <p>Disney's Animal Kingdom²; Minnesota Zoo*; Safari West; San Diego Zoo Safari Park*; Virginia Zoo*; Woodland Park Zoo*; Zoo Miami*</p> <p>Columbus Zoo*; San Diego Zoo Safari Park*</p> <p>Saint Louis Zoo*; San Diego Zoo*</p> <p>Fresno Chaffee Zoo*; Fresno Chaffee Zoo*; Indianapolis Zoo*; Oregon Zoo*</p> <p>Africam Safari Park*; Binder Park Zoo*; Baton Rouge Zoo*; Brevard Zoo*; Cleveland Metropark Zoo*; Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Indianapolis Zoo*; Kansas City Zoo*; Kansas City Zoo*; Knoxville Zoo*; Peoria Zoo*; Phoenix Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* →</p>
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<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Horse, Wild (<i>Equus ferus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>San Diego Zoo Safari Park*; Toledo Zoo*; Zoo de Granby* Minnesota Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Wildlife Safari Cameron Park Zoo*; Los Angeles Zoo*; Peoria Zoo*; Phoenix Zoo*; Saint Louis Zoo* Brevard Zoo*; Cameron Park Zoo*; Columbus Zoo*; Knoxville Zoo*; North Carolina Zoo*; Phoenix Zoo*; Safari West*; San Diego Zoo Safari Park*; Utah's Hogle Zoo*; Tampa's Lowry Park Zoo* Disney's Animal Kingdom*; Disney's Animal Kingdom* The Wilds* Africam Safari Park*; Binder Park Zoo*; Brevard Zoo*; Busch Gardens*; Dallas Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Fresno Chaffee Zoo*; Kansas City Zoo*; Kansas City Zoo*; Oregon Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Toledo Zoo* Jacksonville Zoo and Gardens* San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Binder Park Zoo*; Cameron Park Zoo*; Columbus Zoo*; Dallas Zoo*; Fresno Chaffee Zoo*; Jacksonville Zoo and Gardens*; Kansas City Zoo*; Kansas City Zoo*; Knoxville Zoo*; Knoxville Zoo*; Lion Country Safari →</p>
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<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>The Living Desert*; Safari West; San Francisco Zoo*; Toledo Zoo*; Toledo Zoo*</p>
	<p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p>	<p>Blank Park Zoo*; Disney's Animal Kingdom*; Los Angeles Zoo*; Saint Louis Zoo*; Zoo Atlanta*</p>
	<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Dallas Zoo*; Kansas City Zoo*; Kansas City Zoo*; Oklahoma City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
	<p>Nyala (<i>Tragelaphus angasii</i>)</p>	<p>Disney's Animal Kingdom*; Lion Country Safari; Safari West; Utah's Hogle Zoo</p>
	<p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p>	<p>Fossil Rim Wildlife Center*; Knoxville Zoo</p>
	<p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p>	<p>Kansas City Zoo*; Kansas City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Woodland Park Zoo*</p>
	<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Disney's Animal Kingdom*; Disney's Animal Kingdom*; Omaha's Henry Doorly Zoo & Aquarium*; San Francisco Zoo*; Wildlife Safari</p>
	<p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
	<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Fresno Chaffee Zoo*; Honolulu Zoo*; San Diego Zoo Safari Park*; Wildlife Safari*; The Wilds*</p>
	<p>Sitatunga (<i>Tragelaphus spekii</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
<p>Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Cameron Park Zoo*; Disney's Animal Kingdom* →</p>	

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Giraffe (<i>Giraffa camelopardalis</i>)	Zebra, Plains (<i>Equus quagga</i>)	Binder Park Zoo*; Columbus Zoo*; Dallas Zoo*; Disney's Animal Kingdom*; Fossil Rim Wildlife Center; Honolulu Zoo*; Houston Zoo*; Kansas City Zoo*; Kansas City Zoo*; Knoxville Zoo*; Knoxville Zoo*; Lion Country Safari; Los Angeles Zoo*; Mesker Park Zoo*; North Carolina Zoo*; Oklahoma City Zoo*; Pittsburgh Zoo*; Riverbanks Zoo and Garden*; San Francisco Zoo*; Toledo Zoo*; Wildlife Safari; Woodland Park Zoo*; Zoo Atlanta*; Zoo de Granby*; Zoo Miami*
Okapi (<i>Okapia johnstoni</i>)	<p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker, Bay (<i>Cephalophus dorsalis</i>) Duiker, Black (<i>Cephalophus niger</i>)</p> <p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Hog, Red River (<i>Potamochoerus porcus</i>) Impala (<i>Aepyceros melampus</i>) Nyala (<i>Tragelaphus angasii</i>) Steenbok (<i>Raphicerus campestris</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Disney's Animal Kingdom Tampa's Lowry Park Zoo Columbus Zoo; Los Angeles Zoo; San Diego Zoo Saint Louis Zoo Cincinnati Zoo and Botanical Garden; Columbus Zoo; Dallas Zoo; Disney's Animal Kingdom; Houston Zoo; Houston Zoo; Oklahoma City Zoo; Omaha's Henry Doorly Zoo Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom; Saint Louis Zoo Disney's Animal Kingdom</p>
Caprinae		
Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	<p>Ass, African Wild (<i>Equus africanus</i>) Bison, American (<i>Bison bison</i>) Bontebok (<i>Damaliscus pygargus</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Red (<i>Cervus elaphus</i>) Elk, American (<i>Cervus canadensis</i>) Giraffe (<i>Giraffa camelopardalis</i>) Guanaco (<i>Lama guanicoe</i>) Ibex, Nubian (<i>Capra nubiana</i>) Impala (<i>Aepyceros melampus</i>)</p>	<p>San Diego Zoo Safari Park* Wildlife Safari Fossil Rim Wildlife Center Lion Country Safari Fossil Rim Wildlife Center Fossil Rim Wildlife Center Wildlife Safari* Fossil Rim Wildlife Center* Wildlife Safari Dallas Zoo* Lion Country Safari</p>

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<p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)</p>	<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Llama (<i>Lama glama</i>) Oryx, Arabian (<i>Oryx leucoryx</i>) Sheep, Domestic (<i>Ovis aries</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Lion Country Safari Lion Country Safari Wildlife Safari Fossil Rim Wildlife Center Toronto Zoo* Lion Country Safari Fossil Rim Wildlife Center San Diego Zoo Safari Park Fossil Rim Wildlife Center* Fossil Rim Wildlife Center</p>
<p>Bharal (<i>Pseudois nayaur</i>)</p>	<p>Barasingha, Indian (<i>Rucervus duvaucelii</i>) Blackbuck (<i>Antilope cervicapra</i>) Deer, Axis (<i>Axis axis</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Elk, American (<i>Cervus canadensis</i>) Gaur (<i>Bos gaurus</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>) Ibex, Spanish (<i>Capra pyrenaica</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Pig, Bornean Bearded (<i>Sus barbatus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Rusa, Javan (<i>Rusa timorensis</i>) Sheep, Wild (<i>Ovis orientalis</i>) Tur (<i>Capra cylindricornis</i>)</p>	<p>San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo* San Diego Zoo Safari Park* San Diego Zoo San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo</p>
<p>Goat, Domestic (<i>Capra aegagrus hircus</i>)</p>	<p>Alpaca (<i>Vicugna pacos</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Domestic (<i>Bos taurus</i>) Donkey (<i>Equus africanus asinus</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Horse, Domestic (<i>Equus ferus caballus</i>) Llama (<i>Lama glama</i>) Pig, Domestic (<i>Sus scrofa</i>) Sheep, Domestic (<i>Ovis aries</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Capron Park Zoo*; Roosevelt Park Zoo Dallas Zoo* Buffalo Zoo*; Sunset Zoo* Buffalo Zoo; Mesker Park Zoo Dallas Zoo* Dallas Zoo Mesker Park Zoo; Zoo Boise* Mesker Park Zoo* Capron Park Zoo*; Roosevelt Park Zoo; Sunset Zoo; Zoo Boise* Buffalo Zoo*; Sunset Zoo* Mesker Park Zoo; Roosevelt Park Zoo; Sunset Zoo; Zoo Boise* Dallas Zoo*</p>

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Goat, Rocky Mountain (<i>Oreamnos americanus</i>)	Bison, American (<i>Bison bison</i>) Caribou (<i>Rangifer tarandus</i>) Deer, Mule (<i>Odocoileus hemionus</i>) Elk, American (<i>Cervus canadensis</i>) Moose, North American (<i>Alces americanus</i>) Pronghorn (<i>Antilocapra americana</i>) Sheep, Bighorn (<i>Ovis Canadensis</i>) Sheep, Dall's (<i>Ovis dalli</i>)	Northwest Trek Wildlife Park Northwest Trek Wildlife Park Northwest Trek Wildlife Park Northwest Trek Wildlife Park* Northwest Trek Wildlife Park Northwest Trek Wildlife Park Northwest Trek Wildlife Park Calgary Zoo
Goral, Chinese (<i>Naemorhedus griseus</i>)	Deer, Hog (<i>Axis porcinus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Muntjac, Indian (<i>Muntiacus muntjak</i>) Takin (<i>Budorcas taxicolor</i>)	Oklahoma City Zoo Oklahoma City Zoo Oklahoma City Zoo Oklahoma City Zoo Saint Louis Zoo Oklahoma City Zoo; Saint Louis Zoo*; Saint Louis Zoo*; San Diego Zoo*
Ibex, Nubian (<i>Capra nubiana</i>)	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Klipspringer (<i>Oreotragus oreotragus</i>) Sheep, Bighorn (<i>Ovis canadensis</i>) Sheep, Wild (<i>Ovis orientalis</i>)	Dallas Zoo* Los Angeles Zoo San Diego Zoo Safari Park* San Diego Zoo Safari Park*
Ibex, Siberian (<i>Capra sibirica</i>)	Sheep, Domestic (<i>Ovis aries</i>) Tahr, Himalayan (<i>Hemitragus jemlahicus</i>)	San Diego Zoo Safari Park* San Diego Zoo Safari Park
Ibex, Spanish (<i>Capra pyrenaica</i>)	Bharal (<i>Pseudois nayaur</i>) Deer, Red (<i>Cervus elaphus</i>) Tur (<i>Capra cylindricornis</i>)	San Diego Zoo San Diego Zoo* San Diego Zoo
Markhor (<i>Capra falconeri</i>)	Deer, Eld's (<i>Rucervus eldii</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-lipped (<i>Cervus albirostris</i>)	Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³
Markhor, Bukharan (<i>Capra falconeri heptneri</i>)	Tahr, Himalayan (<i>Hemitragus jemlahicus</i>)	Bronx Zoo
Serow, Japanese (<i>Capricornis crispus</i>)	Deer, Chinese Water (<i>Hydropotes inermis</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Los Angeles Zoo Los Angeles Zoo
Sheep, Bighorn (<i>Ovis canadensis</i>)	Bison, American (<i>Bison bison</i>) Caribou (<i>Rangifer tarandus</i>) Deer, Calamian (<i>Axis calamianensis</i>) Deer, Mule (<i>Odocoileus hemionus</i>) Elk, American (<i>Cervus canadensis</i>) Goat, Rocky Mountain (<i>Oreamnos americanus</i>) Ibex, Nubian (<i>Capra nubiana</i>) Moose, North American (<i>Alces americanus</i>) Pronghorn (<i>Antilocapra americana</i>)	Northwest Trek Wildlife Park Northwest Trek Wildlife Park Cervid Mixed-Species Table ³ Northwest Trek Wildlife Park Northwest Trek Wildlife Park* Northwest Trek Wildlife Park San Diego Zoo Safari Park* Northwest Trek Wildlife Park Northwest Trek Wildlife Park

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Sheep, Bighorn (<i>Ovis canadensis</i>)	Sheep, Bighorn (<i>Ovis canadensis</i>) Sheep, Wild (<i>Ovis orientalis</i>)	San Diego Zoo Safari Park* San Diego Zoo Safari Park*
Sheep, Dall's (<i>Ovis dalli</i>)	Goat, Rocky Mountain (<i>Oreamnos americanus</i>)	Calgary Zoo
Sheep, Domestic (<i>Ovis aries</i>)	Alpaca (<i>Vicugna pacos</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Cattle, Domestic (<i>Bos taurus</i>) Donkey (<i>Equus africanus asinus</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Horse, Domestic (<i>Equus ferus caballus</i>) Horse, Wild (<i>Equus ferus</i>) Ibex, Siberian (<i>Capra sibirica</i>) Llama (<i>Lama glama</i>) Pig, Domestic (<i>Sus scrofa</i>) Tahr, Himalayan (<i>Hemitragus jemlahicus</i>) Yak (<i>Bos grunniens</i>)	Roosevelt Park Zoo Toronto Zoo* Happy Hollow Zoo*; Sunset Zoo* Happy Hollow Zoo*; Mesker Park Zoo Mesker Park Zoo*; Roosevelt Park Zoo*; Sunset Zoo*; Zoo Boise* Happy Hollow Zoo*; Mesker Park Zoo Toronto Zoo* San Diego Zoo Safari Park* Roosevelt Park Zoo; Sunset Zoo; Zoo Boise Sunset Zoo* San Diego Zoo Safari Park* Lee Richardson Zoo; Toronto Zoo*
Sheep, Wild (<i>Ovis orientalis</i>)	Banteng (<i>Bos javanicus</i>) Barasingha, Indian (<i>Rucervus duvaucelii</i>) Bharal (<i>Pseudois nayaur</i>) Blackbuck (<i>Antilope cervicapra</i>) Deer, Axis (<i>Axis axis</i>) Deer, Eld's (<i>Rucervus eldii</i>) Deer, Hog (<i>Axis porcinus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-lipped (<i>Cervus albirostris</i>) Elk, American (<i>Cervus canadensis</i>)	San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Cervid Mixed-Species Table ^{3*} San Diego Zoo Safari Park*

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<p>Sheep, Wild (<i>Ovis orientalis</i>)</p>	<p>Gaur (<i>Bos gaurus</i>)</p> <p>Gayal (<i>Bos frontalis</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Ibex, Nubian (<i>Capra nubiana</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Rusa, Javan (<i>Rusa timorensis</i>)</p> <p>Sheep, Bighorn (<i>Ovis canadensis</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p>
<p>Tahr, Himalayan (<i>Hemitragus jemlahicus</i>)</p>	<p>Ibex, Siberian (<i>Capra sibirica</i>)</p> <p>Markhor, Bukharan (<i>Capra falconeri heptneri</i>)</p> <p>Sheep, Domestic (<i>Ovis aries</i>)</p> <p>Yak (<i>Bos grunniens</i>)</p>	<p>San Diego Zoo Safari Park</p> <p>Bronx Zoo</p> <p>San Diego Zoo Safari Park*</p> <p>Zoo de Granby</p>
<p>Takin (<i>Budorcas taxicolor</i>)</p>	<p>Camel, Bactrian (<i>Camelus bactrianus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Hog (<i>Axis porcinus</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Deer, Tufted (<i>Elaphodus cephalophus</i>)</p> <p>Horse, Wild (<i>Equus ferus</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Goral, Chinese (<i>Naemorhedus griseus</i>)</p> <p>Muntjac, Indian (<i>Muntiacus muntjak</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>Detroit Zoo; The Wilds*</p> <p>Mesker Park Zoo*</p> <p>Detroit Zoo</p> <p>Oklahoma City Zoo</p> <p>Oklahoma City Zoo; The Wilds*; The Wilds*</p> <p>Oklahoma City Zoo</p> <p>Oklahoma City Zoo</p> <p>The Wilds*</p> <p>The Wilds*</p> <p>Oklahoma City Zoo; Saint Louis Zoo*; Saint Louis Zoo*; San Diego Zoo*</p> <p>Saint Louis Zoo*</p> <p>The Wilds*</p>
<p>Tur (<i>Capra cylindricornis</i>)</p>	<p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Ibex, Spanish (<i>Capra pyrenaica</i>)</p>	<p>San Diego Zoo</p> <p>San Diego Zoo*</p> <p>San Diego Zoo</p>
Deer (Cervid/Tragulid)		
<p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p>	<p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Camel, Bactrian (<i>Camelus bactrianus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p>	<p>San Diego Zoo Safari Park</p> <p>Bronx Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Mesker Park Zoo</p> <p>Bronx Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p>

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<p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p>	<p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Gayal (<i>Bos frontalis</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Muntjac, Indian (<i>Muntiacus muntjak</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Rusa, Javan (<i>Rusa timorensis</i>)</p> <p>Sheep, Wild (<i>Ovis orientalis</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>Cervid Mixed-Species Table³</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
<p>Caribou (<i>Rangifer tarandus</i>)</p>	<p>Bison, American (<i>Bison bison</i>)</p> <p>Deer, Mule (<i>Odocoileus hemionus</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Goat, Rocky Mountain (<i>Oreamnos americanus</i>)</p> <p>Moose, North American (<i>Alces americanus</i>)</p> <p>Pronghorn (<i>Antilocapra americana</i>)</p> <p>Sheep, Bighorn (<i>Ovis Canadensis</i>)</p> <p>Yak (<i>Bos grunniens</i>)</p>	<p>Northwest Trek Wildlife Park</p> <p>Northwest Trek Wildlife Park</p> <p>Toronto Zoo*</p> <p>Northwest Trek Wildlife Park*</p> <p>Northwest Trek Wildlife Park</p> <p>Toronto Zoo*</p>
<p>Deer, Axis (<i>Axis axis</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Blackbuck (<i>Antelope cervicapra</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p>	<p>Fossil Rim Wildlife Center;</p> <p>Fossil Rim Wildlife Center</p> <p>Bronx Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Bronx Zoo; Los Angeles Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Africam Safari Park</p> <p>Fossil Rim Wildlife Center</p> <p>Africam Safari Park</p> <p>San Diego Zoo Safari Park*</p>

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<p>Deer, Axis (<i>Axis axis</i>)</p>	<p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Horse, Wild (<i>Equus ferus</i>)</p> <p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Rusa, Javan (<i>Rusa timorensis</i>)</p> <p>Sheep, Wild (<i>Ovis orientalis</i>)</p> <p>Takin (<i>Budorcas taxicolor</i>)</p> <p>Tapir, Malayan (<i>Acrocodia indica</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Africam Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Fossil Rim Wildlife Center</p> <p>San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Buffalo Zoo; Los Angeles Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center</p> <p>Mesker Park Zoo*</p> <p>Mesker Park Zoo</p> <p>Africam Safari Park; Mesker Park Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>Buffalo Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Mesker Park Zoo*</p> <p>Africam Safari Park</p> <p>Fossil Rim Wildlife Center</p>
<p>Deer, Calamian (<i>Axis calamianensis</i>)</p>	<p>Pronghorn (<i>Antilocapra americana</i>)</p> <p>Sheep, Bighorn (<i>Ovis Canadensis</i>)</p>	<p>Cervid Mixed-Species Table³</p> <p>Cervid Mixed-Species Table³</p>
<p>Deer, Chinese Water (<i>Hydropotes inermis</i>)</p>	<p>Serow, Japanese (<i>Capricornis crispus</i>)</p>	<p>Los Angeles Zoo</p>
<p>Deer, Eld's (<i>Rucervus eldii</i>)</p>	<p>Banteng (<i>Bos javanicus</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Deer, Hog (<i>Axis porcinus</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p>	<p>Disney's Animal Kingdom; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Bronx Zoo</p>

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<p>Deer, Eld's (<i>Rucervus eldii</i>)</p>	<p>Markhor (<i>Capra falconeri</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Sheep, Wild (<i>Ovis orientalis</i>) Wisent (European Bison) (<i>Bison bonasus</i>)</p>	<p>Cervid Mixed-Species Table³ San Diego Zoo Safari Park; San Diego Zoo Safari Park* San Diego Zoo Safari Park* Cervid Mixed-Species Table³</p>
<p>Deer, Fallow (<i>Dama dama</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antilope cervicapra</i>) Bontebok (<i>Damaliscus pygargus</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Hybrid (Red/White-lipped) (<i>Cervus elaphus/Cervus albirostris</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-lipped (<i>Cervus albirostris</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Eland, Common (<i>Taurotragus oryx</i>) Elk, American (<i>Cervus canadensis</i>) Gemsbok (<i>Oryx gazella</i>) Giraffe (<i>Giraffa camelopardalis</i>) Guanaco (<i>Lama guanicoe</i>) Horse, Wild (<i>Equus ferus</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Llama (<i>Lama glama</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Oryx, Arabian (<i>Oryx leucoryx</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Takin (<i>Budorcas taxicolor</i>) Tapir (<i>sp.</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Yak (<i>Bos grunniens</i>) Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center Amarillo Zoo; Oakland Zoo Fossil Rim Wildlife Center; Wildlife Safari Fossil Rim Wildlife Center*; Fossil Rim Wildlife Center Detroit Zoo Fossil Rim Wildlife Center Detroit Zoo Fossil Rim Wildlife Center Roosevelt Park Zoo; Wildlife Safari Cervid Mixed-Species Table³ Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Detroit Zoo Amarillo Zoo; Oakland Zoo* Fossil Rim Wildlife Center Fossil Rim Wildlife Center* Detroit Zoo; Fossil Rim Wildlife Center Center Detroit Zoo* Detroit Zoo Cervid Mixed-Species Table³ Wildlife Safari Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center* Detroit Zoo Cervid Mixed-Species Table³ Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Wildlife Safari Detroit Zoo</p>

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Deer, Fallow (<i>Dama dama</i>)	Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)	Fossil Rim Wildlife Center* Fossil Rim Wildlife Center
Deer, Hog (<i>Axis porcinus</i>)	Banteng (<i>Bos javanicus</i>) Blackbuck (<i>Antelope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Eld's (<i>Rucervus eldii</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Goral, Chinese (<i>Naemorhedus griseus</i>) Muntjac (<i>Muntiacus sp.</i>) Muntjac, Indian (<i>Muntiacus muntjak</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Sheep, Wild (<i>Ovis orientalis</i>) Takin (<i>Budorcas taxicolor</i>) Wisent (European Bison) (<i>Bison bonasus</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park Cervid Mixed-Species Table ³ San Diego Zoo Safari Park; San Diego Zoo Safari Park* Oklahoma City Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park Bronx Zoo; San Diego Zoo Safari Park Bronx Zoo*; Oklahoma City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Oklahoma City Zoo Oklahoma City Zoo Cervid Mixed-Species Table ³ Bronx Zoo Bronx Zoo San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park* Oklahoma City Zoo Cervid Mixed-Species Table ³
Deer, Hybrid (Red/White-lipped) (<i>Cervus elaphus/Cervus albirostris</i>)	Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Fallow (<i>Dama dama</i>) Horse, Wild (<i>Equus ferus</i>) Takin (<i>Budorcas taxicolor</i>)	Detroit Zoo Detroit Zoo Detroit Zoo* Detroit Zoo
Deer, Mule (<i>Odocoileus hemionus</i>)	Bison, American (<i>Bison bison</i>) Caribou (<i>Rangifer tarandus</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Elk, American (<i>Cervus canadensis</i>) Goat, Rocky Mountain (<i>Oreamnos americanus</i>) Moose (<i>Alces alces</i>) Moose, North American (<i>Alces americanus</i>) Pronghorn (<i>Antilocapra americana</i>) Sheep, Bighorn (<i>Ovis Canadensis</i>)	Northwest Trek Wildlife Park Northwest Trek Wildlife Park Arizona-Sonora Desert Museum Northwest Trek Wildlife Park* Northwest Trek Wildlife Park Milwaukee County Zoo Northwest Trek Wildlife Park Northwest Trek Wildlife Park Northwest Trek Wildlife Park
Deer, Pere David's (<i>Elaphurus davidianus</i>)	Banteng (<i>Bos javanicus</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antelope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park; The Wilds The Wilds Africam Safari Park; San Diego Zoo Safari Park Africam Safari Park

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<p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p>	<p>Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Eld's (<i>Rucervus eldii</i>) Deer, Hog (<i>Axis porcinus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Deer, White-lipped (<i>Cervus albirostris</i>) Gaur (<i>Bos gaurus</i>) Giraffe (<i>Giraffa camelopardalis</i>) Goral, Chinese (<i>Naemorhedus griseus</i>) Horse, Wild (<i>Equus ferus</i>) Markhor (<i>Capra falconeri</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Onager, Persian (<i>Equus hemionus onager</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Sheep, Wild (<i>Ovis orientalis</i>) Takin (<i>Budorcas taxicolor</i>) Tapir, Malayan (<i>Acrocodia indica</i>) Wisent (European Bison) (<i>Bison bonasus</i>) Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>The Wilds; The Wilds Africam Safari Park San Diego Zoo Safari Park; San Diego Zoo Safari Park* Oklahoma City Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park Africam Safari Park; Oklahoma City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds* Oklahoma City Zoo Cervid Mixed-Species Table³ Africam Safari Park The Wilds* Oklahoma City Zoo The Wilds* Cervid Mixed-Species Table³ Los Angeles Zoo Africam Safari Park The Wilds San Diego Zoo Safari Park; San Diego Zoo Safari Park; The Wilds San Diego Zoo Safari Park* Oklahoma City Zoo; The Wilds*; The Wilds* Africam Safari Park Cervid Mixed-Species Table³ The Wilds</p>
<p>Deer, Red (<i>Cervus elaphus</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Barasingha, Indian (<i>Rucervus duvaucelii</i>) Bharal (<i>Pseudois nayaur</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antilope cervicapra</i>) Bontebok (<i>Damaliscus pygargus</i>) Camel, Dromedary (<i>Camelus dromedarius</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Fallow (<i>Dama dama</i>)</p>	<p>Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center San Diego Zoo Safari Park*; San Diego Zoo Safari Park San Diego Zoo* Cervid Mixed-Species Table³ San Diego Zoo Safari Park*; San Diego Zoo Safari Park Fossil Rim Wildlife Center; San Diego Zoo Safari Park* Cervid Mixed-Species Table³ San Diego Zoo Safari Park* San Diego Zoo Safari Park* Fossil Rim Wildlife Center</p>

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<p>Deer, Red (<i>Cervus elaphus</i>)</p>	<p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Deer, White-lipped (<i>Cervus albirostris</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Gayal (<i>Bos frontalis</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Horse, Wild (<i>Equus ferus</i>)</p> <p>Ibex, Spanish (<i>Capra pyrenaica</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Peccary, Collared (<i>Pecari tajacu</i>)</p> <p>Pronghorn (<i>Antilocapra americana</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Sheep, Wild (<i>Ovis orientalis</i>)</p> <p>Tur (<i>Capra cylindricornis</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>Cervid Mixed-Species Table^{3*}</p> <p>Audubon Zoo^{2*}</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center</p> <p>Cervid Mixed-Species Table³</p> <p>San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center*; The Wilds*</p> <p>Fossil Rim Wildlife Center</p> <p>The Wilds*</p> <p>San Diego Zoo*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center</p> <p>San Diego Zoo Safari Park*</p> <p>Audubon Zoo^{2*}; Audubon Zoo^{2*}</p> <p>Cervid Mixed-Species Table³</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo*</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center*; Fossil Rim Wildlife Center*</p> <p>Fossil Rim Wildlife Center</p>
<p>Deer, Red Brocket (<i>Mazama temama</i>)</p>	<p>Guanaco (<i>Lama guanicoe</i>)</p>	<p>Bergen County Zoo</p>
<p>Deer, Sambar (<i>Rusa unicolor</i>)</p>	<p>Banteng (<i>Bos javanicus</i>)</p> <p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Eld's (<i>Rucervus eldii</i>)</p>	<p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p>

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<p>Deer, Sambar (<i>Rusa unicolor</i>)</p>	<p>Deer, Hog (<i>Axis porcinus</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Deer, White-lipped (<i>Cervus albirostris</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Gayal (<i>Bos frontalis</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Markhor (<i>Capra falconeri</i>)</p> <p>Muntjac, Indian (<i>Muntiacus muntjak</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Rusa, Javan (<i>Rusa timorensis</i>)</p> <p>Sheep, Wild (<i>Ovis orientalis</i>)</p>	<p>Bronx Zoo; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Bronx Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Cervid Mixed-Species Table³</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>Cervid Mixed-Species Table³</p> <p>Bronx Zoo</p> <p>Bronx Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p>
<p>Deer, Sika (<i>Cervus nippon</i>)</p>	<p>Banteng (<i>Bos javanicus</i>)</p> <p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Bison, American (<i>Bison bison</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Camel, Bactrian (<i>Camelus bactrianus</i>)</p> <p>Caribou (<i>Rangifer tarandus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>The Wilds*</p> <p>Africam Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; Wildlife Safari</p> <p>Africam Safari Park</p> <p>The Wilds*</p> <p>Toronto Zoo*</p> <p>Africam Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p>

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Deer, Sika (<i>Cervus nippon</i>)	Deer, Eld's (<i>Rucervus eldii</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Deer, Fallow (<i>Dama dama</i>)	Roosevelt Park Zoo; Wildlife Safari
	Deer, Hog (<i>Axis porcinus</i>)	Bronx Zoo*; Oklahoma City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Deer, Pere David's (<i>Elaphurus davidianus</i>)	Africam Safari Park; Oklahoma City Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds*
	Deer, Red (<i>Cervus elaphus</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park
	Deer, Sambar (<i>Rusa unicolor</i>)	Bronx Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Deer, Tufted (<i>Elaphodus cephalophus</i>)	Oklahoma City Zoo
	Deer, White-lipped (<i>Cervus albirostris</i>)	Cervid Mixed-Species Table ³
	Elk, American (<i>Cervus canadensis</i>)	San Diego Zoo Safari Park*
	Gaur (<i>Bos gaurus</i>)	Africam Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park
	Gayal (<i>Bos frontalis</i>)	San Diego Zoo Safari Park
	Gazelle, Goitered (<i>Gazella subgutturosa</i>)	San Diego Zoo Safari Park
	Goral, Chinese (<i>Naemorhedus griseus</i>)	Oklahoma City Zoo
	Horse, Wild (<i>Equus ferus</i>)	The Wilds*
	Llama (<i>Lama glama</i>)	Zoo Boise
	Markhor (<i>Capra falconeri</i>)	Cervid Mixed-Species Table ³
	Muntjac, Indian (<i>Muntiacus muntjak</i>)	Bronx Zoo*
	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Trevor Zoo
	Nilgai (<i>Boselaphus tragocamelus</i>)	Africam Safari Park; Bronx Zoo*; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari
	Onager, Persian (<i>Equus hemionus onager</i>)	The Wilds*
	Pig, Bornean Bearded (<i>Sus barbatus</i>)	San Diego Zoo Safari Park
	Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*; The Wilds*
	Rusa, Javan (<i>Rusa timorensis</i>)	San Diego Zoo Safari Park
	Sheep, Wild (<i>Ovis orientalis</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Takin (<i>Budorcas taxicolor</i>)	Oklahoma City Zoo

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Deer, Sika (<i>Cervus nippon</i>)	Tapir, Malayan (<i>Acrocodia indica</i>) Wisent (European Bison) (<i>Bison bonasus</i>) Yak (<i>Bos grunniens</i>)	Africam Safari Park Cervid Mixed-Species Table ³ Toronto Zoo; Wildlife Safari
Deer, Tufted (<i>Elaphodus cephalophus</i>)	Deer, Hog (<i>Axis porcinus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Goral, Chinese (<i>Naemorhedus griseus</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Takin (<i>Budorcas taxicolor</i>)	Oklahoma City Zoo Oklahoma City Zoo Oklahoma City Zoo Oklahoma City Zoo Potter Park Zoo Oklahoma City Zoo
Deer, White-lipped (<i>Cervus albirostris</i>)	Banteng (<i>Bos javanicus</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Elk, American (<i>Cervus canadensis</i>) Markhor (<i>Capra falconeri</i>) Sheep, Wild (<i>Ovis orientalis</i>) Wisent (European Bison) (<i>Bison bonasus</i>)	Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ^{3*} Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ^{3*} Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ^{3*} Cervid Mixed-Species Table ³
Deer, White-tailed (<i>Odocoileus virginianus</i>)	Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antelope cervicapra</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Domestic (<i>Bos taurus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Mule (<i>Odocoileus hemionus</i>) Deer, Red (<i>Cervus elaphus</i>) Elk, American (<i>Cervus canadensis</i>) Gemsbok (<i>Oryx gazella</i>) Guanaco (<i>Lama guanicoe</i>) Klipspringer (<i>Oreotragus oreotragus</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Peccary, Collared (<i>Pecari tajacu</i>) Pronghorn (<i>Antilocapra americana</i>) Pudu, Southern (<i>Pudu puda</i>)	Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center Buttonwood Park Zoo; Caldwell Zoo; Connecticut's Beardsley Zoo; Great Plains Zoo; Kansas City Zoo Fossil Rim Wildlife Center Fossil Rim Wildlife Center* Caldwell Zoo* Fossil Rim Wildlife Center Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Arizona-Sonora Desert Museum Audubon Zoo ^{2*} Caldwell Zoo; Great Plains Zoo; Kansas City Zoo Fossil Rim Wildlife Center Fossil Rim Wildlife Center Jacksonville Zoo and Gardens Fossil Rim Wildlife Center Africam Safari Park*; Audubon Zoo ² ; Cameron Park Zoo Sunset Zoo; Sunset Zoo Jacksonville Zoo and Gardens

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Deer, White-tailed (<i>Odocoileus virginianus</i>)	Rhinoceros, White (<i>Ceratotherium simum</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)	Fossil Rim Wildlife Center* Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Fossil Rim Wildlife Center
Elk (<i>Cervus sp.</i>)	Bison, American (<i>Bison bison</i>)	Cape May County Zoo; Living Desert Zoo and Gardens State Park
Elk, American (<i>Cervus canadensis</i>)	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Barasingha, Indian (<i>Rucervus duvaucelii</i>) Bharal (<i>Pseudois nayaur</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antelope cervicapra</i>) Caribou (<i>Rangifer tarandus</i>) Cattle, Domestic (<i>Bos taurus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Mule (<i>Odocoileus hemionus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-lipped (<i>Cervus albirostris</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Gaur (<i>Bos gaurus</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>) Goat, Rocky Mountain (<i>Oreamnos americanus</i>) Guanaco (<i>Lama guanicoe</i>) Llama (<i>Lama glama</i>) Moose, North American (<i>Alces americanus</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Pig, Bornean Bearded (<i>Sus barbatus</i>)	Wildlife Safari* San Diego Zoo Safari Park* San Diego Zoo Safari Park* Amarillo Zoo; Bergen County Zoo*; Caldwell Zoo; Great Plains Zoo; Kansas City Zoo; Lee G. Simmons Conservation Park and Wildlife Safari; Lee Richardson Zoo; Minnesota Zoo; North Carolina Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Northwest Trek Wildlife Park*; Oakland Zoo*; Rosamond Gifford Zoo*; Toronto Zoo*; Turtle Back Zoo; Wildlife Safari*; ZooAmerica Wildlife Park San Diego Zoo Safari Park* Northwest Trek Wildlife Park* Caldwell Zoo* San Diego Zoo Safari Park* Amarillo Zoo; Oakland Zoo* Northwest Trek Wildlife Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* Cervid Mixed-Species Table ^{3*} Caldwell Zoo; Great Plains Zoo; Kansas City Zoo San Diego Zoo Safari Park* San Diego Zoo Safari Park* Northwest Trek Wildlife Park* Wildlife Safari* Wildlife Safari* Northwest Trek Wildlife Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park*

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Elk, American (<i>Cervus canadensis</i>)	Pronghorn (<i>Antilocapra americana</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Rusa, Javan (<i>Rusa timorensis</i>) Sheep, Bighorn (<i>Ovis Canadensis</i>) Sheep, Wild (<i>Ovis orientalis</i>)	Amarillo Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Northwest Trek Wildlife Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* Northwest Trek Wildlife Park* San Diego Zoo Safari Park*
Moose (<i>Alces alces</i>)	Deer, Mule (<i>Odocoileus hemionus</i>)	Milwaukee County Zoo
Moose, North American (<i>Alces americanus</i>)	Bison, American (<i>Bison bison</i>) Caribou (<i>Rangifer tarandus</i>) Deer, Mule (<i>Odocoileus hemionus</i>) Elk, American (<i>Cervus canadensis</i>) Goat, Rocky Mountain (<i>Oreamnos americanus</i>) Pronghorn (<i>Antilocapra americana</i>) Sheep, Bighorn (<i>Ovis Canadensis</i>)	Northwest Trek Wildlife Park Northwest Trek Wildlife Park Northwest Trek Wildlife Park Northwest Trek Wildlife Park* Northwest Trek Wildlife Park Northwest Trek Wildlife Park Northwest Trek Wildlife Park
Muntjac (<i>Muntiacus sp.</i>)	Deer, Hog (<i>Axis porcinus</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)	Cervid Mixed-Species Table ³ Tampa's Lowry Park Zoo Tampa's Lowry Park Zoo
Muntjac, Indian (<i>Muntiacus muntjak</i>)	Barasingha, Indian (<i>Rucervus duvaucelii</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Hog (<i>Axis porcinus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Goral, Chinese (<i>Naemorhedus griseus</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Takin (<i>Budorcas taxicolor</i>)	Cervid Mixed-Species Table ³ Mesker Park Zoo Bronx Zoo Bronx Zoo Bronx Zoo* Saint Louis Zoo Cervid Mixed-Species Table ³ Bronx Zoo Saint Louis Zoo*
Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Banteng (<i>Bos javanicus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Gaur (<i>Bos gaurus</i>) Horse, Wild (<i>Equus ferus</i>) Muntjac, Indian (<i>Muntiacus muntjak</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Serow, Japanese (<i>Capricornis crispus</i>) Springbok (<i>Antidorcas marsupialis</i>)	Saint Louis Zoo Mesker Park Zoo Los Angeles Zoo Trevor Zoo Potter Park Zoo Toronto Zoo Mesker Park Zoo* Cervid Mixed-Species Table ³ Mesker Park Zoo Toronto Zoo Los Angeles Zoo Santa Fe College Teaching Zoo
Pronghorn (<i>Antilocapra americana</i>)	Bison, American (<i>Bison bison</i>)	Amarillo Zoo; Columbus Zoo; Great Plains Zoo →

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<p>Pronghorn (<i>Antilocapra americana</i>)</p>	<p>Bison, American (<i>Bison bison</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Caribou (<i>Rangifer tarandus</i>)</p> <p>Deer, Calamian (<i>Axis calamianensis</i>)</p> <p>Deer, Mule (<i>Odocoileus hemionus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Goat, Rocky Mountain (<i>Oreamnos americanus</i>)</p> <p>Moose, North American (<i>Alces americanus</i>)</p> <p>Sheep, Bighorn (<i>Ovis Canadensis</i>)</p>	<p>Los Angeles Zoo; Minnesota Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Northwest Trek Wildlife Park; Toronto Zoo*</p> <p>San Diego Zoo*</p> <p>Northwest Trek Wildlife Park</p> <p>Cervid Mixed-Species Table³</p> <p>Northwest Trek Wildlife Park</p> <p>Cervid Mixed-Species Table³</p> <p>Sunset Zoo; Sunset Zoo</p> <p>Amarillo Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Northwest Trek Wildlife Park*</p> <p>Northwest Trek Wildlife Park</p> <p>Northwest Trek Wildlife Park</p>
<p>Pudu, Southern (<i>Pudu puda</i>)</p>	<p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p>	<p>Jacksonville Zoo and Gardens</p> <p>Jacksonville Zoo and Gardens</p>
<p>Rusa, Javan (<i>Rusa timorensis</i>)</p>	<p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Sheep, Wild (<i>Ovis orientalis</i>)</p>	<p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p>
Elephant		
<p>Elephant, African Bush (<i>Loxodonta africana</i>)</p>	<p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Kansas City Zoo</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo</p> <p>Dallas Zoo*</p> <p>Dallas Zoo; Kansas City Zoo; Tampa's Lowry Park Zoo</p> <p>Dallas Zoo; Kansas City Zoo</p> <p>Dallas Zoo</p> <p>Kansas City Zoo</p> <p>Dallas Zoo; Kansas City Zoo*</p>

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Equid		
Ass, African Wild (<i>Equus africanus</i>)	Addax (<i>Addax nasomaculatus</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Gemsbok (<i>Oryx gazella</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Springbok (<i>Antidorcas marsupialis</i>)	Dallas Zoo*; Disney's Animal Kingdom* San Diego Zoo Safari Park* Disney's Animal Kingdom* Dallas Zoo* Disney's Animal Kingdom* Disney's Animal Kingdom* Disney's Animal Kingdom* Disney's Animal Kingdom* Disney's Animal Kingdom*
Donkey (<i>Equus africanus asinus</i>)	Cattle, Domestic (<i>Bos taurus</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Horse, Domestic (<i>Equus ferus caballus</i>) Pig, Domestic (<i>Sus scrofa</i>) Sheep, Domestic (<i>Ovis aries</i>)	Buffalo Zoo* Buffalo Zoo; Mesker Park Zoo Great Plains Zoo*; Happy Hollow Zoo*; Mesker Park Zoo Buffalo Zoo* Happy Hollow Zoo*; Mesker Park Zoo
Horse, Domestic (<i>Equus ferus caballus</i>)	Cattle, Domestic (<i>Bos taurus</i>) Donkey (<i>Equus africanus asinus</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Sheep, Domestic (<i>Ovis aries</i>)	Great Plains Zoo* Great Plains Zoo*; Happy Hollow Zoo*; Mesker Park Zoo Mesker Park Zoo Happy Hollow Zoo*; Mesker Park Zoo
Horse, Wild (<i>Equus ferus</i>)	Banteng (<i>Bos javanicus</i>) Bison, American (<i>Bison bison</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Axis (<i>Axis axis</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Hybrid (Red/White-lipped) (<i>Cervus elaphus/Cervus albirostris</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sika (<i>Cervus nippon</i>) Giraffe (<i>Giraffa camelopardalis</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Onager, Persian (<i>Equus hemionus onager</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Sheep, Domestic (<i>Ovis aries</i>) Takin (<i>Budorcas taxicolor</i>) Yak (<i>Bos grunniens</i>)	The Wilds* The Wilds* Detroit Zoo*; Minnesota Zoo*; San Diego Zoo Safari Park*; The Wilds*; Toronto Zoo* Mesker Park Zoo* Detroit Zoo* Detroit Zoo* The Wilds*, The Wilds* The Wilds* The Wilds* The Wilds* Mesker Park Zoo* The Wilds* The Wilds* Toronto Zoo* The Wilds* Toronto Zoo*

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Kulan (<i>Equus hemionus kulan</i>)	Buffalo, Water (<i>Bubalus bubalis</i>) Nilgai (<i>Boselaphus tragocamelus</i>)	Lion Country Safari Lion Country Safari
Onager, Persian (<i>Equus hemionus onager</i>)	Banteng (<i>Bos javanicus</i>) Bison, American (<i>Bison bison</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Horse, Wild (<i>Equus ferus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)	The Wilds The Wilds The Wilds The Wilds The Wilds* The Wilds* The Wilds
Zebra (<i>Equus sp.</i>)	Antelope, Sable (<i>Hippotragus niger</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Oryx, East African (Beisa) (<i>Oryx beisa</i>)	Kansas City Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo
Zebra, Grevy's (<i>Equus grevyi</i>)	Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Banteng (<i>Bos javanicus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Eland, Common (<i>Taurotragus oryx</i>) Eland, Giant (<i>Taurotragus derbianus</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Speke's (<i>Gazella spekei</i>)	Busch Gardens; Dallas Zoo; Dallas Zoo B. Bryan Preserve; White Oak Conservation Center B. Bryan Preserve; Cheyenne Mountain Zoo San Diego Zoo Safari Park White Oak Conservation Center; White Oak Conservation Center Great Plains Zoo White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center The Wilds San Diego Zoo Safari Park Detroit Zoo The Wilds Busch Gardens*; Dallas Zoo; Sacramento Zoo; The Wilds White Oak Conservation Center Minnesota Zoo Caldwell Zoo Pueblo Zoo

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<p>Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>) Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Takin (<i>Budorcas taxicolor</i>) Topi (<i>Damaliscus korrigum jimela</i>) Warthog, Common (<i>Phacochoerus africanus</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Busch Gardens*; Calgary Zoo; Great Plains Zoo*; Minnesota Zoo*; Zoo New England*</p> <p>Busch Gardens; Caldwell Zoo Jackson Zoo; Omaha's Henry Doorly Zoo & Aquarium Caldwell Zoo Detroit Zoo San Diego Zoo Safari Park; White Oak Conservation Center Brevard Zoo*; Peoria Zoo*; Tampa's Lowry Park Zoo*; The Wilds* The Wilds* Caldwell Zoo Caldwell Zoo San Diego Zoo Safari Park* Caldwell Zoo; Minnesota Zoo; San Diego Zoo Safari Park B. Bryan Preserve*</p>
<p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Buffalo, Cape (<i>Syncerus caffer</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>) Deer, Red (<i>Cervus elaphus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Fossil Rim Wildlife Center* B. Bryan Preserve*; B. Bryan Preserve*; Disney's Animal Kingdom* B. Bryan Preserve*; Fossil Rim Wildlife Center*; San Diego Zoo Safari Park* Fossil Rim Wildlife Center* Disney's Animal Kingdom* San Diego Zoo Safari Park* San Diego Zoo Safari Park* Disney's Animal Kingdom*; Virginia Zoo* Fossil Rim Wildlife Center* Fossil Rim Wildlife Center*; Fossil Rim Wildlife Center* San Diego Zoo Safari Park* Fossil Rim Wildlife Center* San Diego Zoo Safari Park* Disney's Animal Kingdom* Minnesota Zoo*; San Diego Zoo Safari Park* Calgary Zoo*; Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Minnesota Zoo*; San Diego Zoo Safari Park* →</p>

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<p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>Tampa's Lowry Park Zoo*; Utah's Hogle Zoo*</p> <p>Fossil Rim Wildlife Center* Disney's Animal Kingdom* Disney's Animal Kingdom*; Utah's Hogle Zoo*</p> <p>Fossil Rim Wildlife Center*; Fossil Rim Wildlife Center* Disney's Animal Kingdom* San Diego Zoo Safari Park*; Virginia Zoo*</p> <p>Disney's Animal Kingdom*; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom*; Minnesota Zoo* B. Bryan Preserve*</p>
<p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Elephant, African Bush (<i>Loxodonta africana</i>)</p>	<p>Disney's Animal Kingdom; Kansas City Zoo*; Wildlife Safari Disney's Animal Kingdom B. Bryan Preserve*; Busch Gardens*; Kansas City Zoo*</p> <p>Fossil Rim Wildlife Center Cape May County Zoo*; North Carolina Zoo; Pittsburgh Zoo*; Wildlife Safari</p> <p>Binder Park Zoo*; Dallas Zoo; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Nashville Zoo at Grassmere*; Pittsburgh Zoo*</p> <p>Toledo Zoo*; Wildlife Safari Fossil Rim Wildlife Center Fossil Rim Wildlife Center Kansas City Zoo* San Francisco Zoo*</p> <p>Chehaw Wild Animal Park; Cincinnati Zoo and Botanical Garden*; Dallas Zoo; Kansas City Zoo*; Knoxville Zoo*; Milwaukee County Zoo; Nashville Zoo at Grassmere*; Pittsburgh Zoo*; Safari West; Wildlife Safari; Zoo de Granby*</p> <p>Houston Zoo* Dallas Zoo; Kansas City Zoo*</p>

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<p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Cuvier's (<i>Gazella cuvier</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Soemmerring's (<i>Gazella soemmerringii</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Goat, Domestic (<i>Capra aegagrus hircus</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p>	<p>Binder Park Zoo*; Columbus Zoo*; Fort Wayne Children's Zoo*; Indianapolis Zoo*; Pittsburgh Zoo*; Toledo Zoo* San Diego Zoo^{2*}</p> <p>Busch Gardens*; Tulsa Zoo*; Woodland Park Zoo; Zoo Miami*</p> <p>Cleveland Metroparks Zoo*; Columbus Zoo*; Dallas Zoo San Diego Zoo^{2*}</p> <p>Oregon Zoo</p> <p>Audubon Zoo*; Binder Park Zoo*; Columbus Zoo*; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Kansas City Zoo*; Kansas City Zoo*; Pittsburgh Zoo*; Toledo Zoo*; Zoo de Granby*</p> <p>Oregon Zoo</p> <p>Nashville Zoo at Grassmere*; Safari West; Wildlife Safari</p> <p>Binder Park Zoo*; Columbus Zoo*; Dallas Zoo*; Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Honolulu Zoo*; Houston Zoo*; Kansas City Zoo*; Kansas City Zoo*; Knoxville Zoo*; Knoxville Zoo*; Lion Country Safari; Los Angeles Zoo*; Mesker Park Zoo*; North Carolina Zoo*; Oklahoma City Zoo*; Pittsburgh Zoo*; Riverbanks Zoo and Garden*; San Francisco Zoo*; Toledo Zoo*; Wildlife Safari; Woodland Park Zoo*; Zoo Atlanta*; Zoo de Granby*; Zoo Miami*</p> <p>Dallas Zoo*</p> <p>Lion Country Safari</p> <p>Disney's Animal Kingdom</p> <p>Binder Park Zoo*; Chehaw Wild Animal Park; Dallas Zoo; Disney's Animal Kingdom →</p>
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<p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Kansas City Zoo*; Kansas City Zoo*; Toledo Zoo*</p> <p>Binder Park Zoo*; Busch Gardens*; Columbus Zoo*; Dallas Zoo; Indianapolis Zoo*; Kansas City Zoo*; Kansas City Zoo*; Knoxville Zoo*; Milwaukee County Zoo; San Francisco Zoo*; Toledo Zoo* Como Zoo*; Como Zoo*; Kansas City Zoo*; Zoo Atlanta</p> <p>Baton Rouge Zoo; Dallas Zoo; Kansas City Zoo*</p> <p>Baton Rouge Zoo; Chehaw Wild Animal Park</p> <p>Knoxville Zoo*</p> <p>Kansas City Zoo*; Kansas City Zoo*; Woodland Park Zoo*</p> <p>Memphis Zoo*; San Francisco Zoo*; Wildlife Safari</p> <p>Audubon Zoo*; Busch Gardens*; Disney's Animal Kingdom; Honolulu Zoo*; Lion Country Safari*; Los Angeles Zoo*; The Maryland Zoo*; Philadelphia Zoo*; Virginia Zoo*; Wildlife Safari*; Zoo de Granby*</p> <p>Nashville Zoo at Grassmere*; Pittsburgh Zoo*; San Diego Zoo*</p> <p>Hagenbeck Zoo²*; Houston Zoo*; San Diego Zoo*; Toledo Zoo*</p> <p>Binder Park Zoo*; Brookfield Zoo*; Disney's Animal Kingdom; Milwaukee County Zoo; Safari West; Wildlife Safari</p> <p>Audubon Zoo*; Busch Gardens*; Chehaw Wild Animal Park; Columbus Zoo*; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Fossil Rim Wildlife Center; Indianapolis Zoo*; Lion Country Safari →</p>
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Zebra, Plains (<i>Equus quagga</i>)	Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)	Roger Williams Park Zoo; Toledo Zoo*; Wildlife Safari; Zoo New England*
Rhinoceros		
Rhinoceros, Black (<i>Diceros bicornis</i>)	<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p>
Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)	<p>Banteng (<i>Bos javanicus</i>)</p> <p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Bharal (<i>Pseudois nayaur</i>)</p> <p>Bison, American (<i>Bison bison</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; The Wilds</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>The Wilds</p>

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<p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p>	<p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Camel, Bactrian (<i>Camelus bactrianus</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Eld's (<i>Rucervus eldii</i>)</p> <p>Deer, Hog (<i>Axis porcinus</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, Sambar (<i>Rusa unicolor</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Elk, American (<i>Cervus canadensis</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Gayal (<i>Bos frontalis</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Horse, Wild (<i>Equus ferus</i>)</p> <p>Muntjac (<i>Muntiacus sp.</i>)</p> <p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Onager, Persian (<i>Equus hemionus onager</i>)</p> <p>Pig, Bornean Bearded (<i>Sus barbatus</i>)</p> <p>Rusa, Javan (<i>Rusa timorensis</i>)</p> <p>Sheep, Wild (<i>Ovis orientalis</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>The Wilds</p> <p>Buffalo Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; The Wilds</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>Buffalo Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>The Wilds*</p> <p>Tampa's Lowry Park Zoo</p> <p>Toronto Zoo</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; Tampa's Lowry Park Zoo</p> <p>The Wilds</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p>
<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p>	<p>Disney's Animal Kingdom; Fossil Rim Wildlife Center*; Fresno Chaffee Zoo*; Wildlife Safari*</p> <p>Fossil Rim Wildlife Center</p>

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<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bison, American (<i>Bison bison</i>)</p> <p>Blackbuck (<i>Antelope cervicapra</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptocero</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Busch Gardens*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds* The Wilds*</p> <p>Fossil Rim Wildlife Center* North Carolina Zoo*; Wildlife Safari*</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center*; Jacksonville Zoo and Gardens*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Lion Country Safari*</p> <p>Virginia Zoo*; Wildlife Safari* Fossil Rim Wildlife Center* Fossil Rim Wildlife Center* Fresno Chaffee Zoo*; San Diego Zoo Safari Park*; Wildlife Safari*; The Wilds*</p> <p>North Carolina Zoo*</p> <p>Busch Gardens*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park* Fresno Chaffee Zoo*; Phoenix Zoo*; Reid Park Zoo*</p> <p>North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Wildlife Safari*</p> <p>Fresno Chaffee Zoo*; Honolulu Zoo* →</p>
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Rhinoceros, White (<i>Ceratotherium simum</i>)	Giraffe (<i>Giraffa camelopardalis</i>)	San Diego Zoo Safari Park*; Wildlife Safari*; The Wilds* Fossil Rim Wildlife Center* Lion Country Safari*
	Guanaco (<i>Lama guanicoe</i>)	
	Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)	
	Impala (<i>Aepyceros melampus</i>)	Fresno Chaffee Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Kob (<i>Kobus kob</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Busch Gardens*; Fresno Chaffee Zoo*; Houston Zoo*; Jacksonville Zoo and Gardens*; North Carolina Zoo*
	Lechwe, Nile (<i>Kobus megaceros</i>)	North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Oryx, East African (Beisa) (<i>Oryx beisa</i>)	North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds*
	Oryx, Scimitar-horned (<i>Oryx dammah</i>)	Fossil Rim Wildlife Center; Wildlife Safari*
	Rhinoceros, Black (<i>Diceros bicornis</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Rhinoceros, White (<i>Ceratotherium simum</i>)	San Diego Zoo Safari Park*
	Sitatunga (<i>Tragelaphus spekii</i>)	North Carolina Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Springbok (<i>Antidorcas marsupialis</i>)	Fresno Chaffee Zoo*; San Diego Zoo Safari Park*; Tulsa Zoo*
Topi (<i>Damaliscus korrigum jimela</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*	
Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	Fossil Rim Wildlife Center*; North Carolina Zoo*; San Diego Zoo Safari Park* →	

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<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Wildlife Safari*</p> <p>Audubon Zoo*; Busch Gardens*; Fossil Rim Wildlife Center*; Fresno Chaffee Zoo*; Lion Country Safari*; San Diego Zoo Safari Park*; Wildlife Safari*</p> <p>Brevard Zoo*; Peoria Zoo*; Tampa's Lowry Park Zoo*; The Wilds*</p> <p>San Diego Zoo Safari Park*; Virginia Zoo*</p> <p>Audubon Zoo*; Busch Gardens*; Disney's Animal Kingdom; Honolulu Zoo*; Lion Country Safari*; Los Angeles Zoo*; The Maryland Zoo*; Philadelphia Zoo*; Virginia Zoo*; Wildlife Safari*; Zoo de Granby*</p>
Tapir		
<p>Tapir (<i>sp.</i>)</p>	<p>Deer, Fallow (<i>Dama dama</i>)</p>	<p>Cervid Mixed-Species Table³</p>
<p>Tapir, Baird's (<i>Tapirus bairdii</i>)</p>	<p>Alpaca (<i>Vicugna pacos</i>)</p>	<p>Milwaukee County Zoo</p>
<p>Tapir, Malayan (<i>Acrocodia indica</i>)</p>	<p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Pig, Visayan Warty (<i>Sus cebifrons</i>)</p>	<p>Africam Safari Park</p> <p>San Diego Zoo; Tampa's Lowry Park Zoo</p>
<p>Tapir, South American (<i>Tapirus terrestris</i>)</p>	<p>Alpaca (<i>Vicugna pacos</i>)</p> <p>Guanaco (<i>Lama guanicoe</i>)</p> <p>Llama (<i>Lama glama</i>)</p> <p>Peccary, Collared (<i>Pecari tajacu</i>)</p>	<p>Lion Country Safari</p> <p>Audubon Zoo²; Detroit Zoo</p> <p>Lion Country Safari</p> <p>Audubon Zoo²; Dallas Zoo</p>

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Wild Cattle and Camelid		
Alpaca (<i>Vicugna pacos</i>)	Goat, Domestic (<i>Capra aegagrus hircus</i>) Llama (<i>Lama glama</i>) Sheep, Domestic (<i>Ovis aries</i>) Tapir, Baird's (<i>Tapirus bairdii</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Capron Park Zoo*; Roosevelt Park Zoo Lion Country Safari; Roosevelt Park Zoo Roosevelt Park Zoo Milwaukee County Zoo Lion Country Safari
Anoa, Lowland (<i>Bubalus depressicornis</i>)	Babirusa, North Sulawesi (<i>Babyrousa celebensis</i>)	Los Angeles Zoo; San Diego Zoo
Banteng (<i>Bos javanicus</i>)	Antelope, Roan (<i>Hippotragus equinus</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antilope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Eld's (<i>Rucervus eldii</i>) Deer, Hog (<i>Axis porcinus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-lipped (<i>Cervus albirostris</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Horse, Wild (<i>Equus ferus</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Onager, Persian (<i>Equus hemionus onager</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Pig, Wild (<i>Sus scrofa</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)	White Oak Conservation Center* The Wilds Disney's Animal Kingdom; San Diego Zoo Safari Park White Oak Conservation Center* White Oak Conservation Center; White Oak Conservation Center* The Wilds Disney's Animal Kingdom; San Diego Zoo Safari Park; San Diego Zoo Safari Park* San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park; San Diego Zoo Safari Park; The Wilds San Diego Zoo Safari Park San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; The Wilds* Cervid Mixed-Species Table ³ Saint Louis Zoo The Wilds* White Oak Conservation Center* Saint Louis Zoo The Wilds White Oak Conservation Center*; The Wilds San Diego Zoo San Diego Zoo Safari Park; San Diego Zoo Safari Park; The Wilds

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Banteng (<i>Bos javanicus</i>)	Sheep, Wild (<i>Ovis orientalis</i>) Zebra, Grevy's (<i>Equus grevyi</i>)	San Diego Zoo Safari Park* White Oak Conservation Center; White Oak Conservation Center
Bison, American (<i>Bison bison</i>)	Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Banteng (<i>Bos javanicus</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Caribou (<i>Rangifer tarandus</i>) Cattle, Domestic (<i>Bos taurus</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Mule (<i>Odocoileus hemionus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Eland, Common (<i>Taurotragus oryx</i>) Elk (<i>Cervus sp.</i>) Elk, American (<i>Cervus canadensis</i>) Goat, Rocky Mountain (<i>Oreamnos americanus</i>) Guanaco (<i>Lama guanicoe</i>) Horse, Wild (<i>Equus ferus</i>) Llama (<i>Lama glama</i>) Moose, North American (<i>Alces americanus</i>) Onager, Persian (<i>Equus hemionus onager</i>) Oryx, East African (Beisa) (<i>Oryx beisa</i>)	The Wilds Wildlife Safari The Wilds The Wilds Northwest Trek Wildlife Park Caldwell Zoo* Amarillo Zoo; Oakland Zoo Northwest Trek Wildlife Park The Wilds Cervid Mixed-Species Table ³ The Wilds* Buttonwood Park Zoo; Caldwell Zoo; Connecticut's Beardsley Zoo; Great Plains Zoo; Kansas City Zoo The Wilds Caldwell Zoo; Cape May County Zoo; Living Desert Zoo and Gardens State Park Amarillo Zoo; Bergen County Zoo*; Caldwell Zoo; Great Plains Zoo; Kansas City Zoo; Lee G. Simmons Conservation Park and Wildlife Safari; Lee Richardson Zoo; Minnesota Zoo; North Carolina Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Northwest Trek Wildlife Park*; Oakland Zoo*; Rosamond Gifford Zoo*; Toronto Zoo*; Turtle Back Zoo; Wildlife Safari*; ZooAmerica Wildlife Park Northwest Trek Wildlife Park Wildlife Safari The Wilds* Wildlife Safari Northwest Trek Wildlife Park The Wilds The Wilds*

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<p>Bison, American (<i>Bison bison</i>)</p>	<p>Pronghorn (<i>Antilocapra americana</i>)</p> <p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sheep, Bighorn (<i>Ovis Canadensis</i>)</p>	<p>Amarillo Zoo; Columbus Zoo; Great Plains Zoo; Los Angeles Zoo; Minnesota Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Northwest Trek Wildlife Park; Toronto Zoo* The Wilds</p> <p>The Wilds*</p> <p>Northwest Trek Wildlife Park</p>
<p>Buffalo, Cape (<i>Syncerus caffer</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; White Oak Conservation Center*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>White Oak Conservation Center*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>White Oak Conservation Center*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p>

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<p>Buffalo, Cape (<i>Syncerus caffer</i>)</p>	<p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p>
<p>Buffalo, Water (<i>Bubalus bubalis</i>)</p>	<p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Deer, Axis (<i>Axis axis</i>)</p> <p>Deer, Eld's (<i>Rucervus eldii</i>)</p> <p>Deer, Hog (<i>Axis porcinus</i>)</p> <p>Deer, Pere David's (<i>Elaphurus davidianus</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>)</p> <p>Deer, Sika (<i>Cervus nippon</i>)</p> <p>Gaur (<i>Bos gaurus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kulan (<i>Equus hemionus kulan</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nilgai (<i>Boselaphus tragocamelus</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Tapir, Malayan (<i>Acrocodia indica</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Lion Country Safari</p> <p>Africam Safari Park; Disney's Animal Kingdom; Lion Country Safari</p> <p>Africam Safari Park</p> <p>Disney's Animal Kingdom</p> <p>Cervid Mixed-Species Table³</p> <p>Africam Safari Park</p> <p>Cervid Mixed-Species Table³</p> <p>Africam Safari Park</p> <p>Africam Safari Park</p> <p>Lion Country Safari</p> <p>Lion Country Safari; Parc Safari</p> <p>Lion Country Safari</p> <p>Lion Country Safari</p> <p>Africam Safari Park; Lion Country Safari; Lion Country Safari</p> <p>Parc Safari; Rolling Hills Wildlife Adventure</p> <p>Africam Safari Park</p> <p>Lion Country Safari</p>

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Cattle, Ankole (Watusi) (<i>Bos taurus</i>)	Addax (<i>Addax nasomaculatus</i>)	Disney's Animal Kingdom; Wildlife Safari
	Antelope, Roan (<i>Hippotragus equinus</i>)	Disney's Animal Kingdom; San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Antelope, Sable (<i>Hippotragus niger</i>)	Disney's Animal Kingdom
	Ass, African Wild (<i>Equus africanus</i>)	Disney's Animal Kingdom*
	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)	Disney's Animal Kingdom; Wildlife Safari
	Bontebok (<i>Damaliscus pygargus</i>)	San Diego Zoo Safari Park
	Camel, Dromedary (<i>Camelus dromedarius</i>)	Africam Safari Park
	Deer, Red (<i>Cervus elaphus</i>)	San Diego Zoo Safari Park*
	Eland, Common (<i>Taurotragus oryx</i>)	Africam Safari Park; Disney's Animal Kingdom; Lion Country Safari; Phoenix Zoo; Wildlife Safari
	Gazelle, Addra (Dama) (<i>Nanger dama</i>)	San Diego Zoo Safari Park ¹ ; Toledo Zoo
	Gazelle, Grant's (<i>Gazella granti</i>)	Disney's Animal Kingdom ²
	Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park
	Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)	Africam Safari Park
	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom; Phoenix Zoo
Gemsbok (<i>Oryx gazella</i>)	Lion Country Safari; Wildlife Safari	
Gerenuk (<i>Litocranius walleri</i>)	Phoenix Zoo	
Giraffe (<i>Giraffa camelopardalis</i>)	Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Phoenix Zoo*; Toledo Zoo*; Wildlife Safari	
Hog, Red River (<i>Potamochoerus porcus</i>)	Disney's Animal Kingdom; Disney's Animal Kingdom; Duisburg Zoo ² ; San Diego Zoo Safari Park	
Impala (<i>Aepyceros melampus</i>)	Africam Safari Park; Busch Gardens; Disney's Animal Kingdom; Disney's Animal Kingdom →	

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<p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p>	<p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob (<i>Kobus kob</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Disney's Animal Kingdom; Lion Country Safari; Toledo Zoo</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Toledo Zoo</p> <p>Disney's Animal Kingdom</p> <p>San Diego Zoo Safari Park</p> <p>Africam Safari Park; Busch Gardens; Disney's Animal Kingdom; Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>Busch Gardens; Cape May County Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Wildlife Safari</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park*</p> <p>Virginia Zoo*; Wildlife Safari*</p> <p>San Diego Zoo Safari Park*</p> <p>Africam Safari Park; Disney's Animal Kingdom; Disney's Animal Kingdom; San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom</p> <p>Toledo Zoo</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom; Lion Country Safari; San Diego Zoo Safari Park*; Wildlife Safari</p> <p>Africam Safari Park; Disney's Animal Kingdom; Disney's Animal Kingdom; Lion Country Safari; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Toledo Zoo; Wildlife Safari</p> <p>Safari</p> <p>San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom*; Virginia Zoo*</p> <p>Toledo Zoo*; Wildlife Safari</p>
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<p>Cattle, Domestic (<i>Bos taurus</i>)</p>	<p>Bison, American (<i>Bison bison</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Donkey (<i>Equus africanus asinus</i>) Elk, American (<i>Cervus canadensis</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Horse, Domestic (<i>Equus ferus caballus</i>) Llama (<i>Lama glama</i>) Pig, Domestic (<i>Sus scrofa</i>) Sheep, Domestic (<i>Ovis aries</i>)</p>	<p>Caldwell Zoo* Caldwell Zoo* Buffalo Zoo* Caldwell Zoo* Buffalo Zoo*; Sunset Zoo* Great Plains Zoo* Sunset Zoo* Buffalo Zoo*; Sunset Zoo* Happy Hollow Zoo*; Sunset Zoo*</p>
<p>Camel, Bactrian (<i>Camelus bactrianus</i>)</p>	<p>Banteng (<i>Bos javanicus</i>) Barasingha, Indian (<i>Rucervus duvaucelii</i>) Bison, American (<i>Bison bison</i>) Camel, Dromedary (<i>Camelus dromedarius</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Hybrid (Red Deer/White-lipped) (<i>Cervus elaphus/Cervus albirostris</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Giraffe (<i>Giraffa camelopardalis</i>) Horse, Wild (<i>Equus ferus</i>) Muntjac, Indian (<i>Muntiacus muntjak</i>) Onager, Persian (<i>Equus hemionus onager</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Takin (<i>Budorcas taxicolor</i>) Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>The Wilds Mesker Park Zoo The Wilds Denver Zoological Gardens Detroit Zoo Detroit Zoo The Wilds; The Wilds The Wilds* Fresno Chaffee Zoo Fresno Chaffee Zoo Fresno Chaffee Zoo* Detroit Zoo*; Minnesota Zoo*; San Diego Zoo Safari Park*; Toronto Zoo*; The Wilds Mesker Park Zoo The Wilds The Wilds Detroit Zoo; The Wilds* The Wilds</p>
<p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p>	<p>Camel, Bactrian (<i>Camelus bactrianus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Deer, Red (<i>Cervus elaphus</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Nyala (<i>Tragelaphus angasii</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Pronghorn (<i>Antilocapra americana</i>)</p>	<p>Denver Zoological Gardens Africam Safari Park Cervid Mixed-Species Table³ Africam Safari Park; Africam Safari Park Africam Safari Park* Africam Safari Park; Africam Safari Park Africam Safari Park Brevard Zoo San Diego Zoo*</p>

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Camel, Dromedary (<i>Camelus dromedarius</i>)	Rhinoceros, White (<i>Ceratotherium simum</i>) Springbok (<i>Antidorcas marsupialis</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)	Lion Country Safari* Africam Safari Park Africam Safari Park Africam Safari Park; Africam Safari Park
Gaur (<i>Bos gaurus</i>)	Barasingha, Indian (<i>Rucervus duvaucelii</i>) Bharal (<i>Pseudois nayaur</i>) Blackbuck (<i>Antilope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Axis (<i>Axis axis</i>) Deer, Eld's (<i>Rucervus eldii</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Elk, American (<i>Cervus canadensis</i>) Gayal (<i>Bos frontalis</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Pig, Bornean Bearded (<i>Sus barbatus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Rusa, Javan (<i>Rusa timorensis</i>) Sheep, Wild (<i>Ovis orientalis</i>) Tapir, Malayan (<i>Acrocodia indica</i>)	San Diego Zoo Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park* Africam Safari Park; Los Angeles Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park Africam Safari Park Africam Safari Park; Buffalo Zoo; Los Angeles Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park Bronx Zoo Africam Safari Park San Diego Zoo Safari Park*; San Diego Zoo Safari Park San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Africam Safari Park; San Diego Zoo Safari Park*; San Diego Zoo Safari Park San Diego Zoo Safari Park* San Diego Zoo Safari Park San Diego Zoo Safari Park Toronto Zoo Africam Safari Park; San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park Buffalo Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park San Diego Zoo Safari Park San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park* Africam Safari Park
Gayal (<i>Bos frontalis</i>)	Barasingha, Indian (<i>Rucervus duvaucelii</i>) Blackbuck (<i>Antilope cervicapra</i>)	San Diego Zoo Safari Park San Diego Zoo Safari Park

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<p>Gayal (<i>Bos frontalis</i>)</p>	<p>Deer, Red (<i>Cervus elaphus</i>) Deer, Sambar (<i>Rusa unicolor</i>) Deer, Sika (<i>Cervus nippon</i>) Gaur (<i>Bos gaurus</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>) Sheep, Wild (<i>Ovis orientalis</i>)</p>	<p>San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park San Diego Zoo Safari Park San Diego Zoo Safari Park San Diego Zoo Safari Park*</p>
<p>Guanaco (<i>Lama guanicoe</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antelope cervicapra</i>) Bontebok (<i>Damaliscus pygargus</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, Red Brocket (<i>Mazama temama</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Elk, American (<i>Cervus canadensis</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Llama (<i>Lama glama</i>) Oryx, Arabian (<i>Oryx leucoryx</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Peccary, Collared (<i>Pecari tajacu</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Tapir, South American (<i>Tapirus terrestris</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center Wildlife Safari Wildlife Safari Fossil Rim Wildlife Center Fossil Rim Wildlife Center* Detroit Zoo; Fossil Rim Wildlife Center Fossil Rim Wildlife Center Bergen County Zoo Fossil Rim Wildlife Center Wildlife Safari* Fossil Rim Wildlife Center Salisbury Zoo; Wildlife Safari Fossil Rim Wildlife Center Fossil Rim Wildlife Center Audubon Zoo² Fossil Rim Wildlife Center* Audubon Zoo²; Detroit Zoo Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center*</p>
<p>Llama (<i>Lama glama</i>)</p>	<p>Alpaca (<i>Vicugna pacos</i>) Antelope, Sable (<i>Hippotragus niger</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Bison, American (<i>Bison bison</i>) Cattle, Domestic (<i>Bos taurus</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Sika (<i>Cervus nippon</i>) Elk, American (<i>Cervus canadensis</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>)</p>	<p>Lion Country Safari; Roosevelt Park Zoo Lee G. Simmons Conservation Park and Wildlife Safari Wildlife Safari Wildlife Safari Sunset Zoo* Cervid Mixed-Species Table³ Zoo Boise Wildlife Safari* Capron Park Zoo*; Roosevelt Park Zoo; Sunset Zoo; Zoo Boise*</p>

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Llama (<i>Lama glama</i>)	Guanaco (<i>Lama guanicoe</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Pig, Domestic (<i>Sus scrofa</i>) Sheep, Domestic (<i>Ovis aries</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Salisbury Zoo; Wildlife Safari Lee G. Simmons Conservation Park and Wildlife Safari Sunset Zoo* Roosevelt Park Zoo; Sunset Zoo; Zoo Boise Lion Country Safari
Wisent (European Bison) (<i>Bison bonasus</i>)	Deer, Eld's (<i>Rucervus eldii</i>) Deer, Hog (<i>Axis porcinus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-lipped (<i>Cervus albirostris</i>)	Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³
Yak (<i>Bos grunniens</i>)	Blackbuck (<i>Antilope cervicapra</i>) Caribou (<i>Rangifer tarandus</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Sika (<i>Cervus nippon</i>) Horse, Wild (<i>Equus ferus</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Sheep, Domestic (<i>Ovis aries</i>) Tahr, Himalayan (<i>Hemitragus jemlahicus</i>)	Wildlife Safari Toronto Zoo* Wildlife Safari Toronto Zoo; Wildlife Safari Toronto Zoo* Wildlife Safari Lee Richardson Zoo; Toronto Zoo* Zoo de Granby
Wild Pig, Peccary, and Hippo		
Babirusa, North Sulawesi (<i>Babirusa celebensis</i>)	Anoa, Lowland (<i>Bubalus depressicornis</i>)	Los Angeles Zoo; San Diego Zoo
Hog, Giant Forest (<i>Hylochoerus meinertzhageni</i>)	Hog, Red River (<i>Potamochoerus porcus</i>)	San Diego Zoo ^{2*}
Hog, Red River (<i>Potamochoerus porcus</i>)	Antelope, Roan (<i>Hippotragus equinus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Buffalo, Cape (<i>Syncerus caffer</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Gazelle, Grant's (<i>Gazella granti</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>)	Disney's Animal Kingdom; San Diego Zoo Safari Park Baton Rouge Zoo; Disney's Animal Kingdom; Los Angeles Zoo; Sacramento Zoo; Zoo New England San Diego Zoo* Disney's Animal Kingdom; Disney's Animal Kingdom; Duisburg Zoo ² ; San Diego Zoo Safari Park Disney's Animal Kingdom ² Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom Disney's Animal Kingdom*; Disney's Animal Kingdom*

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Pig, Visayan Warty (<i>Sus cebifrons</i>)	Tapir, Malayan (<i>Acrocodia indica</i>)	San Diego Zoo; Tampa's Lowry Park Zoo
Warthog, Common (<i>Phacochoerus africanus</i>)	Antelope, Sable (<i>Hippotragus niger</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Eland, Giant (<i>Taurotragus derbianus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Cuvier's (<i>Gazella cuvieri</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Springbok (<i>Antidorcas marsupialis</i>) Topi (<i>Damaliscus korrigum jimela</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)	San Diego Zoo ^{2*} Baton Rouge Zoo Toledo Zoo Houston Zoo Toledo Zoo Saint Louis Zoo; San Diego Zoo ² Sedgwick County Zoo Caldwell Zoo; San Diego Zoo ² Toledo Zoo* Caldwell Zoo; Toledo Zoo Caldwell Zoo; Toledo Zoo San Diego Zoo Caldwell Zoo Brookfield Zoo Caldwell Zoo; Toledo Zoo Caldwell Zoo Hagenbeck Zoo ^{2*} ; Houston Zoo*; San Diego Zoo*; Toledo Zoo*

SUCCESSFUL GROUPS OF UNGULATES MIXED WITH NON-UNGULATES (Sorted by Ungulates)

The table below lists all ungulate species that have been mixed successfully with non-ungulate species at AZA institutions. This table is organized alphabetically by TAG, then by subgroups within the TAGs, and finally by common name of the animals included in each subgroup.

The best way to use this table is to search for an ungulate species in the left-hand column and then find which non-ungulate species it has been successfully mixed with by looking in the corresponding middle column; in the right hand column is a list of all institutions that have successfully managed those species together. Please note that a “→” after an institution name means that the list for that specific mix continues on the next page. All institution names have been linked to the corresponding exhibit templates that are provided in this manual; you can click on the institution link to read more about the mixed-species exhibit and its management. Please note, after clicking the link, if you do not see the species you are looking for at the top of the exhibit summary page, scroll down to the "Group/Exhibit Changes Over Time" section.

Next to several institution names, you will find an asterisk (*). These asterisks mean that the subspecies for one or both of the species in the mix was provided for that specific institution.

Information from three past surveys has also been incorporated into this table: information from the 1997/1998 Mixed Antelope Exhibits Survey has a ¹ after the institution name, information from the 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure has a ² after the institution name, and information from the Cervid Mixed-Species Table that was included in the 2014 Cervid RCP did not include institution names, so in the institution column you will see “Cervid Mixed-Species Table³”. These entries do not have links throughout the table; however, the results from these three surveys have been posted on the AZA Ungulates website, and can be accessed by clicking on the links below.

¹ 1997/1998 Mixed Antelope Exhibits Survey

² 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure

³ Cervid Mixed-Species Table that was included in the 2014 Cervid RCP

Ungulate Species	Non-Ungulate Species Mixes (Current and Historic)	Institutions
Antelope and Giraffe		
<i>Aridland Antelope and Gazelles</i>		
Addax (<i>Addax nasomaculatus</i>)	Capybara (<i>Hydrochoerus hydrochaeris</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Demoiselle (<i>Grus virgo</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>)	Gulf Breeze Zoo ¹ Lee Richardson Zoo Lee Richardson Zoo Lee Richardson Zoo Blank Park Zoo; Disney’s Animal Kingdom →

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<p>Addax (<i>Addax nasomaculatus</i>)</p>	<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Shelduck, Common (<i>Tadorna tadorna</i>)</p> <p>Shelduck, South African (Cape) (<i>Tadorna cana</i>)</p> <p>Spoonbill, African (<i>Platalea alba</i>)</p> <p>Stork, Abdim's (<i>Ciconia abdimii</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p>	<p>Omaha's Henry Doorly Zoo & Aquarium*; Saint Louis Zoo*</p> <p>Minnesota Zoo</p> <p>Disney's Animal Kingdom</p> <p>Saint Louis Zoo</p> <p>Saint Louis Zoo</p> <p>Busch Gardens; Dallas Zoo; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Fossil Rim Wildlife Center; Fresno Chaffee Zoo; Kansas City Zoo; Minnesota Zoo; Saint Louis Zoo¹</p> <p>Fresno Chaffee Zoo</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>Fresno Chaffee Zoo</p> <p>Fresno Chaffee Zoo</p> <p>Saint Louis Zoo</p> <p>Disney's Animal Kingdom</p> <p>Gulf Breeze Zoo¹</p>
<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>)</p> <p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Common (<i>Grus grus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Sandhill (<i>Grus canadensis</i>)</p> <p>Crane, Sarus (<i>Grus antigone</i>)</p> <p>Crane, Wattled (<i>Bugeranus carunculatus</i>)</p> <p>Emu (<i>Dromaius novaehollandiae</i>)</p>	<p>Phoenix Zoo</p> <p>Africam Safari Park</p> <p>Binder Park Zoo; White Oak Conservation Center*</p> <p>White Oak Conservation Center</p> <p>Oakland Zoo*</p> <p>Binder Park Zoo; Columbus Zoo*; Indianapolis Zoo*; The Living Desert*; Oakland Zoo*; Omaha's Henry Doorly Zoo & Aquarium*</p> <p>Fossil Rim Wildlife Center</p> <p>Oakland Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo; White Oak Conservation Center; White Oak Conservation Center</p> <p>Fossil Rim Wildlife Center</p>

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<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p>	<p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Tortoise, Spur-thighed (<i>Testudo graeca</i>)</p> <p>Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>)</p> <p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Griffon (<i>Gyps fulvus</i>)</p> <p>Vulture, Hooded (<i>Necrosyrtes monachus</i>)</p> <p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p>	<p>Jackson Zoo; North Carolina Zoo</p> <p>Africam Safari Park</p> <p>Columbus Zoo;</p> <p>Indianapolis Zoo; Oakland Zoo; Toledo Zoo</p> <p>The Living Desert; The Maryland Zoo; White Oak Conservation Center</p> <p>White Oak Conservation Center</p> <p>Africam Safari Park; Binder Park Zoo; Columbus Zoo; Dallas Zoo; Fort Wayne Children's Zoo; Fossil Rim Wildlife Center; Indianapolis Zoo; Jackson Zoo; Montgomery Zoo¹; North Carolina Zoo; Oakland Zoo; Pittsburgh Zoo; Saint Louis Zoo; Toledo Zoo</p> <p>Indianapolis Zoo</p> <p>Binder Park Zoo; Fort Wayne Children's Zoo; Jackson Zoo</p> <p>Columbus Zoo; The Maryland Zoo</p> <p>Fort Wayne Children's Zoo; Indianapolis Zoo</p> <p>The Living Desert</p> <p>Zoo Miami</p> <p>Phoenix Zoo</p> <p>Binder Park Zoo</p> <p>Oakland Zoo</p> <p>Pittsburgh Zoo</p> <p>Oakland Zoo</p> <p>National Zoo</p> <p>Africam Safari Park</p>
<p>Gazelle, Cuvier's (<i>Gazella cuvieri</i>)</p>	<p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p>	<p>Roger Williams Park Zoo</p> <p>Saint Louis Zoo</p> <p>The Living Desert</p> <p>The Living Desert</p>

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Gazelle, Cuvier's (<i>Gazella cuvieri</i>)	Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ostrich, Common (<i>Struthio camelus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>)	Saint Louis Zoo The Living Desert Saint Louis Zoo
Gazelle, Goitered (<i>Gazella subgutturosa</i>)	Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Wattled (<i>Buggeranus carunculatus</i>)	White Oak Conservation Center White Oak Conservation Center* White Oak Conservation Center
Gazelle, Grant's (<i>Nanger granti</i>)	Bustard, Kori (<i>Ardeotis kori</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Guineafowl (<i>sp.</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Guineafowl, Vulturine (<i>Acryllium vulturinum</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ostrich, Common (<i>Struthio camelus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)	North Carolina Zoo North Carolina Zoo Animal Kingdom ^{2*} ; Oklahoma City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Tulsa Zoo* Oklahoma City Zoo; Tulsa Zoo; Woodland Park Zoo Memphis Zoo; Oklahoma City Zoo; Tulsa Zoo Woodland Park Zoo Zoo Miami Animal Kingdom ² Virginia Zoo Birmingham Zoo ¹ ; Busch Gardens; Disney's Animal Kingdom ² ; Lincoln Park Zoo; Memphis Zoo; Minnesota Zoo; North Carolina Zoo; Oklahoma City Zoo*; Virginia Zoo; Woodland Park Zoo; Zoo Miami Animal Kingdom ² ; North Carolina Zoo; Tulsa Zoo North Carolina Zoo Oklahoma City Zoo Disney's Animal Kingdom ²
Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)	Crane, African Crowned (<i>Balearica sp.</i>) Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>)	San Diego Zoo Safari Park San Diego Zoo Safari Park San Diego Zoo Safari Park; San Diego Zoo Safari Park

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<p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p>	<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Buggeranus carunculatus</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Various birds</p>	<p>Columbus Zoo*; The Living Desert*</p> <p>White Oak Conservation Center</p> <p>Columbus Zoo</p> <p>The Living Desert; White Oak Conservation Center</p> <p>Columbus Zoo; Montgomery Zoo¹</p> <p>Columbus Zoo</p> <p>The Living Desert</p> <p>San Diego Zoo Safari Park</p>
<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p>	<p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>)</p>	<p>Caldwell Zoo</p> <p>Saint Louis Zoo</p> <p>Oklahoma City Zoo*</p> <p>Oklahoma City Zoo</p> <p>Africam Safari Park;</p> <p>Oklahoma City Zoo</p> <p>Caldwell Zoo</p> <p>Caldwell Zoo</p> <p>Africam Safari Park;</p> <p>Caldwell Zoo; Oklahoma City Zoo*;</p> <p>Saint Louis Zoo</p> <p>Saint Louis Zoo</p> <p>Oklahoma City Zoo</p>
<p>Gazelle, Speke's (<i>Gazella spekei</i>)</p>	<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Sarus (<i>Grus antigone</i>)</p> <p>Crane, Wattled (<i>Buggeranus carunculatus</i>)</p> <p>Goose, Orinoco (<i>Neochen jubata</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Stork, Abdim's (<i>Ciconia abdimii</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p>	<p>Saint Louis Zoo</p> <p>Indianapolis Zoo*; Saint Louis Zoo*</p> <p>Saint Louis Zoo</p> <p>Saint Louis Zoo</p> <p>Phoenix Zoo</p> <p>Indianapolis Zoo</p> <p>Milwaukee County Zoo</p> <p>Fresno Chaffee Zoo;</p> <p>Fresno Chaffee Zoo;</p> <p>Pueblo Zoo</p> <p>Fresno Chaffee Zoo</p> <p>Indianapolis Zoo</p> <p>Fresno Chaffee Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo</p>

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<p>Gazelle, Speke's (<i>Gazella spekei</i>)</p>	<p>Stork, White (<i>Ciconia ciconia</i>) Stork, Yellow-billed (<i>Mycteria ibis</i>) Tortoise, Spur-thighed (<i>Testudo graeca</i>) Vulture, Cinereous (<i>Aegypius monachus</i>)</p>	<p>Indianapolis Zoo; Saint Louis Zoo; Saint Louis Zoo Fresno Chaffee Zoo Saint Louis Zoo Milwaukee County Zoo</p>
<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Common (<i>Grus grus</i>) Crane, Demoiselle (<i>Grus virgo</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Wattled (<i>Buggeranus carunculatus</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Flamingo, Greater (<i>Phoenicopterus roseus</i>) Goose, Blue-winged (<i>Cyanochen cyanoptera</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Guineafowl (<i>sp.</i>) Guineafowl, Crested (<i>Guttera pucherani</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>)</p>	<p>North Carolina Zoo Africam Safari Park; Disney's Animal Kingdom; North Carolina Zoo Albuquerque Biological Park*; Dallas Zoo* Brevard Zoo; Disney's Animal Kingdom Bronx Zoo* Mesker Park Zoo Binder Park Zoo; Cincinnati Zoo and Botanical Garden*; Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Kansas City Zoo*; Kansas City Zoo*; Phoenix Zoo*; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Toledo Zoo* Disney's Animal Kingdom Indianapolis Zoo¹; Kansas City Zoo Disney's Animal Kingdom Toledo Zoo Disney's Animal Kingdom; Disney's Animal Kingdom; Kansas City Zoo; Kansas City Zoo; Toledo Zoo Disney's Animal Kingdom; North Carolina Zoo Africam Safari Park; Kansas City Zoo; Knoxville Zoo; Milwaukee County Zoo¹; Phoenix Zoo Cincinnati Zoo and Botanical Garden* Columbus Zoo; Toledo Zoo</p>

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<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ibis, African Sacred (<i>Threskiornis aethiopicus</i>) Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>)</p> <p>Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>) Vulture, Cape Griffon (<i>Gyps coprotheres</i>) Vulture, Cinereous (<i>Aegypius monachus</i>) Vulture, Hooded (<i>Necrosyrtes monachus</i>)</p>	<p>Audubon Zoo; Disney's Animal Kingdom Dallas Zoo; Milwaukee County Zoo Toledo Zoo Africam Safari Park; Binder Park Zoo; Bronx Zoo; Cincinnati Zoo and Botanical Garden; Columbus Zoo; Dallas Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Fossil Rim Wildlife Center¹; Fort Wayne Children's Zoo; Jacksonville Zoo¹; Kansas City Zoo; North Carolina Zoo; Phoenix Zoo; Pittsburgh Zoo; San Antonio Zoo¹; Toledo Zoo; Zoo Atlanta¹; Zoo de Granby Cincinnati Zoo and Botanical Garden Albuquerque Biological Park; Dallas Zoo Cincinnati Zoo and Botanical Garden; Indianapolis Zoo¹ Binder Park Zoo; Dallas Zoo; Fort Wayne Children's Zoo; North Carolina Zoo; Zoo de Granby Cincinnati Zoo and Botanical Garden; Columbus Zoo; North Carolina Zoo; Toledo Zoo Fort Wayne Children's Zoo; Indianapolis Zoo¹; Toledo Zoo Phoenix Zoo Toledo Zoo Binder Park Zoo; Milwaukee County Zoo Pittsburgh Zoo</p>
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<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>)</p> <p>Vulture, White-headed (<i>Trigonoceps occipitalis</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p>	<p>Cincinnati Zoo and Botanical Garden; Dallas Zoo; Phoenix Zoo</p> <p>Cincinnati Zoo and Botanical Garden; Disney's Animal Kingdom; Phoenix Zoo</p> <p>Kansas City Zoo</p> <p>Toledo Zoo</p> <p>Africam Safari Park; Jacksonville Zoo¹</p>
<p>Gemsbok (<i>Oryx gazella</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>)</p> <p>Crane, Crowned (<i>Balearic asp.</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>)</p> <p>Pelican, Great White (<i>Pelecanus onocrotalus</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Various birds</p>	<p>North Carolina Zoo</p> <p>North Carolina Zoo</p> <p>Dallas Zoo; Lion Country Safari; Los Angeles Zoo¹; Montgomery Zoo¹; Minnesota Zoo; Nashville Zoo at Grassmere; North Carolina Zoo</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>North Carolina Zoo</p> <p>North Carolina Zoo</p> <p>San Diego Zoo Safari Park</p>
<p>Oryx, Arabian (<i>Oryx leucoryx</i>)</p>	<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Fossil Rim Wildlife Center</p>
<p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p>	<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Egret, Cattle (<i>Bubulcus ibis</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>)</p>	<p>Kansas City Zoo*; Kansas City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo; Kansas City Zoo; Woodland Park Zoo*</p> <p>North Carolina Zoo*</p> <p>Kansas City Zoo</p> <p>Woodland Park Zoo*</p> <p>Kansas City Zoo; North Carolina Zoo*; Woodland Park Zoo*</p> <p>Kansas City Zoo</p>
<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p>	<p>Cape May County Zoo</p> <p>Lehigh Valley Zoo*; San Francisco Zoo*; White Oak Conservation Center*</p>

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<p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p>	<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>)</p> <p>Shelduck, Common (<i>Tadorna tadorna</i>)</p> <p>Shelduck, South African (Cape) (<i>Tadorna cana</i>)</p> <p>Spoonbill, African (<i>Platalea alba</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Disney's Animal Kingdom*; Disney's Animal Kingdom*; San Francisco Zoo*; White Oak Conservation Center*</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom Staten Island Zoo</p> <p>Brevard Zoo; Denver Zoological Gardens; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Lion Country Safari; Potter Park Zoo; San Francisco Zoo; Staten Island Zoo; The Wilds</p> <p>Denver Zoological Gardens</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; San Francisco Zoo</p> <p>Disney's Animal Kingdom; National Zoo</p>
Forest Woodland		
<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p>	<p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Buggeranus carunculatus</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p>	<p>White Oak Conservation Center*</p> <p>White Oak Conservation Center</p> <p>Disney's Animal Kingdom*; Disney's Animal Kingdom*; White Oak Conservation Center*</p> <p>White Oak Conservation Center</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; Fossil Rim Wildlife Center</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>Disney's Animal Kingdom</p>
<p>Antelope, Royal (<i>Neotragus pygmaeus</i>)</p>	<p>Hornbill, Red-billed (<i>Tockus sp.</i>)</p>	<p>Brookfield Zoo; Brookfield Zoo</p>

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<p>Antelope, Royal (<i>Neotragus pygmaeus</i>)</p>	<p>Shrew, Black & White Giant Elephant (<i>Rhynchocyon petersi</i>) Starling, Superb (<i>Lamprotornis superbus</i>) Turaco, White-crested (<i>Tauraco leucolophus</i>)</p>	<p>Brookfield Zoo Los Angeles Zoo Los Angeles Zoo</p>
<p>Antelope, Sable (<i>Hippotragus niger</i>)</p>	<p>Crane, African Crowned (<i>Balearica sp.</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Flamingo, Greater (<i>Phoenicopterus roseus</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Guineafowl (<i>sp.</i>) Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Great White (<i>Pelecanus onocrotalus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Various birds Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Disney's Animal Kingdom Kansas City Zoo* Kansas City Zoo Disney's Animal Kingdom Kansas City Zoo Jackson Zoo Kansas City Zoo Busch Gardens; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Jacksonville Zoo¹; Jackson Zoo; Kansas City Zoo; Lee G. Simmons Conservation Park and Wildlife Safari San Diego Zoo Safari Park San Diego Zoo Safari Park Jackson Zoo San Diego Zoo Safari Park Cheyenne Mountain Zoo</p>
<p>Blackbuck (<i>Antelope cervicapra</i>)</p>	<p>Capybara (<i>Hydrochoerus hydrochaeris</i>) Crane, Demoiselle (<i>Grus virgo</i>) Crane, Sandhill (<i>Grus canadensis</i>) Crane, Sarus (<i>Grus antigone</i>) Crane, White-naped (<i>Grus vipio</i>) Crocodile, American (<i>Crocodylus acutus</i>) Emu (<i>Dromaius novaehollandiae</i>)</p> <p>Goose, Bar-headed (<i>Anser indicus</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Ostrich, Common (<i>Struthio camelus</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>)</p> <p>Pheasant, Golden (<i>Chrysolophus pictus</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p>	<p>Gulf Breeze Zoo¹ Africam Safari Park Fossil Rim Wildlife Center Disney's Animal Kingdom Wildlife Safari Africam Safari Park Fossil Rim Wildlife Center; Wildlife Safari Disney's Animal Kingdom Africam Safari Park Fossil Rim Wildlife Center Africam Safari Park; Disney's Animal Kingdom Africam Safari Park Wildlife Safari Disney's Animal Kingdom</p>
<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p>	<p>Colobus, Black and White (<i>Colobus guereza</i>) Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p>	<p>Caldwell Zoo Dickerson Park Zoo; Fort Worth Zoo; Gladys Porter Zoo; Kansas City Zoo; San Diego Zoo Safari Park Albuquerque Biological Park* →</p>

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<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p>	<p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Sandhill (<i>Grus canadensis</i>)</p> <p>Crane, Wattled (<i>Bugeranus carunculatus</i>)</p> <p>Emu (<i>Dromaius novaehollandiae</i>)</p> <p>Fox, Bat-eared (<i>Otocyon megalotis</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Heron, Goliath (<i>Ardea goliath</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, African Ground (<i>Bucorvus sp.</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Chehaw Wild Animal Park; Roosevelt Park Zoo; White Oak Conservation Center*</p> <p>Jacksonville Zoo and Gardens; White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center</p> <p>Great Plains Zoo*; Great Plains Zoo*; Virginia Zoo*; White Oak Conservation Center*; White Oak Conservation Center*</p> <p>Fossil Rim Wildlife Center</p> <p>White Oak Conservation Center; White Oak Conservation Center</p> <p>Fossil Rim Wildlife Center</p> <p>Los Angeles Zoo</p> <p>Jacksonville Zoo and Gardens; Omaha's Henry Doorly Zoo & Aquarium; Virginia Zoo</p> <p>North Carolina Zoo</p> <p>Gladys Porter Zoo; Memphis Zoo; Minnesota Zoo</p> <p>Disney's Animal Kingdom; John Ball Zoo</p> <p>Los Angeles Zoo</p> <p>Los Angeles Zoo; Omaha's Henry Doorly Zoo & Aquarium; White Oak Conservation Center; White Oak Conservation Center</p> <p>Dickerson Park Zoo</p> <p>John Ball Zoo; Potter Park Zoo</p> <p>Disney's Animal Kingdom; Great Plains Zoo; Memphis Zoo; Milwaukee County Zoo¹; Minnesota Zoo; Montgomery Zoo¹; North Carolina Zoo →</p>
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<p>Bongo, Eastern (Mountain) <i>(Tragelaphus eurycerus isaaci)</i></p>	<p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Tortoise, Sulcata (African Spurred) <i>(Centrochelys sulcata)</i></p> <p>Vulture, Hooded (<i>Necrosyrtes monachus</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p>	<p>North Carolina Zoo; Pittsburgh Zoo Jacksonville Zoo and Gardens; San Diego Zoo Safari Park Albuquerque Biological Park Disney's Animal Kingdom; Saint Louis Zoo Disney's Animal Kingdom Milwaukee County Zoo</p> <p>Pittsburgh Zoo John Ball Zoo Caldwell Zoo</p>
<p>Eland, Common <i>(Taurotragus oryx)</i></p>	<p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Flamingo, Greater (<i>Phoenicopterus roseus</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Africam Safari Park; Disney's Animal Kingdom Dallas Zoo*; Mesker Park Zoo*</p> <p>Blank Park Zoo; Cincinnati Zoo and Botanical Garden*; Kansas City Zoo; Phoenix Zoo*</p> <p>Disney's Animal Kingdom Kansas City Zoo; Oakland Zoo</p> <p>Africam Safari Park; Africam Safari Park; Blank Park Zoo; Phoenix Zoo Audubon Zoo</p> <p>Dallas Zoo</p> <p>Africam Safari Park; Africam Safari Park; Busch Gardens*; Chehaw Wild Animal Park; Detroit Zoo; Disney's Animal Kingdom; Fresno Chaffee Zoo; Fresno Chaffee Zoo; Indianapolis Zoo; Lion Country Safari; Milwaukee County Zoo; Nashville Zoo at Grassmere; Phoenix Zoo; Pittsburgh Zoo; Riverbanks Zoo¹; Sacramento Zoo →</p>

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<p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>)</p> <p>Pelican, Great White (<i>Pelecanus onocrotalus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>)</p> <p>Stork, Abdim's (<i>Ciconia abdimii</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>)</p> <p>Various birds</p> <p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Griffon (<i>Gyps fulvus</i>)</p> <p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p>	<p>Sacramento Zoo; Saint Louis Zoo¹; Zoo de Granby</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>Detroit Zoo; Fresno Chaffee Zoo</p> <p>Dallas Zoo</p> <p>Fresno Chaffee Zoo</p> <p>Dallas Zoo; Mesker Park Zoo; Milwaukee County Zoo; Zoo de Granby</p> <p>Detroit Zoo</p> <p>Fresno Chaffee Zoo; Phoenix Zoo</p> <p>Detroit Zoo</p> <p>San Diego Zoo Safari Park*</p> <p>Detroit Zoo</p> <p>Detroit Zoo</p> <p>Cincinnati Zoo and Botanical Garden; Dallas Zoo; Phoenix Zoo</p> <p>Phoenix Zoo</p> <p>Kansas City Zoo</p> <p>Africam Safari Park</p>
<p>Eland, Giant (<i>Taurotragus derbianus</i>)</p>	<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Bufo carunculatus</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p>	<p>White Oak Conservation Center</p> <p>Cincinnati Zoo and Botanical Garden*</p> <p>White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center</p> <p>White Oak Conservation Center</p> <p>White Oak Conservation Center</p> <p>Los Angeles Zoo¹</p> <p>Houston Zoo</p> <p>Cincinnati Zoo and Botanical Garden</p>

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<p>Gerenuk (<i>Litocranius walleri</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>)</p> <p>Crane, African Crowned (<i>Balearica sp.</i>) Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Duck, White-faced Whistling (<i>Dendrocygna viduata</i>) Guineafowl (<i>sp.</i>) Hornbill (<i>Bucerotidae sp.</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>) Stork, White (<i>Ciconia ciconia</i>)</p> <p>Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>) Vulture, Lappet-faced (<i>Torgos tracheliotos</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Denver Zoological Gardens; Disney's Animal Kingdom; Phoenix Zoo Cameron Park Zoo* Albuquerque Biological Park*; Dallas Zoo; Denver Zoological Gardens* Dallas Zoo; Phoenix Zoo*; Saint Louis Zoo*; Saint Louis Zoo* Dallas Zoo</p> <p>Phoenix Zoo Forth Worth Zoo Denver Zoological Gardens; Oklahoma City Zoo Dallas Zoo</p> <p>Phoenix Zoo; Saint Louis Zoo Albuquerque Biological Park; Dallas Zoo Cameron Park Zoo*; Dallas Zoo; Saint Louis Zoo; Saint Louis Zoo Phoenix Zoo Saint Louis Zoo; Saint Louis Zoo Phoenix Zoo</p> <p>Dallas Zoo; Phoenix Zoo Phoenix Zoo</p>
<p>Impala (<i>Aepyceros melampus</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>) Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>)</p>	<p>North Carolina Zoo Africam Safari Park; Caldwell Zoo; North Carolina Zoo Binder Park Zoo Brevard Zoo; Disney's Animal Kingdom Binder Park Zoo; Cincinnati Zoo and Botanical Garden*; Disney's Animal Kingdom*; Disney's Animal Kingdom* →</p>

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Impala (<i>Aepyceros melampus</i>)	Crane, Grey Crowned (<i>Balearica regulorum</i>)	Disney's Animal Kingdom*; Disney's Animal Kingdom; Kansas City Zoo; Kansas City Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park*
	Crane, Wattled (<i>Bufo carunculatus</i>)	Disney's Animal Kingdom
	Egret, Cattle (<i>Bubulcus ibis</i>)	Kansas City Zoo
	Goose, Egyptian (<i>Alopochen aegyptiaca</i>)	Disney's Animal Kingdom; Disney's Animal Kingdom; Kansas City Zoo; Kansas City Zoo
	Goose, Spur-winged (<i>Plectropterus gambensis</i>)	Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom
	Guineafowl (<i>sp.</i>)	Africam Safari Park; Africam Safari Park; Kansas City Zoo
	Guineafowl, Crested (<i>Guttera pucherani</i>)	Cincinnati Zoo and Botanical Garden*
	Guineafowl, Helmeted (<i>Numida meleagris</i>)	Caldwell Zoo; Dallas Zoo; Toledo Zoo
	Guineafowl, Vulturine (<i>Acryllium vulturinum</i>)	Dallas Zoo
	Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)	Disney's Animal Kingdom
	Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)	Dallas Zoo; Milwaukee County Zoo; Toronto Zoo
	Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)	Caldwell Zoo
	Ostrich, Common (<i>Struthio camelus</i>)	Africam Safari Park; Africam Safari Park; Binder Park Zoo; Busch Gardens; Caldwell Zoo; Chehaw Wild Animal Park; Cincinnati Zoo and Botanical Garden; Dallas Zoo; Dallas Zoo; Disney's Animal Kingdom; Fresno Chaffee Zoo; Kansas City Zoo; Lion Country Safari; Lion Country Safari; North Carolina Zoo; Toledo Zoo; Toledo Zoo ¹ ; Toronto Zoo; Zoo Atlanta ¹
Pelican, Pink-backed (<i>Pelecanus rufescens</i>)	Cincinnati Zoo and Botanical Garden; Fresno Chaffee Zoo	

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<p>Impala (<i>Aepyceros melampus</i>)</p>	<p>Shelduck, Common (<i>Tadorna tadorna</i>) Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Shelduck, South African (Cape) (<i>Tadorna cana</i>) Spoonbill, African (<i>Platalea alba</i>) Stork, Abdim's (<i>Ciconia abdimii</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>) Stork, Yellow-billed (<i>Mycteria ibis</i>) Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>) Vulture, White-headed (<i>Trigonoceps occipitalis</i>) Waterfowl (<i>assorted sp.</i>)</p>	<p>Disney's Animal Kingdom Cincinnati Zoo and Botanical Garden Disney's Animal Kingdom Disney's Animal Kingdom Fresno Chaffee Zoo Binder Park Zoo; Dallas Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; North Carolina Zoo; Oregon Zoo Cincinnati Zoo and Botanical Garden; Los Angeles Zoo¹; North Carolina Zoo Dickerson Park Zoo* Fresno Chaffee Zoo Binder Park Zoo; Milwaukee County Zoo Cincinnati Zoo and Botanical Garden; Dallas Zoo Cincinnati Zoo and Botanical Garden; Disney's Animal Kingdom; Disney's Animal Kingdom Kansas City Zoo Toronto Zoo Africam Safari Park</p>
<p>Kudu (<i>Tragelaphus sp.</i>)</p>	<p>Crane, Common (<i>Grus grus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Sarus (<i>Grus antigone</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Ostrich, Common (<i>Sruthio camelus</i>) Vulture, Griffon (<i>Gyps fulvus</i>) Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p>	<p>Oakland Zoo* Oakland Zoo* Oakland Zoo Oakland Zoo Oakland Zoo Oakland Zoo Oakland Zoo</p>
<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>) Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p>	<p>North Carolina Zoo Caldwell Zoo; Cameron Park Zoo; Los Angeles Zoo; North Carolina Zoo Dallas Zoo*; San Francisco Zoo* Binder Park Zoo; Columbus Zoo*; Indianapolis Zoo →</p>

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<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Sandhill (<i>Grus canadensis</i>)</p> <p>Crane, Wattled (<i>Bufo carunculatus</i>)</p> <p>Duck, Whistling Tree (<i>Dendrocygna autumnalis</i>)</p> <p>Duck, Yellow-billed (<i>Anas undulata</i>)</p> <p>Egret, Cattle (<i>Bubulcus ibis</i>)</p> <p>Emu (<i>Dromaius novaehollandiae</i>)</p> <p>Goose, Blue-winged (<i>Cyanochen cyanoptera</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Guineafowl, Vulturine (<i>Acryllium vulturinum</i>)</p> <p>Heron, Goliath (<i>Ardea goliath</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Hyrax, Rock (<i>Procavia capensis</i>)</p> <p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Jacksonville Zoo and Gardens*; Kansas City Zoo*; Kansas City Zoo*; Mesker Park Zoo; San Francisco Zoo; Toledo Zoo*</p> <p>Fossil Rim Wildlife Center</p> <p>Jacksonville Zoo and Gardens</p> <p>Indianapolis Zoo</p> <p>Jacksonville Zoo and Gardens</p> <p>Kansas City Zoo</p> <p>Fossil Rim Wildlife Center</p> <p>Toledo Zoo</p> <p>Indianapolis Zoo; Jacksonville Zoo and Gardens; Kansas City Zoo; Kansas City Zoo; The Living Desert; Toledo Zoo</p> <p>North Carolina Zoo</p> <p>Kansas City Zoo; Knoxville Zoo</p> <p>Caldwell Zoo; Columbus Zoo; Dallas Zoo; Disney's Animal Kingdom; Toledo Zoo</p> <p>Dallas Zoo</p> <p>Jacksonville Zoo and Gardens</p> <p>Mesker Park Zoo</p> <p>Dallas Zoo; Toronto Zoo</p> <p>Los Angeles Zoo</p> <p>Caldwell Zoo; Toledo Zoo</p> <p>Binder Park Zoo; Busch Gardens; Caldwell Zoo; Columbus Zoo; Dallas Zoo; Dallas Zoo; Fresno Chaffee Zoo; Gladys Porter Zoo; Indianapolis Zoo; Jacksonville Zoo and Gardens; Kansas City Zoo; Lion Country Safari; The Living Desert →</p>
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<p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p>	<p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>)</p> <p>Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Stork, Abdim's (<i>Ciconia abdimii</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Tortoise, Leopard (<i>Stigmochelys pardalis</i>)</p> <p>Tortoise, Spur-thighed (<i>Testudo graeca</i>) Vulture, Cape Griffon (<i>Gyps coprotheres</i>) Vulture, Cinereous (<i>Aegypius monachus</i>) Vulture, Lappet-faced (<i>Torgos tracheliotos</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>) Vulture, White-backed (<i>Gyps africanus</i>)</p> <p>Vulture, White-headed (<i>Trionoceps occipitalis</i>)</p>	<p>Mesker Park Zoo; Milwaukee County Zoo; Montgomery Zoo¹; North Carolina Zoo; San Francisco Zoo; Toledo Zoo; Toledo Zoo; Toronto Zoo</p> <p>San Diego Zoo Safari Park Fresno Chaffee Zoo; San Diego Zoo Safari Park Dallas Zoo; Los Angeles Zoo</p> <p>Jacksonville Zoo and Gardens Fresno Chaffee Zoo Binder Park Zoo; Cameron Park Zoo; Dallas Zoo; Indianapolis Zoo; Jacksonville Zoo and Gardens; Milwaukee County Zoo; North Carolina Zoo; San Francisco Zoo; Toronto Zoo</p> <p>Columbus Zoo; Disney's Animal Kingdom; Jacksonville Zoo and Gardens; North Carolina Zoo; Toledo Zoo Dickerson Park Zoo*; Toledo Zoo</p> <p>Disney's Animal Kingdom; Fresno Chaffee Zoo Jacksonville Zoo and Gardens Zoo Miami Toledo Zoo Binder Park Zoo Dallas Zoo Indianapolis Zoo Jacksonville Zoo and Gardens; Kansas City Zoo Toledo Zoo; Toronto Zoo</p>
<p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p>	<p>Crane, African Crowned (<i>Balearica sp.</i>) Crane, Black Crowned (<i>Balearica pavonina</i>)</p>	<p>Como Zoo Dallas Zoo*</p>

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<p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p>	<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Common (<i>Grus grus</i>) Crane, Demoiselle (<i>Grus virgo</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Buggeranus carunculatus</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>) Guineafowl, Crested (<i>Guttera pucherani</i>)</p> <p>Hornbill (<i>Bucerotidae sp.</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>) Shelduck, Common (<i>Tadorna tadorna</i>) Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Shelduck, South African (Cape) (<i>Tadorna cana</i>) Spoonbill, African (<i>Platalea alba</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>) Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>) Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p>	<p>White Oak Conservation Center Bronx Zoo* Como Zoo Blank Park Zoo; Cincinnati Zoo and Botanical Garden*; Disney's Animal Kingdom White Oak Conservation Center Disney's Animal Kingdom Cincinnati Zoo and Botanical Garden* Fort Worth Zoo The Maryland Zoo; National Zoo; White Oak Conservation Center Dallas Zoo; White Oak Conservation Center Bronx Zoo; Cincinnati Zoo and Botanical Garden; Detroit Zoo; Kansas City Zoo; Los Angeles Zoo; Saint Louis Zoo; Zoo Atlanta Cincinnati Zoo and Botanical Garden Dallas Zoo Disney's Animal Kingdom Cincinnati Zoo and Botanical Garden Disney's Animal Kingdom Disney's Animal Kingdom Dallas Zoo; Saint Louis Zoo; Saint Louis Zoo Cincinnati Zoo and Botanical Garden; The Maryland Zoo; Saint Louis Zoo; Saint Louis Zoo Como Zoo Como Zoo; Detroit Zoo Cincinnati Zoo and Botanical Garden; Dallas Zoo; Denver Zoological Gardens</p>
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Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)	Cincinnati Zoo and Botanical Garden; Disney's Animal Kingdom
Nyala (<i>Tragelaphus angasii</i>)	<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Bufo carunculatus</i>)</p> <p>Goose, Blue-winged (<i>Cyanochen cyanoptera</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Tortoise, Spur-thighed (<i>Testudo graeca</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Disney's Animal Kingdom; White Oak Conservation Center; White Oak Conservation Center Bronx Zoo*; Denver Zoological Gardens*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Saint Louis Zoo*; Saint Louis Zoo*</p> <p>Disney's Animal Kingdom Bronx Zoo</p> <p>Disney's Animal Kingdom; Utah's Hogle Zoo</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom Africam Safari Park</p> <p>Disney's Animal Kingdom; Utah's Hogle Zoo Denver Zoological Gardens; Disney's Animal Kingdom; White Oak Conservation Center Tampa's Lowry Park Zoo</p> <p>Africam Safari Park; Baton Rouge Zoo; Chehaw Wild Animal Park; Disney's Animal Kingdom; North Carolina Zoo; Sacramento Zoo; Utah's Hogle Zoo Bronx Zoo; Disney's Animal Kingdom; Houston Zoo; Reid Park Zoo; Tampa's Lowry Park Zoo</p> <p>Disney's Animal Kingdom; Los Angeles Zoo Saint Louis Zoo; Saint Louis Zoo</p> <p>Reid Park Zoo Disney's Animal Kingdom</p>
Nilgai (<i>Boselaphus tragocamelus</i>)	<p>Crane, Common (<i>Grus grus</i>)</p> <p>Crane, Demoiselle (<i>Grus virgo</i>)</p>	<p>Mesker Park Zoo*</p> <p>Africam Safari Park</p>

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<p>Nilgai (<i>Boselaphus tragocamelus</i>)</p>	<p>Crane, White-naped (<i>Grus vipio</i>) Crocodile, American (<i>Crocodylus acutus</i>) Emu (<i>Dromaius novaehollandiae</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>) Pheasant, Golden (<i>Chrysolophus pictus</i>) Rhea, Greater (American) (<i>Rhea americana</i>)</p>	<p>Wildlife Safari Africam Safari Park Wildlife Safari Africam Safari Park Africam Safari Park Africam Safari Park Wildlife Safari</p>
<p>Sitatunga (<i>Tragelaphus spekii</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>) Capybara (<i>Hydrochoerus hydrochaeris</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Demoiselle (<i>Grus virgo</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Hornbill, Abyssinian Ground (<i>Bucorbus abyssinicus</i>) Ostrich, Common (<i>Struthio camelus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Stork, White (<i>Ciconia ciconia</i>) Waterfowl (<i>assorted sp.</i>)</p>	<p>North Carolina Zoo Gulf Breeze Zoo^{1*} The Maryland Zoo* North Carolina Zoo Mesker Park Zoo Fort Wayne Children's Zoo; San Diego Zoo Safari Park; San Diego Zoo Safari Park* North Carolina Zoo The Maryland Zoo Jacksonville Zoo¹; North Carolina Zoo North Carolina Zoo North Carolina Zoo The Maryland Zoo; Mesker Park Zoo Gulf Breeze Zoo^{1*}</p>
<p>Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Flamingo, Greater (<i>Phoenicopterus roseus</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Guineafowl (<i>sp.</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Hyrax, Rock (<i>Procavia capensis</i>) Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>North Carolina Zoo Cameron Park Zoo; Los Angeles Zoo; North Carolina Zoo Disney's Animal Kingdom*; Mesker Park Zoo*; Santa Fe College Teaching Zoo*; Tulsa Zoo* Disney's Animal Kingdom Disney's Animal Kingdom; Jackson Zoo Africam Safari Park Mesker Park Zoo Los Angeles Zoo Africam Safari Park; Denver Zoological Gardens; Fresno Chaffee Zoo; Jackson Zoo; Mesker Park Zoo →</p>

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<p>Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Great White (<i>Pelecanus onocrotalus</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>) Secretarybird (<i>Sagittarius serpentarius</i>) Shelduck, Common (<i>Tadorna tadorna</i>) Shelduck, South African (Cape) (<i>Tadorna cana</i>) Spoonbill, African (<i>Platalea alba</i>) Stork, Abdim's (<i>Ciconia abdimii</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Stork, White (<i>Ciconia ciconia</i>) Stork, Yellow-billed (<i>Mycteria ibis</i>) Tortoise, Asian Forest (<i>Manouria emys</i>)</p> <p>Tortoise, Leopard (<i>Stigmochelys pardalis</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Nashville Zoo at Grassmere; North Carolina Zoo; Pittsburgh Zoo San Diego Zoo Safari Park San Diego Zoo Safari Park Fresno Chaffee Zoo Los Angeles Zoo Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Fresno Chaffee Zoo Cameron Park Zoo; Jackson Zoo; North Carolina Zoo North Carolina Zoo</p> <p>Tulsa Zoo Fresno Chaffee Zoo Santa Fe College Teaching Zoo Santa Fe College Teaching Zoo Disney's Animal Kingdom</p>
Hartebeest		
<p>Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Bustards, Kori (<i>Ardeotis kori</i>) Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Buggeranus carunculatus</i>)</p> <p>Duck, Yellow-billed (<i>Anas undulata</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p>	<p>Los Angeles Zoo¹ Binder Park Zoo; White Oak Conservation Center*; White Oak Conservation Center* Binder Park Zoo; Jacksonville Zoo and Gardens*; White Oak Conservation Center* White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center Jacksonville Zoo and Gardens Jacksonville Zoo and Gardens Cleveland Metroparks Zoo</p>

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<p>Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Heron, Goliath (<i>Ardea goliath</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Various birds</p> <p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Hooded (<i>Necrosyrtes monachus</i>)</p> <p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>)</p>	<p>Jacksonville Zoo and Gardens</p> <p>White Oak Conservation Center</p> <p>Dallas Zoo</p> <p>Binder Park Zoo; Denver Zoological Gardens*; Detroit Zoo^{1*}; Disney's Animal Kingdom; Fossil Rim Wildlife Center*; Kansas City Zoo*; Nashville Zoo at Grassmere; Mesker Park Zoo¹; North Carolina Zoo*; Pittsburgh Zoo* Jacksonville Zoo and Gardens</p> <p>Binder Park Zoo; Cleveland Metroparks Zoo; Dallas Zoo; Jacksonville Zoo and Gardens; Zoo Miami¹</p> <p>Cleveland Metroparks Zoo</p> <p>San Diego Zoo Safari Park*</p> <p>Binder Park Zoo</p> <p>Pittsburgh Zoo*</p> <p>Dallas Zoo</p> <p>Cleveland Metroparks Zoo</p>
<p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>)</p> <p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p>	<p>North Carolina Zoo</p>
<p>Topi (<i>Damaliscus korrigum jimela</i>)</p>	<p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Caldwell Zoo</p> <p>San Diego Zoo Safari Park*</p> <p>Caldwell Zoo</p> <p>Caldwell Zoo</p> <p>Caldwell Zoo; Indianapolis Zoo*; Gulf Breeze Zoo^{1*}</p>
<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Capybara (<i>Hydrochoerus hydrochaeris</i>)</p> <p>Crane, African Crowned (<i>Balearica sp.</i>)</p>	<p>Gulf Breeze Zoo^{1*}</p> <p>Africam Safari Park; Caldwell Zoo; Disney's Animal Kingdom</p>

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<p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p>	<p>Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Indianapolis Zoo*; San Diego Zoo Safari Park; San Diego Zoo Safari Park; Toledo Zoo* Indianapolis Zoo</p>
	<p>Duck, Whistling Tree (<i>Dendrocygna autumnalis</i>)</p>	
	<p>Flamingo, Greater (<i>Phoenicopterus roseus</i>)</p>	<p>Disney's Animal Kingdom Toledo Zoo</p>
	<p>Goose, Blue-winged (<i>Cyanochen cyanoptera</i>)</p>	<p>Disney's Animal Kingdom; Indianapolis Zoo; Toledo Zoo</p>
	<p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p>	
	<p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p>	<p>Disney's Animal Kingdom</p>
	<p>Guineafowl (<i>sp.</i>)</p>	<p>Africam Safari Park; Africam Safari Park; Minnesota Zoo</p>
	<p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p>	<p>Caldwell Zoo; Columbus Zoo; Toledo Zoo</p>
	<p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p>	<p>Caldwell Zoo; Toledo Zoo</p>
	<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Africam Safari Park; Africam Safari Park; Busch Gardens; Caldwell Zoo; Chehaw Wild Animal Park; Columbus Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Fossil Rim Wildlife Center; Fresno Chaffee Zoo; Indianapolis Zoo; Lion Country Safari; Lion Country Safari; Minnesota Zoo; Minnesota Zoo; Minnesota Zoo; Toledo Zoo; Zoo New England*</p>
<p>Pelican (<i>Pelecanus sp.</i>)</p>	<p>Audubon Zoo</p>	
<p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p>	<p>Fresno Chaffee Zoo</p>	
<p>Stork, Abdim's (<i>Ciconia abdimii</i>)</p>	<p>Fresno Chaffee Zoo</p>	
<p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p>	<p>Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Indianapolis Zoo</p>	
<p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p>	<p>Columbus Zoo; Toledo Zoo</p>	

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Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Vulture, White-backed (<i>Gyps africanus</i>) Waxbill, Gold-breasted (<i>Amandava subflava</i>) Weaver, White-headed Buffalo (<i>Dinemellia dinemelli</i>) Whydah, Pin-tailed (<i>Vidua macroura</i>)	Kansas City Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo
Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Barbet, Brown-breasted (<i>Lybius melanopterus</i>) Barbet, Crested (<i>Trachyphonus vaillantii</i>) Bulbul, Common (<i>Pycnonotus barbatus</i>) Bustard, Kori (<i>Ardeotis kori</i>) Duck, White-faced Whistling (<i>Dendrocygna viduata</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Go-away Bird, Bare-faced (<i>Corythaixoides personatus</i>) Grenadier, Purple (<i>Uraeginthus ianthinogaster</i>) Guenon, De Brazza's (<i>Cercopithecus neglectus</i>) Guineafowl (<i>sp.</i>) Hammerkop (<i>Scopus umbretta</i>) Roller, Lilac-breasted (<i>Coracias caudatus</i>) Spurfowl, Yellow-necked (<i>Pternistis leucoscepus</i>) Starling, Golden-breasted (<i>Lamprotornis regius</i>) Starling, Superb (<i>Lamprotornis superbus</i>) Teal, Hottentot (<i>Anas hottentota</i>) Thrush, Red-tailed Laughing (<i>Trochalopteron milnei</i>) Tortoise, Leopard (<i>Stigmochelys pardalis</i>) Tortoise, Spur-thighed (<i>Testudo graeca</i>) Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>) Turaco, White-cheeked (<i>Tauraco leucotis</i>) Whydah, Pin-tailed (<i>Vidua macroura</i>)	Kansas City Zoo Kansas City Zoo Kansas City Zoo Phoenix Zoo Kansas City Zoo North Carolina Zoo Kansas City Zoo Kansas City Zoo Cincinnati Zoo ¹ Denver Zoological Gardens Kansas City Zoo Kansas City Zoo Denver Zoological Gardens Kansas City Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo North Carolina Zoo North Carolina Zoo Phoenix Zoo Kansas City Zoo Kansas City Zoo
Duiker (<i>sp.</i>)	Guineafowl, Helmeted (<i>Numida meleagris</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Vulture, White-backed (<i>Gyps africanus</i>)	John Ball Zoo John Ball Zoo John Ball Zoo
Duiker, Black (<i>Cephalophus niger</i>)	Starling, Superb (<i>Lamprotornis superbus</i>) Stork, White (<i>Ciconia ciconia</i>) Turaco, Lady Ross (<i>Musophaga rossae</i>) Turaco, Violaceous (<i>Musophaga violacea</i>) Turaco, White-crested (<i>Tauraco leucolophus</i>) Weaver, White-headed Buffalo (<i>Dinemellia dinemelli</i>)	Los Angeles Zoo Zoo Miami ¹ Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo

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<p>Duiker, Bay (<i>Cephalophus dorsalis</i>)</p>	<p>Bat, Rodriguez (Flying Fox) Fruit (<i>Pteropus rodricensis</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Galago, Moholi (Mohol Bushbaby) (<i>Galago moholi</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Porcupine, Prehensile-tailed (<i>Coendou sp.</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p>	<p>Bronx Zoo Ellen Trout Zoo* Bronx Zoo Tampa’s Lowry Park Zoo Bronx Zoo Tampa’s Lowry Park Zoo; Tampa’s Lowry Park Zoo</p>
<p>Duiker, Blue (<i>Philantomba monticola</i>)</p>	<p>Crane, Demoiselle (<i>Grus virgo</i>) Goose, Blue-winged (<i>Cyanochen cyanoptera</i>) Hornbill, Red-billed (<i>Tockus sp.</i>) Hornbill, Silvery-cheeked (<i>Bycanistes brevis</i>) Peafowl (<i>Pavo sp.</i>) Screamer, Crested (Southern) (<i>Chauna torquata</i>) Teal, Hottentot (<i>Anas hottentota</i>) Tortoise, Spider (<i>Pyxis arachnoides</i>)</p>	<p>Virginia Zoo Oklahoma City Zoo Brookfield Zoo Denver Zoological Gardens Northeastern Wisconsin Zoo (NEW Zoo) Virginia Zoo Moody Gardens Moody Gardens</p>
<p>Duiker, Maxwell’s (<i>Philantomba maxwellii</i>)</p>	<p>Aardvark (<i>Orycteropus afer</i>) Colobus, Black and White (<i>Colobus guereza</i>) Lovebird, Black-cheeked (<i>Agapornis nigrigenis</i>) Owl, White-faced Scops (<i>Ptilopsis leucotis</i>)</p>	<p>Bronx Zoo Bronx Zoo Bronx Zoo Bronx Zoo</p>
<p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p>	<p>Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Duck (<i>sp.</i>) Flamingo (<i>sp.</i>) Galago, Brown Greater (<i>Otolemur crassicaudatus</i>) Goose (<i>sp.</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Guenon, Moustached (<i>Cercopithecus cephus</i>) Guineafowl, Vulturine (<i>Acryllium vulturinum</i>) Hornbill, Red-billed (<i>Tockus sp.</i>) Hornbill, Silvery-cheeked (<i>Bycanistes brevis</i>) Ibis (<i>sp.</i>) Lemur, Black and White Ruffed (<i>Varecia variegata</i>) Pelican (<i>Pelecanus sp.</i>) Stork, White (<i>Ciconia ciconia</i>)</p>	<p>Roger Williams Park Zoo Saint Louis Zoo Abilene Zoo*; Saint Louis Zoo*; Virginia Zoo* Moody Gardens Moody Gardens Los Angeles Zoo Moody Gardens Virginia Zoo Los Angeles Zoo Abilene Zoo Brookfield Zoo Idaho Falls Zoo Moody Gardens Los Angeles Zoo Moody Gardens Brookfield Zoo; Saint Louis Zoo</p>

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Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Tortoise, Radiated (<i>Astrochelys radiata</i>) Turaco, White-crested (<i>Tauraco leucolophus</i>)	Los Angeles Zoo Los Angeles Zoo
Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)	Colobus, Black and White (<i>Colobus guereza</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Fox, Bat-eared (<i>Otocyon megalotis</i>) Guineafowl (<i>sp.</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ostrich, Common (<i>Struthio camelus</i>) Secretarybird (<i>Sagittarius serpentarius</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Various birds Vulture, Lappet-faced (<i>Torgos tracheliotos</i>) Waterfowl (<i>assorted sp.</i>)	Caldwell Zoo Gladys Porter Zoo Brevard Zoo; Chehaw Wild Animal Park; Dallas Zoo*; San Francisco Zoo* Disney's Animal Kingdom; Houston Zoo; Houston Zoo San Francisco Zoo*; Virginia Zoo* Los Angeles Zoo Gladys Porter Zoo Kansas City Zoo Omaha's Henry Doorly Zoo Brevard Zoo; Dallas Zoo; Virginia Zoo Los Angeles Zoo; San Francisco Zoo; Virginia Zoo Dallas Zoo Dallas Zoo; San Francisco Zoo Columbus Zoo ^{1*} Dallas Zoo Caldwell Zoo
Duiker, Zebra (<i>Cephalophus zebra</i>)	Lemur, Black and White Ruffed (<i>Varecia variegata</i>) Lemur, Crowned (<i>Eulemur coronatus</i>) Monkey, Diana (<i>Cercopithecus diana</i>) Talapoin sp. (<i>Miopithecus sp.</i>)	Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo ^{1*}
Klipspringer (<i>Oreotragus oreotragus</i>)	Bishop, Red (<i>Euplectes orix orix</i>) Bustard, Buff-crested (<i>Eupodotis gindiana</i>) Colobus, Black and White (<i>Colobus sp.</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Sandhill (<i>Grus canadensis</i>) Crane, Wattled (<i>Buggeranus carunculatus</i>) Duiker, Bay (<i>Cephalophus dorsalis</i>) Finch, Green Singing (<i>Serinus mozambicus</i>)	Staten Island Zoo Staten Island Zoo Cleveland Metroparks Zoo Brevard Zoo Mesker Park Zoo Staten Island Zoo Jacksonville Zoo and Gardens Jackson Zoo; Jacksonville Zoo and Gardens San Diego Zoo Safari Park ¹ Staten Island Zoo

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<p>Klipspringer (<i>Oreotragus oreotragus</i>)</p>	<p>Gelada (<i>Theropithecus gelada</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Guineafowl, Crested (<i>Guttera pucherani</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Hyrax, Rock (<i>Procavia capensis</i>) Kingfisher, White-throated (<i>Halcyon smyrnensis</i>) Mousebird, Speckled (<i>Colius striatus</i>) Ostrich, Common (<i>Struthio camelus</i>) Pigeon, Bruce's Green (<i>Treron waalia</i>) Starling, Emerald (<i>Lamprotornis iris</i>) Starling, Royal (<i>Cosmopsarus regius</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Tortoise, Leopard (<i>Stigmochelys pardalis</i>) Turaco, Violaceous (<i>Musophaga violacea</i>) Vulture, White-backed (<i>Gyps africanus</i>) Weaver, White-headed Buffalo (<i>Dinemellia dinemelli</i>)</p>	<p>Los Angeles Zoo^{1*} Jackson Zoo; Jackson Zoo Staten Island Zoo* Brevard Zoo Cleveland Metroparks Zoo; Dallas Zoo Staten Island Zoo Staten Island Zoo Jackson Zoo; Jackson Zoo Staten Island Zoo Staten Island Zoo Staten Island Zoo Brevard Zoo; Jackson Zoo Jacksonville Zoo and Gardens Jacksonville Zoo and Gardens Staten Island Zoo Jacksonville Zoo and Gardens Staten Island Zoo</p>
<p>Steenbok (<i>Raphicerus campestris</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Wattled (<i>Bugeranus carunculatus</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Stork, White (<i>Ciconis ciconia</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Denver Zoological Gardens Disney's Animal Kingdom; Saint Louis Zoo Disney's Animal Kingdom*; Saint Louis Zoo*; Saint Louis Zoo* Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Saint Louis Zoo; Saint Louis Zoo Disney's Animal Kingdom</p>
<p>Suni (<i>Neotragus moschatus</i>)</p>	<p>Guenon, Schmidt's Spot-nosed (<i>Cercopithecus petaurista</i>) Tortoise, Leopard (<i>Stigmochelys pardalis</i>)</p>	<p>Los Angeles Zoo Los Angeles Zoo</p>

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Waterbuck		
Kob (<i>Kobus kob</i>)	Crane, Grey Crowned (<i>Balearica regulorum</i>) Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park*
Lechwe (<i>Kobus leche</i>)	Bustard, Kori (<i>Ardeotis kori</i>) Capybara (<i>Hydrochoerus hydrochaeris</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Wattled (<i>Buggeranus carunculatus</i>) Hyrax, Rock (<i>Procavia capensis</i>) Ostrich, Common (<i>Struthio camelus</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>) Secretarybird (<i>Sagittarius serpentarius</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Waterfowl (<i>assorted sp.</i>)	North Carolina Zoo* Gulf Breeze Zoo ^{1*} San Diego Zoo Safari Park*; Los Angeles Zoo*; North Carolina Zoo* White Oak Conservation Center* White Oak Conservation Center* Los Angeles Zoo* North Carolina Zoo* San Diego Zoo Safari Park* Los Angeles Zoo* North Carolina Zoo* North Carolina Zoo* Gulf Breeze Zoo ^{1*}
Lechwe, Nile (<i>Kobus megaceros</i>)	Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Wattled (<i>Buggeranus carunculatus</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Guineafowl (<i>sp.</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Guineafowl, Vulturine (<i>Acryllium vulturinum</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)	Mesker Park Zoo* White Oak Conservation Center Kansas City Zoo*; San Diego Zoo Safari Park; San Diego Zoo Safari Park White Oak Conservation Center; White Oak Conservation Center Kansas City Zoo Kansas City Zoo North Carolina Zoo Kansas City Zoo Dallas Zoo Dallas Zoo Oklahoma City Zoo White Oak Conservation Center

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<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p>	<p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>) Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p>	<p>Baton Rouge Zoo; Dallas Zoo; Kansas City Zoo; Lion Country Safari; Lion Country Safari; Los Angeles Zoo; North Carolina Zoo; Oklahoma City Zoo*</p> <p>Mesker Park Zoo Los Angeles Zoo</p>
<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>) Capybara (<i>Hydrochoerus hydrochaeris</i>) Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Buggeranus carunculatus</i>) Flamingo, Greater (<i>Phoenicopterus roseus</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Great White (<i>Pelecanus onocrotalus</i>)</p>	<p>North Carolina Zoo* Gulf Breeze Zoo^{1*} Africam Safari Park; Fort Worth Zoo; North Carolina Zoo*</p> <p>Binder Park Zoo; Mesker Park Zoo* Disney's Animal Kingdom</p> <p>Binder Park Zoo; Disney's Animal Kingdom*; Disney's Animal Kingdom*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom North Carolina Zoo Africam Safari Park; Knoxville Zoo Disney's Animal Kingdom</p> <p>Africam Safari Park; Binder Park Zoo; Brookfield Zoo; Brookfield Zoo; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Lion Country Safari; Lion Country Safari; Milwaukee County Zoo; North Carolina Zoo San Diego Zoo Safari Park San Diego Zoo Safari Park</p>

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<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Shelduck, South African (<i>Tadorna cana</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Various birds</p> <p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p>	<p>Denver Zoological Gardens^{1*}</p> <p>Disney's Animal Kingdom²; Binder Park Zoo; Mesker Park Zoo; Milwaukee County Zoo; North Carolina Zoo* North Carolina Zoo*</p> <p>Milwaukee County Zoo¹; San Diego Zoo Safari Park Binder Park Zoo</p> <p>Disney's Animal Kingdom Africam Safari Park; Gulf Breeze Zoo^{1*}</p>
Giraffe		
<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Bustard, Kori (<i>Ardeotis kori</i>)</p> <p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Buggeranus carunculatus</i>)</p>	<p>Sedgwick County Zoo* Africam Safari Park*; Calgary Zoo; Cameron Park Zoo*; Cleveland Metropark Zoo*; Disney's Animal Kingdom*; Kansas City Zoo*</p> <p>Binder Park Zoo*; San Francisco Zoo* Brevard Zoo</p> <p>Binder Park Zoo*; Blank Park Zoo*; Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Great Plains Zoo*; Indianapolis Zoo*; Kansas City Zoo*; Omaha's Henry Doorly Zoo & Aquarium*; Phoenix Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Francisco Zoo*; Toledo Zoo*; Topeka Zoo*; Virginia Zoo*</p> <p>Jacksonville Zoo and Gardens*</p>

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<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Egret, Cattle (<i>Bubulcus ibis</i>)</p> <p>Flamingo, Greater (<i>Phoenicopterus roseus</i>)</p> <p>Goose, Blue-winged (<i>Cyanochen cyanoptera</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Guineafowl, Vulturine (<i>Acryllium vulturinum</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Cheyenne Mountain Zoo; Kansas City Zoo Disney's Animal Kingdom* Toledo Zoo Disney's Animal Kingdom; Kansas City Zoo; The Living Desert*; Oakland Zoo*; Omaha's Henry Doorly Zoo & Aquarium; Toledo Zoo; Utah's Hogle Zoo*; Woodland Park Zoo*</p> <p>Cleveland Metropark Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Omaha's Henry Doorly Zoo & Aquarium Africam Safari Park*; Kansas City Zoo; Knoxville Zoo*; Minnesota Zoo*; Oklahoma City Zoo*; Phoenix Zoo*</p> <p>Birmingham Zoo*; Cheyenne Mountain Zoo; Cleveland Metropark Zoo*; Columbus Zoo*; Dallas Zoo*; Indianapolis Zoo; Toledo Zoo*; Utah's Hogle Zoo*; Woodland Park Zoo*</p> <p>Dallas Zoo*; Zoo Miami* Disney's Animal Kingdom²; Oklahoma City Zoo*, Omaha's Henry Doorly Zoo & Aquarium Virginia Zoo</p> <p>Toledo Zoo Africam Safari Park*; Binder Park Zoo*; Birmingham Zoo*; Bronx Zoo*; Busch Gardens*; Calgary Zoo; Columbus Zoo*; Dallas Zoo*; Dickerson Park Zoo* →</p>
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<p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Tortoise, Leopard (<i>Stigmochelys pardalis</i>)</p> <p>Various birds</p> <p>Vulture, Cape Griffon (<i>Gyps coprotheres</i>)</p> <p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Griffon (<i>Gyps fulvus</i>)</p> <p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>)</p> <p>Vulture, White-headed (<i>Trionoceps occipitalis</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p>	<p>Omaha's Henry Doorly Zoo & Aquarium; Toledo Zoo</p> <p>Fresno Chaffee Zoo*; Phoenix Zoo*</p> <p>Jacksonville Zoo and Gardens*</p> <p>San Diego Zoo Safari Park*</p> <p>Cheyenne Mountain Zoo; Toledo Zoo</p> <p>Binder Park Zoo*</p> <p>Cheyenne Mountain Zoo</p> <p>Phoenix Zoo*</p> <p>Disney's Animal Kingdom; Phoenix Zoo*</p> <p>Jacksonville Zoo and Gardens*</p> <p>Toledo Zoo</p> <p>Africam Safari Park*</p>
<p>Okapi (<i>Okapia johnstoni</i>)</p>	<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p> <p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Crane, Wattled (<i>Bugeranus carunculatus</i>)</p> <p>Duck, Muscovy (<i>Cairina moschata</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p> <p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p> <p>Secretarybird (<i>Sagittarius serpentarius</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p>	<p>Disney's Animal Kingdom; Disney's Animal Kingdom; Houston Zoo; Houston Zoo; Saint Louis Zoo</p> <p>Sedgwick County Zoo</p> <p>Cheyenne Mountain Zoo*; Disney's Animal Kingdom*, Oklahoma City Zoo*</p> <p>Disney's Animal Kingdom</p> <p>Cheyenne Mountain Zoo</p> <p>Disney's Animal Kingdom, Oklahoma City Zoo</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; Omaha's Henry Doorly Zoo & Aquarium; Saint Louis Zoo</p> <p>Cheyenne Mountain Zoo</p> <p>Denver Zoological Gardens</p> <p>Jacksonville Zoo and Gardens; Tampa's Lowry Park Zoo</p>

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Okapi (<i>Okapia johnstoni</i>)	Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)	Denver Zoological Gardens; Sedgwick County Zoo Oklahoma City Zoo Disney's Animal Kingdom
Caprinae		
Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	Fox, Bat-eared (<i>Otocyon megalotis</i>) Macaque, Barbary (<i>Macaca sylvanus</i>) Monkey, Mona (<i>Cercopithecus mona</i>) Monkey, Vervet (<i>Chlorocebus pygerythrus</i>) Ostrich, Common (<i>Struthio camelus</i>) Rhea, Greater (American) (<i>Rhea americana</i>)	Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo Lion Country Safari Wildlife Safari
Goat, Domestic (<i>Capra aegagrus hircus</i>)	Chicken, Domestic (<i>Gallus gallus domesticus</i>) Emu (<i>Dromaius novaehollandiae</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Swan, Mute (<i>Cygnus olor</i>) Turkey, Wild (<i>Meleagris gallopavo</i>)	Sunset Zoo Mesker Park Zoo Mesker Park Zoo Brookgreen Gardens* Brookgreen Gardens*
Goral, Chinese (<i>Naemorhedus griseus</i>)	Crane, Hooded (<i>Grus monacha</i>) Crane, White-naped (<i>Grus vipio</i>)	Lee Richardson Zoo Oklahoma City Zoo
Ibex, Nubian (<i>Capra nubiana</i>)	Duck, Yellow-billed (<i>Anas undulata</i>) Gelada (<i>Theropithecus gelada</i>) Goose, Blue-winged (<i>Cyanochen cyanoptera</i>) Hyrax, Rock (<i>Procavia capensis</i>) Pintail, Red-billed (<i>Anas erythrorhyncha</i>) Teal, Cape (<i>Anas capensis</i>)	Bronx Zoo Bronx Zoo; Los Angeles Zoo Bronx Zoo Bronx Zoo; Los Angeles Zoo Bronx Zoo Bronx Zoo
Markhor, Bukharan (<i>Capra falconeri heptneri</i>)	Macaque, Sulawesi Crested (<i>Macaca nigra</i>)	Los Angeles Zoo
Sheep, Domestic (<i>Ovis aries</i>)	Chicken, Domestic (<i>Gallus gallus domesticus</i>) Emu (<i>Dromaius novaehollandiae</i>) Pheasant, Common (<i>Phasianus colchicus</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Turkey, Wild (<i>Meleagris gallopavo</i>) Vulture, Turkey (<i>Cathartes aura</i>)	Lee Richardson Zoo*; Sunset Zoo Mesker Park Zoo Trevor Zoo* Mesker Park Zoo Trevor Zoo Trevor Zoo
Deer (Cervid/Tragulid)		
Barasingha, Indian (<i>Rucervus duvaucelii</i>)	Crane, Sarus (<i>Grus antigone</i>)	White Oak Conservation Center
Caribou (<i>Rangifer tarandus</i>)	Crane, Sandhill (<i>Grus canadensis</i>)	Cervid Mixed-Species Table ³
Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Bird-of-Paradise, Lesser (<i>Paradisaea minor</i>) Dove, Jambu Fruit (<i>Ptilinopus jambu</i>)	Columbus Zoo Columbus Zoo

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<p>Chevrotain, Greater Malay (<i>Tragulus napu</i>)</p>	<p>Duck, Plumed Whistling (<i>Dendrocygna eytoni</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Flying Fox, Indian (<i>Pteropus giganteus</i>)</p> <p>Goose, Magpie (<i>Anseranas semipalmata</i>) Honeyeater, Blue-faced (<i>Entomyzon cyanotis</i>) Hyrax, Rock (<i>Procavia capensis</i>) Ibis, Straw-necked (<i>Threskiornis spinicollis</i>) Lorikeet, Goldie's (<i>Psitteuteles goldiei</i>) Lemur, Red-ruffed (<i>Varecia rubra</i>) Loris, Pygmy Slow (<i>Nycticebus pygmaeus</i>)</p> <p>Loris, Sunda Slow (<i>Nycticebus coucang</i>)</p> <p>Partridge, Crested Wood (<i>Rollulus rouloul</i>) Pheasant, Peacock (<i>Polyplectron sp.</i>) Pigeon, Nicobar (<i>Caloenas nicobarica</i>) Pigeon, Victoria Crowned (<i>Goura victoria</i>) Roller, Lilac-breasted (<i>Coracias caudatus</i>) Rosella, Eastern (<i>Platyercus eximius</i>) Shelduck, Radjah (<i>Tadorna radjah</i>) Shrew, Large Tree (<i>Tupaia tana</i>) Shrew, Lesser Tree (<i>Tupaia minor</i>) Shrew, Tree (<i>Tupaia sp.</i>) Squirrel, Prevost's (<i>Callosciurus prevostii</i>)</p> <p>Swan, Black (<i>Cygnus atratus</i>) Teal, Chestnut (<i>Anas castanea</i>) Tortoise, Aldabra (<i>Aldabrachelys gigantea</i>) Tortoise, Asian Forest (<i>Manouria emys</i>)</p> <p>Tortoise, Indian Star (<i>Geochelone elegans</i>)</p>	<p>Columbus Zoo Columbus Zoo Los Angeles Zoo; Moody Gardens Columbus Zoo Columbus Zoo National Zoo Columbus Zoo Columbus Zoo National Zoo Bronx Zoo; Moody Gardens Bronx Zoo; Los Angeles Zoo Columbus Zoo Moody Gardens Columbus Zoo Columbus Zoo National Zoo Columbus Zoo Columbus Zoo National Zoo Columbus Zoo National Zoo National Zoo Columbus Zoo Columbus Zoo; Los Angeles Zoo; National Zoo Columbus Zoo Columbus Zoo Zoo Boise Cervid Mixed-Species Table³ Moody Gardens</p>
<p>Deer, Axis (<i>Axis axis</i>)</p>	<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Common (<i>Grus grus</i>) Crane, Demoiselle (<i>Grus virgo</i>) Crane, Sandhill (<i>Grus canadensis</i>)</p> <p>Crane, Saurus (<i>Grus antigone</i>)</p> <p>Crocodile, American (<i>Crocodylus acutus</i>) Dog, Domestic (<i>Canis lupus familiaris</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Peafowl, Blue (Indian) (<i>Pavo cristatus</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>) Pheasant, Golden (<i>Chrysolophus pictus</i>)</p>	<p>Cervid Mixed-Species Table³ Mesker Park Zoo* Africam Safari Park Cervid Mixed-Species Table³ Cervid Mixed-Species Table³ Africam Safari Park Buffalo Zoo Africam Safari Park Buffalo Zoo Africam Safari Park Africam Safari Park</p>

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Deer, Axis (<i>Axis axis</i>)	Turkey, Wild (<i>Meleagris gallopavo</i>)	Cervid Mixed-Species Table ³
Deer, Chinese Water (<i>Hydropotes inermis</i>)	Crane, Sarus (<i>Grus antigone</i>)	Los Angeles Zoo
Deer, Eld's (<i>Rucervus eldii</i>)	Crane, Sarus (<i>Grus antigone</i>) Goose, Bar-headed (<i>Anser indicus</i>) Peafowl, Javan (Green) (<i>Pavo muticus</i>) Shelduck, Ruddy (<i>Tadorna ferruginea</i>)	Disney's Animal Kingdom; Saint Louis Zoo Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom
Deer, Fallow (<i>Dama dama</i>)	Crane, White-naped (<i>Grus vipio</i>) Emu (<i>Dromaius novaehollandiae</i>) Ostrich, Common (<i>Struthio camelus</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Screamer, Crested (Southern) (<i>Chauna torquata</i>) Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>) Vulture, Cinereous (<i>Aegypius monachus</i>) Vulture, Griffon (<i>Gyps fulvus</i>)	Wildlife Safari Wildlife Safari Detroit Zoo; Fossil Rim Wildlife Center Detroit Zoo Detroit Zoo; Wildlife Safari Detroit Zoo Detroit Zoo Detroit Zoo Detroit Zoo Detroit Zoo Detroit Zoo
Deer, Hog (<i>Axis porcinus</i>)	Crane, Sarus (<i>Grus antigone</i>) Crane, White-naped (<i>Grus vipio</i>)	Cervid Mixed-Species Table ³ Oklahoma City Zoo
Deer, Mule (<i>Odocoileus hemionus</i>)	Crane, Sandhill (<i>Grus canadensis</i>) Rabbit, Jack (<i>Lepus californicus</i>) Turkey, Wild (<i>Meleagris gallopavo</i>)	Milwaukee County Zoo Arizona-Sonora Desert Museum Arizona-Sonora Desert Museum; Living Desert Zoo and Gardens State Park
Deer, Pere David's (<i>Elaphurus davidianus</i>)	Crane, Demoiselle (<i>Grus virgo</i>) Crane, White-naped (<i>Grus vipio</i>) Crocodile, American (<i>Crocodylus acutus</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>) Pheasant, Golden (<i>Chrysolophus pictus</i>) Swan, Tundra (<i>Cyngus columbianus</i>) Swan, Whooper (<i>Cygnus cygnus</i>)	Africam Safari Park Oklahoma City Zoo Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Bronx Zoo Bronx Zoo
Deer, Red (<i>Cervus elaphus</i>)	Ostrich, Common (<i>Struthio camelus</i>) Roadrunner (<i>Geococcyx californianus</i>) Turkey, Wild (<i>Meleagris gallopavo</i>)	Fossil Rim Wildlife Center Cervid Mixed-Species Table ³ Audubon Zoo ^{2*}

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<p>Deer, Red Brocket (<i>Mazama temama</i>)</p>	<p>Capybara (<i>Hydrochoerus hydrochaeris</i>) Crane, Sandhill (<i>Grus canadensis</i>) Pelican, Brown (<i>Pelecanus occidentalis</i>) Pelican (<i>Pelecanus sp.</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Screamer (<i>sp.</i>)</p>	<p>Bergen County Zoo Phoenix Zoo Phoenix Zoo Phoenix Zoo Bergen County Zoo Phoenix Zoo</p>
<p>Deer, Sika (<i>Cervus nippon</i>)</p>	<p>Crane, Demoiselle (<i>Grus virgo</i>) Crane, Sarus (<i>Grus antigone</i>) Crane, White-naped (<i>Grus vipio</i>) Crocodile, American (<i>Crocodylus acutus</i>) Emu (<i>Dromaius novaehollandiae</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>) Peafowl, Indian (Blue) (<i>Pavo cristatus</i>) Pheasant (<i>sp.</i>) Pheasant, Golden (<i>Chrysolophus pictus</i>) Rhea, Greater (American) (<i>Rhea americana</i>)</p>	<p>Africam Safari Park Cervid Mixed-Species Table³ Oklahoma City Zoo; Trevor Zoo; Wildlife Safari Africam Safari Park Wildlife Safari Africam Safari Park Africam Safari Park Lehigh Valley Zoo Cervid Mixed-Species Table³ Africam Safari Park Wildlife Safari</p>
<p>Deer, Tufted (<i>Elaphodus cephalophus</i>)</p>	<p>Crane, Demoiselle (<i>Grus virgo</i>) Crane, Red-crowned (<i>Grus japonensis</i>) Crane, White-naped (<i>Grus vipio</i>) Duck (assorted species) Duck, Mandarin (<i>Aix galericulata</i>) Duck, Redhead (<i>Aythya americana</i>) Goose, Red-breasted (<i>Branta ruficollis</i>) Peafowl (<i>Pavo sp.</i>) Shelduck, Common (<i>Tadorna tadorna</i>) Smew (<i>Mergellus albellus</i>) Stork, Lesser Adjutant (<i>Leptoptilos javanicus</i>) Swan, Black (<i>Cygnus atratus</i>)</p>	<p>Prospect Park Zoo Cleveland Metroparks Zoo; Sunset Zoo Columbus Zoo; Oklahoma City Zoo Disney's Animal Kingdom Cleveland Metroparks Zoo; Prospect Park Zoo Cleveland Metroparks Zoo Prospect Park Zoo Cervid Mixed-Species Table³ Cleveland Metroparks Zoo Cleveland Metroparks Zoo Racine Zoo Racine Zoo</p>
<p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p>	<p>Bear, American Black (<i>Ursus americanus</i>) Coot (<i>Fulica sp.</i>) Crane, Sandhill (<i>Grus canadensis</i>) Duck, Mallard (<i>Anas platyrhynchos</i>)</p>	<p>Africam Safari Park* Africam Safari Park* Caldwell Zoo; Cosley Zoo; Jacksonville Zoo and Gardens; Northeastern Wisconsin Zoo (NEW Zoo); Oklahoma City Zoo; Sunset Zoo Africam Safari Park*; Chattanooga Zoo</p>

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Muntjac (<i>Muntiacus sp.</i>)	Crane, Red-crowned (<i>Grus japonensis</i>)	Sunset Zoo
Muntjac, Indian (<i>Muntiacus muntjak</i>)	Crane, Sarus (<i>Grus antigone</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Panda, Red (<i>Ailurus fulgens</i>) Shelduck, South African (Cape) (<i>Tadorna cana</i>)	Mesker Park Zoo; Mesker Park Zoo Cervid Mixed-Species Table ³ Sequoia Park Zoo Oklahoma City Zoo
Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Crane, Common (<i>Grus grus</i>) Crane, Demoiselle (<i>Grus virgo</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Red-crowned (<i>Grus japonensis</i>) Crane, Sarus (<i>Grus antigone</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, White-naped (<i>Grus vipio</i>) Curassow (<i>sp.</i>) Dove (<i>sp.</i>) Duck, Mandarin (<i>Aix galericulata</i>) Duck, Northern Shoveler (<i>Anas clypeata</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Flying Fox, Indian (<i>Pteropus giganteus</i>) Gibbon, White-cheeked (<i>Nomascus leucogenys</i>) Goose, Bar-headed (<i>Anser indicus</i>) Hornbill (<i>sp.</i>) Hwamei, Chinese (<i>Garrulax canorus</i>) Langur, Francois's (<i>Trachypithecus francoisi</i>) Langur, Spectacled (<i>Trachypithecus obscurus</i>) Laughingthrush, Black-throated (<i>Garrulax chinesis</i>) Laughingthrush, White-crested (<i>Garrulax leucolophus</i>) Marmoset (<i>sp.</i>) Otter, Asian Small-clawed (<i>Amblonyx cinereus</i>) Panda, Red (<i>Ailurus fulgens</i>) Parakeet, Derbyan (Lord Derby's) (<i>Psittacula derbiana</i>)	Mesker Park Zoo* Alexandria Zoological Park; Idaho Falls Zoo Santa Fe College Teaching Zoo* Capron Park Zoo Saint Louis Zoo Cervid Mixed-Species Table ³ Trevor Zoo Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Alexandria Zoological Park; Idaho Falls Zoo Columbus Zoo Columbus Zoo Topeka Zoo Los Angeles Zoo Idaho Falls Zoo Cervid Mixed-Species Table ³ Columbus Zoo Los Angeles Zoo Santa Barbara Zoo Columbus Zoo Columbus Zoo Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³ Zoo de Granby Columbus Zoo

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<p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p>	<p>Partridge, Chinese Bamboo (<i>Bambusicola thoracicus</i>) Peafowl (<i>Pavo sp.</i>)</p> <p>Pheasant, Golden (<i>Chrysolophus pictus</i>) Pheasant, Lady Amherst's (<i>Chrysolophus amherstiae</i>) Sloth, Hoffmann's Two-toed (<i>Choloepus hoffmanni</i>) Squirrel, Prevost's (<i>Callosciurus prevostii</i>) Stork, Greater Adjutant (<i>Leptoptilos dubius</i>)</p> <p>Tamarin (<i>Saguinus sp.</i>)</p> <p>Tortoise, Asian Forest (<i>Manouria emys</i>)</p> <p>Tropical birds (<i>sp.</i>) Turaco (<i>sp.</i>)</p> <p>Waterfowl (<i>assorted sp.</i>)</p> <p>Wood-rail (<i>Aramides sp.</i>)</p>	<p>Columbus Zoo</p> <p>Cervid Mixed-Species Table³</p> <p>Columbus Zoo Los Angeles Zoo</p> <p>Topeka Zoo</p> <p>Santa Barbara Zoo Cervid Mixed-Species Table³</p> <p>Cervid Mixed-Species Table³</p> <p>Santa Fe College Teaching Zoo Topeka Zoo</p> <p>Cervid Mixed-Species Table³</p> <p>Cervid Mixed-Species Table³</p> <p>Cervid Mixed-Species Table³</p>
<p>Pronghorn (<i>Antilocapra americana</i>)</p>	<p>Crane, Sandhill (<i>Grus canadensis</i>)</p> <p>Turkey, Wild (<i>Meleagris gallopavo</i>)</p>	<p>Northeastern Wisconsin Zoo (NEW Zoo); Rosamond Gifford Zoo; Sedgwick County Zoo; Sunset Zoo; ZooAmerica Wildlife Park Sunset Zoo</p>
<p>Pudu, Southern (<i>Pudu puda</i>)</p>	<p>Anteater, Giant (<i>Myrmecophaga tridactyla</i>) Crane, Sandhill (<i>Grus canadensis</i>)</p> <p>Curassow (<i>sp.</i>)</p> <p>Ibis (<i>sp.</i>)</p> <p>Loris, Slow (<i>Nycticebus sp.</i>)</p> <p>Monkey, Black Howler (<i>Alouatta caraya</i>) Monkey, White-faced Saki (<i>Pithecia pithecia</i>) South American Birds (multiple species) Stilt, Black-necked (<i>Himantopus mexicanus</i>)</p> <p>Tamarin (<i>Saguinus sp.</i>)</p>	<p>Sedgwick County Zoo Jacksonville Zoo and Gardens</p> <p>Cervid Mixed-Species Table³</p> <p>Cervid Mixed-Species Table³</p> <p>Cervid Mixed-Species Table³</p> <p>Los Angeles Zoo Los Angeles Zoo Sedgwick County Zoo</p> <p>Cervid Mixed-Species Table³</p> <p>Cervid Mixed-Species Table³</p>

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Pudu, Southern (<i>Pudu puda</i>)	Toucan (<i>sp.</i>)	Cervid Mixed-Species Table ³
Elephant		
Elephant, African Bush (<i>Loxodonta africana</i>)	Crane, Grey Crowned (<i>Balearica regulorum</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Guineafowl, Vulturine (<i>Acryllium vulturinum</i>) Ostrich, Common (<i>Struthio camelus</i>) Vulture, White-backed (<i>Gyps africanus</i>)	Kansas City Zoo Kansas City Zoo Dallas Zoo Dallas Zoo Dallas Zoo Kansas City Zoo
Equid		
Ass, African Wild (<i>Equus africanus</i>)	Crane, Grey Crowned (<i>Balearica regulorum</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Ostrich, Common (<i>Struthio camelus</i>) Shelduck, Common (<i>Tadorna tadorna</i>) Shelduck, South African (Cape) (<i>Tadorna cana</i>) Spoonbill, African (<i>Platalea alba</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)	Disney's Animal Kingdom* Disney's Animal Kingdom* Dallas Zoo*; Denver Zoological Gardens* Disney's Animal Kingdom* Disney's Animal Kingdom* Disney's Animal Kingdom* Disney's Animal Kingdom*
Donkey (<i>Equus africanus asinus</i>)	Emu (<i>Dromaius novaehollandiae</i>) Rhea, Greater (American) (<i>Rhea americana</i>)	Mesker Park Zoo Mesker Park Zoo
Horse, Domestic (<i>Equus ferus caballus</i>)	Emu (<i>Dromaius novaehollandiae</i>) Rhea, Greater (American) (<i>Rhea americana</i>)	Great Plains Zoo*; Mesker Park Zoo Mesker Park Zoo
Zebra (<i>Equus sp.</i>)	Crane, Grey Crowned (<i>Balearica regulorum</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Guineafowl (<i>sp.</i>) Ostrich, Common (<i>Struthio camelus</i>)	Chehaw Wild Animal Park; Kansas City Zoo* Kansas City Zoo Kansas City Zoo Kansas City Zoo Chehaw Wild Animal Park; Kansas City Zoo
Zebra, Grevy's (<i>Equus grevyi</i>)	Crane, African Crowned (<i>Balearica sp.</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Wattled (<i>Bugeranus carunculatus</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ibis, African Sacred (<i>Threskiornis aethiopicus</i>) Ostrich, Common (<i>Struthio camelus</i>)	Caldwell Zoo; Calgary Zoo Great Plains Zoo*; Great Plains Zoo* Jackson Zoo; White Oak Conservation Center; White Oak Conservation Center Jackson Zoo Caldwell Zoo Toronto Zoo Caldwell Zoo Busch Gardens; Caldwell Zoo; Calgary Zoo; Dallas Zoo →

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<p>Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Shelduck, Cape (<i>Tadorna cana</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Vulture, White-headed (<i>Trigonoceps occipitalis</i>)</p>	<p>Denver Zoological Gardens; Great Plains Zoo; Minnesota Zoo; Oglebay's Good Zoo; Omaha's Henry Doorly Zoo & Aquarium; Pueblo Zoo; Sacramento Zoo; Saint Louis Zoo</p> <p>Toronto Zoo</p> <p>Phoenix Zoo; Toronto Zoo</p> <p>Detroit Zoo</p> <p>Cheyenne Mountain Zoo</p> <p>Toronto Zoo</p>
<p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Various birds</p>	<p>Calgary Zoo*</p> <p>Disney's Animal Kingdom*; Henry Vilas Zoo*</p> <p>Utah's Hogle Zoo*</p> <p>Disney's Animal Kingdom*</p> <p>Utah's Hogle Zoo*</p> <p>Calgary Zoo*; Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Minnesota Zoo*; Utah's Hogle Zoo*</p> <p>Disney's Animal Kingdom*</p> <p>San Diego Zoo Safari Park*</p>
<p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Crane, African Crowned (<i>Balearica sp.</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Duck, Whistling Tree (<i>Dendrocygna autumnalis</i>)</p> <p>Goose, Blue-winged (<i>Cyanochen cyanoptera</i>)</p>	<p>Como Zoo*; Kansas City Zoo*</p> <p>Binder Park Zoo*; San Francisco Zoo*</p> <p>Binder Park Zoo*; Cincinnati Zoo and Botanical Garden*; Columbus Zoo*; Disney's Animal Kingdom*; Indianapolis Zoo*; Kansas City Zoo*; San Francisco Zoo*; Toledo Zoo*; Tulsa Zoo*; Zoo de Granby*</p> <p>Indianapolis Zoo*</p> <p>Toledo Zoo*</p>

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<p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p>	<p>Disney’s Animal Kingdom; Indianapolis Zoo*; Kansas City Zoo*; Toledo Zoo*; Tulsa Zoo*; Woodland Park Zoo</p>
	<p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p>	<p>Cleveland Metroparks Zoo*</p>
	<p>Guineafowl (<i>sp.</i>)</p>	<p>Oklahoma City Zoo*; Tulsa Zoo*</p>
	<p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p>	<p>Columbus Zoo*; Dallas Zoo; Idaho Falls Zoo; Toledo Zoo*; Woodland Park Zoo</p>
	<p>Guineafowl, Vulturine (<i>Acryllium vulturinum</i>)</p>	<p>Dallas Zoo; Zoo Miami*</p>
	<p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p>	<p>Toledo Zoo*</p>
	<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Abilene Zoo*; Binder Park Zoo*; Baton Rouge Zoo; Brookfield Zoo*; Busch Gardens*; Chehaw Wild Animal Park; Cleveland Metroparks Zoo*; Cleveland Metroparks Zoo*; Columbus Zoo*; Dallas Zoo; Disney’s Animal Kingdom; Fort Wayne Children’s Zoo*; Hagenbeck Zoo²*; Honolulu Zoo; Houston Zoo*; Indianapolis Zoo*; Kansas City Zoo*; Lehigh Valley Zoo*; The Maryland Zoo; Milwaukee County Zoo; Nashville Zoo at Grassmere*; North Carolina Zoo; Pittsburgh Zoo*; Pueblo Zoo; Riverbanks Zoo and Garden; San Francisco Zoo*; Toledo Zoo*; Woodland Park Zoo; Zoo Atlanta; Zoo de Granby*; Zoo Miami*; Zoo New England*</p>
<p>Pelican (<i>Pelecanus sp.</i>)</p>	<p>Audubon Zoo*</p>	
<p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p>	<p>Binder Park Zoo*; Cleveland Metroparks Zoo* →</p>	

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<p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>)</p> <p>Vulture, Cape Griffon (<i>Gyps coprotheres</i>)</p> <p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p> <p>Vulture, Hooded (<i>Necrosyrtes monachus</i>)</p> <p>Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)</p> <p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p> <p>Vulture, White-backed (<i>Gyps africanus</i>)</p> <p>Vulture, White-headed (<i>Trionoceps occipitalis</i>)</p>	<p>Fort Wayne Children's Zoo*; Indianapolis Zoo*; Milwaukee County Zoo; San Francisco Zoo*; Tulsa Zoo*; Zoo de Granby* Columbus Zoo*; Toledo Zoo*</p> <p>Cleveland Metroparks Zoo*; Fort Wayne Children's Zoo*; Toledo Zoo*</p> <p>Como Zoo*</p> <p>Como Zoo*</p> <p>Toledo Zoo*</p> <p>Binder Park Zoo*</p> <p>Pittsburgh Zoo*</p> <p>Cincinnati Zoo and Botanical Garden*</p> <p>Fort Wayne Children's Zoo*; Indianapolis Zoo*</p> <p>Cleveland Metroparks Zoo*; Kansas City Zoo*</p> <p>Toledo Zoo*</p>
Rhinoceros		
<p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p>	<p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p>	<p>Saint Louis Zoo</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p>
<p>Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)</p>	<p>Dog, Domestic (<i>Canis lupus familiaris</i>)</p> <p>Peafowl, Blue (Indian) (<i>Pavo cristatus</i>)</p>	<p>Buffalo Zoo</p> <p>Buffalo Zoo</p>
<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p> <p>Duck, Yellow-billed (<i>Anas undulata</i>)</p> <p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p> <p>Goose, Orinoco (<i>Neochen jubata</i>)</p> <p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p>	<p>Jacksonville Zoo and Gardens*; Omaha's Henry Doorly Zoo & Aquarium*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Tulsa Zoo*; Zoo de Granby*</p> <p>Jacksonville Zoo and Gardens*</p> <p>Jacksonville Zoo and Gardens*; Toronto Zoo*</p> <p>Phoenix Zoo*</p> <p>North Carolina Zoo*</p>

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<p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p>	<p>Heron, Goliath (<i>Ardea goliath</i>)</p> <p>Ostrich, Common, (<i>Struthio camelus</i>)</p> <p>Pelican (<i>Pelecanus sp.</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>)</p> <p>Pelican, Great White (<i>Pelecanus onocrotalus</i>)</p> <p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p> <p>Shelduck, Cape (<i>Tadorna cana</i>)</p> <p>Shelduck, Ruddy (<i>Tadorna ferruginea</i>)</p> <p>Stork, Abdim's (<i>Ciconia abdimii</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Stork, White (<i>Ciconia ciconia</i>)</p> <p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p> <p>Various birds</p>	<p>Jacksonville Zoo and Gardens*</p> <p>Busch Gardens*; Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Fresno Chaffee Zoo*; Honolulu Zoo*; Jacksonville Zoo and Gardens*; The Maryland Zoo*; North Carolina Zoo* Audubon Zoo*</p> <p>San Diego Zoo Safari Park*, San Diego Safari Park*</p> <p>San Diego Zoo Safari Park*, San Diego Safari Park*</p> <p>Fresno Chaffee Zoo* Toronto Zoo*</p> <p>Jacksonville Zoo and Gardens*</p> <p>Fresno Chaffee Zoo*</p> <p>Jacksonville Zoo and Gardens*; North Carolina Zoo*</p> <p>Tulsa Zoo*</p> <p>Fresno Chaffee Zoo* San Diego Zoo Safari Park*</p>
Tapir		
<p>Tapir, Baird's (<i>Tapirus bairdii</i>)</p>	<p>Cacique, Yellow-rumped (<i>Cacicus cela</i>)</p> <p>Capybara (<i>Hydrochoerus hydrochaeris</i>)</p> <p>Cardinal, Red-crested (<i>Paroaria coronate</i>)</p> <p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p> <p>Ibis, Scarlet (<i>Eudocimus ruber</i>)</p> <p>Motmot, Blue-crowned (<i>Momotus momota</i>)</p> <p>Oropendola, Crested (<i>Psarocolius decumanus</i>)</p> <p>Rhea, Greater (American) (<i>Rhea americana</i>)</p> <p>Spoonbill, Roseate (<i>Platalea ajaja</i>)</p> <p>Sunbittern (<i>Eurypyga helias</i>)</p> <p>Swan, Black (<i>Cygnus atratus</i>)</p> <p>Swan, Black-necked (<i>Cygnus melancoryphus</i>)</p> <p>Swan, Coscoroba (<i>Coscoroba coscoroba</i>)</p>	<p>Mesker Park Zoo Houston Zoo; Mesker Park Zoo; San Francisco Zoo</p> <p>Mesker Park Zoo Mesker Park Zoo*</p> <p>Mesker Park Zoo</p> <p>Mesker Park Zoo</p> <p>Mesker Park Zoo Houston Zoo; Milwaukee County Zoo</p> <p>Mesker Park Zoo Mesker Park Zoo San Francisco Zoo San Francisco Zoo San Francisco Zoo</p>

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Tapir, Baird's (<i>Tapirus bairdii</i>)	Swan, Trumpeter (<i>Cygnus buccinator</i>) Tanager, Blue-gray (<i>Thraupis episcopus</i>) Tanager, Silver-beaked (<i>Ramphocelus carbo</i>) Teal, Cinnamon (<i>Anas cyanoptera</i>) Tortoise, Red-footed (<i>Chelonoidis carbonaria</i>) Tortoise, Yellow-footed (<i>Chelonoidis denticulata</i>)	Houston Zoo Mesker Park Zoo Mesker Park Zoo Mesker Park Zoo Milwaukee County Zoo Milwaukee County Zoo
Tapir, Malayan (<i>Acrocodia indica</i>)	Crane, Demoiselle (<i>Grus virgo</i>) Gibbon, White-cheeked (<i>Nomascus leucogenys</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Otter, Asian Small-clawed (<i>Amblonyx cinereus</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>) Pheasant, Golden (<i>Chrysolophus pictus</i>) Siamang (<i>Symphalangus syndactylus</i>)	Africam Safari Park Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo Africam Safari Park Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo Africam Safari Park Africam Safari Park Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo
Tapir, Mountain (<i>Tapirus pinchaque</i>)	Goose, Bar-headed (<i>Anser indicus</i>)	Cheyenne Mountain Zoo
Tapir, South American (<i>Tapirus terrestris</i>)	Capybara (<i>Hydrochoerus hydrochaeris</i>) Duck, Black-bellied Whistling (<i>Dendrocygna autumnalis</i>) Duck, White-faced Whistling Duck (<i>Dendrocygna viduata</i>) Goose, Orinoco (<i>Neochem jubata</i>) Goose, Ruddy-headed (<i>Chloephaga rubidiceps</i>) Pelican, Brown (<i>Pelecanus occidentalis</i>) Pintail, Bahama (White-cheeked) (<i>Anas bahamensis</i>) Pochard, Rosy-bill (<i>Netta peposaca</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Rhea, Lesser (Darwin's) (<i>Rhea pennata</i>) Screamer, Crested (Southern) (<i>Chauna torquata</i>) Seriema, Red-legged (<i>Cariama cristata</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Swan, Black-necked (<i>Cygnus melanocoryph</i>) Teal, Sharp-winged (<i>Anas oxypteryx</i>) Tortoise, Aldabra (<i>Aldabrachelys gigantea</i>)	Alexandria Zoological Park; Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Lion Country Safari Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Lion Country Safari Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Lion Country Safari

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Tapir, South American (<i>Tapirus terrestris</i>)	Widgeon, Chiloe (<i>Anas sibilatrix</i>)	Audubon Zoo ²
Wild Cattle and Camelid		
Alpaca (<i>Vicugna pacos</i>)	Duck, Muscovy (<i>Cairina moschata</i>) Pelican, American White (<i>Pelecanus erythrorhynchos</i>) Pelican, Brown (<i>Pelecanus occidentalis</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Tortoise, Aldabra (<i>Aldabrachelys gigantea</i>) Tortoise, Red-footed (<i>Chelonoidis carbonaria</i>) Tortoise, Yellow-footed (<i>Chelonoidis denticulata</i>)	Lincoln Park Zoo Salisbury Zoo Lion Country Safari Great Plains Zoo; Henry Vilas Zoo; Lion Country Safari; Milwaukee County Zoo; Trevor Zoo Lion Country Safari Lion Country Safari Milwaukee County Zoo Milwaukee County Zoo
Anoa, Lowland (<i>Bubalus depressicornis</i>)	Gibbon, White-cheeked (<i>Nomascus leucogenys</i>) Otter, Asian Small-clawed (<i>Amblonyx cinereus</i>) Siamang (<i>Symphalangus syndactylus</i>)	Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo
Banteng (<i>Bos javanicus</i>)	Crane, Hooded (<i>Grus monacha</i>) Crane, Sarus (<i>Grus antigone</i>) Crane, Wattled (<i>Buggeranus carunculatus</i>) Crane, White-naped (<i>Grus vipio</i>) Goose, Bar-headed (<i>Anser indicus</i>) Ostrich, Common (<i>Struthio camelus</i>) Peafowl, Javan Green (<i>Pavo muticus</i>) Shelduck, Ruddy (<i>Tadorna ferruginea</i>)	Saint Louis Zoo Disney's Animal Kingdom; Saint Louis Zoo; Saint Louis Zoo White Oak Conservation Center* Saint Louis Zoo Disney's Animal Kingdom The Wilds Disney's Animal Kingdom Disney's Animal Kingdom
Bison, American (<i>Bison bison</i>)	Crane, Sandhill (<i>Grus canadensis</i>) Goose, Canada (<i>Branta canadensis</i>) Goose, Snow (<i>Chen caerulescens</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>)	Caldwell Zoo; Great Plains Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Rosamond Gifford Zoo Rosamond Gifford Zoo Rosamond Gifford Zoo Rosamond Gifford Zoo

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Bison, American (<i>Bison bison</i>)	Merganser, Common (<i>Mergus merganser</i>) Rhea, Greater (American) (<i>Rhea americana</i>) Turkey, Wild (<i>Meleagris gallopavo</i>) Waterfowl (<i>assorted sp.</i>)	Rosamond Gifford Zoo Wildlife Safari Caldwell Zoo* Caldwell Zoo
Buffalo, Cape (<i>Syncerus caffer</i>)	Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Wattled (<i>Buggeranus carunculatus</i>) Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Great White (<i>Pelecanus onocrotalus</i>) Various birds	White Oak Conservation Center* San Diego Zoo Safari Park; San Diego Zoo Safari Park White Oak Conservation Center* San Diego Zoo Safari Park San Diego Zoo Safari Park San Diego Zoo Safari Park
Buffalo, Water (<i>Bubalus bubalis</i>)	Crane, Demoiselle (<i>Grus virgo</i>) Crane, Sarus (<i>Grus antigone</i>) Crocodile, American (<i>Crocodylus acutus</i>) Goose, Bar-headed (<i>Anser indicus</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Ostrich, Common (<i>Struthio camelus</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>) Pheasant, Golden (<i>Chrysolophus pictus</i>) Shelduck, Ruddy (<i>Tadorna ferruginea</i>)	Africam Safari Park Disney's Animal Kingdom Africam Safari Park Disney's Animal Kingdom Africam Safari Park Lion Country Safari Africam Safari Park; Disney's Animal Kingdom Africam Safari Park Disney's Animal Kingdom
Camel, Bactrian (<i>Camelus bactrianus</i>)	Crane, Sarus (<i>Grus antigone</i>) Ostrich, Common (<i>Struthio camelus</i>) Pelican (<i>Pelecanus sp.</i>) Swan, Trumpeter (<i>Cygnus buccinator</i>)	Blank Park Zoo; Mesker Park Zoo Fresno Chaffee Zoo Roosevelt Park Zoo Roosevelt Park Zoo
Camel, Dromedary (<i>Camelus dromedarius</i>)	Crane, African Crowned (<i>Balearica sp.</i>) Guineafowl (<i>sp.</i>) Ostrich, Common (<i>Struthio camelus</i>) Waterfowl (<i>assorted sp.</i>)	Africam Safari Park Africam Safari Park; Africam Safari Park Africam Safari Park; Africam Safari Park; Brevard Zoo; Mesker Park Zoo Africam Safari Park
Cattle, Ankole (Watusi) (<i>Bos taurus</i>)	Chicken, Domestic (<i>Gallus gallus domesticus</i>) Crane, African Crowned (<i>Balearica sp.</i>) Crane, Black Crowned (<i>Balearica pavonina</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>)	Blank Park Zoo* Cape May County Zoo; Disney's Animal Kingdom Mesker Park Zoo* Blank Park Zoo; Disney's Animal Kingdom Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom; Phoenix Zoo*

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<p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p>	<p>Crane, Wattled (<i>Bugeranus carunculatus</i>) Flamingo, Greater (<i>Phoenicopterus roseus</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p> <p>Guineafowl (<i>sp.</i>)</p> <p>Guineafowl, Helmeted (<i>Numida meleagris</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pelican, Dalmatian (<i>Pelecanus crispus</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>) Shelduck, Common (<i>Tadorna tadorna</i>) Shelduck, South African (Cape) (<i>Tadorna cana</i>) Spoonbill, African (<i>Platalea alba</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Stork, Yellow-billed (<i>Mycteria ibis</i>) Vulture, Lappet-faced (<i>Torgos tracheliotos</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom Africam Safari Park; Blank Park Zoo; Phoenix Zoo Toledo Zoo Disney's Animal Kingdom</p> <p>Africam Safari Park; Disney's Animal Kingdom; Disney's Animal Kingdom; Lion Country Safari; Phoenix Zoo; Toledo Zoo San Diego Zoo Safari Park San Diego Zoo Safari Park Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Phoenix Zoo Phoenix Zoo Disney's Animal Kingdom; Disney's Animal Kingdom; Phoenix Zoo</p>
<p>Cattle, Domestic (<i>Bos taurus</i>)</p>	<p>Chicken, Domestic (<i>Gallus gallus domesticus</i>) Crane, Sandhill (<i>Grus canadensis</i>) Turkey, Wild (<i>Meleagris gallopavo</i>) Waterfowl (<i>assorted sp.</i>)</p>	<p>Sunset Zoo* Caldwell Zoo Caldwell Zoo* Caldwell Zoo</p>
<p>Gaur (<i>Bos gaurus</i>)</p>	<p>Crane, Demoiselle (<i>Grus virgo</i>) Crocodile, American (<i>Crocodylus acutus</i>) Dog, Domestic (<i>Canis lupus familiaris</i>) Macaque, Tonkean (<i>Macaca tonkeana</i>) Peafowl, Blue (Indian) (<i>Pavo cristatus</i>) Peafowl, Green (Java) (<i>Pavo muticus</i>) Pheasant, Golden (<i>Chrysolophus pictus</i>)</p>	<p>Africam Safari Park Africam Safari Park Buffalo Zoo Africam Safari Park Buffalo Zoo Africam Safari Park Africam Safari Park</p>
<p>Guanaco (<i>Lama guanicoe</i>)</p>	<p>Capybara (<i>Hydrochoerus hydrochaeris</i>)</p> <p>Cavy, Patagonian (<i>Dolichotis patagonum</i>) Duck, Black-bellied Whistling (<i>Dendrocygna autumnalis</i>) Duck, White-faced Whistling Duck (<i>Dendrocygna viduata</i>)</p>	<p>Audubon Zoo²; Bergen County Zoo; Detroit Zoo; Salisbury Zoo; San Francisco Zoo Abilene Zoo Audubon Zoo² Audubon Zoo²</p>

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<p>Guanaco (<i>Lama guanicoe</i>)</p>	<p>Emu (<i>Dromaius novaehollandiae</i>)</p> <p>Goose, Orinoco (<i>Neochem jubata</i>)</p> <p>Goose, Ruddy-headed (<i>Chloephaga rubidiceps</i>)</p> <p>Macaw, Blue and Gold (<i>Ara ararauna</i>)</p> <p>Ostrich, Common (<i>Struthio camelus</i>)</p> <p>Pintail, Bahama (White-cheeked) (<i>Anas bahamensis</i>)</p> <p>Pochard, Rosy-bill (<i>Netta peposaca</i>)</p> <p>Rhea, Greater (American) (<i>Rhea americana</i>)</p> <p>Rhea, Lesser (Darwin's) (<i>Rhea pennata</i>)</p> <p>Screamer, Crested (Southern) (<i>Chauna torquata</i>)</p> <p>Seriema, Red-legged (<i>Cariama cristata</i>)</p> <p>Swan, Black (<i>Cygnus atratus</i>)</p> <p>Swan, Black-necked (<i>Cygnus melanocoryph</i>)</p> <p>Swan, Coscoroba (<i>Coscoroba coscoroba</i>)</p> <p>Teal, Sharp-winged (<i>Anas oxypterus</i>)</p> <p>Tortoise, Red-footed (<i>Chelonoidis carbonaria</i>)</p> <p>Widgeon, Chiloe (<i>Anas sibilatrix</i>)</p>	<p>Santa Fe College Teaching Zoo</p> <p>Audubon Zoo²</p> <p>Audubon Zoo²</p> <p>Salisbury Zoo</p> <p>Fossil Rim Wildlife Center; Fossil Rim Wildlife Center</p> <p>Audubon Zoo²</p> <p>Audubon Zoo²</p> <p>Abilene Zoo; Bergen County Zoo; Detroit Zoo; Santa Fe College Teaching Zoo; Wildlife Safari</p> <p>Audubon Zoo²; Salisbury Zoo</p> <p>Audubon Zoo²; Detroit Zoo</p> <p>Audubon Zoo²</p> <p>San Francisco Zoo</p> <p>Audubon Zoo²; San Francisco Zoo</p> <p>San Francisco Zoo</p> <p>Audubon Zoo²</p> <p>Santa Fe College Teaching Zoo</p> <p>Audubon Zoo²</p>
<p>Llama (<i>Lama glama</i>)</p>	<p>Capybara (<i>Hydrochoerus hydrochaeris</i>)</p> <p>Cavy, Patagonian (<i>Dolichotis patagonum</i>)</p> <p>Chicken, Domestic (<i>Gallus gallus domesticus</i>)</p> <p>Goose, Andean (<i>Neochen melanoptera</i>)</p> <p>Macaw, Blue and Gold (<i>Ara ararauna</i>)</p> <p>Pelican, Brown (<i>Pelecanus occidentalis</i>)</p> <p>Rhea, Greater (American) (<i>Rhea americana</i>)</p> <p>Rhea, Lesser (Darwin's) (<i>Rhea pennata</i>)</p> <p>Seriema (<i>Cariamidae</i>)</p> <p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p> <p>Swan, Black-necked (<i>Cygnus melancoryphus</i>)</p> <p>Swan, Mute (<i>Cygnus alor</i>)</p>	<p>Mesker Park Zoo; Salisbury Zoo; Turtle Back Zoo; Zoo de Granby</p> <p>Denver Zoological Gardens</p> <p>Sunset Zoo</p> <p>Salisbury Zoo</p> <p>Salisbury Zoo</p> <p>Lion Country Safari</p> <p>Lion Country Safari; Mesker Park Zoo; Salisbury Zoo; Turtle Back Zoo; Wildlife Safari; Zoo de Granby</p> <p>Salisbury Zoo</p> <p>Mesker Park Zoo</p> <p>Lion Country Safari</p> <p>Mesker Park Zoo; Turtle Back Zoo</p> <p>Mesker Park Zoo</p>

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Llama (<i>Lama glama</i>)	Tortoise, Aldabra (<i>Aldabrachelys gigantea</i>) Vulture, South American Black (<i>Coragypus atratus</i>)	Lion Country Safari Mesker Park Zoo
Yak (<i>Bos grunniens</i>)	Chicken, Domestic (<i>Gallus gallus domesticus</i>) Crane, White-naped (<i>Grus vipio</i>) Emu (<i>Dromaius novaehollandiae</i>) Goose, Canada (<i>Branta canadensis</i>) Goose, Snow (<i>Chen caerulescens</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Merganser, Common (<i>Mergus merganser</i>) Rhea, Greater (American) (<i>Rhea americana</i>)	Lee Richardson Zoo* Wildlife Safari Wildlife Safari Rosamond Gifford Zoo Rosamond Gifford Zoo Rosamond Gifford Zoo Rosamond Gifford Zoo Wildlife Safari
Wild Pig, Peccary, and Hippo		
Babirusa, Moluccan (<i>Babyrousa babyrussa</i>)	Siamang (<i>Hylobates syndactylus</i>)	Louisville Zoo ²
Babirusa, North Sulawesi (<i>Babyrousa celebensis</i>)	Otter, Asian Small-clawed (<i>Amblonyx cinereus</i>)	Audubon Zoo; Jacksonville Zoo and Gardens
Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Cichlid, African (assorted species) Chicken, Domestic (<i>Gallus gallus domesticus</i>) Cormorant, White-breasted (<i>Phalacrocorax lucidus</i>) Duck, Northern Pintail (<i>Anas acuta</i>) Duck, Tufted (<i>Aythya fuligula</i>) Duck, White-eyed (Harhead) (<i>Aythya australis</i>) Duck, White-faced Whistling (<i>Dendrocygna viduata</i>) Duck, Yellow-billed (<i>Anas undulata</i>) Egret, Cattle (<i>Bubulcus ibis</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Hammerkop (<i>Scopus umbretta</i>) Pelican, Pink-backed (<i>Pelecanus rufescens</i>) Porcupine, Cape (<i>Hystrix africaeaustralis</i>) Stork, Abdim's (<i>Ciconia abdimii</i>) Tilapia, Spotted (<i>Tilapia mariae</i>) Tilapia, Zebra (<i>Tilapia buttikoferi</i>) Weaver, Taveta Golden (<i>Ploceus castaneiceps</i>)	Adventure Aquarium Cheyenne Mountain Zoo Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Adventure Aquarium Disney's Animal Kingdom Adventure Aquarium Disney's Animal Kingdom Adventure Aquarium Adventure Aquarium Saint Louis Zoo Saint Louis Zoo Adventure Aquarium
Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Birds (assorted species) Colobus, Black and White (<i>Colobus guereza</i>) Duck, Hartlaub's (<i>Pteronetta hartlaubii</i>) Guenon, Schmidt's Red-tailed (<i>Cercopithecus ascanius</i>) Mandrill (<i>Mandrillus sphinx</i>) Mangabey, Red-capped (Collared) (<i>Cercocebus torquatus</i>) Mangabey, Sooty (<i>Cercocebus atys</i>)	Brookfield Zoo Brookfield Zoo Zoo New England Brookfield Zoo Brookfield Zoo Brookfield Zoo Brookfield Zoo

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Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Monkey, Syke's (<i>Cercopithecus albogularis</i>) Talapoin (<i>Miopithecus sp.</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)	Brookfield Zoo Brookfield Zoo Zoo New England
Hog, Red River (<i>Potamochoerus porcus</i>)	Bonobo (<i>Pan paniscus</i>) Colobus, Black and White (<i>Colobus guereza</i>) Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>) Crane, Grey Crowned (<i>Balearica regulorum</i>) Crane, Wattled (<i>Bugeranus carunculatus</i>) Fox, Bat-eared (<i>Otocyon megalotis</i>) Goose, Egyptian (<i>Alopochen aegyptiaca</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>) Mandrill (<i>Mandrillus sphinx</i>) Monkey, De Brazza's (<i>Cercopithecus neglectus</i>) Ostrich, Common (<i>Struthio camelus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)	Columbus Zoo ² Peoria Zoo Disney's Animal Kingdom Disney's Animal Kingdom*; Disney's Animal Kingdom* Disney's Animal Kingdom Saint Louis Zoo Disney's Animal Kingdom; Disney's Animal Kingdom Saint Louis Zoo Disney's Animal Kingdom Disney's Animal Kingdom Bronx Zoo Bronx Zoo Disney's Animal Kingdom Disney's Animal Kingdom ² Disney's Animal Kingdom
Peccary, Chacoan (<i>Catagonus wagneri</i>)	Rhea, Greater (American) (<i>Rhea americana</i>)	Sequoia Park Zoo
Peccary, Collared (<i>Pecari tajacu</i>)	Bear, American Black (<i>Ursus americanus</i>) Capybara (<i>Hydrochoerus hydrochaeris</i>) Coot (<i>Fulica sp.</i>) Duck, Black-bellied Whistling (<i>Dendrocygna autumnalis</i>) Duck, Mallard (<i>Anas platyrhynchos</i>) Duck, Mexican (<i>Anas diazi</i>) Duck, White-faced Whistling Duck (<i>Dendrocygna viduata</i>) Goose, Canada (<i>Branta canadensis</i>) Goose, Orinoco (<i>Neochem jubata</i>) Goose, Ruddy-headed (<i>Chloephaga rubidiceps</i>) Pintail, Bahama (White-cheeked) (<i>Anas bahamensis</i>) Pochard, Rosy-bill (<i>Netta peposaca</i>) Rhea, Lesser (Darwin's) (<i>Rhea pennata</i>) Screamer, Crested (Southern) (<i>Chauna torquata</i>) Seriema, Red-legged (<i>Cariama cristata</i>) Swan, Black-necked (<i>Cygnus melanocoryph</i>) Teal, Sharp-winged (<i>Anas oxypteryx</i>)	Africam Safari Park Audubon Zoo ² Africam Safari Park Audubon Zoo ² Africam Safari Park Africam Safari Park Audubon Zoo ² Africam Safari Park Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²

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Peccary, Collared <i>(Pecari tajacu)</i>	Turkey, Wild (<i>Meleagris gallopavo</i>) Waterfowl (<i>assorted sp.</i>) Widgeon, Chiloe (<i>Anas sibilatrix</i>)	Africam Safari Park; Audubon Zoo ² ; Cameron Park Zoo Africam Safari Park Audubon Zoo ²
Pig, Domestic (<i>Sus scrofa</i>)	Chicken, Domestic (<i>Gallus gallus domesticus</i>)	Sunset Zoo*
Warthog, Common <i>(Phacochoerus africanus)</i>	Fox, Bat-eared (<i>Otocyon megalotis</i>) Guineafowl, Helmeted (<i>Numida meleagris</i>) Ostrich, Common (<i>Struthio camelus</i>) Porcupine, African Crested (<i>Hystrix cristata</i>)	San Diego Zoo Safari Park Toledo Zoo Brookfield Zoo; Hagenbeck Zoo ² ; Toledo Zoo Zoo New England

SUCCESSFUL GROUPS OF UNGULATES MIXED WITH NON-UNGULATES (Sorted by Non-Ungulates)

The table below lists all non-ungulate species that have been mixed successfully with ungulate species at AZA institutions. This table is organized by taxa (birds, mammals, reptiles, and fish) and then alphabetically by common name.

The best way to use this table is to search for a non-ungulate species in the left-hand column and then find which ungulate species it has been successfully mixed with by looking in the corresponding middle column; in the right hand column is a list of all institutions that have successfully managed those species together. Please note that a “→” after an institution name means that the list for that specific mix continues on the next page. All institution names have been linked to the corresponding exhibit templates that are provided in this manual; you can click on the institution link to read more about the mixed-species exhibit and its management. Please note, after clicking the link, if you do not see the species you are looking for at the top of the exhibit summary page, scroll down to the "Group/Exhibit Changes Over Time" section.

Next to several institution names, you will find an asterisk (*). These asterisks mean that the subspecies for one or both of the species in the mix was provided for that specific institution.

Information from three past surveys has also been incorporated into this table: information from the 1997/1998 Mixed Antelope Exhibits Survey has a ¹ after the institution name, information from the 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure has a ² after the institution name, and information from the Cervid Mixed-Species Table that was included in the 2014 Cervid RCP did not include institution names, so in the institution column you will see “Cervid Mixed-Species Table³”. These entries do not have links throughout the table; however, the results from these three surveys have been posted on the AZA Ungulates website, and can be accessed by clicking on the links below.

¹ 1997/1998 Mixed Antelope Exhibits Survey

² 2005 Pig, Peccary, and Hippo TAG Mixed Species Brochure

³ Cervid Mixed-Species Table that was included in the 2014 Cervid RCP

Non-Ungulate Species (Current and Historic)	Ungulate Species	Institutions
Birds		
Barbet, Brown-breasted (<i>Lybius melanopterus</i>)	Dik-dik, Gunther’s (<i>Madoqua guentheri</i>) Dik-dik, Kirk’s (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo
Barbet, Crested (<i>Trachyphonus vaillantii</i>)	Dik-dik, Gunther’s (<i>Madoqua guentheri</i>) Dik-dik, Kirk’s (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo
Bird-of-Paradise, Lesser (<i>Paradisaea minor</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Birds (variety of species)	Dik-dik, Gunther’s (<i>Madoqua guentheri</i>) Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Caldwell Zoo Brookfield Zoo

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Bishop, Orange (<i>Euplectes franciscanus</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Kansas City Zoo
Bishop, Red (<i>Euplectes orix orix</i>)	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo
Bluebird, Fairy (<i>Irena puella</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Kansas City Zoo
Bulbul, Common (<i>Pycnonotus barbatus</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo
Bustard, Buff-crested (<i>Eupodotis gindiana</i>)	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo
Bustard, Kori (<i>Ardeotis kori</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gemsbok (<i>Oryx gazella</i>) Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>) Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Lechwe (<i>Kobus leche</i>) Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>) Steenbok (<i>Raphicerus campestris</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	Cameron Park Zoo Phoenix Zoo Phoenix Zoo North Carolina Zoo North Carolina Zoo North Carolina Zoo North Carolina Zoo Denver Zoological Gardens; Disney's Animal Kingdom; Phoenix Zoo Sedgwick County Zoo* North Carolina Zoo North Carolina Zoo North Carolina Zoo North Carolina Zoo* North Carolina Zoo North Carolina Zoo Denver Zoological Gardens North Carolina Zoo*
Cacique, Yellow-rumped (<i>Cacicus cela</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Cardinal, Red-crested (<i>Paroaria coronate</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Chicken, Domestic (<i>Gallus gallus domesticus</i>)	Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Cattle, Domestic (<i>Bos taurus</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Hippopotamus, Common (<i>Hippopotamus amphibious</i>) Llama (<i>Lama glama</i>) Pig, Domestic (<i>Sus scrofa</i>) Sheep, Domestic (<i>Ovis aries</i>) Yak (<i>Bos grunniens</i>)	Blank Park Zoo* Sunset Zoo* Sunset Zoo Cheyenne Mountain Zoo Sunset Zoo Sunset Zoo* Lee Richardson Zoo* Lee Richardson Zoo*
Coot (<i>Fulica sp.</i>)	Deer, White-tailed (<i>Odocoileus virginianus</i>) Peccary, Collared (<i>Pecari tajacu</i>)	Africam Safari Park* Africam Safari Park

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Cormorant, White-breasted (<i>Phalacrocorax lucidus</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Disney's Animal Kingdom
Crane, African Crowned (<i>Balearica sp.</i>)	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p>	<p>Lee Richardson Zoo</p> <p>Disney's Animal Kingdom</p> <p>Dickerson Park Zoo; Fort Worth Zoo; Gladys Porter Zoo; Kansas City Zoo; San Diego Zoo Safari Park</p> <p>Africam Safari Park</p> <p>Cape May County Zoo; Disney's Animal Kingdom</p> <p>Caldwell Zoo; Cameron Park Zoo</p> <p>Gladys Porter Zoo</p> <p>Africam Safari Park; Disney's Animal Kingdom</p> <p>Africam Safari Park</p> <p>North Carolina Zoo</p> <p>San Diego Zoo Safari Park</p> <p>Caldwell Zoo</p> <p>Africam Safari Park; Disney's Animal Kingdom; North Carolina Zoo</p> <p>North Carolina Zoo</p> <p>Cameron Park Zoo*</p> <p>Africam Safari Park*; Calgary Zoo; Cameron Park Zoo*; Cleveland Metropark Zoo*; Disney's Animal Kingdom*; Kansas City Zoo*</p> <p>North Carolina Zoo</p> <p>Africam Safari Park; Caldwell Zoo; North Carolina Zoo</p> <p>Caldwell Zoo; Cameron Park Zoo; Los Angeles Zoo; North Carolina Zoo</p> <p>Como Zoo</p> <p>Los Angeles Zoo*; North Carolina Zoo*; San Diego Zoo Safari Park*</p>

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<p>Crane, African Crowned (<i>Balearica</i> <i>sp.</i>)</p>	<p>Okapi (<i>Okapia johnstoni</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Sedgwick County Zoo Cape May County Zoo North Carolina Zoo Cameron Park Zoo; Los Angeles Zoo; North Carolina Zoo Caldwell Zoo Africam Safari Park; Fort Worth Zoo; North Carolina Zoo* Africam Safari Park; Caldwell Zoo; Disney's Animal Kingdom Caldwell Zoo; Calgary Zoo Calgary Zoo* Como Zoo*; Kansas City Zoo*</p>
<p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p>	<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker, Bay (<i>Cephalophus dorsalis</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Cuvier's (<i>Gazella cuvieri</i>) Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>White Oak Conservation Center* Albuquerque Biological Park*; Chehaw Wild Animal Park; Roosevelt Park Zoo; White Oak Conservation Center* Binder Park Zoo; White Oak Conservation Center*; White Oak Conservation Center* White Oak Conservation Center* Mesker Park Zoo* Ellen Trout Zoo* Roger Williams Park Zoo Brevard Zoo; Chehaw Wild Animal Park; Dallas Zoo*; San Francisco Zoo* Dallas Zoo*; Mesker Park Zoo* Binder Park Zoo; White Oak Conservation Center* Roger Williams Park Zoo White Oak Conservation Center* Albuquerque Biological Park*; Dallas Zoo*</p>

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<p>Crane, Black Crowned (<i>Balearica pavonina</i>)</p>	<p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Tapir, Baird's (<i>Tapirus bairdii</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Albuquerque Biological Park*; Dallas Zoo*; Denver Zoological Gardens*</p> <p>Binder Park Zoo*; San Francisco Zoo*</p> <p>Brevard Zoo</p> <p>Dallas Zoo*; San Francisco Zoo*</p> <p>Dallas Zoo*</p> <p>Binder Park Zoo</p> <p>White Oak Conservation Center*</p> <p>Mesker Park Zoo*</p> <p>Lehigh Valley Zoo*; San Francisco Zoo*; White Oak Conservation Center*</p> <p>The Maryland Zoo*</p> <p>Mesker Park Zoo</p> <p>Binder Park Zoo; Mesker Park Zoo*</p> <p>Binder Park Zoo*; San Francisco Zoo*</p>
<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p> <p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Cuiver's (<i>Gazella cuvieri</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p>	<p>Lee Richardson Zoo</p> <p>White Oak Conservation Center</p> <p>Jacksonville Zoo and Gardens; White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center</p> <p>Blank Park Zoo; Disney's Animal Kingdom</p> <p>Saint Louis Zoo</p> <p>Disney's Animal Kingdom; Houston Zoo; Houston Zoo</p> <p>White Oak Conservation Center</p> <p>White Oak Conservation Center</p> <p>Saint Louis Zoo</p> <p>White Oak Conservation Center</p>

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<p>Crane, Blue (Stanley) (<i>Anthropoides paradiseus</i>)</p>	<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>) Hog, Red River (<i>Potamochoerus porcus</i>) Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Saint Louis Zoo</p> <p>Saint Louis Zoo Brevard Zoo; Disney's Animal Kingdom Brevard Zoo* Disney's Animal Kingdom Brevard Zoo; Disney's Animal Kingdom Mesker Park Zoo White Oak Conservation Center White Oak Conservation Center Cervid Mixed-Species Table³ Disney's Animal Kingdom; White Oak Conservation Center; White Oak Conservation Center Disney's Animal Kingdom; Disney's Animal Kingdom; Houston Zoo; Houston Zoo; Saint Louis Zoo Disney's Animal Kingdom; Saint Louis Zoo Disney's Animal Kingdom</p>
<p>Crane, Common (<i>Grus grus</i>)</p>	<p>Deer, Axis (<i>Axis axis</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Kudu (<i>Tragelaphus sp.</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nilgai (<i>Boselaphus tragocamelus</i>)</p>	<p>Mesker Park Zoo* Oakland Zoo* Bronx Zoo* Oakland Zoo* Bronx Zoo* Mesker Park Zoo* Mesker Park Zoo*</p>
<p>Crane, Demoiselle (<i>Grus virgo</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Blackbuck (<i>Antilope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Axis (<i>Axis axis</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Duiker, Blue (<i>Philantomba monticola</i>) Gaur (<i>Bos gaurus</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Lee Richardson Zoo Africam Safari Park Prospect Park Zoo Virginia Zoo Africam Safari Park Mesker Park Zoo</p>

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<p>Crane, Demoiselle (<i>Grus virgo</i>)</p>	<p>Kudu, Lesser (<i>Tragelaphus imberbis</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Sitatunga (<i>Tragelaphus spekii</i>) Tapir, Malayan (<i>Acrocodia indica</i>)</p>	<p>Como Zoo Alexandria Zoological Park; Idaho Falls Zoo Africam Safari Park Mesker Park Zoo Africam Safari Park</p>
<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>) Ass, African Wild (<i>Equus africanus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p> <p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Blank Park Zoo; Disney's Animal Kingdom; Omaha's Henry Doorly Zoo & Aquarium*; Saint Louis Zoo*</p> <p>Disney's Animal Kingdom*; Disney's Animal Kingdom*; White Oak Conservation Center*</p> <p>Kansas City Zoo* Disney's Animal Kingdom*</p> <p>Great Plains Zoo*; Great Plains Zoo*; Virginia Zoo*; White Oak Conservation Center*; White Oak Conservation Center*</p> <p>Binder Park Zoo; Jacksonville Zoo and Gardens*; White Oak Conservation Center*</p> <p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom; Phoenix Zoo* Kansas City Zoo*; Saint Louis Zoo*</p> <p>Abilene Zoo; Saint Louis Zoo*; Virginia Zoo* San Francisco Zoo*; Virginia Zoo*</p> <p>Blank Park Zoo; Cincinnati Zoo and Botanical Garden* →</p>

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<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p>	<p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Elephant, African Bush (<i>Loxodonta africana</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Kansas City Zoo*; Phoenix Zoo*</p> <p>Cincinnati Zoo and Botanical Garden*</p> <p>Kansas City Zoo*</p> <p>Binder Park Zoo; Columbus Zoo*; Indianapolis Zoo*; The Living Desert*; Oakland Zoo*; Omaha's Henry Doorly Zoo & Aquarium* Disney's Animal Kingdom²; Oklahoma City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Tulsa Zoo</p> <p>Columbus Zoo*; The Living Desert* Oklahoma City Zoo*</p> <p>Indianapolis Zoo*; Saint Louis Zoo*</p> <p>Binder Park Zoo; Cincinnati Zoo and Botanical Garden*; Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Kansas City Zoo*; Kansas City Zoo*; Phoenix Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Toledo Zoo*</p> <p>Dallas Zoo*; Phoenix Zoo*; Saint Louis Zoo*; Saint Louis Zoo*</p> <p>Binder Park Zoo*; Blank Park Zoo*; Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Great Plains Zoo*; Indianapolis Zoo*; Kansas City Zoo* →</p>
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Crane, Grey Crowned (<i>Balearica regulorum</i>)	Giraffe (<i>Giraffa camelopardalis</i>)	Omaha's Henry Doorly Zoo & Aquarium*; Phoenix Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; San Francisco Zoo*; Toledo Zoo*; Topeka Zoo*; Virginia Zoo*
	Hog, Red River (<i>Potamochoerus porcus</i>)	Disney's Animal Kingdom*; Disney's Animal Kingdom*
	Impala (<i>Aepyceros melampus</i>)	Binder Park Zoo; Cincinnati Zoo and Botanical Garden*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Disney's Animal Kingdom; Kansas City Zoo*; Kansas City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo
	Kob (<i>Kobus kob</i>)	San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Kudu (<i>Tragelaphus sp.</i>)	Oakland Zoo*
	Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Binder Park Zoo; Columbus Zoo*; Indianapolis Zoo*; Jacksonville Zoo and Gardens*; Kansas City Zoo*; Kansas City Zoo*; Mesker Park Zoo; San Francisco Zoo*; Toledo Zoo*
	Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Blank Park Zoo; Cincinnati Zoo and Botanical Garden*; Disney's Animal Kingdom
	Lechwe, Nile (<i>Kobus megaceros</i>)	Kansas City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*
	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Santa Fe College Teaching Zoo*

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<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p>	<p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Bronx Zoo*; Denver Zoological Gardens*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Saint Louis Zoo*; Saint Louis Zoo*</p> <p>Cheyenne Mountain Zoo*; Disney's Animal Kingdom*; Oklahoma City Zoo*</p> <p>Kansas City Zoo*; Kansas City Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom*; Disney's Animal Kingdom; San Francisco Zoo*; White Oak Conservation Center*</p> <p>Jacksonville Zoo and Gardens*; Omaha's Henry Doorly Zoo & Aquarium*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Tulsa Zoo*; Zoo de Granby*</p> <p>Fort Wayne Children's Zoo; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Disney's Animal Kingdom; Mesker Park Zoo*; Santa Fe College Teaching Zoo*; Tulsa Zoo</p> <p>Disney's Animal Kingdom*; Saint Louis Zoo*; Saint Louis Zoo*</p> <p>San Diego Zoo Safari Park*</p> <p>Binder Park Zoo; Disney's Animal Kingdom*; Disney's Animal Kingdom* →</p>
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<p>Crane, Grey Crowned (<i>Balearica regulorum</i>)</p>	<p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>San Diego Zoo Safari Park*; San Diego Zoo Safari Park*</p> <p>Columbus Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom*; Indianapolis Zoo*; San Diego Zoo Safari Park*; San Diego Zoo Safari Park*; Toledo Zoo*</p> <p>Chehaw Wild Animal Park; Kansas City Zoo*</p> <p>Great Plains Zoo*; Great Plains Zoo*</p> <p>Disney's Animal Kingdom*; Henry Vilas Zoo*</p> <p>Binder Park Zoo*; Cincinnati Zoo and Botanical Garden*; Columbus Zoo*; Disney's Animal Kingdom*; Indianapolis Zoo*; Kansas City Zoo*; San Francisco Zoo*; Toledo Zoo*; Tulsa Zoo*; Zoo de Granby*</p>
<p>Crane, Hooded (<i>Grus monacha</i>)</p>	<p>Banteng (<i>Bos javanicus</i>)</p> <p>Goral, Chinese (<i>Naemorhedus griseus</i>)</p>	<p>Saint Louis Zoo</p> <p>Lee Richardson Zoo</p>
<p>Crane, Red-crowned (<i>Grus japonensis</i>)</p>	<p>Deer, Tufted (<i>Elaphodus cephalophus</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Muntjac (<i>Muntiacus sp.</i>)</p> <p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p>	<p>Cleveland Metropark Zoo; Sunset Zoo</p> <p>Kansas City Zoo</p> <p>Sunset Zoo</p> <p>Capron Park Zoo</p>
<p>Crane, Sandhill (<i>Grus canadensis</i>)</p>	<p>Bison, American (<i>Bison bison</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Caribou (<i>Rangifer tarandus</i>)</p> <p>Cattle, Domestic (<i>Bos taurus</i>)</p> <p>Deer, Mule (<i>Odocoileus hemionus</i>)</p> <p>Deer, Red Brocket (<i>Mazama temama</i>)</p>	<p>Caldwell Zoo; Great Plains Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Rosamond Gifford Zoo</p> <p>Fossil Rim Wildlife Center</p> <p>Fossil Rim Wildlife Center</p> <p>Cervid Mixed-Species Table³</p> <p>Caldwell Zoo</p> <p>Milwaukee County Zoo</p> <p>Phoenix Zoo</p>

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<p>Crane, Sandhill (<i>Grus canadensis</i>)</p>	<p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Elk, American (<i>Cervus Canadensis</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>) Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Moose (<i>Alces alces</i>)</p> <p>Pronghorn (<i>Antilocapra americana</i>)</p> <p>Pudu, Southern (<i>Pudu puda</i>)</p>	<p>Caldwell Zoo; Cosley Zoo; Jacksonville Zoo and Gardens; Northeastern Wisconsin Zoo (NEW Zoo); Oklahoma City Zoo; Sunset Zoo</p> <p>Milwaukee County Zoo; Northeastern Wisconsin Zoo (NEW Zoo)</p> <p>Fossil Rim Wildlife Center Jacksonville Zoo and Gardens</p> <p>Fossil Rim Wildlife Center Milwaukee County Zoo; Northeastern Wisconsin Zoo (NEW Zoo)</p> <p>Northeastern Wisconsin Zoo (NEW Zoo); Rosamond Gifford Zoo; Sedgwick County Zoo; Sunset Zoo; ZooAmerica Wildlife Park</p> <p>Jacksonville Zoo and Gardens</p>
<p>Crane, Sarus (<i>Grus antigone</i>)</p>	<p>Banteng (<i>Bos javanicus</i>)</p> <p>Barasingha, Indian (<i>Rucervus duvaucelii</i>)</p> <p>Blackbuck (<i>Antilope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Camel, Bactrian (<i>Camelus bactrianus</i>)</p> <p>Deer, Eld's (<i>Rucervus eldii</i>)</p> <p>Deer, Chinese Water (<i>Hydropotes inermis</i>) Deer, Sika (<i>Cervus nippon</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Kudu (<i>Tragelaphus sp.</i>) Muntjac, Indian (<i>Muntiacus muntjak</i>)</p> <p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p>	<p>Disney's Animal Kingdom; Saint Louis Zoo; Saint Louis Zoo White Oak Conservation Center</p> <p>Disney's Animal Kingdom Disney's Animal Kingdom Blank Park Zoo; Mesker Park Zoo</p> <p>Disney's Animal Kingdom; Saint Louis Zoo Los Angeles Zoo</p> <p>Cervid Mixed-Species Table³</p> <p>Oakland Zoo Saint Louis Zoo Oakland Zoo Mesker Park Zoo; Mesker Park Zoo Saint Louis Zoo</p>

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<p>Crane, Wattled (<i>Bucconas carunculatus</i>)</p>	<p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Banteng (<i>Bos javanicus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Goitered (<i>Gazella subgutturosa</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thompson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p>	<p>White Oak Conservation Center</p> <p>White Oak Conservation Center</p> <p>White Oak Conservation Center; White Oak Conservation Center</p> <p>White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center</p> <p>White Oak Conservation Center*</p> <p>Disney's Animal Kingdom</p> <p>White Oak Conservation Center; White Oak Conservation Center; White Oak Conservation Center</p> <p>Saint Louis Zoo; Saint Louis Zoo; White Oak Conservation Center; White Oak Conservation Center</p> <p>White Oak Conservation Center</p> <p>White Oak Conservation Center</p> <p>Saint Louis Zoo</p> <p>Disney's Animal Kingdom</p> <p>Jacksonville Zoo and Gardens*</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>Jackson Zoo; Jacksonville Zoo and Gardens</p> <p>Jacksonville Zoo and Gardens</p> <p>White Oak Conservation Center</p> <p>White Oak Conservation Center*</p>
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Crane, Wattled (<i>Bugeranus carunculatus</i>)	Lechwe, Nile (<i>Kobus megaceros</i>) Nyala (<i>Tragelaphus angasii</i>) Okapi (<i>Okapia johnstoni</i>) Steenbok (<i>Raphicerus campestris</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Zebra, Grevy's (<i>Equus grevyi</i>)	White Oak Conservation Center; White Oak Conservation Center Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Jackson Zoo; White Oak Conservation Center; White Oak Conservation Center
Crane, White-naped (<i>Grus vipio</i>)	Banteng (<i>Bos javanicus</i>) Blackbuck (<i>Antilope cervicapra</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Hog (<i>Axis porcinus</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Goral, Chinese (<i>Naemorhedus griseus</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Yak (<i>Bos grunniens</i>)	Saint Louis Zoo Wildlife Safari Wildlife Safari Oklahoma City Zoo Oklahoma City Zoo Oklahoma City Zoo; Trevor Zoo; Wildlife Safari Columbus Zoo; Oklahoma City Zoo Oklahoma City Zoo Trevor Zoo Wildlife Safari Wildlife Safari
Curassow (sp.)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Pudu, Southern (<i>Pudu puda</i>)	Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³
Dove (sp.)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³
Dove, Jambu Fruit (<i>Ptilinopus jambu</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Duck (sp.)	Deer, Tufted (<i>Elaphodus cephalophus</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Disney's Animal Kingdom Moody Gardens
Duck, Black-bellied Whistling (<i>Dendrocygna autumnalis</i>)	Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²
Duck, Hartlaub's (<i>Pteronetta hartlaubii</i>)	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Zoo New England
Duck, Mallard (<i>Anas platyrhynchos</i>)	Deer, White-tailed (<i>Odocoileus virginianus</i>) Moose (<i>Alces alces</i>) Peccary, Collared (<i>Pecari tajacu</i>)	Africam Safari Park*; Chattanooga Zoo Cheyenne Mountain Zoo Africam Safari Park

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Duck, Mandarin (<i>Aix galericulata</i>)	Deer, Tufted (<i>Elaphodus cephalophus</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cleveland Metroparks Zoo; Prospect Park Zoo Alexandria Zoological Park; Idaho Falls Zoo
Duck, Merganser (<i>Mergus merganser</i>)	Moose (<i>Alces alces</i>)	Cheyenne Mountain Zoo
Duck, Mexican (<i>Anas diazi</i>)	Deer, White-tailed (<i>Odocoileus virginianus</i>) Peccary, Collared (<i>Pecari tajacu</i>)	Africam Safari Park* Africam Safari Park
Duck, Muscovy (<i>Cairina moschata</i>)	Alpaca (<i>Vicugna pacos</i>) Okapi (<i>Okapia johnstoni</i>)	Lincoln Park Zoo Cheyenne Mountain Zoo
Duck, Northern Pintail (<i>Anas acuta</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Disney's Animal Kingdom
Duck, Northern Shoveler (<i>Anas clypeata</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Columbus Zoo
Duck, Plumed Whistling (<i>Dendrocygna eytoni</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Duck, Redhead (<i>Aythya americana</i>)	Deer, Tufted (<i>Elaphodus cephalophus</i>)	Cleveland Metroparks Zoo
Duck, Tufted (<i>Aythya fuligula</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Disney's Animal Kingdom
Duck, Whistling Tree (<i>Dendrocygna autumnalis</i>)	Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Plains (<i>Equus quagga</i>)	Indianapolis Zoo Indianapolis Zoo Indianapolis Zoo*
Duck, White-eyed (Harhead) (<i>Aythya australis</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Disney's Animal Kingdom
Duck, White-faced Whistling (<i>Dendrocygna viduata</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Gerenuk (<i>Litocranius walleri</i>) Guanaco (<i>Lama guanicoe</i>) Hippopotamus, Common (<i>Hippopotamus amphibius</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Kansas City Zoo Kansas City Zoo Dallas Zoo Audubon Zoo ² Disney's Animal Kingdom Audubon Zoo ² Audubon Zoo ²
Duck, Yellow-billed (<i>Anas undulata</i>)	Bontebok (<i>Damaliscus pygargus</i>) Hippopotamus, Common (<i>Hippopotamus amphibius</i>) Ibex, Nubian (<i>Capra nubiana</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Rhinoceros, White (<i>Ceratotherium simum</i>)	Jacksonville Zoo and Gardens Disney's Animal Kingdom Bronx Zoo Jacksonville Zoo and Gardens Jacksonville Zoo and Gardens*

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<p>Egret, Cattle (<i>Bubulcus ibis</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>) Chevrotain, Greater Malay (<i>Tragulus napu</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hippopotamus, Common (<i>Hippopotamus amphibius</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Oryx, East African (Beisa) (<i>Oryx beisa</i>) Zebra (<i>Equus sp.</i>)</p>	<p>Kansas City Zoo Columbus Zoo North Carolina Zoo Kansas City Zoo Cheyenne Mountain Zoo; Kansas City Zoo Adventure Aquarium</p> <p>Kansas City Zoo Kansas City Zoo Kansas City Zoo Columbus Zoo</p> <p>Kansas City Zoo Kansas City Zoo</p>
<p>Emu (<i>Dromaius novaehollandiae</i>)</p>	<p>Blackbuck (<i>Antilope cervicapra</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Sika (<i>Cervus nippon</i>) Donkey (<i>Equus africanus asinus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Guanaco (<i>Lama guanicoe</i>)</p> <p>Horse, Domestic (<i>Equus ferus caballus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Sheep, Domestic (<i>Ovis aries</i>) Yak (<i>Bos grunniens</i>)</p>	<p>Fossil Rim Wildlife Center; Wildlife Safari Fossil Rim Wildlife Center</p> <p>Wildlife Safari Wildlife Safari Mesker Park Zoo Fossil Rim Wildlife Center Mesker Park Zoo Santa Fe College Teaching Zoo Great Plains Zoo*; Mesker Park Zoo Fossil Rim Wildlife Center Wildlife Safari Mesker Park Zoo Wildlife Safari</p>
<p>Finch, Green Singing (<i>Serinus mozambicus</i>)</p>	<p>Klipspringer (<i>Oreotragus oreotragus</i>)</p>	<p>Staten Island Zoo</p>
<p>Flamingo (<i>sp.</i>)</p>	<p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p>	<p>Moody Gardens</p>
<p>Flamingo, Greater (<i>Phoenicopterus roseus</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p>	<p>Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom* Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom</p>

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Go-away Bird, Bare-faced (<i>Corythaixoides personatus</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo
Goose (sp.)	Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Moody Gardens
Goose, Andean (<i>Neochen melanoptera</i>)	Llama (<i>Lama glama</i>)	Salisbury Zoo
Goose, Bar-headed (<i>Anser indicus</i>)	Banteng (<i>Bos javanicus</i>) Blackbuck (<i>Antelope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Eld's (<i>Rucervus eldii</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Tapir, Mountain (<i>Tapirus pinchaque</i>)	Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Idaho Falls Zoo Cheyenne Mountain Zoo
Goose, Blue-winged (<i>Cyanochen cyanoptera</i>)	Duiker, Blue (<i>Philantomba monticola</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Ibex, Nubian (<i>Capra nubiana</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Nyala (<i>Tragelaphus angasii</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Plains (<i>Equus quagga</i>)	Oklahoma City Zoo Toledo Zoo Toledo Zoo* Bronx Zoo Toledo Zoo Bronx Zoo Toledo Zoo Toledo Zoo*
Goose, Canada (<i>Branta canadensis</i>)	Bison, American (<i>Bison bison</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Peccary, Collared (<i>Pecari tajacu</i>) Yak (<i>Bos grunniens</i>)	Rosamond Gifford Zoo Africam Safari Park* Africam Safari Park Rosamond Gifford Zoo
Goose, Egyptian (<i>Alopochen aegyptiaca</i>)	Antelope, Roan (<i>Hippotragus equinus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Eland, Common (<i>Taurotragus oryx</i>) Elephant, African Bush (<i>Loxodonta africana</i>) Gazelle, Cuvier's (<i>Gazella cuvieri</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Disney's Animal Kingdom Jacksonville Zoo and Gardens; Omaha's Henry Doorly Zoo & Aquarium; Virginia Zoo Jacksonville Zoo and Gardens Disney's Animal Kingdom Kansas City Zoo Virginia Zoo Kansas City Zoo; Oakland Zoo Kansas City Zoo The Living Desert Oklahoma City Zoo; Tulsa Zoo; Woodland Park Zoo Oklahoma City Zoo Disney's Animal Kingdom →

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<p>Goose, Egyptian (<i>Alopochen aegyptiaca</i>)</p>	<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hippopotamus, Common (<i>Hippopotamus amphibius</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Moose (<i>Alces alces</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Disney's Animal Kingdom; Kansas City Zoo; Kansas City Zoo; Toledo Zoo</p> <p>Disney's Animal Kingdom*; Kansas City Zoo; The Living Desert*; Toledo Zoo*; Oakland Zoo*; Omaha's Henry Doorly Zoo & Aquarium*; Utah's Hogle Zoo*; Woodland Park Zoo*</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom; Saint Louis Zoo</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom; Kansas City Zoo; Kansas City Zoo</p> <p>Indianapolis Zoo; Jacksonville Zoo and Gardens; Kansas City Zoo; Kansas City Zoo; The Living Desert; Toledo Zoo</p> <p>Kansas City Zoo</p> <p>Northeastern Wisconsin Zoo (NEW Zoo)</p> <p>Disney's Animal Kingdom; Utah's Hogle Zoo</p> <p>Disney's Animal Kingdom; Oklahoma City Zoo</p> <p>Kansas City Zoo; Kansas City Zoo; Woodland Park Zoo*</p> <p>Jacksonville Zoo and Gardens*; Toronto Zoo</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom</p>
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Goose, Egyptian (<i>Alopochen aegyptiaca</i>)	Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra (<i>Equus sp.</i>) Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)	Disney's Animal Kingdom; Indianapolis Zoo; Toledo Zoo Kansas City Zoo Utah's Hogle Zoo* Disney's Animal Kingdom; Indianapolis Zoo*; Kansas City Zoo*; Toledo Zoo*; Tulsa Zoo*; Woodland Park Zoo
Goose, Magpie (<i>Anseranas semipalmata</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Goose, Orinoco (<i>Neochen jubata</i>)	Gazelle, Speke's (<i>Gazella spekei</i>) Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Phoenix Zoo Audubon Zoo ² Audubon Zoo ² Phoenix Zoo* Audubon Zoo ²
Goose, Red-breasted (<i>Branta ruficollis</i>)	Deer, Tufted (<i>Elaphodus cephalophus</i>)	Prospect Park Zoo
Goose, Ruddy-headed (<i>Chloephaga rubidiceps</i>)	Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²
Goose, Snow (<i>Chen caerulescens</i>)	Yak (<i>Bos grunniens</i>)	Rosamond Gifford Zoo
Goose, Spur-winged (<i>Plectropterus gambensis</i>)	Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Ass, African Wild (<i>Equus africanus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>)	Disney's Animal Kingdom Disney's Animal Kingdom Jackson Zoo Disney's Animal Kingdom* North Carolina Zoo Cleveland Metroparks Zoo Disney's Animal Kingdom; Disney's Animal Kingdom; Disney's Animal Kingdom Jackson Zoo; North Carolina Zoo Disney's Animal Kingdom; North Carolina Zoo Cleveland Metropark Zoo*; Disney's Animal Kingdom*; Disney's Animal Kingdom* →

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<p>Goose, Spur-winged (<i>Plectropterus gambensis</i>)</p>	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Omaha's Henry Doorly Zoo & Aquarium*</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom;</p> <p>Disney's Animal Kingdom</p> <p>Jackson Zoo; Jackson Zoo</p> <p>North Carolina Zoo</p> <p>Disney's Animal Kingdom</p> <p>North Carolina Zoo</p> <p>Disney's Animal Kingdom; Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p> <p>North Carolina Zoo*</p> <p>Disney's Animal Kingdom</p> <p>North Carolina Zoo*</p> <p>North Carolina Zoo</p> <p>Disney's Animal Kingdom; Jackson Zoo</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom; North Carolina Zoo</p> <p>Zoo</p> <p>Disney's Animal Kingdom</p> <p>Jackson Zoo</p> <p>Disney's Animal Kingdom*</p> <p>Cleveland Metroparks Zoo*</p>
<p>Grenadier, Purple (<i>Uraeginthus ianthinogaster</i>)</p>	<p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>)</p> <p>Dik-dik, Kirk's (<i>Madoqua kirkii</i>)</p>	<p>Kansas City Zoo</p> <p>Kansas City Zoo</p>
<p>Guineafowl (sp.)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p>	<p>Minnesota Zoo</p> <p>Kansas City Zoo</p> <p>Gladys Porter Zoo;</p> <p>Memphis Zoo; Minnesota Zoo</p> <p>Zoo</p> <p>Africam Safari Park;</p> <p>Africam Safari Park</p> <p>Africam Safari Park; Blank Park Zoo; Phoenix Zoo</p>

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<p>Guineafowl (<i>sp.</i>)</p>	<p>Dik-dik, Kirk's (<i>Madoqua kirkii</i>)</p> <p>Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Denver Zoological Gardens</p> <p>Gladys Porter Zoo</p> <p>Africam Safari Park;</p> <p>Africam Safari Park; Blank Park Zoo; Phoenix Zoo</p> <p>Africam Safari Park</p> <p>Memphis Zoo; Oklahoma City Zoo; Tulsa Zoo</p> <p>Africam Safari Park; Oklahoma City Zoo</p> <p>Africam Safari Park; Kansas City Zoo; Knoxville Zoo; Phoenix Zoo</p> <p>Phoenix Zoo</p> <p>Africam Safari Park*;</p> <p>Kansas City Zoo; Knoxville Zoo*;</p> <p>Minnesota Zoo*;</p> <p>Oklahoma City Zoo*;</p> <p>Phoenix Zoo*</p> <p>Africam Safari Park;</p> <p>Africam Safari Park;</p> <p>Kansas City Zoo</p> <p>Kansas City Zoo; Knoxville Zoo</p> <p>Kansas City Zoo</p> <p>Africam Safari Park</p> <p>Africam Safari Park;</p> <p>Knoxville Zoo</p> <p>Africam Safari Park;</p> <p>Africam Safari Park;</p> <p>Minnesota Zoo</p> <p>Kansas City Zoo</p> <p>Oklahoma City Zoo*;</p> <p>Tulsa Zoo*</p>
<p>Guineafowl, Crested (<i>Guttera pucherani</i>)</p>	<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p>	<p>Cincinnati Zoo and Botanical Garden*</p> <p>Cincinnati Zoo and Botanical Garden*</p> <p>Staten Island Zoo*</p> <p>Cincinnati Zoo and Botanical Garden*</p>
<p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p>	<p>Bison, American (<i>Bison bison</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p>	<p>Rosamond Gifford Zoo</p> <p>Disney's Animal Kingdom; John Ball Zoo</p>

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<p>Guineafowl, Helmeted (<i>Numida meleagris</i>)</p>	<p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker (<i>sp.</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Elephant, African Bush (<i>Loxodonta Africana</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu (<i>Tragelaphus sp.</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>) Muntjac, Indian (<i>Muntiacus muntjak</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, East African (Beisa) (<i>Oryx beisa</i>) Topi (<i>Damaliscus korrigum jimela</i>) Warthog, Common (<i>Phacochoerus africanus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Yak (<i>Bos grunniens</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Mountain (<i>Equus zebra</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Toledo Zoo John Ball Zoo Kansas City Zoo Dallas Zoo Columbus Zoo; Indianapolis Zoo; Oakland Zoo; Toledo Zoo Woodland Park Zoo Columbus Zoo Caldwell Zoo</p> <p>Indianapolis Zoo Columbus Zoo; Toledo Zoo Birmingham Zoo*; Cheyenne Mountain Zoo; Cleveland Metropark Zoo*; Columbus Zoo*; Dallas Zoo*; Indianapolis Zoo; Toledo Zoo*; Utah's Hogle Zoo*; Woodland Park Zoo*</p> <p>Caldwell Zoo; Dallas Zoo; Toledo Zoo Oakland Zoo Caldwell Zoo; Columbus Zoo; Dallas Zoo; Disney's Animal Kingdom; Toledo Zoo Dallas Zoo Cervid Mixed-Species Table³ Disney's Animal Kingdom; Utah's Hogle Zoo Woodland Park Zoo* Caldwell Zoo Toledo Zoo Caldwell Zoo; Columbus Zoo; Toledo Zoo Rosamond Gifford Zoo Caldwell Zoo Utah's Hogle Zoo* Columbus Zoo*; Dallas Zoo; Idaho Falls Zoo; Toledo Zoo*; Woodland Park Zoo</p>
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Guineafowl, Vulturine (<i>Acryllium vulturinum</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Elephant, African Bush (<i>Loxodonta africana</i>) Gazelle, Grant's (<i>Nanger granti</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Lechwe, Nile (<i>Kobus megaceros</i>) Zebra, Plains (<i>Equus quagga</i>)	Kansas City Zoo Abilene Zoo Dallas Zoo Zoo Miami Dallas Zoo*; Zoo Miami* Dallas Zoo Dallas Zoo Dallas Zoo Dallas Zoo; Zoo Miami*
Hammerkop (<i>Scopus umbretta</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Kansas City Zoo Kansas City Zoo Adventure Aquarium
Heron, Goliath (<i>Ardea goliath</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Rhinoceros, White (<i>Ceratotherium simum</i>)	Los Angeles Zoo Jacksonville Zoo and Gardens Jacksonville Zoo and Gardens Jacksonville Zoo and Gardens*
Heron, Great Blue (<i>Ardea herodias</i>)	Deer, White-tailed (<i>Odocoileus virginianus</i>)	Cosley Zoo
Honeyeater, Blue-faced (<i>Entomyzon cyanotis</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Hornbill (<i>sp.</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³
Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)	Addax (<i>Addax nasomaculatus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Eland, Giant (<i>Taurotragus derbianus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Cuvier's (<i>Gazella cuvieri</i>)	Saint Louis Zoo Los Angeles Zoo; Omaha's Henry Doorly Zoo & Aquarium; White Oak Conservation Center; White Oak Conservation Center White Oak Conservation Center Disney's Animal Kingdom Omaha's Henry Doorly Zoo and Aquarium Audubon Zoo White Oak Conservation Center The Living Desert; The Maryland Zoo; White Oak Conservation Center The Living Desert

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<p>Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)</p>	<p>Gazelle, Grant's (<i>Gazella granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hog, Red River (<i>Potamochoerus porcus</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Steenbok (<i>Raphicerus campestris</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>Disney's Animal Kingdom²</p> <p>The Living Desert; White Oak Conservation Center</p> <p>Audubon Zoo; Disney's Animal Kingdom</p> <p>Denver Zoological Gardens; Oklahoma City Zoo</p> <p>Disney's Animal Kingdom²; Oklahoma City Zoo*; Omaha's Henry Doorly Zoo & Aquarium*</p> <p>Disney's Animal Kingdom</p> <p>Mesker Park Zoo</p> <p>National Zoo; The Maryland Zoo; White Oak Conservation Center</p> <p>Oklahoma City Zoo</p> <p>Denver Zoological Gardens*; Disney's Animal Kingdom; White Oak Conservation Center</p> <p>Disney's Animal Kingdom; Omaha's Henry Doorly Zoo & Aquarium; Saint Louis Zoo</p> <p>The Maryland Zoo</p> <p>Mesker Park Zoo</p> <p>Disney's Animal Kingdom</p> <p>Disney's Animal Kingdom</p>
<p>Hornbill, African Ground (<i>Bucorvus sp.</i>)</p>	<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p>	<p>Dickerson Park Zoo</p> <p>Fort Worth Zoo</p> <p>Fort Worth Zoo</p>
<p>Hornbill, Red-billed (<i>Tockus sp.</i>)</p>	<p>Antelope, Royal (<i>Neotragus pygmaeus</i>)</p> <p>Duiker, Blue (<i>Philantomba monticola</i>)</p> <p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p>	<p>Brookfield Zoo;</p> <p>Brookfield Zoo</p> <p>Brookfield Zoo</p> <p>Brookfield Zoo</p>
<p>Hornbill, Silvery-cheeked (<i>Bycanistes brevis</i>)</p>	<p>Duiker, Blue (<i>Philantomba monticola</i>)</p> <p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p>	<p>Denver Zoological Gardens</p> <p>Idaho Falls Zoo</p>
<p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Saint Louis Zoo</p> <p>John Ball Zoo; Potter Park Zoo</p> <p>Dallas Zoo</p>

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<p>Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>)</p>	<p>Duiker (<i>sp.</i>) Duiker, Bay (<i>Cephalophus dorsalis</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>) Eland, Giant (<i>Taurotragus derbianus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Cuiver's (<i>Gazella cuvieri</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>) Okapi (<i>Okapia johnstoni</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>John Ball Zoo Tampa's Lowry Park Zoo Brevard Zoo; Dallas Zoo; Virginia Zoo Dallas Zoo White Oak Conservation Center White Oak Conservation Center Virginia Zoo Saint Louis Zoo Milwaukee County Zoo Dallas Zoo; Milwaukee County Zoo Dallas Zoo Virginia Zoo* Dallas Zoo; Milwaukee County Zoo; Toronto Zoo Brevard Zoo Dallas Zoo; Toronto Zoo Dallas Zoo; White Oak Conservation Center White Oak Conservation Center Tampa's Lowry Park Zoo Cheyenne Mountain Zoo Staten Island Zoo Toronto Zoo</p>
<p>Hwamei, Chinese (<i>Garrulax canorus</i>)</p>	<p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p>	<p>Columbus Zoo</p>
<p>Ibis (<i>sp.</i>)</p>	<p>Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Pudu, Southern (<i>Pudu puda</i>)</p>	<p>Moody Gardens Cervid Mixed-Species Table³</p>
<p>Ibis, African Sacred (<i>Threskiornis aethiopicus</i>)</p>	<p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Rhinoceros, Black (<i>Diceros bicornis</i>) Topi (<i>Damaliscus korrigum jimela</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Caldwell Zoo Toledo Zoo Toledo Zoo* Caldwell Zoo Caldwell Zoo; Toledo Zoo Saint Louis Zoo Caldwell Zoo Caldwell Zoo; Toledo Zoo Caldwell Zoo Toledo Zoo*</p>

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Ibis, Scarlet (<i>Eudocimus ruber</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Ibis, Straw-necked (<i>Threskiornis spinicollis</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Kingfisher, White-throated (<i>Halcyon smyrnensis</i>)	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo
Laughingthrush, Black-throated (<i>Chalcophaps indica</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Columbus Zoo
Laughingthrush, White-crested (<i>Garrulax leucolophus</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Columbus Zoo
Lorikeet, Goldie's (<i>Psitteuteles goldiei</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Lovebird, Black-cheeked (<i>Agapornis nigrigenis</i>)	Duiker, Maxwell's (<i>Philantomba maxwellii</i>)	Bronx Zoo
Lovebird, Masked (<i>Agapornis personatus</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Kansas City Zoo
Macaw, Blue and Gold (<i>Ara ararauna</i>)	Guanaco (<i>Lama guanicoe</i>) Llama (<i>Lama glama</i>)	Salisbury Zoo Salisbury Zoo
Merganser, Common (<i>Mergus merganser</i>)	Bison, American (<i>Bison bison</i>) Yak (<i>Bos grunniens</i>)	Rosamond Gifford Zoo Rosamond Gifford Zoo
Motmot, Blue-crowned (<i>Momotus momota</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Mousebird, Speckled (<i>Colius striatus</i>)	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo
Mousebird, White-backed (<i>Colius colius</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Kansas City Zoo
Oropendola, Crested (<i>Psarocolius decumanus</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Ostrich, Common (<i>Struthio camelus</i>)	Addax (<i>Addax nasomaculatus</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>)	Busch Gardens; Dallas Zoo; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Fossil Rim Wildlife Center; Fresno Chaffee Zoo; Kansas City Zoo; Minnesota Zoo Disney's Animal Kingdom; Fossil Rim Wildlife Center Busch Gardens; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Jackson Zoo →

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<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Ass, African Wild (<i>Equus africanus</i>)</p> <p>Banteng (<i>Bos javanicus</i>) Blackbuck (<i>Antilope cervicapra</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Water (<i>Bubalus bubalis</i>) Camel, Bactrian (<i>Camelus bactrianus</i>) Camel, Dromedary (<i>Camelus dromedarius</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Deer, Red (<i>Cervus elaphus</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Kansas City Zoo; Lee G. Simmons Conservation Park and Wildlife Safari Lion Country Safari Dallas Zoo*; Denver Zoological Gardens* The Wilds Fossil Rim Wildlife Center Disney's Animal Kingdom; Great Plains Zoo; Memphis Zoo; Minnesota Zoo; North Carolina Zoo; North Carolina Zoo; Pittsburgh Zoo Binder Park Zoo; Denver Zoological Gardens*; Disney's Animal Kingdom; Fossil Rim Wildlife Center*; Kansas City Zoo*; Nashville Zoo at Grassmere; North Carolina Zoo*; Pittsburgh Zoo* Lion Country Safari Fresno Chaffee Zoo Africam Safari Park; Africam Safari Park; Brevard Zoo; Mesker Park Zoo Africam Safari Park; Disney's Animal Kingdom; Disney's Animal Kingdom; Lion Country Safari; Phoenix Zoo; Toledo Zoo Detroit Zoo; Fossil Rim Wildlife Center Fossil Rim Wildlife Center Fossil Rim Wildlife Center Los Angeles Zoo; San Francisco Zoo; Virginia Zoo Africam Safari Park; Africam Safari Park; Busch Gardens*; Chehaw Wild Animal Park →</p>
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<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Elephant, African Bush (<i>Loxodonta Africana</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Cuvier's (<i>Gazella cuvieri</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>Detroit Zoo; Disney's Animal Kingdom; Fresno Chaffee Zoo; Fresno Chaffee Zoo; Indianapolis Zoo; Lion Country Safari; Milwaukee County Zoo; Nashville Zoo at Grassmere; Phoenix Zoo; Pittsburgh Zoo; Sacramento Zoo; Sacramento Zoo; Zoo de Granby</p> <p>Dallas Zoo</p> <p>Africam Safari Park; Binder Park Zoo; Columbus Zoo; Dallas Zoo; Fort Wayne Children's Zoo; Fossil Rim Wildlife Center; Indianapolis Zoo; Jackson Zoo; North Carolina Zoo; Oakland Zoo; Pittsburgh Zoo; Saint Louis Zoo; Toledo Zoo</p> <p>The Living Desert</p> <p>Busch Gardens; Disney's Animal Kingdom²; Lincoln Park Zoo; Memphis Zoo; Minnesota Zoo; North Carolina Zoo; Oklahoma City Zoo*; Virginia Zoo; Woodland Park Zoo; Zoo Miami</p> <p>Columbus Zoo</p> <p>Africam Safari Park; Caldwell Zoo; Oklahoma City Zoo*; Saint Louis Zoo</p> <p>Fresno Chaffee Zoo; Fresno Chaffee Zoo; Pueblo Zoo</p> <p>Africam Safari Park; Binder Park Zoo; Bronx Zoo; Cincinnati Zoo and Botanical Garden; Columbus Zoo; Dallas Zoo; Disney's Animal Kingdom →</p>
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<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Gazelle, Thomson’s (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Disney’s Animal Kingdom; Fort Wayne Children’s Zoo; Kansas City Zoo; North Carolina Zoo; Phoenix Zoo; Pittsburgh Zoo; Toledo Zoo; Zoo de Granby Dallas Zoo; Lion Country Safari; Lion Country Safari; Minnesota Zoo; Nashville Zoo at Grassmere; North Carolina Zoo Phoenix Zoo; Saint Louis Zoo</p> <p>Africam Safari Park*; Binder Park Zoo*; Birmingham Zoo*; Bronx Zoo*; Busch Gardens*; Calgary Zoo; Columbus Zoo*; Dallas Zoo*; Dickerson Park Zoo*; Disney’s Animal Kingdom*; Disney’s Animal Kingdom*; Fresno Chaffee Zoo*; Fresno Chaffee Zoo*; Great Plains Zoo*; Honolulu Zoo*; Houston Zoo*; Kansas City Zoo; The Living Desert*; Minnesota Zoo*; Minnesota Zoo*; Minnesota Zoo*; North Carolina Zoo*; Oklahoma City Zoo*; Omaha’s Henry Doorly Zoo & Aquarium*; Phoenix Zoo*; Riverbanks Zoo and Garden*; Saint Louis Zoo*; Saint Louis Zoo*; San Francisco Zoo*; Sedgwick County Zoo*; Toledo Zoo*; Toledo Zoo; Utah’s Hogle Zoo*; Virginia Zoo*; Woodland Park Zoo*; Zoo Atlanta*</p> <p>→</p>
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<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Lechwe (<i>Kobus leche</i>) Nyala (<i>Tragelaphus angasii</i>)</p> <p>Oryx, Arabian (<i>Oryx leucoryx</i>) Oryx, East African (Beisa) (<i>Oryx beisa</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>)</p>	<p>Baton Rouge Zoo; Dallas Zoo; Kansas City Zoo; Lion Country Safari; Lion Country Safari; Los Angeles Zoo; North Carolina Zoo; Oklahoma City Zoo*</p> <p>North Carolina Zoo* Africam Safari Park; Baton Rouge Zoo; Chehaw Wild Animal Park; Disney's Animal Kingdom; North Carolina Zoo; Sacramento Zoo; Utah's Hogle Zoo</p> <p>Fossil Rim Wildlife Center Kansas City Zoo; North Carolina Zoo*; Woodland Park Zoo*</p> <p>Brevard Zoo; Denver Zoological Gardens; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Lion Country Safari; Potter Park Zoo; San Francisco Zoo; Staten Island Zoo; The Wilds</p> <p>Busch Gardens*; Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Fresno Chaffee Zoo*; Honolulu Zoo*; Jacksonville Zoo and Gardens*; The Maryland Zoo*; North Carolina Zoo*</p> <p>North Carolina Zoo Africam Safari Park; Denver Zoological Gardens; Fresno Chaffee Zoo; Jackson Zoo; Mesker Park Zoo; Nashville Zoo at Grassmere; North Carolina Zoo; Pittsburgh Zoo</p>
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<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Topi (<i>Damaliscus korrigum jimela</i>)</p> <p>Warthog, Common (<i>Phacochoerus africanus</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra (<i>Equus sp.</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p>	<p>Caldwell Zoo; Indianapolis Zoo* Brookfield Zoo; Hagenbeck Zoo²; Toledo Zoo Africam Safari Park; Binder Park Zoo; Brookfield Zoo; Brookfield Zoo; Disney's Animal Kingdom; Fossil Rim Wildlife Center; Lion Country Safari; Lion Country Safari; Milwaukee County Zoo; North Carolina Zoo* Africam Safari Park; Africam Safari Park; Busch Gardens; Caldwell Zoo; Chehaw Wild Animal Park; Columbus Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Fossil Rim Wildlife Center; Fresno Chaffee Zoo; Indianapolis Zoo; Lion Country Safari; Lion Country Safari; Minnesota Zoo; Minnesota Zoo; Minnesota Zoo; Toledo Zoo; Zoo New England* Chehaw Wild Animal Park; Kansas City Zoo Busch Gardens; Caldwell Zoo; Calgary Zoo; Dallas Zoo; Denver Zoological Gardens; Great Plains Zoo; Minnesota Zoo; Oglebay's Good Zoo; Omaha's Henry Doorly Zoo & Aquarium; Pueblo Zoo; Sacramento Zoo; Saint Louis Zoo</p>
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<p>Ostrich, Common (<i>Struthio camelus</i>)</p>	<p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Calgary Zoo*; Disney's Animal Kingdom*; Fossil Rim Wildlife Center*; Minnesota Zoo*; Utah's Hogle Zoo*</p> <p>Abilene Zoo*; Binder Park Zoo*; Baton Rouge Zoo; Brookfield Zoo*; Busch Gardens*; Chehaw Wild Animal Park; Cleveland Metroparks Zoo*; Cleveland Metroparks Zoo*; Columbus Zoo*; Dallas Zoo; Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Honolulu Zoo; Houston Zoo*; Indianapolis Zoo*; Kansas City Zoo*; Lehigh Valley Zoo*; The Maryland Zoo; Milwaukee County Zoo; Nashville Zoo at Grassmere*; North Carolina Zoo; Pittsburgh Zoo*; Pueblo Zoo; Riverbanks Zoo and Garden; San Francisco Zoo*; Toledo Zoo*; Woodland Park Zoo; Zoo Atlanta; Zoo de Granby*; Zoo Miami*; Zoo New England*</p>
<p>Owl, White-faced Scops (<i>Ptilopsis leucotis</i>)</p>	<p>Duiker, Maxwell's (<i>Philantomba maxwellii</i>)</p>	<p>Bronx Zoo</p>
<p>Parakeet, Derbyan (Lord Derby's) (<i>Psittacula derbiana</i>)</p>	<p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p>	<p>Columbus Zoo</p>
<p>Partridge, Chinese Bamboo (<i>Bambusicola thoracicus</i>)</p>	<p>Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)</p>	<p>Columbus Zoo</p>
<p>Partridge, Crested Wood (<i>Rollulus rouloul</i>)</p>	<p>Chevrotain, Greater Malay (<i>Tragulus napu</i>)</p>	<p>Columbus Zoo</p>
<p>Peafowl (<i>Pavo sp.</i>)</p>	<p>Deer, Tufted (<i>Elaphodus cephalophus</i>)</p>	<p>Cervid Mixed-Species Table³</p>

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Peafowl (<i>Pavo sp.</i>)	Duiker, Blue (<i>Philantomba monticola</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Northeastern Wisconsin Zoo (NEW Zoo) Cervid Mixed-Species Table ³
Peafowl, Blue (Indian) (<i>Pavo cristatus</i>)	Deer, Axis (<i>Axis axis</i>) Deer, Sika (<i>Cervus nippon</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Gaur (<i>Bos gaurus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)	Buffalo Zoo Lehigh Valley Zoo Cosley Zoo Buffalo Zoo Buffalo Zoo
Peafowl, Green (Java) (<i>Pavo muticus</i>)	Banteng (<i>Bos javanicus</i>) Blackbuck (<i>Antelope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Axis (<i>Axis axis</i>) Deer, Eld's (<i>Rucervus eldii</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Gaur (<i>Bos gaurus</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Tapir, Malayan (<i>Acrocodia indica</i>)	Disney's Animal Kingdom Africam Safari Park; Disney's Animal Kingdom Africam Safari Park; Disney's Animal Kingdom Africam Safari Park Disney's Animal Kingdom Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park
Pelican (<i>Pelecanus sp.</i>)	Camel, Bactrian (<i>Camelus bactrianus</i>) Deer, Red Brocket (<i>Mazama temama</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Plains (<i>Equus quagga</i>)	Roosevelt Park Zoo Phoenix Zoo Cervid Mixed-Species Table ³ Moody Gardens Audubon Zoo* Audubon Zoo Audubon Zoo*
Pelican, American White (<i>Pelecanus erythrorhynchos</i>)	Alpaca (<i>Vicugna pacos</i>)	Salisbury Zoo
Pelican, Brown (<i>Pelecanus occidentalis</i>)	Alpaca (<i>Vicugna pacos</i>) Deer, Red Brocket (<i>Mazama temama</i>) Llama (<i>Lama glama</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Lion Country Safari Phoenix Zoo Lion Country Safari Lion Country Safari
Pelican, Dalmatian (<i>Pelecanus crispus</i>)	Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Buffalo, Cape (<i>Syncerus caffer</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>) Gemsbok (<i>Oryx gazella</i>)	San Diego Zoo Safari Park San Diego Zoo Safari Park

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<p>Pelican, Dalmatian (<i>Pelecanus crispus</i>)</p>	<p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Kob, Ugandan (<i>Kobus kob thomasi</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Rhinoceros, Black (<i>Diceros bicornis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p>
<p>Pelican, Great White (<i>Pelecanus onocrotalus</i>)</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p>	<p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park*</p> <p>San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p>
<p>Pelican, Pink-backed (<i>Pelecanus rufescens</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Antelope, Roan (<i>Hippotragus equinus</i>)</p> <p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)</p> <p>Cattle, Ankole (Watusi) (<i>Bos taurus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Red-fronted (<i>Eudorcas rufifrons</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hippopotamus, Common (<i>Hippopotamus amphibius</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kob, Ugandan (<i>Kobus kob thomasi</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p>	<p>Fresno Chaffee Zoo</p> <p>San Diego Zoo Safari Park</p> <p>Jacksonville Zoo and Gardens; San Diego Zoo Safari Park</p> <p>San Diego Zoo Safari Park</p> <p>Detroit Zoo</p> <p>Detroit Zoo; Fresno Chaffee Zoo</p> <p>San Diego Zoo Safari Park; San Diego Zoo Safari Park</p> <p>Fresno Chaffee Zoo</p> <p>Cincinnati Zoo and Botanical Garden</p> <p>Fresno Chaffee Zoo*</p> <p>Disney's Animal Kingdom</p> <p>Cincinnati Zoo and Botanical Garden; Fresno Chaffee Zoo</p> <p>San Diego Zoo Safari Park</p> <p>Fresno Chaffee Zoo; San Diego Zoo Safari Park</p> <p>Cincinnati Zoo and Botanical Garden</p> <p>San Diego Zoo Safari Park*</p>

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Pelican, Pink-backed (<i>Pelecanus rufescens</i>)	Rhinoceros, Black (<i>Diceros bicornis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Springbok (<i>Antidorcas marsupialis</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)	San Diego Zoo Safari Park Fresno Chaffee Zoo* Fresno Chaffee Zoo Fresno Chaffee Zoo
Penguin, Black-footed (<i>Spheniscus demersus</i>)	Giraffe (<i>Giraffa camelopardalis</i>)	Omaha's Henry Doorly Zoo & Aquarium*
Pheasant (<i>sp.</i>)	Deer, Sika (<i>Cervus nippon</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³
Pheasant, Common (<i>Phasianus colchicus</i>)	Sheep, Domestic (<i>Ovis aries</i>)	Trevor Zoo*
Pheasant, Golden (<i>Chrysolophus pictus</i>)	Blackbuck (<i>Antilope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Axis (<i>Axis axis</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Gaur (<i>Bos gaurus</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Tapir, Malayan (<i>Acrocodia indica</i>)	Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Columbus Zoo Africam Safari Park Africam Safari Park
Pheasant, Lady Amherst's (<i>Chrysolophus amherstiae</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Los Angeles Zoo
Pheasant, Peacock (<i>Polyplectron sp.</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Moody Gardens
Pigeon, Bruce's Green (<i>Treron waalia</i>)	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo
Pigeon, Nicrobar (<i>Caloenas nicrobarica</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Pigeon, Victoria Crowned (<i>Goura victoria</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Pintail, Bahama (White-cheeked) (<i>Anas bahamensis</i>)	Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²
Pintail, Red-billed (<i>Anas erythrorhyncha</i>)	Ibex, Nubian (<i>Capra nubiana</i>)	Bronx Zoo
Pochard, Rosy-bill (<i>Netta peposaca</i>)	Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²
Rhea, Lesser (Darwin's) (<i>Rhea pennata</i>)	Guanaco (<i>Lama guanicoe</i>)	Audubon Zoo ² ; Salisbury Zoo

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Rhea, Lesser (Darwin's) (<i>Rhea pennata</i>)	Llama (<i>Lama glama</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Salisbury Zoo Audubon Zoo ² Audubon Zoo ²
Rhea, Greater (American) (<i>Rhea americana</i>)	Alpaca (<i>Vicugna pacos</i>) Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Bison, American (<i>Bison bison</i>) Blackbuck (<i>Antilope cervicapra</i>) Deer, Fallow (<i>Dama dama</i>) Deer, Red Brocket (<i>Mazama temama</i>) Deer, Sika (<i>Cervus nippon</i>) Donkey (<i>Equus africanus asinus</i>) Elk, American (<i>Cervus canadensis</i>) Goat, Domestic (<i>Capra aegagrus hircus</i>) Guanaco (<i>Lama guanicoe</i>) Horse, Domestic (<i>Equus ferus caballus</i>) Llama (<i>Lama glama</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Peccary, Chacoan (<i>Catagonus wagneri</i>) Sheep, Domestic (<i>Ovis aries</i>) Tapir, Baird's (<i>Tapirus bairdii</i>) Tapir, South American (<i>Tapirus terrestris</i>) Yak (<i>Bos grunniens</i>)	Great Plains Zoo; Henry Vilas Zoo; Lion Country Safari; Milwaukee County Zoo; Trevor Zoo Wildlife Safari Wildlife Safari Wildlife Safari Detroit Zoo; Wildlife Safari Bergen County Zoo Wildlife Safari Mesker Park Zoo Wildlife Safari* Mesker Park Zoo Abilene Zoo; Bergen County Zoo; Detroit Zoo; Santa Fe College Teaching Zoo; Wildlife Safari Mesker Park Zoo Lion Country Safari; Mesker Park Zoo; Salisbury Zoo; Turtle Back Zoo; Wildlife Safari; Zoo de Granby Wildlife Safari Sequoia Park Zoo Mesker Park Zoo Houston Zoo; Milwaukee County Zoo Lion Country Safari Wildlife Safari
Roadrunner, Greater (<i>Geococcyx californianus</i>)	Deer, Red (<i>Cervus elaphus</i>)	Cervid Mixed-Species Table ³
Roller, Lilac-breasted (<i>Coracias caudatus</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>) Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Smithsonian National Zoo Kansas City Zoo Kansas City Zoo
Rosella, Eastern (<i>Platycerus eximius</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Screamer (<i>sp.</i>)	Deer, Red Brocket (<i>Mazama temama</i>)	Phoenix Zoo

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Screamer, Crested (Southern) (<i>Chauna torquata</i>)	Deer, Fallow (<i>Dama dama</i>) Duiker, Blue (<i>Philantomba monticola</i>) Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Detroit Zoo Virginia Zoo Audubon Zoo ² ; Detroit Zoo Audubon Zoo ² Audubon Zoo ²
Secretarybird (<i>Sagittarius serpentarius</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gerenuk (<i>Litocranius walleri</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Lechwe (<i>Kobus leche</i>) Okapi (<i>Okapia johnstoni</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Springbok (<i>Antidorcas marsupialis</i>)	Albuquerque Biological Park Dallas Zoo Dallas Zoo Albuquerque Biological Park; Dallas Zoo Albuquerque Biological Park; Dallas Zoo Dallas Zoo; Los Angeles Zoo Dallas Zoo Los Angeles Zoo* Denver Zoological Gardens Denver Zoological Gardens Los Angeles Zoo
Seriema (<i>Cariamidae</i>)	Llama (<i>Lama glama</i>)	Mesker Park Zoo
Seriema, Red-legged (<i>Cariama cristata</i>)	Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²
Shelduck, Common (<i>Tadorna tadorna</i>)	Addax (<i>Addax nasomaculatus</i>) Ass, African Wild (<i>Equus africanus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Springbok (<i>Antidorcas marsupialis</i>)	Disney's Animal Kingdom Disney's Animal Kingdom* Disney's Animal Kingdom Cleveland Metroparks Zoo Disney's Animal Kingdom* Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom
Shelduck, Radjah (<i>Tadorna radjah</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Shelduck, Ruddy (<i>Tadorna ferruginea</i>)	Banteng (<i>Bos javanicus</i>) Blackbuck (<i>Antilope carvicapra</i>) Bontebok (<i>Damaliscus pygargus</i>) Buffalo, Water (<i>Bubalus bubalis</i>)	Disney's Animal Kingdom Disney's Animal Kingdom Jacksonville Zoo and Gardens Disney's Animal Kingdom

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Shelduck, Ruddy (<i>Tadorna ferruginea</i>)	Deer, Eld's (<i>Rucervus eldii</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>)	Disney's Animal Kingdom Indianapolis Zoo Indianapolis Zoo Cincinnati Zoo and Botanical Garden Indianapolis Zoo* Cincinnati Zoo and Botanical Garden Jacksonville Zoo and Gardens Cincinnati Zoo and Botanical Garden Jacksonville Zoo and Gardens*
Shelduck, South African (Cape) (<i>Tadorna cana</i>)	Addax (<i>Addax nasomaculatus</i>) Ass, African Wild (<i>Equus africanus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Muntjac, Indian (<i>Muntiacus muntjak</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Springbok (<i>Antidorcas marsupialis</i>) Zebra, Grevy's (<i>Equus grevyi</i>)	Disney's Animal Kingdom Disney's Animal Kingdom* Disney's Animal Kingdom Disney's Animal Kingdom* Disney's Animal Kingdom Disney's Animal Kingdom Oklahoma City Zoo Disney's Animal Kingdom Toronto Zoo Disney's Animal Kingdom Toronto Zoo
South American Birds (multiple species)	Pudu, Southern (<i>Pudu pudu</i>)	Sedgwick County Zoo
Spoonbill, African (<i>Platalea alba</i>)	Addax (<i>Addax nasomaculatus</i>) Ass, African Wild (<i>Equus africanus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Springbok (<i>Antidorcas marsupialis</i>)	Disney's Animal Kingdom Disney's Animal Kingdom* Disney's Animal Kingdom Disney's Animal Kingdom* Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom
Spoonbill, Roseate (<i>Platalea ajaja</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Spurfowl, Yellow-necked (<i>Pternistis leucoscepus</i>)	Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Denver Zoological Gardens
Starling, Emerald (<i>Lamprotornis iris</i>)	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo

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Starling, Golden-breasted (<i>Lamprotornis regius</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo
Starling, Royal (<i>Cosmopsarus regius</i>)	Klipspringer (<i>Oreotragus oreotragus</i>)	Staten Island Zoo
Starling, Superb (<i>Lamprotornis superbus</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Duiker, Black (<i>Cephalophus niger</i>) Antelope, Royal (<i>Neotragus pygmaeus</i>)	Kansas City Zoo Kansas City Zoo Los Angeles Zoo Los Angeles Zoo
Stilt, Black-necked (<i>Himantopus mexicanus</i>)	Pudu, Southern (<i>Pudu puda</i>)	Cervid Mixed-Species Table ³
Stork, Abdim's (<i>Ciconia abdimii</i>)	Addax (<i>Addax nasomaculatus</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Giraffe (<i>Giraffa camelopardalis</i>) Hippopotamus, Common (<i>Hippopotamus amphibius</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Springbok (<i>Antidorcas marsupialis</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)	Fresno Chaffee Zoo Fresno Chaffee Zoo Fresno Chaffee Zoo Fresno Chaffee Zoo* Adventure Aquarium; Fresno Chaffee Zoo Fresno Chaffee Zoo Fresno Chaffee Zoo* Fresno Chaffee Zoo Fresno Chaffee Zoo
Stork, Greater Adjutant (<i>Leptoptilos dubius</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³
Stork, Lesser Adjutant (<i>Leptoptilos javanicus</i>)	Deer, Tufted (<i>Elaphodus cephalophus</i>)	Racine Zoo
Stork, Marabou (<i>Leptoptilos crumenifer</i>)	Alpaca (<i>Vicugna pacos</i>) Antelope, Roan (<i>Hippotragus equinus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker, Bay (<i>Cephalophus dorsalis</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Eland, Giant (<i>Taurotragus derbianus</i>)	Lion Country Safari Disney's Animal Kingdom Jackson Zoo Binder Park Zoo; Cleveland Metroparks Zoo; Dallas Zoo; Jacksonville Zoo and Gardens Disney's Animal Kingdom Tampa's Lowry Park Zoo; Tampa's Lowry Park Zoo Dallas Zoo; San Francisco Zoo Dallas Zoo; Mesker Park Zoo; Milwaukee County Zoo; Zoo de Granby Houston Zoo

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Stork, Marabou (<i>Leptoptilos crumenifer</i>)	Gazelle, Addra (Dama) (<i>Nanger dama</i>)	Binder Park Zoo; Fort Wayne Children's Zoo; Jackson Zoo
	Gazelle, Cuiver's (<i>Gazella cuvieri</i>)	Saint Louis Zoo
	Gazelle, Grant's (<i>Nanger granti</i>)	Disney's Animal Kingdom ² ; North Carolina Zoo; Tulsa Zoo
	Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>)	Saint Louis Zoo
	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Binder Park Zoo; Dallas Zoo; Fort Wayne Children's Zoo; North Carolina Zoo; Zoo de Granby
	Gemsbok (<i>Oryx gazella</i>)	North Carolina Zoo
	Gerenuk (<i>Litocranius walleri</i>)	Cameron Park Zoo*; Dallas Zoo; Saint Louis Zoo; Saint Louis Zoo
	Giraffe (<i>Giraffa camelopardalis</i>)	Binder Park Zoo*; Cameron Park Zoo*; Disney's Animal Kingdom*; Henry Vilas Zoo*; Oregon Zoo*; San Francisco Zoo*; Zoo de Granby*
	Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)	North Carolina Zoo
	Hog, Red River (<i>Potamochoerus porcus</i>)	Disney's Animal Kingdom ²
	Impala (<i>Aepyceros melampus</i>)	Binder Park Zoo; Dallas Zoo; Disney's Animal Kingdom; Disney's Animal Kingdom; North Carolina Zoo; Oregon Zoo
Klipspringer (<i>Oreotragus oreotragus</i>)	Brevard Zoo; Jackson Zoo	
Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Binder Park Zoo; Cameron Park Zoo; Dallas Zoo; Indianapolis Zoo; Jacksonville Zoo and Gardens; Milwaukee County Zoo; North Carolina Zoo; San Francisco Zoo; Toronto Zoo	
Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Dallas Zoo; Saint Louis Zoo; Saint Louis Zoo	
Lechwe (<i>Kobus leche</i>)	North Carolina Zoo*	

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<p>Stork, Marabou (<i>Leptoptilos crumenifer</i>)</p>	<p>Lechwe, Nile (<i>Kobus megaceros</i>) Llama (<i>Lama glama</i>) Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>) Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Tapir, South American (<i>Tapirus terrestris</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Grevy's (<i>Equus grevyi</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Mesker Park Zoo Lion Country Safari Bronx Zoo; Disney's Animal Kingdom; Houston Zoo; Reid Park Zoo; Tampa's Lowry Park Zoo</p> <p>Jacksonville Zoo and Gardens; Tampa's Lowry Park Zoo</p> <p>Disney's Animal Kingdom; San Francisco Zoo</p> <p>Jacksonville Zoo and Gardens*; North Carolina Zoo*</p> <p>North Carolina Zoo Cameron Park Zoo; Jackson Zoo; North Carolina Zoo</p> <p>Lion Country Safari Binder Park Zoo; Disney's Animal Kingdom²; Mesker Park Zoo; Milwaukee County Zoo; North Carolina Zoo*</p> <p>Disney's Animal Kingdom; Fort Wayne Children's Zoo*; Indianapolis Zoo</p> <p>Phoenix Zoo; Toronto Zoo</p> <p>Disney's Animal Kingdom*</p> <p>Binder Park Zoo*; Cleveland Metroparks Zoo*; Fort Wayne Children's Zoo*; Indianapolis Zoo*; Milwaukee County Zoo; San Francisco Zoo*; Tulsa Zoo*; Zoo de Granby*</p>
<p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p>	<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Deer, Fallow (<i>Dama dama</i>) Eland, Common (<i>Taurotragus oryx</i>)</p>	<p>Disney's Animal Kingdom; Saint Louis Zoo Detroit Zoo Detroit Zoo</p>

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<p>Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>)</p>	<p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Grant's (<i>Nanger granti</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hartebeest, Jackson's (<i>Alcelaphus buselaphus lelwel</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Klipspringer (<i>Oreotragus oreotragus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Lechwe (<i>Kobus leche</i>)</p> <p>Lechwe, Nile (<i>Kobus megaceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Okapi (<i>Okapia johnstoni</i>)</p> <p>Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Columbus Zoo; The Maryland Zoo</p> <p>North Carolina Zoo</p> <p>Columbus Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo</p> <p>Cincinnati Zoo and Botanical Garden; Columbus Zoo; North Carolina Zoo; Toledo Zoo</p> <p>North Carolina Zoo</p> <p>Columbus Zoo*; Los Angeles Zoo*; Toledo Zoo*</p> <p>North Carolina Zoo</p> <p>Cincinnati Zoo and Botanical Garden; North Carolina Zoo</p> <p>Jacksonville Zoo and Gardens</p> <p>Columbus Zoo; Disney's Animal Kingdom; Jacksonville Zoo and Gardens; North Carolina Zoo; Toledo Zoo</p> <p>Cincinnati Zoo and Botanical Garden; The Maryland Zoo; Saint Louis Zoo; Saint Louis Zoo</p> <p>North Carolina Zoo*</p> <p>Los Angeles Zoo</p> <p>Disney's Animal Kingdom; Los Angeles Zoo</p> <p>Denver Zoological Gardens; Sedgwick County Zoo</p> <p>North Carolina Zoo</p> <p>North Carolina Zoo</p> <p>North Carolina Zoo*</p> <p>Columbus Zoo; Toledo Zoo</p> <p>Columbus Zoo*; Toledo Zoo*</p>
<p>Stork, White (<i>Ciconia ciconia</i>)</p>	<p>Bontebok (<i>Damaliscus pygargus</i>)</p>	<p>Cleveland Metroparks Zoo</p>

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<p>Stork, White (<i>Ciconia ciconia</i>)</p>	<p>Dik-Dik, Guenther's (<i>Madoqua guentheri</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>) Sitatunga (<i>Tragelaphus spekii</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>) Steenbok (<i>Raphicerus campestris</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Saint Louis Zoo Brookfield Zoo; Saint Louis Zoo</p> <p>Fort Wayne Children's Zoo; Indianapolis Zoo</p> <p>Indianapolis Zoo; Saint Louis Zoo; Saint Louis Zoo</p> <p>Fort Wayne Children's Zoo; Toledo Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo</p> <p>Cleveland Metropark Zoo*; Indianapolis Zoo*; Omaha's Henry Doorly Zoo*; Toledo Zoo*</p> <p>Dickerson Park Zoo*</p> <p>Dickerson Park Zoo*; Toledo Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo</p> <p>Tulsa Zoo*</p> <p>The Maryland Zoo; Mesker Park Zoo</p> <p>Tulsa Zoo</p> <p>Saint Louis Zoo; Saint Louis Zoo</p> <p>Fort Wayne Children's Zoo*; Toledo Zoo</p> <p>Cleveland Metroparks Zoo*; Fort Wayne Children's Zoo*; Toledo Zoo*</p>
<p>Stork, Wood (<i>Mycteria americana</i>)</p>	<p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p>	<p>Cervid Mixed-Species Table³</p>
<p>Stork, Yellow-billed (<i>Mycteria ibis</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p>	<p>Fresno Chaffee Zoo Phoenix Zoo Disney's Animal Kingdom</p> <p>Fresno Chaffee Zoo; Phoenix Zoo</p> <p>The Living Desert The Living Desert Fresno Chaffee Zoo</p> <p>Phoenix Zoo Phoenix Zoo Phoenix Zoo</p> <p>Fresno Chaffee Zoo*; Phoenix Zoo*</p>

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Stork, Yellow-billed (<i>Mycteria ibis</i>)	Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Springbok (<i>Antidorcas marsupialis</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Plains (<i>Equus quagga</i>)	Fresno Chaffee Zoo Disney's Animal Kingdom; Fresno Chaffee Zoo Como Zoo Fresno Chaffee Zoo* Fresno Chaffee Zoo Fresno Chaffee Zoo Como Zoo*
Sunbittern (<i>Eurypyga helias</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Swan, Black (<i>Cygnus atratus</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>) Deer, Tufted (<i>Elaphodus cephalophus</i>) Guanaco (<i>Lama guanicoe</i>) Tapir, Baird's (<i>Tapirus bairdii</i>)	Columbus Zoo Racine Zoo San Francisco Zoo San Francisco Zoo
Swan, Black-necked (<i>Cygnus melancoryphus</i>)	Llama (<i>Lama glama</i>) Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, Baird's (<i>Tapirus bairdii</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Mesker Park Zoo; Turtle Back Zoo Audubon Zoo ² ; San Francisco Zoo Audubon Zoo ² San Francisco Zoo Audubon Zoo ²
Swan, Coscoroba (<i>Coscoroba coscoroba</i>)	Guanaco (<i>Lama guanicoe</i>) Tapir, Baird's (<i>Tapirus bairdii</i>)	San Francisco Zoo San Francisco Zoo
Swan, Mute (<i>Cygnus olor</i>)	Goat, Domestic (<i>Capra aegagrus hircus</i>) Llama (<i>Lama glama</i>)	Brookgreen Gardens* Mesker Park Zoo
Swan, Trumpeter (<i>Cygnus buccinator</i>)	Camel, Bactrian (<i>Camelus bactrianus</i>) Moose (<i>Alces alces</i>) Tapir, Baird's (<i>Tapirus bairdii</i>)	Roosevelt Park Zoo Cervid Mixed-Species Table ³ Houston Zoo
Swan, Tundra (<i>Cygnus columbianus</i>)	Deer, Pere David's (<i>Elaphurus davidianus</i>)	Bronx Zoo
Swan, Whooper (<i>Cygnus cygnus</i>)	Deer, Pere David's (<i>Elaphurus davidianus</i>)	Bronx Zoo
Tanager, Blue-gray (<i>Thraupis episcopus</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Tanager, Silver-beaked (<i>Ramphocelus carbo</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo
Teal, Cape (<i>Anas capensis</i>)	Ibex, Nubian (<i>Capra nubiana</i>)	Bronx Zoo
Teal, Chestnut (<i>Anas castanea</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Teal, Cinnamon (<i>Anas cyanoptera</i>)	Tapir, Baird's (<i>Tapirus bairdii</i>)	Mesker Park Zoo

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Teal, Hottentot (<i>Anas hottentota</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Duiker, Blue (<i>Philantomba monticola</i>)	Kansas City Zoo Kansas City Zoo Moody Gardens
Teal, Marbled (<i>Marmaronetta angustirostris</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Kansas City Zoo
Teal, Sharp-winged (<i>Anas oxypterus</i>)	Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²
Thrush, Red-tailed Laughing (<i>Trochalopteron milnei</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo
Toucan (<i>sp.</i>)	Pudu, Souther, (<i>Pudu puda</i>)	Cervid Mixed-Species Table ³
Tropical birds	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Topeka Zoo
Turaco (<i>sp.</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³
Turaco, Lady Ross (<i>Musophaga rossae</i>)	Duiker, Black (<i>Cephalophus niger</i>)	Los Angeles Zoo
Turaco, Violaceous (<i>Musophaga violacea</i>)	Duiker, Black (<i>Cephalophus niger</i>) Klipspringer (<i>Oreotragus oreotragus</i>)	Los Angeles Zoo Staten Island Zoo
Turaco, White-cheeked (<i>Tauraco leucotis</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo
Turaco, White-crested (<i>Tauraco leucolophus</i>)	Antelope, Royal (<i>Neotragus pygmaeus</i>) Duiker, Black (<i>Cephalophus niger</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo
Turkey, Wild (<i>Meleagris gallopavo</i>)	Bison, American (<i>Bison bison</i>) Cattle, Domestic (<i>Bos taurus</i>) Deer, Mule (<i>Odocoileus hemionus</i>) Deer, Red (<i>Cervus elaphus</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>)	Caldwell Zoo* Caldwell Zoo* Arizona-Sonora Desert Museum; Living Desert Zoo and Gardens State Park Audubon Zoo ^{2*} ; Cervid Mixed-Species Table ³ Africam Safari Park*; Arizona-Sonora Desert Museum; Audubon Zoo ² ; Caldwell Zoo*; Cameron Park Zoo; Chattanooga Zoo; Cosley Zoo*; Lehigh Valley Zoo; Northeastern Wisconsin Zoo (NEW Zoo); Oklahoma City Zoo; Salisbury Zoo; Sedgwick County Zoo; Sunset Zoo; Trevor Zoo →

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<p>Turkey, Wild (<i>Meleagris gallopavo</i>)</p>	<p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Goat, Domestic (<i>Capra aegagrus hircus</i>)</p> <p>Moose (<i>Alces alces</i>)</p> <p>Peccary, Collared (<i>Pecari tajacu</i>)</p> <p>Pronghorn (<i>Antilocapra americana</i>)</p> <p>Sheep, Domestic (<i>Ovis aries</i>)</p>	<p>Virginia Living Museum; ZooAmerica Wildlife Park Brookgreen Gardens* Cheyenne Mountain Zoo Africam Safari Park; Audubon Zoo²; Cameron Park Zoo Sunset Zoo Trevor Zoo</p>
<p>Various birds</p>	<p>Antelope, Sable (<i>Hippotragus niger</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Buffalo, Cape (<i>Syncerus caffer</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Slender-horned (<i>Gazella leptoceros</i>)</p> <p>Gemsbok (<i>Oryx gazella</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Rhinoceros, White (<i>Ceratotherium simum</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Zebra, Mountain (<i>Equus zebra</i>)</p>	<p>San Diego Zoo Safari Park San Diego Zoo Safari Park* San Diego Zoo Safari Park San Diego Zoo Safari Park* San Diego Zoo Safari Park San Diego Zoo Safari Park San Diego Zoo Safari Park* San Diego Zoo Safari Park* San Diego Zoo Safari Park San Diego Zoo Safari Park*</p>
<p>Vulture, Cape Griffon (<i>Gyps coprotheres</i>)</p>	<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Toledo Zoo Cheyenne Mountain Zoo; Toledo Zoo* Toledo Zoo Toledo Zoo Toledo Zoo*</p>
<p>Vulture, Cinereous (<i>Aegypius monachus</i>)</p>	<p>Addax (<i>Addax nasomaculatus</i>)</p> <p>Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Deer, Fallow (<i>Dama dama</i>)</p> <p>Eland, Common (<i>Taurotragus oryx</i>)</p> <p>Gazelle, Addra (Dama) (<i>Nanger dama</i>)</p> <p>Gazelle, Speke's (<i>Gazella spekei</i>)</p> <p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>)</p> <p>Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)</p> <p>Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Saint Louis Zoo Binder Park Zoo Detroit Zoo Detroit Zoo Binder Park Zoo Milwaukee County Zoo Binder Park Zoo; Milwaukee County Zoo Binder Park Zoo* Binder Park Zoo; Milwaukee County Zoo Binder Park Zoo Binder Park Zoo Binder Park Zoo*</p>

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Vulture, Griffon (<i>Gyps fulvus</i>)	Deer, Fallow (<i>Dama dama</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Giraffe (<i>Giraffa camelopardalis</i>) Kudu (<i>Tragelaphus sp.</i>)	Detroit Zoo Detroit Zoo Oakland Zoo Cheyenne Mountain Zoo Oakland Zoo
Vulture, Hooded (<i>Necrosyrtes monachus</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Zebra, Plains (<i>Equus quagga</i>)	Pittsburgh Zoo Pittsburgh Zoo* Pittsburgh Zoo Pittsburgh Zoo Pittsburgh Zoo*
Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)	Bontebok (<i>Damaliscus pygargus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Eland, Giant (<i>Taurotragus derbianus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu (<i>Tragelaphus sp.</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Zebra, Plains (<i>Equus quagga</i>)	Dallas Zoo Phoenix Zoo Dallas Zoo Cincinnati Zoo and Botanical Garden; Dallas Zoo; Phoenix Zoo Cincinnati Zoo and Botanical Garden Oakland Zoo Cincinnati Zoo and Botanical Garden; Dallas Zoo; Phoenix Zoo Dallas Zoo; Phoenix Zoo Phoenix Zoo* Cincinnati Zoo and Botanical Garden; Dallas Zoo Oakland Zoo Dallas Zoo Cincinnati Zoo and Botanical Garden; Dallas Zoo; Denver Zoological Gardens Cincinnati Zoo and Botanical Garden*
Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)	Addax (<i>Addax nasomaculatus</i>) Antelope, Sable (<i>Hippotragus niger</i>) Ass, African Wild (<i>Equus africanus</i>) Cattle, Ankole (Watusi) (<i>Bos taurus</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Grant's (<i>Gazella granti</i>)	Disney's Animal Kingdom Cheyenne Mountain Zoo Disney's Animal Kingdom Disney's Animal Kingdom; Disney's Animal Kingdom; Phoenix Zoo Phoenix Zoo National Zoo Disney's Animal Kingdom ²

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<p>Vulture, Ruppell's (Griffon) (<i>Gyps rueppellii</i>)</p>	<p>Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p> <p>Gerenuk (<i>Litocranius walleri</i>) Giraffe (<i>Giraffa camelopardalis</i>)</p> <p>Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>) Hog, Red River (<i>Potamochoerus porcus</i>) Impala (<i>Aepyceros melampus</i>)</p> <p>Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>)</p> <p>Nyala (<i>Tragelaphus angasii</i>) Okapi (<i>Okapia johnstoni</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>)</p> <p>Springbok (<i>Antidorcas marsupialis</i>) Steenbok (<i>Raphicerus campestris</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)</p>	<p>Cincinnati Zoo and Botanical Garden; Disney's Animal Kingdom; Phoenix Zoo Phoenix Zoo Disney's Animal Kingdom*; Phoenix Zoo* Zoo New England Disney's Animal Kingdom Cincinnati Zoo and Botanical Garden; Disney's Animal Kingdom; Disney's Animal Kingdom Indianapolis Zoo Cincinnati Zoo and Botanical Garden; Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom Disney's Animal Kingdom; National Zoo Disney's Animal Kingdom Disney's Animal Kingdom Fort Wayne Children's Zoo*; Indianapolis Zoo Cheyenne Mountain Zoo Fort Wayne Children's Zoo*; Indianapolis Zoo*</p>
<p>Vulture, South American Black (<i>Coragyps atratus</i>)</p>	<p>Llama (<i>Lama glama</i>)</p>	<p>Mesker Park Zoo</p>
<p>Vulture, Turkey (<i>Cathartes aura</i>)</p>	<p>Deer, White-tailed (<i>Odocoileus virginianus</i>)</p> <p>Sheep, Domestic (<i>Ovis aries</i>)</p>	<p>Alexandria Zoological Park; Cosley Zoo; Trevor Zoo Trevor Zoo</p>
<p>Vulture, White-backed (<i>Gyps africanus</i>)</p>	<p>Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Bontebok (<i>Damaliscus pygargus</i>)</p> <p>Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Duiker (<i>sp.</i>) Eland, Common (<i>Taurotragus oryx</i>) Elephant, African Bush (<i>Loxodonta africana</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)</p>	<p>John Ball Zoo Cleveland Metroparks Zoo Kansas City Zoo John Ball Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo</p>

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Vulture, White-backed (<i>Gyps africanus</i>)	Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Klipspringer (<i>Oreotragus oreotragus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Oryx, East African (Beisa) (<i>Oryx beisa</i>) Zebra, Plains (<i>Equus quagga</i>)	Jacksonville Zoo and Gardens* Kansas City Zoo Jacksonville Zoo and Gardens Jacksonville Zoo and Gardens; Kansas City Zoo Kansas City Zoo Cleveland Metroparks Zoo*; Kansas City Zoo*
Vulture, White-headed (<i>Trigonoceps occipitalis</i>)	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)	Toledo Zoo Toledo Zoo* Toronto Zoo Toledo Zoo; Toronto Zoo Toledo Zoo Toronto Zoo Toledo Zoo
Waterfowl (assorted sp.)	Bison, American (<i>Bison bison</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Camel, Dromedary (<i>Camelus dromedarius</i>) Cattle, Domestic (<i>Bos taurus</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Impala (<i>Aepyceros melampus</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Peccary, Collared (<i>Pecari tajacu</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Wildebeest, Blue (White-bearded) (<i>Connochaetes taurinus</i>)	Caldwell Zoo Caldwell Zoo Africam Safari Park Caldwell Zoo* Africam Safari Park*; Caldwell Zoo Caldwell Zoo Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park* Africam Safari Park Cervid Mixed-Species Table ³ Africam Safari Park Africam Safari Park Africam Safari Park
Waxbill, Gold-breasted (<i>Amandava subflava</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Kansas City Zoo
Weaver, Taveta Golden (<i>Ploceus castaneiceps</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Adventure Aquarium
Weaver, White-headed Buffalo (<i>Dinemellia dinemelli</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Duiker, Black (<i>Cephalophus niger</i>) Klipspringer (<i>Oreotragus oreotragus</i>)	Kansas City Zoo Los Angeles Zoo Staten Island Zoo
Whydah, Pin-tailed (<i>Vidua macroura</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>)	Kansas City Zoo Kansas City Zoo

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Widgeon, Chiloe (<i>Anas sibilatrix</i>)	Guanaco (<i>Lama guanicoe</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Audubon Zoo ² Audubon Zoo ² Audubon Zoo ²
Wood-rail (<i>Aramides sp.</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³
Mammals		
Aardvark (<i>Orycteropus afer</i>)	Duiker, Maxwell's (<i>Philantomba maxwellii</i>)	Bronx Zoo
Anteater, Giant (<i>Myrmecophaga tridactyla</i>)	Pudu, Southern (<i>Pudu pudu</i>)	Sedgwick County Zoo
Bat, Rodriguez (Flying Fox) Fruit (<i>Pteropus rodricensis</i>)	Duiker, Bay (<i>Cephalophus dorsalis</i>)	Bronx Zoo
Bear, American Black (<i>Ursus americanus</i>)	Deer, White-tailed (<i>Odocoileus virginianus</i>) Peccary, Collared (<i>Pecari tajacu</i>)	Africam Safari Park* Africam Safari Park
Bonobo (<i>Pan paniscus</i>)	Red River Hog (<i>Potamochoerus porcus</i>)	Columbus Zoo ²
Capybara (<i>Hydrochoerus hydrochaeris</i>)	Deer, Red Brocket (<i>Mazama temama</i>) Guanaco (<i>Lama guanicoe</i>) Llama (<i>Lama glama</i>) Peccary, Collared (<i>Pecari tajacu</i>) Tapir, Baird's (<i>Tapirus bairdii</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Bergen County Zoo Audubon Zoo ² ; Bergen County Zoo; Detroit Zoo; Salisbury Zoo; San Francisco Zoo Mesker Park Zoo; Salisbury Zoo; Turtle Back Zoo; Zoo de Granby Audubon Zoo ² Houston Zoo; Mesker Park Zoo; San Francisco Zoo Alexandria Zoological Park; Audubon Zoo ²
Cavy, Patagonian (<i>Dolichotis patagonum</i>)	Guanaco (<i>Lama guanicoe</i>) Llama (<i>Lama glama</i>)	Abilene Zoo Denver Zoological Gardens
Colobus, Black and White (<i>Colobus guereza</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Duiker, Maxwell's (<i>Philantomba maxwellii</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>) Hog, Red River (<i>Potamochoerus porcus</i>) Klipspringer (<i>Oreotragus oreotragus</i>)	Caldwell Zoo Bronx Zoo Caldwell Zoo Brookfield Zoo Peoria Zoo Cleveland Metroparks Zoo
Dog, Domestic (<i>Canis lupus familiaris</i>)	Deer, Axis (<i>Axis axis</i>) Gaur (<i>Bos gaurus</i>) Rhinoceros, Greater One-horned (<i>Rhinoceros unicornis</i>)	Buffalo Zoo Buffalo Zoo Buffalo Zoo

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Flying Fox, Indian (<i>Pteropus giganteus</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Los Angeles Zoo; Moody Gardens Topeka Zoo
Fox, Bat-eared (<i>Otocyon megalotis</i>)	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>) Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Hog, Red River (<i>Potamochoerus porcus</i>) Warthog, Common (<i>Phacochoerus africanus</i>)	Los Angeles Zoo Los Angeles Zoo Los Angeles Zoo Saint Louis Zoo San Diego Zoo Safari Park
Galago, Brown Greater (<i>Otolemur crassicaudatus</i>)	Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Los Angeles Zoo
Galago, Moholi (Mohol Bushbaby) (<i>Galago moholi</i>)	Duiker, Bay (<i>Cephalophus dorsalis</i>)	Bronx Zoo
Gelada (<i>Theropithecus gelada</i>)	Ibex, Nubian (<i>Capra nubiana</i>)	Bronx Zoo; Los Angeles Zoo
Gibbon, White-cheeked (<i>Nomascus leucogenys</i>)	Anoa, Lowland (<i>Bubalus depressicornis</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Tapir, Malayan (<i>Acrocodia indica</i>)	Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo Los Angeles Zoo Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo
Guenon, Schmidt's Red-tailed (<i>Cercopithecus ascanius</i>)	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>) Suni (<i>Neotragus moschatus</i>)	Brookfield Zoo Los Angeles Zoo
Guenon, Moustached (<i>Cercopithecus cephus</i>)	Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Los Angeles Zoo
Hyrax, Rock (<i>Procavia capensis</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>) Ibex, Nubian (<i>Capra nubiana</i>) Klipspringer (<i>Oreotragus oreotragus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Lechwe (<i>Kobus leche</i>) Springbok (<i>Antidorcas marsupialis</i>)	National Zoo Bronx Zoo; Los Angeles Zoo Zoo Cleveland Metroparks Zoo; Dallas Zoo Los Angeles Zoo Los Angeles Zoo* Los Angeles Zoo
Langur, Francois's (<i>Trachypithecus francoisi</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Los Angeles Zoo

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Langur, Spectacled (<i>Trachypithecus obscurus</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Santa Barbara Zoo
Lemur, Black and White Ruffed (<i>Varecia variegata</i>)	Duiker, Red-flanked (<i>Cephalophus rufilatus</i>) Duiker, Zebra (<i>Cephalophus zebra</i>)	Los Angeles Zoo Los Angeles Zoo
Lemur, Crowned (<i>Eulemur coronatus</i>)	Duiker, Zebra (<i>Cephalophus zebra</i>)	Los Angeles Zoo
Lemur, Red-ruffed (<i>Varecia rubra</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	National Zoo
Loris, Slow (<i>Nycticebus sp.</i>)	Pudu, Southern (<i>Pudu puda</i>)	Cervid Mixed-Species Table ³
Loris, Pygmy Slow (<i>Nycticebus pygmaeus</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Bronx Zoo; Moody Gardens
Loris, Sunda Slow (<i>Nycticebus coucang</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Bronx Zoo; Los Angeles Zoo
Macaque, Barbary (<i>Macaca sylvanus</i>)	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	Los Angeles Zoo
Macaque, Sulawesi Crested (<i>Macaca nigra</i>)	Markhor, Bukharan (<i>Capra falconeri heptneri</i>)	Los Angeles Zoo
Macaque, Tonkean (<i>Macaca tonkeana</i>)	Blackbuck (<i>Antilope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Axis (<i>Axis axis</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Gaur (<i>Bos gaurus</i>) Nilgai (<i>Boselaphus tragocamelus</i>) Tapir, Malayan (<i>Acrocodia indica</i>)	Africam Safari Park Africam Safari Park
Mandrill (<i>Mandrillus sphinx</i>)	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>) Hog, Red River (<i>Potamochoerus porcus</i>)	Brookfield Zoo Bronx Zoo
Mangabey, Red-capped (Collared) (<i>Cercocebus torquatus</i>)	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Brookfield Zoo
Mangabey, Sooty (<i>Cercocebus atys</i>)	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Brookfield Zoo
Marmoset (<i>sp.</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³
Meerkat (<i>Suricata suricatta</i>)	Dik-dik, Gunther's (<i>Madoqua guentheri</i>)	Disney's Animal Kingdom
Monkey, Black Howler (<i>Alouatta caraya</i>)	Pudu, Southern (<i>Pudu puda</i>)	Los Angeles Zoo
Monkey, De Brazza's (<i>Cercopithecus neglectus</i>)	Hog, Red River (<i>Potamochoerus porcus</i>)	Bronx Zoo
Monkey, Diana (<i>Cercopithecus diana</i>)	Duiker, Zebra (<i>Cephalophus zebra</i>)	Los Angeles Zoo

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Monkey, Mona (<i>Cercopithecus mona</i>)	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	Los Angeles Zoo
Monkey, Syke's (<i>Cercopithecus albogularis</i>)	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Brookfield Zoo
Monkey, Vervet (<i>Chlorocebus pygerythrus</i>)	Aoudad (Barbary Sheep) (<i>Ammotragus lervia</i>)	Los Angeles Zoo
Monkey, White-faced Saki (<i>Pithecia pithecia</i>)	Pudu, Southern (<i>Pudu puda</i>)	Los Angeles Zoo
Otter, Asian Small-clawed (<i>Amblonyx cinereus</i>)	Anoa, Lowland (<i>Bubalus depressicornis</i>) Babirusa, North Sulawesi (<i>Babyrousa celebensis</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Tapir, Malayan (<i>Acrocodia indica</i>)	Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo Audubon Zoo; Jacksonville Zoo and Gardens Cervid Mixed-Species Table ³ Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo
Panda, Red (<i>Ailurus fulgens</i>)	Muntjac, Indian (<i>Muntiacus muntjak</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Sequoia Park Zoo Zoo de Granby
Porcupine, African Crested (<i>Hystrix cristata</i>)	Warthog, Common (<i>Phacochoerus africanus</i>)	Zoo New England
Porcupine, Cape (<i>Hystrix africaeaustralis</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Adventure Aquarium
Porcupine, Prehensile-tailed (<i>Coendou sp.</i>)	Duiker, Bay (<i>Cephalophus dorsalis</i>)	Bronx Zoo
Rabbit, Jack (<i>Lepus californicus</i>)	Deer, Mule (<i>Odocoileus hemionus</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>)	Arizona-Sonora Desert Museum Arizona-Sonora Desert Museum
Shrew, Black & White Giant Elephant (<i>Rhynchocyon petersi</i>)	Antelope, Royal (<i>Neotragus pygmaeus</i>)	Brookfield Zoo
Shrew, Large Tree (<i>Tupaia tana</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	National Zoo
Shrew, Lesser Tree (<i>Tupaia minor</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	National Zoo

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Shrew, Tree (<i>Tupaia sp.</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Columbus Zoo
Siamang (<i>Symphalangus syndactylus</i>)	Anoa, Lowland (<i>Bubalus depressicornis</i>) Babirusa, Moluccan (<i>Babyrousa babyrussa</i>) Tapir, Malayan (<i>Acrocodia indica</i>)	Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo Louisville Zoo ² Point Defiance Zoo; Point Defiance Zoo; Point Defiance Zoo
Sloth, Hoffmann's Two-toed (<i>Choloepus hoffmanni</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Topeka Zoo
Smew (<i>Mergellus albellus</i>)	Deer, Tufted (<i>Elaphodus cephalophus</i>)	Cleveland Metroparks Zoo
Squirrel, Fox (<i>Sciurus niger</i>)	Deer, White-tailed (<i>Odocoileus virginianus</i>)	Cervid Mixed-Species Table ³
Squirrel, Prevost's (<i>Callosciurus prevostii</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Columbus Zoo; Los Angeles Zoo; National Zoo Santa Barbara Zoo
Talapoin (<i>Miopithecus sp.</i>)	Hippopotamus, Pygmy (<i>Choeropsis liberiensis</i>)	Brookfield Zoo
Tamarin (<i>Saguinus sp.</i>)	Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>) Pudu, Southern (<i>Pudu puda</i>)	Cervid Mixed-Species Table ³ Cervid Mixed-Species Table ³
Reptiles		
Crocodile, American (<i>Crocodylus acutus</i>)	Blackbuck (<i>Antilope cervicapra</i>) Buffalo, Water (<i>Bubalus bubalis</i>) Deer, Axis (<i>Axis axis</i>) Deer, Pere David's (<i>Elaphurus davidianus</i>) Deer, Sika (<i>Cervus nippon</i>) Gaur (<i>Bos gaurus</i>) Nilgai (<i>Boselaphus tragocamelus</i>)	Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park Africam Safari Park
Tortoise, Aldabra (<i>Aldabrachelys gigantea</i>)	Alpaca (<i>Vicugna pacos</i>) Chevrotain, Greater Malay (<i>Tragulus napu</i>) Llama (<i>Lama glama</i>) Tapir, South American (<i>Tapirus terrestris</i>)	Lion Country Safari Zoo Boise Lion Country Safari Lion Country Safari
Tortoise, Asian Forest (<i>Manouria emys</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>) Muntjac, Reeves's (Chinese) (<i>Muntiacus reevesi</i>)	Cervid Mixed-Species Table ³ Santa Fe College Teaching Zoo

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Tortoise, Asian Forest (<i>Manouria emys</i>)	Springbok (<i>Antidorcas marsupialis</i>)	Santa Fe College Teaching Zoo
Tortoise, Indian Star (<i>Geochelone elegans</i>)	Chevrotain, Greater Malay (<i>Tragulus napu</i>)	Moody Gardens
Tortoise, Leopard (<i>Stigmochelys pardalis</i>)	Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Klipspringer (<i>Oreotragus oreotragus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Springbok (<i>Antidorcas marsupialis</i>) Suni (<i>Neotragus moschatus</i>)	North Carolina Zoo Jacksonville Zoo and Gardens* Jacksonville Zoo and Gardens Jacksonville Zoo and Gardens Santa Fe College Teaching Zoo Los Angeles Zoo
Tortoise, Radiated (<i>Astrochelys radiata</i>)	Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Los Angeles Zoo
Tortoise, Red-footed (<i>Chelonoidis carbonaria</i>)	Alpaca (<i>Vicugna pacos</i>) Guanaco (<i>Lama guanicoe</i>) Tapir, Baird's (<i>Tapirus bairdii</i>)	Milwaukee County Zoo Santa Fe College Teaching Zoo Milwaukee County Zoo
Tortoise, Spider (<i>Pyxis arachnoides</i>)	Duiker, Blue (<i>Philantomba monticola</i>)	Moody Gardens
Tortoise, Spur-thighed (<i>Testudo graeca</i>)	Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Speke's (<i>Gazella spekei</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Nyala (<i>Tragelaphus angasii</i>)	North Carolina Zoo Zoo Miami Saint Louis Zoo Zoo Miami Reid Park Zoo
Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Deer, Fallow (<i>Dama dama</i>) Dik-dik, Kirk's (<i>Madoqua kirkii</i>) Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Grant's (<i>Nanger granti</i>) Gazelle, Soemmerring's (<i>Nanger soemmerringii</i>) Gerenuk (<i>Litocranius walleri</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Okapi (<i>Okapia johnstoni</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>)	Milwaukee County Zoo Detroit Zoo Phoenix Zoo Detroit Zoo Phoenix Zoo Oklahoma City Zoo Oklahoma City Zoo Phoenix Zoo Como Zoo; Detroit Zoo Oklahoma City Zoo Detroit Zoo Como Zoo*
Tortoise, Yellow-footed (<i>Chelonoidis denticulata</i>)	Alpaca (<i>Vicugna pacos</i>) Tapir, Baird's (<i>Tapirus bairdii</i>)	Milwaukee County Zoo Milwaukee County Zoo
Fish		
Cichlid, African (assorted species)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Adventure Aquarium

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Tilapia, Spotted (<i>Tilapia mariae</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Saint Louis Zoo
Tilapia, Zebra (<i>Tilapia buttikoferi</i>)	Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Saint Louis Zoo

Abilene Zoological Gardens, Abilene, TX – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (1.3)
- Common Ostrich (*Struthio camelus*) (1.3)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- All zebra are shifted off exhibit into a holding space connected to a barn. They get barn access during the colder months.
- The male ostrich has to be shifted off exhibit in order to service the exhibit. All ostrich have a holding yard and access to the barn during colder months.
- We have had most of the animals for over 2 years, but all 8 animals have only been mixed for less than a year.

Changes/Accommodations Needed:

- We made recent renovations to the barn and added all new stall panels.
- An extra holding yard has been added within the exhibit perimeter.
- New holding spaces across the barn have also been added.
- New shift gates were added to the holding yards coming from the exhibit.
- There are plenty of holding places if separation is required.

Reproductive Management/Breeding History:

- 1.0 zebra is new to the herd. When mature, male will breed only with 2 of the mares.
- We pull ostrich eggs and don't plan on hatching eggs.

Management Challenges:

- Managing the male ostrich during breeding season is a challenge.

Items Contributing to Group's Success:

- Slow introductions
- Staff observations
- Currently enough space for the 8 animals

Group/Exhibit Changes Over Time:

- None

Abilene Zoological Gardens, Abilene, TX – Current Exhibit

Current Species:

- Guanaco (*Lama guanicoe*) (1.2)
- Greater (American) Rhea (*Rhea americana*) (3.2)
- Patagonian Cavy (*Dolichotis patagonum*) (1.4)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Rheas and cavies are shifted into holding spaces for feeding.

Changes/Accommodations Needed:

- The original landscape plantings were all consumed by the animals. New plantings are needed for the exhibit that are protected by fencing so animals do not consume.

Reproductive Management/Breeding History:

- The male guanaco has attempted to breed one female but has yet to be successful. The other female is not slated to breed.
- Young, male cavy recently added to the group and breeding is welcomed.
- Last year, 8 rhea chicks hatched on exhibit; 4 were pulled for hand rearing and 4 were parent reared.

Management Challenges:

- Managing this mixed species group next door to the maned wolf exhibit. One rhea chick died last year due to fighting between the male rhea and the male maned wolf through the fencing. A visual barrier was put up after that incident.
- Cavy group dig a lot and one did escape from the exhibit and came back. Modifications were made the exhibits perimeter fencing.

Items Contributing to Group's Success:

- Plenty of space for all the animals
- Staff observations
- Selection of species get along well

Group/Exhibit Changes Over Time:

- The exhibit was originally made for a herd of bison. It was later constructed for the current mixed species group.

Abilene Zoological Gardens, Abilene, TX – Historical Exhibit

Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (1.1)
- Grey Crowned Crane (*Balearica regulorum*) (1.1)
- Vulturine Guinea fowl (*Acryllium vulturinum*) (~5)

Group was successfully mixed for 5-10 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The duiker had a shelter in the exhibit and did successfully breed.

Reproductive Management/Breeding History:

- The duiker, cranes, and guinea fowl all successfully bred.

Management Challenges:

- This was an open top exhibit, and predators killed a few birds.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Red-flanked duiker were phased out of the zoo's collection.
- Mixed African birds still exist in the exhibit today.

Group/Exhibit Changes Over Time:

- None

Adventure Aquarium, Camden, NJ – Current Exhibit

Current Species:

Common Hippopotamus (*Hippopotamus amphibius*) (0.2)

Cape Porcupine (*Hystrix africaeaustralis*) (2.0)

African Cichlids (>2000 of assorted species)

Group has been successfully mixed for 11 years (since May 2005, current as of 2016).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Porcupine were introduced to hippos in holding area via howdy pen while hippos were on the other side of the bollards. This was done several times until the hippos no longer reacted to their presence in the holding area before introducing them on exhibit.
- There was no introductory period for the fish.
- We have had many species of cichlids over the years. The hippos do not bother the fish at all; the success is more about selecting cichlids because they are hardy and tolerant of the water quality parameters needed to maintain good exhibit clarity.

Changes/Accommodations Needed:

- We have strategically placed areas of fabricated deadfall that porcupines can hide behind/under that the hippos cannot reach them.
- There is also a waterfall feature with a land area that the porcupines can walk up but the hippos cannot access.

Reproductive Management/Breeding History:

- We have two male porcupines that we rotate between holding and the exhibit as the porcupines do not get along with each other since reaching sexual maturity.

Management Challenges:

- Maintaining water quality while still keeping parameters safe for fish is a challenge. We utilize ozone and flocculent for clarity, and need to balance the setting based on the tolerance of the fish while still achieving good water clarity in the exhibit.
- Fish are a challenge for exhibit repairs and maintenance, as divers must catch out the entire collection and move to holding if we need to drain the exhibit for any reason.
- Adding new fish is a challenge as the flow rate of the exhibit is so high, the new fish need to become acclimated to the intakes. When adding new fish we need to back down on the gpm of the filters to allow the new fish to slowly acclimate to the flow.

Items Contributing to Group's Success:

- Exhibit design
- Training program

Group/Exhibit Changes Over Time:

- When the exhibit opened in 2005 it also housed various species of African birds. The exhibit design was challenging to find species that were easily managed with half of the available

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perching over a shared space with the hippos and the other half over a public walkway. Bird training was limited to a platform in the public space as there was no off exhibit shift area for the birds. The species that were most successful and in the exhibit for the duration of the period of time birds were housed with the hippos were: Abdim's storks, cattle egrets, hamerkops, and Taveta golden weavers. All of these species tended to stay well away from the hippos, and did not have any issues with guests.

- Common Hippopotamus (*Hippopotamus amphibius*)
 - Cape Porcupine (*Hystrix africae australis*)
 - African Cichlids (assorted species)
 - Abdim's Stork (*Ciconia abdimii*)
 - Cattle Egret (*Bubulcus ibis*)
 - Hamerkop (*Scopus umbretta*)
 - Taveta Golden Weaver (*Ploceus castaneiceps*)
- The hippos would occasionally go after any species of birds that would tend to spend too much time on the ground, near the water's edge or fell in the pool. When we identified a problem with a specific species they would be moved out of the exhibit. This included: crowned crane, white bellied bustards and purple swamp hens (they would not move away from the hippos on land), and any species of duck (at first ducks would actively avoid the hippos, but over time they would eventually become desensitized to the hippos and stop moving away from them in the water). See Adventure Aquarium Unsuccessful Exhibit.
 - All of the bird species were moved out in 2013 due to an exhibit redesign that added aerial AV equipment that we felt would be difficult for the birds to navigate.

Africam Safari Park, Puebla, Mexico – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.0)
- Common Eland (*Taurotragus oryx*) (2.4)
- Common Waterbuck (*Kobus ellipsiprymnus*) (1.4)
- Dromedary Camel (*Camelus dromedarius*) (1.1)
- Impala (*Aepyceros melampus*) (1.16)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.7)
- Common Ostrich (*Struthio camelus*) (3.9)
- Crowned Crane (*Balearica sp.*) (2.0)
- Guineafowl (*sp.*) (50+)
- Waterfowl (assorted species) (40+)

Group has been successfully mixed for 25+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- We have multiple holding pens where some species are held at night. This is very helpful when doing procedures to specific animals.

Changes/Accommodations Needed:

- We would like more holding pens.

Reproductive Management/Breeding History:

- Male giraffe are separated from the herd for breeding a specific male to the females.
- All species, except for the crowned cranes, have bred.

Management Challenges:

- Giraffe management is challenging.
- Impala only tolerate young bucks until the age of 10-12 months.
- We had hybridization of gazelle in the past.

Items Contributing to Group's Success:

- Large space
- Several bodies of water
- Very close keeper watch

Group/Exhibit Changes Over Time:

- Thomson's gazelle and addra were kept there. Since hybridization occurred, addra were removed and Thomson's gazelle were phased out over time.
 - Addra (Dama) Gazelle (*Nanger dama*) (breeding group)
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.0)
 - Common Eland (*Taurotragus oryx*) (2.4)
 - Common Waterbuck (*Kobus ellipsiprymnus*) (1.4)
 - Dromedary Camel (*Camelus dromedarius*) (1.1)

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- Impala (*Aepyceros melampus*) (1.16)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.7)
- Thomson's Gazelle (*Eudorcas thomsonii*) (breeding group)
- Common Ostrich (*Struthio camelus*) (3.9)
- Crowned Crane (*Balearica sp.*) (2.0)
- Guineafowl (*sp.*) (50+)
- Waterfowl (assorted species) (40+)

Africam Safari Park, Puebla, Mexico – Current Exhibit

Current Species:

- Axis Deer (*Axis axis*) (1.5)
- Blackbuck (*Antilope cervicapra*) (1.5)
- Gaur (*Bos gaurus*) (1.3)
- Malayan Tapir (*Acrocodia indica*) (1.2)
- Nilgai (*Boselaphus tragocamelus*) (0.6)
- Père David's Deer (*Elaphurus davidianus*) (0.2)
- Sika Deer (*Cervus nippon*) (1.2.1)
- Water Buffalo (*Bubalus bubalis*) (2.2)
- Demoiselle Crane (*Grus virgo*) (1.1)
- Golden Pheasant (*Chrysolophus pictus*) (20+)
- Green (Javan) Peafowl (*Pavo muticus*) (group of 10)
- Tonkean Macaque (*Macaca tonkeana*) (1.4.2)

Group has been successfully mixed for 20+ years (current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Macaques live on a heavily planted island. Sometimes the deer, buffalo and tapir swim to the island to eat fallen ficus leaves and while they are there the macaques climb onto their backs. Twice the buffalo swam back to land with a macaque on their backs. They had to be captured and returned to the island.
- Tapir are separated and penned at night. They are very tough on exhibit decorations (there is a large Buddhist-like temple on exhibit and the tapirs often trample things).
- This, like other large mammal exhibits at Africam Safari, is open for guests to drive through in their cars.

Changes/Accommodations Needed:

- Blackbuck will be phased out. They are just too hyper, often chasing each other and causing other species to spook.
- We need to add more birds such as cranes or a large flock of ibis.

Reproductive Management/Breeding History:

- All have bred well.
- Sometimes gaur and buffalo spar.

Management Challenges:

- There is very heavy traffic from the animals. Keeping turf is a challenge. We are aware that there is a heavy population density but otherwise the exhibit works very well.

Items Contributing to Group's Success:

- Relatively large pond
- Mature trees in exhibit
- Good holding pens for tapir and large ungulates when the latter need to be isolated

Group/Exhibit Changes Over Time:

- We had crocodile in the pond a few years ago, but when tapir and macaques were added to the exhibit, they were removed. All water-loving herbivores would go in the water with the crocs without any problems.
 - Axis Deer (*Axis axis*) (1.5)
 - Blackbuck (*Antilope cervicapra*) (1.5)
 - Gaur (*Bos gaurus*) (1.3)
 - Nilgai (*Boselaphus tragocamelus*) (0.6)
 - Père David's Deer (*Elaphurus davidianus*) (0.2)
 - Sika Deer (*Cervus nippon*) (1.2.1)
 - Water Buffalo (*Bubalus bubalis*) (2.2)
 - American Crocodile (*Crocodylus acutus*)
 - Demoiselle Crane (*Grus virgo*) (1.1)
 - Golden Pheasant (*Chrysolophus pictus*) (20+)
 - Green (Javan) Peafowl (*Pavo muticus*) (group of 10)

Africam Safari Park, Puebla, Mexico – Current Exhibit

Current Species:

- Ankole Cattle (*Bos taurus*) (1.4.2)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (1.4.3)
- Common Eland (*Taurotragus oryx*) (3.0)
- Dromedary Camel (*Camelus dromedarius*) (2.4)
- Impala (*Aepyceros melampus*) (5.0)
- Nyala (*Tragelaphus angasii*) (1.1)
- Soemmerring's Gazelle (*Nanger soemmerringii*) (2.0)
- Springbok (*Antidorcas marsupialis*) (2.0)
- Common Ostrich (*Struthio camelus*) (3.0)
- Guineafowl (*sp.*) (50+)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Hardly ever is the nyala in sight.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- All mixed gender species have bred in the past.
- Males of all bachelor herds are moved around to other exhibits periodically.
- There are only issues when new wildebeest are introduced.
- There is some aggression between dromedary bull and Ankole.
- Overly aggressive Ankole are removed from exhibit.

Management Challenges:

- Dromedary sometimes get too close to guests' vehicles.
- Ostrich become aggressive towards keepers in this exhibit. We don't know why, since we have had other bachelor groups in other areas that don't become aggressive.

Items Contributing to Group's Success:

- Very large exhibit
- Low animal density
- Lots of tree cover

Group/Exhibit Changes Over Time:

- None

Africam Safari Park, Puebla, Mexico – Current Exhibit

Current Species:

- Sinaloan White-tailed Deer (*Odocoileus virginianus sinaloae*) (6.0)
- American Black Bear (*Ursus americanus*) (1.4)
- Canadian Geese (*Branta canadensis*) (3.3.2)
- Collared Peccary (Javelina) (*Pecari tajacu*) (3.9)
- Coot (*Fulica sp.*)
- Mallard Duck (*Anas platyrhynchos*)
- Mexican Black Duck (*Anas diazi*)
- Waterfowl (assorted species)
- Wild Turkey (*Meleagris gallopavo*) (2.5)

Group has been successfully mixed for 13 years (since 2002, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- When a new bear is introduced, peccary and geese are kept in adjacent pens.
- Peccary are penned separately at night.
- Bears are also placed in dormitories at night.

Changes/Accommodations Needed:

- A den for bears on exhibit will be added.
- Other species will be added later this year.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- 1 introduced peccary was predated by bears the second day after it was added to exhibit. No other animal has been predated.

Items Contributing to Group's Success:

- Lots of environmental enrichment for bears
- Plenty of tall grass cover, prickly pear patches where peccary can hide
- Courage when putting these species together

Group/Exhibit Changes Over Time:

- 20 years ago, there were only black bear on exhibit. Deer were added in 1995, peccaries in 1996 and birds in 2002.

Albuquerque Biological Park, Albuquerque, NM – Historical Exhibit

Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3)
- Thomson's Gazelle (*Eudorcas thomsonii*) (~1.8 + offspring)
- Secretary Bird (*Sagittarius serpentarius*) (1.0)
- West African Crowned Crane (*Balearica pavonina pavonina*) (1.0)

Group was successfully mixed for 13+ years (from before 1985 to 1998).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Thomson's gazelle had a sheltered heated run along the back wall to which they were given access.
- The bongo had a large barn they shifted into at night.
- Both species grazed on exhibit grasses, but were fed grain and supplemental hay in the holding areas and barn.
- Crowned crane and secretary bird stayed in the yard; during the colder months they would go in the heated run (with access) with the Thomson's gazelle as they wished.
- Crowned crane and secretary birds had stations on which they were fed.
- The herd of bongo were very mellow and easily shifted into their night barn.
- Thomson's gazelle were more flighty – we used binoculars to keep a closer eye on them.
- The exhibit provided lots of shaded, bushy areas for the bongo to hang out. There was a small pool for drinking.

Reproductive Management/Breeding History:

- Thomson's gazelle were not separated for calving.
- Female bongo with calf were separated off into barn and back holding area until calf was strong enough, usually a week or two, then reintroduced to exhibit and group.

Management Challenges:

- The groups worked really well together. The biggest challenge was that the holding/shift area for the Thomson's gazelle was not very functional. It made veterinarian procedures on them difficult.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Removed for Africa area expansion

Group/Exhibit Changes Over Time:

- The exhibit also housed gerenuk. According to keeper notes (pre 1985) holding area layout was not the best for this species.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Gerenuk (*Litocranius walleri*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Secretary Bird (*Sagittarius serpentarius*)
 - West African Crowned Crane (*Balearica pavonina pavonina*)

Alexandria Zoological Park, Alexandria, LA – Current Exhibit

Current Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.8)
- Demoiselle Crane (*Grus virgo*) (1.0)
- Mandarin Duck (*Aix galericulata*) (3.3)

Group has been successfully mixed for 16+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Birds were added to established herd of muntjac.
- There is no shifting available.
- Birds are all pinioned and sometimes have a hard time getting out of the way if muntjac start running.

Changes/Accommodations Needed:

- We have hides for muntjac.
- We provide hay piles for birds.

Reproductive Management/Breeding History:

- We just recently pulled muntjac males from the yard (except for one neutered male).
- Muntjac bred without a problem and no interaction from birds.

Management Challenges:

- Making sure birds don't get injured during a catch of muntjac is a challenge.

Items Contributing to Group's Success:

- Nonaggressive animal species

Group/Exhibit Changes Over Time:

- Bird species are rotated through the years.

Alexandria Zoological Park, Alexandria, LA – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (3.0)
- Turkey Vulture (*Cathartes aura*) (0.0.1)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Vulture is non-flighted, non-releasable and was in the yard first before the current 3.0 deer.
- We can shift deer only, vulture can walk under the fence.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- Vulture doesn't back down from deer, feisty

Group/Exhibit Changes Over Time:

- None

Alexandria Zoological Park, Alexandria, LA – Current Exhibit

Current Species:

- South American Tapir (*Tapirus terrestris*) (1.1)
- Capybara (*Hydrochoerus hydrochaeris*) (0.2)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Capybara was introduced into tapir exhibit. One was geriatric and the other under 2 years old, tapir did not mind, the capybara took a few days to adjust.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- No breeding in this exhibit.

Management Challenges:

- None

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Amarillo Zoo, Amarillo, TX – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (2.2)
- Elk (*Cervus canadensis*) (1.2)
- Pronghorn (*Antilocapra americana*) (2.0)

Group has been successfully mixed for 6 years (since 2009, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Our female elk are sisters, male is unrelated. All are about 5 years old.
- The bison are a family unit – one old female (20 years old) and 3 of her children.
- The pronghorn were all orphans that we bottle-fed and hand-reared. Our oldest is 2 years, and the baby is 5 months. They like the keepers a lot, and tend to follow the elk around the exhibit for company.

Changes/Accommodations Needed:

- There are no trees, hide spaces, or feeders in this exhibit. It's a very big, open exhibit that has tall grass.

Reproductive Management/Breeding History:

- None of these animals are bred.

Management Challenges:

- Competition for food is a challenge. All food is thrown on the ground in exhibit.

Items Contributing to Group's Success:

- They're very familiar with each other. Fighting is very rare.

Group/Exhibit Changes Over Time:

- This yard has always had bison and elk (15+ years), and before the pronghorn introduction 6 years ago we had 6 fallow deer in with bison and elk.
 - American Bison (*Bison bison*) (2.2)
 - Elk (*Cervus canadensis*) (1.2)
 - Fallow Deer (*Dama dama*) (group of 6)

Aquarium & Rainforest at Moody Gardens, Inc., Galveston, TX – Current Exhibit

Current Species:

- Blue Duiker (*Philantomba monticola*) (1.1)
- Hottentot Teal (*Anas hottentota*) (1.0)
- Spider Tortoise (*Pyxis arachnoides*) (1.1)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This is an open top exhibit within our rainforest exhibit. The hottentot teal lives in the enclosure as he is pinioned, and the tortoises have over-wintered in the exhibit due to outdoor temperatures.
- The 'mix' of species changes daily as it is open top and birds have access into/out of the exhibit.
- We have noted Madagascar teals (flighted) visit the stream on a daily basis, and depending on how we present food and enrichment, we may have a variety of other birds and sometimes lizards that end up in the enclosure with the duiker.

Changes/Accommodations Needed:

- We have to manage how we present food especially since there are free-roaming primates that might have access to the exhibit.
- We train the duiker for stationing, target etc. and hand feed a lot of the food items that we want to ensure the duiker receives.

Reproductive Management/Breeding History:

- None as the male duiker passed away before breeding age.

Management Challenges:

- The biggest challenge is with managing diet consumption. We are unable to scatter feed and often training sessions are interrupted by birds flying into the enclosure.

Items Contributing to Group's Success:

- Different taxon of animals and therefore different niches
- Duiker are easy to train
- Space

Group/Exhibit Changes Over Time:

- Because the exhibit is open top, flighted Madagascar teals and other birds/lizards sometimes end up in the enclosure with the duiker.
- Free-roaming primates may also visit the exhibit.

Aquarium & Rainforest at Moody Gardens, Inc., Galveston, TX – Historical Exhibit

Species:

Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)
Duck (*sp.*)
Flamingo (*sp.*)
Goose (*sp.*)
Ibis (*sp.*)
Pelican (*Pelecanus sp.*)

Group was successfully mixed for 4 years (from 2004 to 2008).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- This exhibit contained mixed groups of various waterfowl and shorebirds with the red-flanked duiker.
- Flamingos were shifted into winter housing during December-January.
- Pelicans were station-trained.
- All waterfowl were free fed.
- Male duiker was approximately 6 years old when introduced to the exhibit.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Challenges included the demeanor of the duiker. He was very skittish when we had to do bird round-ups or catch-ups. There were a lot of places for the duiker to feel 'cornered.'

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was renovated to an otter exhibit in 2010 after a hurricane – all animals were moved off-site during renovations.

Group/Exhibit Changes Over Time:

- None

Aquarium & Rainforest at Moody Gardens, Inc., Galveston, TX – Historical Exhibit

Species:

- Greater Malay Chevrotain (*Tragulus napu*) (1.1)
- Indian Flying Fox (*Pteropus giganteus*) (3.0)
- Indian Star Tortoise (*Geochelone elegans*) (2.0)
- Peacock Pheasant (*Polyplectron sp.*) (1.0)

Group was successfully mixed for 4 years (from 2004 to 2008).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All were introduced together at once with the exception of the pheasant, at various ages.
- The pheasant was added later as he was isolated in this exhibit for breeding management purposes.

Reproductive Management/Breeding History:

- None

Management Challenges:

- No challenges were noted other than feeding stations to keep bats, birds etc. from raiding chevrotain's food bowls.
- A lot of station training and hand feeding was necessary to manage the group/mix.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We no longer house this mix as the exhibit was renovated after a hurricane in 2008, and all animals were moved off site. The space now exists as a Komodo dragon exhibit.

Group/Exhibit Changes Over Time:

- At one point a pair of pygmy lorises were in the exhibit as well. This was short-lived as there was an escape (into the rainforest- not an escape out of an enclosed space). Lorises were moved off after recovered.
 - Greater Malay Chevrotain (*Tragulus napu*) (1.1)
 - Indian Flying Fox (*Pteropus giganteus*) (3.0)
 - Indian Star Tortoise (*Geochelone elegans*) (2.0)
 - Peacock Pheasant (*Polyplectron sp.*) (1.0)
 - Pygmy Slow Loris (*Nycticebus pygmaeus*) (1.1)

Arizona-Sonora Desert Museum, Tucson, AZ – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (0.2)
- Wild Turkey (*Meleagris gallopavo*) (0.1)

Group has been successfully mixed for 7 years (since 2008, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The deer were introduced as fawns and the turkey was less than a year old.

Changes/Accommodations Needed:

- We shift the turkey and deer to separate stalls at night.

Reproductive Management/Breeding History:

- No breeding in this group.

Management Challenges:

- None

Items Contributing to Group's Success:

- Introductions at young ages

Group/Exhibit Changes Over Time:

- In the past we also had mule deer and jack rabbits in this exhibit. All individuals were introduced when they were less than a year old.
 - Mule Deer (*Odocoileus hemionus*) (1.0 or 0.2)
 - White-tailed Deer (*Odocoileus virginianus*) (0.2)
 - Jack Rabbit (*Lepus californicus*) (1.0)
 - Turkey (*Meleagris gallopavo*) (1.2 or 0.3 or 0.2 or 0.1)
- Animals were housed in the following species compositions:
 - 0.2 White-tailed Deer and 1.2 Turkey
 - 0.2 White-tailed Deer and 0.3 Turkey
 - 0.2 White-tailed Deer and 0.2 Turkey
 - 1.0 Mule Deer and 1.0 Jack Rabbit (always together)
 - 0.2 Mule Deer and 1.0 Jack Rabbit (always together)
- The male white-tailed was separated from the does and turkey at night.
- Shifting the male turkey in the afternoon was a challenge – he wanted to stay in the yard.
- Our mule deer and jack rabbit died and the male white-tailed deer were phased out. We are currently awaiting funding for a new exhibit.

Audubon Zoo, New Orleans, LA – Current Exhibit

Current Species:

- North Sulawesi Babirusa (*Babyrousa celebensis*) (2.4)
- Asian Small-clawed Otters (*Amblonyx cinereus*) (0.3 or 1.1)

Group has been successfully mixed for 20+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We have exhibited adults, breeding pairs, piglets and family groups.

Changes/Accommodations Needed:

- We have a large exhibit that is mostly accessible to all animals.
- We have lots of natural substrates.
- There is a large, live oak shade tree in the exhibit.

Reproductive Management/Breeding History:

- The babirusa have bred multiple times in the exhibit.

Management Challenges:

- Otters can be challenging to manage.

Items Contributing to Group's Success:

- The water body
- Free contact
- Staff interest

Group/Exhibit Changes Over Time:

- We have had two different otter groups (0.3 and 1.1).

Audubon Zoo, New Orleans, LA – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.0)
- Grant's Zebra (*Equus quagga boehmi*) (0.2)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.3)
- Pelican (*Pelecanus sp.*) (2.8)

Group has been successfully mixed for 17 years (since 1998, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The rhinos were introduced to the other species when they were in their teens. The wildebeest and zebra were under 2 years old when they were introduced.
- The wildebeest and zebra are both shifted into separate yards every night. The rhinos are shifted and the male is separated from the females in the barn.
- The wildebeest seem to be the biggest troublemakers as they like to "tease" the rhinos. They will head-butt them in the rear and run away.

Changes/Accommodations Needed:

- There are several places where the wildebeest and zebra can get away from the rhinos throughout the exhibit. There are barriers (bollards) surrounding 2 trees and all around the west perimeter. There is also a line of bollards leading to their perspective night yards.

Reproductive Management/Breeding History:

- We had a rhino calf several years ago. The calf was not introduced to the male rhino or the zebra. The zebra were maintained in a separate yard so we could shift them over through a gate behind bollards. The male was rotated with the females and calf.

Management Challenges:

- It is difficult if the zebra or wildebeest will not shift when the rhinos are out, but I've found that if you feed the bulk of the diet in the night yard, they are motivated to shift.

Items Contributing to Group's Success:

- General demeanor of white rhinos
- Areas for the zebra and wildebeest to get away from rhinos
- A separate yard where we can shift the medium-sized hoofstock away from the rhinos but they are still on exhibit

Group/Exhibit Changes Over Time:

- At one point there were 0.5 zebra, 3.0 wildebeest, and 2.0 Thomson's gazelles in this exhibit. There were only problems with the zebra chasing the gazelles, but the gazelle were usually much faster.
 - Grant's Zebra (*Equus quagga boehmi*) (0.5)
 - Thompson's Gazelle (*Eudorcas thomsonii*) (2.0)
 - White-bearded (Blue) Wildebeest (*Connochaetes taurinus*) (3.0)

Audubon Zoo, New Orleans, LA – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (3.0)
- Thomson's Gazelle (*Eudorcas thomsonii*) (2.0)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: No information provided.

General Management Notes:

- All the animals were quite young when introduced – all were less than 2 years old.
- The eland and gazelle are brought inside at night into separate holding pens.
- Each eland has his own pen, as the dominant male exhibits food aggression. We do not feed hay on exhibit for this reason. They get all their hay in their night yards. There is plenty of grass to graze on in the exhibit.

Changes/Accommodations Needed:

- There are several areas around the trees where the gazelle and hornbills can go to get away from the eland.

Reproductive Management/Breeding History:

- None

Management Challenges:

- If the eland won't shift inside the gazelle must remain outside due to the logistics of the shifting gates.

Items Contributing to Group's Success:

- The male eland are castrated
- Year-round grass to graze on
- Areas for the gazelle and hornbills to get away from the eland

Group/Exhibit Changes Over Time:

- There were more Thomson's gazelle (at one point there was a herd of nine); they started dying out due to age.

B. Bryan Preserve, Point Arena, CA – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (1.0)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.0)
- Roan Antelope (*Hippotragus equinus*) (1.0)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- The 2 zebra were introduced at 1.5 years old. The roan was 12 years.

Changes/Accommodations Needed:

- We had to make sure the barn had an escape route on both sides for the Roan during feeding. The Hartmann's mountain zebra would get a little aggressive.

Reproductive Management/Breeding History:

- Neither zebra have ever bred.

Management Challenges:

- Making sure there is plenty of space at feeding time can be a challenge.

Items Contributing to Group's Success:

- Stallions are young

Group/Exhibit Changes Over Time:

- We had a sable bull in prior, but he was pulled for breeding. He defended himself better at feeding.
 - Grevy's Zebra (*Equus grevyi*) (1.0)
 - Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.0)
 - Roan Antelope (*Hippotragus equinus*) (1.0)
 - Sable Antelope (*Hippotragus niger*) (1.0)

B. Bryan Preserve, Point Arena, CA – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (1.0)
- Sable Antelope (*Hippotragus niger*) (1.0)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- They were introduced when the zebra was 13 and the sable was 12 years old.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- This group is non-breeding – there are no females in the group.

Management Challenges:

- None. They ignore each other.

Items Contributing to Group's Success:

- There are no females around

Group/Exhibit Changes Over Time:

- None

B. Bryan Preserve, Point Arena, CA – Current Exhibit

Current Species:

- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.1)
- Roan Antelope (*Hippotragus equinus*) (1.0)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Female Hartmann's mountain zebra is mean.
- Male Hartmann's mountain zebra is 8 years old.
- The roan bull is not near the Hartmann's mountain zebra stallion, but the female Hartmann's is free range and at times comes to visit.

Changes/Accommodations Needed:

- Aggressive substrate and hills to help with zebra hoof wear.

Reproductive Management/Breeding History:

- The roan has never been in a breeding situation.
- Female Hartmann's mountain zebra has never foaled in the 10 years we have had her.
- Male Hartmann's mountain zebra has sired foals in the past.

Management Challenges:

- The female Hartmann's mountain zebra is aggressive and she has been horned by the roan for not backing down.

Items Contributing to Group's Success:

- Space
- Location of feeders

Group/Exhibit Changes Over Time:

- None

B. Bryan Preserve, Point Arena, CA – Current Exhibit

Current Species:

- Roan Antelope (*Hippotragus equinus*) (1.0)
- Sable Antelope (*Hippotragus niger*) (1.0)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- These individuals were introduced when both were approximately 8 years old.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Both were males pulled out of the breeding rotation.

Management Challenges:

- None

Items Contributing to Group's Success:

- Space

Group/Exhibit Changes Over Time:

- None

Bergen County Zoological Park, River Edge, NJ – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (0.3)
- American Elk (*Cervus canadensis nelsoni*) (1.1)

Group has been successfully mixed for 23 years (since 1992, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The animals are exhibited together daily.
- At night, each species is shifted into its own off-exhibit area, separating them overnight.
- During rut, the male elk may be separated from the rest of the group during day if he is particularly aggressive.

Changes/Accommodations Needed:

- There are various trees and shrubs throughout the exhibit providing visual barriers and hides for the animals if they choose to use them.

Reproductive Management/Breeding History:

- Elk have been born into the group. Mothers and calves were separated from the bull elk for several weeks after birth.

Management Challenges:

- During rut, it is sometimes difficult to maintain the male elk separately. He becomes frustrated and has broken sliding doors as a result.

Items Contributing to Group's Success:

- Having separate areas for species to be held overnight.
- Removing male elk's antlers annually to prevent injuries to other animals.
- Having a large enough area to accommodate the animals, and keeping the number of animals at a manageable level for this size enclosure.

Group/Exhibit Changes Over Time:

- We have exhibited various numbers of bison and elk together. No changes were made in the management of the exhibit with any of these numbers.
 - 1.2 American Bison and 2.2 American Elk
 - 1.1 American Bison and 1.2 American Elk
 - 0.1 American Bison and 1.1 American Elk
 - 0.1 American Bison and 1.2 American Elk
- Historically, we have also held sandhill cranes with bison and elk, but this was unsuccessful (female elk chased and killed crane). See Bergen County Zoo Unsuccessful Exhibit.

Bergen County Zoological Park, River Edge, NJ – Current Exhibit

Current Species:

- Red Brocket Deer (*Mazama temama*) (2.2)
- Capybara (*Hydrochoerus hydrochaeris*) (2.0)
- Greater (American) Rhea (*Rhea americana*) (1.2)

Group has been successfully mixed on and off since 1996.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- These species have been together on and off since 1996, however, individual animals have changed over the years resulting in occasional issues within the group. These species have had to be separated for long periods of time.
- Animals are exhibited together daily and separated by species into off-exhibit areas overnight.



Brent Huffman

Changes/Accommodations Needed:

- We have a large exhibit with shrubs as visual barriers and a large pool.

Reproductive Management/Breeding History:

- All species have reproduced in this situation.
- Brockets (mother and offspring) were held off-exhibit for several weeks before reintroducing into the group.
- Rhea chicks are usually raised off-exhibit until they reach an appropriate size.
- Capybaras have reproduced but offspring have not survived (not related to the other species).

Management Challenges:

- Capybara "personalities" are so individualized, so it's occasionally difficult to maintain these species together. We've had particularly aggressive capybaras (females) that have injured/killed brockets, but most groups have worked well over the years. The issue with the capybaras resulted when they broke into the brockets' off-exhibit area overnight. There were never any issues prior to this while on exhibit.

Items Contributing to Group's Success:

- Allowing each species to have its own off-exhibit space that no other species has access to
- Being aware of individual animal personalities and maintaining accordingly

Group/Exhibit Changes Over Time:

- There were various numbers of brockets, capybaras, and rheas over the years; the number of animals did not change the way the exhibit was managed.
- We have also maintained guanacos in this mixed-species exhibit for many years with successful breeding by all species.
 - Guanaco (*Lama guanicoe*)
 - Red Brocket Deer (*Mazama temama*)

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- Capybara (*Hydrochoerus hydrochaeris*)
- Greater (American) Rhea (*Rhea americana*)
- Some individual guanaco did not do well in this exhibit and had to be separated from the other species; our current 0.2 guanacos are housed separately. See Bergen County Zoo Unsuccessful Exhibit.

Binder Park Zoo, Battle Creek, MI – Current Exhibit

Current Species:

Addra (Dama) Gazelle (*Nanger dama*)
Bontebok (*Damaliscus pygargus*) (1.1)
Burchell's (Damara) Zebra (*Equus quagga burchellii*) (0.1)
Common Waterbuck (*Kobus ellipsiprymnus*) (2.3)
Grant's Zebra (*Equus quagga boehmi*) (0.3)
Impala (*Aepyceros melampus*) (1.2)
Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.5)
Black Crowned Crane (*Balearica pavonina*) (1.1)
Cinereous Vulture (*Aegypius monachus*) (1.1)
Common Ostrich (*Struthio camelus*) (0.4)
Grey Crowned Crane (*Balearica regulorum*) (1.0)
Marabou Stork (*Leptoptilos crumenifer*) (1.1)

The core group of animals has been successfully mixed for 16 years (since 1999, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Our 16 acre African savanna exhibit opened in 1999. Due to seasonal weather constraints, this exhibit is only open from April until October.
- We discontinued Thomson's gazelle in 2005 and greater kudu in 2012. We added Addra in 2006, black crowned crane and Damara zebra in 2012, and plan to add addax in spring of 2016.
- The exhibit fence consists of hotwire strands spaced 8"-12" apart, and varies in height from 7'-10'. The first year animals were introduced to this exhibit, the fence was covered in shade cloth to help animals learn their perimeter. After their comfort had been established the cloth was taken down and has not been used since, as new animals tend to stick with their veteran conspecifics.
- When new individuals are introduced, we begin with conspecifics then add different species one at a time. When new ungulate species are added, they are first introduced to at least one "howdy" species in an off exhibit yard. This helps the new species herd up with a veteran species, making the introduction to the exhibit easier and safer.
- Ages of introduction vary between species as well as the individual. For examples, some calves are more precocious than others, some mothers are less attentive, etc.
- All birds, impala, and Thomson's gazelles are left on exhibit at night with access to a small yard with a shelter. All other animals are brought back into the barn each night.



Sheena Kalemkiewicz

Changes/Accommodations Needed:

- This is a fairly large exhibit, so space is rarely an issue.
- Topography varies greatly and substrate primarily consists of grass and dirt.

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- There are some wooded areas that provide some cover, but the exhibit is also fairly deep, allowing animals to avoid visitors if they choose.
- There are also a few areas where the smaller birds may go to avoid larger hoofstock should they choose.

Reproductive Management/Breeding History:

- All ungulate breeding is done in off-exhibit holding spaces.
- All adult intact males are left off exhibit.
- Females are left off exhibit for calving.



Michael Murray

Management Challenges:

- In 2013 we transitioned to managing giraffe with protected contact. This meant that keepers would no longer enter the exhibit to herd animals in each night. Some simple modifications, like replacing the swinging gates with sliders that could be accessed from outside of the exhibit, and the introduction of an audible cue that lets the animals know it is time to come in, helped make this transition smooth.
- We rarely see interspecies aggression, but we did have one major incident early on, when a cinereous vulture was killed by a zebra.

Items Contributing to Group's Success:

- Large exhibit – no competition for space or other resources
- A competent and confident keeper staff
- Relatively docile species

Group/Exhibit Changes Over Time:

- The species composition for this exhibit has varied over the last 15 years a bit. Thomson's gazelles were quite flighty and had to be left on exhibit overnight. We opted to replace them with Addra gazelle because they were calmer and had a higher conservation value.
- Group composition from 1999-2005
 - Bontebok (*Damaliscus pygargus*) (≤5)
 - Common Waterbuck (*Kobus ellipsiprymnus*) (≤7)
 - Grant's Zebra (*Equus quagga boehmi*) (≤6)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Impala (*Aepyceros melampus*) (≤4)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (≤9)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Cinereous Vulture (*Aegypius monachus*) (1.1)
 - Common Ostrich (*Struthio camelus*) (≤7)
 - Grey Crowned Crane (*Balearica regulorum*) (≤9)
 - Marabou Stork (*Leptoptilos crumenifer*) (1.1)
- Group composition from 2006-2012



Sheena Kalemkiewicz

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- Addra (Dama) Gazelle (*Nanger dama*)
- Bontebok (*Damaliscus pygargus*) (≤5)
- Common Waterbuck (*Kobus ellipsiprymnus*) (≤7)
- Grant's Zebra (*Equus quagga boehmi*) (≤6)
- Greater Kudu (*Tragelaphus strepsiceros*)
- Impala (*Aepyceros melampus*) (≤4)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (≤9)
- Cinereous Vulture (*Aegypius monachus*) (1.1)
- Common Ostrich (*Struthio camelus*) (≤7)
- Grey Crowned Crane (*Balearica regulorum*) (≤9)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)

Birmingham Zoo, Birmingham, AL – Current Exhibit

Current Species:

- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.3)
- Common Ostrich (*Struthio camelus*) (0.2)
- Helmeted Guinea fowl (*Numida meleagris*) (0.0.1)

Group has been successfully mixed for 5 years (since April 2011, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Introductions of our mixed species exhibit have been an ongoing process as different members are brought in at various stages and ages. The adult bull was received in March of 2007 when he was roughly 1 year old and integrated into the previous herd. One of the female giraffe was birthed here at Birmingham Zoo in July 2008 and remains here. The other two females were introduced to the herd in April of 2011 when transferred to Birmingham. Both of these giraffe were between 1 and 2 years old.
- Before the arrival of the bull and two females the herd had additional members that were managed in the same way.
- Our last calf born here, a young male born January of 2014, was mixed into the herd slowly through 'howdys' in the giraffe barn using stalls as separation prior to allowing all members to return to a group. According to a staff member whom was present at the arrival of all calves, transitioning all into the herd was a smooth transition that started with 'howdys' then quickly progressed to integration with the others with no issues or concerns.
- The ostrich were both hatched on site with one significantly older than the other (22 years and 2 years). With three areas of the exhibit that are sectioned off to prevent giraffe from following, the ostrich have the capability to separate themselves from the giraffe.
- Guinea fowl have free range of the area with no restrictions and ample spaces to separate themselves from giraffe and ostrich.

Changes/Accommodations Needed:

- The ostrich and guinea fowl have access to three locations, sectioned off with hot wire, that are not accessible to the giraffe.
- Once temperatures become low enough (20 degrees F) the ostrich must be locked inside.
- Indoor stalls are accessible to the ostrich at all times.
- The exhibit also contains berms which are off-limits to our ostrich and giraffe, but the guinea fowl use as a hideaway. The berms are thickly plated with bamboo in areas that allow a nightly roosting area for the guinea fowl.
- The guinea fowl are also given access to an inside stall where they can be secured if needed.
- The substrate used is primarily an 8/9/10 cut of gravel with some sand mixed into areas. This combination had traditionally worked very well. The gravel provides natural wear to the giraffe hooves and during dry times gives the ostrich and guinea an adequate area to dust bathe.
- Overnight, weather dependent, all animals have the choice of access to their indoor holding and exhibit area. If temperatures reach the lock in temperature, each species has separate stalls inside the two barns.

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Reproductive Management/Breeding History:

- Prior to the birth of our last calf (1.0), all four (1.3) remained together year round with the exception of overnight lock-ins due to low temperatures. During these times the adult bull was physically separated but still maintained visual access to the females.
- During the gestation of our last calf, the pregnant cow was separated inside her own 'calf proof' stall that had been bedded down with rubber mats and a heavy layer of sand. She was with the herd during the day then separated overnight so that she could be monitored via camera.

Management Challenges:

- The overall group, as a mixed species group, has not shown significant challenges.
- Occasionally, the giraffe are seen herding the ostrich; however, the ostrich may choose to separate themselves from the giraffe at any time.

Items Contributing to Group's Success:

- Young age of herd when introduced at various times
- Spacing of exhibit which allows species to separate when needed by choice
- Access of two giraffe yards to separate and rotate if needed

Group/Exhibit Changes Over Time:

- None

Blank Park Zoo, Des Moines, IA – Current Exhibit

Current Species:

Addax (*Addax nasomaculatus*) (1.2)

Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.3)

Group has been successfully mixed for approximately 9 months (since March 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Addax are shifted onto exhibit before the giraffe (a keeper shuts a gate behind them – free contact), and the giraffe are then shifted via a corridor (protected contact). The process is reversed when bringing them in at night.
- Sometimes during late nights or if the addax are agitated by flies, they will attempt to shift inside with the giraffe, but we've never had any serious issues with this group.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The giraffe females are contracepted.
- The addax male is always with the females.

Management Challenges:

- These groups coexist very peacefully – we've never had any issues.

Items Contributing to Group's Success:

- Species demeanor
- Exhibit size
- Exhibit complexity – each species seems to enjoy different areas

Group/Exhibit Changes Over Time:

- For around 5 years prior to the addax arriving, 1.2 giraffe were exhibited with 2.0 lesser kudu, then 1.2 giraffe and 1.0 lesser kudu. Crowned cranes are normally in this exhibit as well, but have been taken off this year due to health concerns with the birds.
 - Lesser Kudu (*Tragelaphus imberbis*) (1.0 or 2.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
 - Grey Crowned Crane (*Balearica regulorum*)
- For a while the exhibit featured 1.2 giraffe with 1.2 addax and 1.0 lesser kudu and African crowned cranes.
 - Addax (*Addax nasomaculatus*) (1.2)
 - Lesser Kudu (*Tragelaphus imberbis*) (1.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
 - Grey Crowned Crane (*Balearica regulorum*)

Blank Park Zoo, Des Moines, IA – Current Exhibit

Current Species:

- Bactrian Camel (*Camelus bactrianus*) (2.3)
- Sarus Crane (*Grus antigone*) (1.1)

Group has been successfully mixed for approximately 7 months (since May 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Each species has exhibit access overnight, but they don't really interact with each other.
- This exhibit has been going particularly well.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- Species temperament
- Exhibit size
- Adequate barn space for both camel and cranes

Group/Exhibit Changes Over Time:

- None

Blank Park Zoo, Des Moines, IA – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (1.1)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)
- Guineafowl (*sp.*) (0.0.4)

Group has been successfully mixed for 2.5 years (since March 2013, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Watusi and birds leave one another alone.
- We sometimes worry about the Watusi trampling the guineas during shifting, but so far this hasn't been an issue.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The male Watusi is castrated.

Management Challenges:

- Ensuring birds aren't trampled by the Watusi is a challenge. Otherwise, this is a very easy group to manage.

Items Contributing to Group's Success:

- Large exhibit size
- Watusi aren't interested in the birds
- Birds stay away from Watusi

Group/Exhibit Changes Over Time:

- Naked neck chickens (0.0.3) were once included in this group, but were removed due to space issues.
 - Ankole (Watusi) Cattle (*Bos taurus*) (1.1)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)
 - Guineafowl (*sp.*) (0.0.4)
 - Naked Neck Chicken (*Gallus gallus domesticus*) (0.0.3)

Blank Park Zoo, Des Moines, IA – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (1.2)
- Grey Crowned Crane (*Balearica regulorum*) (1.1)
- Guineafowl (*sp.*) (0.0.7)

Group has been successfully mixed for 2.5 years (since March 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The group is on exhibit together when temperatures allow.

Changes/Accommodations Needed:

- The eland are contained within the exhibit by hotwire and the birds are free to move in and out of the hotwire to get away from the eland if necessary.

Reproductive Management/Breeding History:

- Male eland is separate from any calves for about 2 months.

Management Challenges:

- None, eland and birds ignore one another.

Items Contributing to Group's Success:

- Species temperament
- Ability for birds to remove themselves from eland's space

Group/Exhibit Changes Over Time:

- We had tried mixing ostrich (1.2) with this group, but it ultimately failed since these particular ostrich were never comfortable being around the eland (eland were never aggressive toward ostrich) and the exhibit's size was too small with too many corners to be successful. We tried for about 1 month before we removed ostrich. See Blank Park Zoo Unsuccessful Exhibit.

BREC's Baton Rouge Zoo, Baton Rouge, LA – Current Exhibit

Current Species:

- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.3)
- Thomson's Gazelle (*Eudorcas thomsonii*) (3.0)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Thomson's gazelle are all castrated and were introduced as yearlings.

Changes/Accommodations Needed:

- This is a wide open exhibit.

Reproductive Management/Breeding History:

- The giraffe breed.

Management Challenges:

- We have no problems with this exhibit – these species don't interact at all.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- We used to have 1.3 breeding Thomson's Gazelles in this exhibit without any problems.

BREC's Baton Rouge Zoo, Baton Rouge, LA – Current Exhibit

Current Species:

- Nile Lechwe (*Kobus megaceros*) (1.4)
- Roan Antelope (*Hippotragus equinus*) (0.1)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.0)

Group has been successfully mixed for 15+ years (current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These species are housed together 24/7.

Changes/Accommodations Needed:

- There is one thicket located in the center of the yard.

Reproductive Management/Breeding History:

- We used to have 1.5 roan but they are being phased out.

Management Challenges:

- The male roan was aggressive to the male lechwe so they had to be rotated.

Items Contributing to Group's Success:

- Only having one male antelope in the exhibit

Group/Exhibit Changes Over Time:

- We used to have 1.5 roan with the lechwe and duiker.

BREC's Baton Rouge Zoo, Baton Rouge, LA – Current Exhibit

Current Species:

- Nile Lechwe (*Kobus megaceros*) (1.0)
- Nyala (*Tragelaphus angasii*) (2.0)
- Plains Zebra (*Equus quagga*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.2)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- These species are housed together 24/7.
- The surplus male lechwe are held here until placed elsewhere
- The nyala were added to the exhibit last year. The other species has been together for 15 years, with some individuals changed. We've had up to 3 male lechwe in the exhibit.

Changes/Accommodations Needed:

- There are some thickets in the yard.

Reproductive Management/Breeding History:

- The zebras breed.
- We pull the ostrich eggs.

Management Challenges:

- Two male lechwe seems to work well but a third seems to be more problematic. If two are sparing it is okay, but a third animal gains access for a side shot so we had to separate one.

Items Contributing to Group's Success:

- Size of the yard

Group/Exhibit Changes Over Time:

- We have had up to three male lechwe in this exhibit at a time.

BREC's Baton Rouge Zoo, Baton Rouge, LA – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
- Red River Hog (*Potamochoerus porcus*) (2.0)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These species are housed together 24/7.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The bongo breed and we hold the red river hogs off exhibit when the bongo are about to calve. This is a safety precaution – we have never had any problems.

Management Challenges:

- None

Items Contributing to Group's Success:

- Yard size

Group/Exhibit Changes Over Time:

- Prior to the red river hogs we had 1.1 warthogs (breeding) with the bongos without any problems.
 - Common Warthog (*Phacochoerus africanus*) (1.1)
 - Eastern Mountain Bongo (*Tragelaphus eurycerus isaaci*) (1.2)

Brevard Zoo, Melbourne, FL – Current Exhibit

Current Species:

- Impala (*Aepyceros melampus*) (6.9)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.3)
- Reticulated/Rothschild's Giraffe Hybrid (*Giraffa camelopardalis*) (1.0)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.0)

Group has been successfully mixed for 12 years (since 2003, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- All animals have learned to shift by walking on a bridge over a river and are fairly good at shifting one species at a time. The order is usually giraffe and blue crane and then rhinos from an adjacent exhibit are shifted through the giraffe exhibit and into the barn the same way. Impala are shifted last. To shift on exhibit the rhinos shift first, then crane, impala, and giraffe last. There have been times when the impala and giraffe shift in together but they sort themselves out in the yard just in front of the barn and have separate entry points.

Changes/Accommodations Needed:

- There are several rock rings that provide safe space for impala and vegetation from the giraffe.
- A river edges the perimeter of the exhibit and is used for guided kayak tours.
- There is a giraffe feeding platform.

Reproductive Management/Breeding History:

- The impala are now split into two groups due to aging females and an aggressive bull impala. Some days there are 10 impala and some days 5 are out. We have 3 (soon to be 4) castrated impala and the breeding bull (4 years old); the breeding male sometimes picks on the older two males (14 and 12 years old). The 14 year old has now been added to the old lady group and does not go out with the bull.
- Animals are held in for parturition when possible.
- Impala calves are left in the barn until they are 1 1/2 to 2 months old.
- Giraffe calves are left in the barn until 1 1/2 to 2 months old also. Young female giraffe have had a history of stomping at younger impala, rabbits, turtles, and native wildlife.

Management Challenges:

- Before the routine was established, getting each species to cross the bridge at all was a challenge. Finding the order to cross the bridge into the barn also took time.
- When there are health issues it may be hard to get a close look or approach an animal. To date it has always been managed.
- Animals giving birth on exhibit have been challenging to get in right away.

Items Contributing to Group's Success:

- Patience with the original animals
- Young animals following dam's routine

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Mixed-species Manual 2016

- Keeper training

Group/Exhibit Changes Over Time:

- The giraffe exhibit opened with Thomson's Gazelles, Impala, and a single Blue Crane. The Thomson's Gazelles were phased out within a few years.
 - Impala (*Aepyceros melampus*)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Reticulated/Rothschild's Giraffe (*Giraffa camelopardalis*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*)
- We have recently had up to 10 giraffe housed with both other species.

Brevard Zoo, Melbourne, FL – Current Exhibit

Current Species:

Grevy's Zebra (*Equus grevyi*) (0.2)

Southern White Rhinoceros (*Ceratotherium simum simum*) (1.2)

Group has been successfully mixed for approximately 10 months (since February 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 1.2 rhinos are shifted first from the barn (same barn as the giraffe) through the giraffe exhibit and into the rhino exhibit.
- The zebra are held in their own barn adjacent to the rhino/zebra exhibit.
- The zebra were 4 and 10 years when added to the zoo's collection. They were held in the zebra barn for a day, given access to paddock and barn for a day, and then given access to barn, paddock and exhibit alone for a week. The rhinos were then shifted onto exhibit with the zebra locked in the barn with a visual. After a day the zebra were given access to paddock adjacent to the rhino exhibit. After a week, the zebra were given access to the rhino yard. The rhinos actively chased the zebra for several days. Safe spaces for the zebra were the paddock and barn. Three openings to the paddock/barn were 28 inches apart, allowing the zebra to pass, but not the rhinos. At first, the rhinos would appear to split up in order to trap the zebra in various spots; this behavior stopped after animals adjusted to each other – this took about a month.
- The zebra are cued into the zebra barn each morning and night in order to open the gates to the giraffe exhibit so we can shift the rhinos into their barn.

Changes/Accommodations Needed:

- The zebra paddock leads to the zebra barn, with vertical poles as the fence.
- Three 28" spaces allow the zebra, but not the rhinos, into the paddock.
- There are several rock rings with lots of trees and foliage to allow animals to visually separate from each other.
- One large rock ring was opened up with 28" spaces to allow zebra access. This rock ring had previously been somewhat of a dead end and trap for the zebra.

Reproductive Management/Breeding History:

- Usually, 1.2 rhinos get along well. The male is sometimes kept off-exhibit one day and females off-exhibit one day just for change. The male has bred one female but no pregnancy has occurred.
- A study is being done to find out if the females are cycling. Zebra are not recommended to breed.

Management Challenges:

- Chasing and outrage in the first month was a challenge. The exhibit has been fairly simple since then.

Items Contributing to Group's Success:

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Mixed-species Manual 2016

- Time allowed for acclimation for each new step in the introduction process
- Keeper training (operant conditioning of animals)
- Temperament of individual animals

Group/Exhibit Changes Over Time:

- This space was used as a rhino exhibit since 2003; the zebra were added in February 2015.

Brevard Zoo, Melbourne, FL – Current Exhibit

Current Species:

Dromedary Camel (*Camelus dromedarius*) (2.0)

Scimitar-horned Oryx (*Oryx dammah*) (3.4)

Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for 6 years (since 2009, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The camels were added to this group in 2009.
- The animals have access to a permanent shelter but are not shifted unless there is a medical reason or pending shipment.
- Keepers work free-contact but always have tools and a vehicle for immediate shelter.
- The zoo train runs through the yard.

Changes/Accommodations Needed:

- The design of the exhibit enables shifting and separating animals. It is also connected to the giraffe barn so animals can be moved around if necessary.
- Oryx are moved into smaller stalls in the giraffe barn for immobilizations.

Reproductive Management/Breeding History:

- There is no breeding at this time but an oryx male will be arriving in the fall.

Management Challenges:

- Diets cannot be restricted to one species as they all have access to each other's food.
- Separating a specific animal off can be tricky and takes patience. It is usually done by placing food bowls close to holding pens, and then in the holding pens.

Items Contributing to Group's Success:

- Allowing animals time to acclimate to routine
- Keeper training (operant conditioning)
- Passionate and respectful train operators

Group/Exhibit Changes Over Time:

- Scimitar-horned oryx and ostrich have been housed together since 2003. The camels were added in 2009 when they were one year old.

Brevard Zoo, Melbourne, FL – Current Exhibit

Current Species:

- Klipspringer (*Oreotragus oreotragus*) (2.1)
- Black Crowned Crane (*Balearica pavonina*) (1.1)
- Marabou Stork (*Leptoptilos crumenifer*) (2.1)

Group has been successfully mixed for 7 years (since 2008, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Animals shift directly from exhibit into holding.
- The exhibit has a river for most of the perimeter.
- A new klipspringer female was introduced at 8 months old and has had two calves since 2013.
- Marabou storks were added to the exhibit in 2008.

Changes/Accommodations Needed:

- There are rocks, trees, and vegetation as visual barriers.

Reproductive Management/Breeding History:

- Klipspringer have been very successful breeding in this exhibit.

Management Challenges:

- Once in a while there is aggression between species and sometimes there is aggression from the male black crane towards keepers.

Items Contributing to Group's Success:

- Keeper training (operant conditioning)
- Animals familiar with routine or learning from parents
- Good observations and communication between volunteers and keepers

Group/Exhibit Changes Over Time:

- In 2003 this exhibit had klipspringer, Southern ground hornbill, yellow-backed duiker, and dark cranes.
 - Klipspringer (*Oreotragus oreotragus*)
 - Yellow-backed Duiker (*Cephalophus silvicultor*)
 - Black Crowned Crane (*Balearica pavonina*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)
- The duiker escaped by swimming the river and was no longer housed there afterward.
- The hornbills have been moved to a more private space to encourage breeding.
- We started adding Marabou storks to the exhibit in 2008.

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Red River Hog (*Potamochoerus porcus*) (1.1)
- De Brazza's Monkey (*Cercopithecus neglectus*) (1.0 + females + offspring)
- Mandrill (*Mandrillus sphinx*) (1.1 or 0.2)

Group has been successfully mixed for 16 years (since 1999, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- This is a summer exhibit only.
- Mandrills and De Brazza's don't get along so they are alternated. This happens more when both species are breeding groups.
- The mandrill-hog tolerance varies over time, with certain individuals, and with the presence of babies of either species. An adult male mandrill who has not been exhibited with other species previously will have a different outcome than a young male who gets accustomed to hogs before becoming fully adult.
- De Brazza's group size varies but there is always a single adult male with females and offspring.

Changes/Accommodations Needed:

- There is plenty of space for primates to get above the hogs, even to their own hillside.

Reproductive Management/Breeding History:

- All species have bred in this exhibit in the past.
- Piglets are not introduced to mandrills until they are a good size (usually about 5-10 pounds).

Management Challenges:

- Fluctuating mandrill-hog tolerance is a challenge.

Items Contributing to Group's Success:

- Big space
- Multiple ground areas so mandrills don't have to be on the same ground with hogs
- Keeping very young hogs/piglets away from mandrills

Group/Exhibit Changes Over Time:

- Alternating between the mandrills and De Brazza's with the red river hogs.

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Lesser Kudu (*Tragelaphus imberbis*) (2.0)
- Thomson's Gazelle (*Eudorcas thomsonii*) (1.20 + offspring)
- Common Ostrich (*Struthio camelus*) (0.2)
- Lilford's Crane (*Grus grus lilfordi*) (1.1)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 1-3 acres

General Management Notes:

- The Thomson's gazelle group composition is constantly changing. We always have one adult male with 20-35 females and offspring.
- We don't let the kudu out during Thomson's gazelle calving season because we have to be in the exhibit a lot, moving around searching for calves

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Thomson's gazelle breed/calve in the fall/summer, respectively.

Management Challenges:

- None

Items Contributing to Group's Success:

- Large exhibit

Group/Exhibit Changes Over Time:

- Thomson's gazelle and various bird species have been exhibited together for many years intermittently.

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Nyala (*Tragelaphus angasii*) (0.10.10)
- Blue-winged Goose (*Cyanochen cyanoptera*) (various groups)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (various groups)
- Marabou Stork (*Leptoptilos crumenifer*) (various groups)

Group has been successfully mixed for various amounts of time over the years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- There is no special management; we put the birds with the nyala when it's warm enough.
- We currently have about 20 nyala – a mix of females and their offspring.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- None, nyala are bred in a separate yard.

Management Challenges:

- None

Items Contributing to Group's Success:

- They don't bother each other.

Group/Exhibit Changes Over Time:

- None



Brent Huffman

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

Reticulated/Rothschild's Giraffe Hybrid (*Giraffa camelopardalis*) (0.6.2)
Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Giraffe and ostrich are kept in separate holding.
- Giraffe calves learn the exhibit for a day or two before being introduced to the ostrich.

Changes/Accommodations Needed:

- None



Brent Huffman

Reproductive Management/Breeding History:

- Occasionally a giraffe bull and male ostrich are added to the exhibit.
- Giraffe breeding has occurred both on and off exhibit.

Management Challenges:

- Male ostrich are sometimes too pushy with female ostrich.

Items Contributing to Group's Success:

- They don't care about each other.

Group/Exhibit Changes Over Time:

- None

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Nyala (*Tragelaphus angasii*) (0.5 - 0.15)
- Red-flanked Duiker (*Cephalophus rufilatus*) (1.1.1)

Group has been successfully mixed for 3 months (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The red-flanked duiker are given a long howdy in a small "play pen" built inside the nyala holding yard, then given access.

Changes/Accommodations Needed:

- No changes were needed once the two species were fully introduced. The only exception is that our nyala are very curious and sometimes want to enter the red-flanked duiker holding door.

Reproductive Management/Breeding History:

- There has not been any breeding in this group yet.

Management Challenges:

- None. However, initially, the nyala were more nervous about this mix than the duiker.

Items Contributing to Group's Success:

- Size difference between the species

Group/Exhibit Changes Over Time:

- None

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Bukharan Markhor (*Capra falconeri heptneri*) (3.5.8)
- Himalayan Tahr (*Hemitragus jemlahicus*) (0.10)

Group has been successfully mixed for 2 summers (since 2013, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- These species had a long howdy period and were first introduced off exhibit.

Changes/Accommodations Needed:

- We need to ensure the tahr have access to their own barn in the winter because the markhor are dominant to them and otherwise will displace them from the barn.

Reproductive Management/Breeding History:

- Currently we are breeding the markhor and we are not breeding the tahr.

Management Challenges:

- Nothing major, the tahr have learned to stay out of the markhor's way.

Items Contributing to Group's Success:

- Big exhibit
- Species separation in winter

Group/Exhibit Changes Over Time:

- None

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Eld's Deer (*Rucervus eldii thamin*) (0.14 - 0.20)
- Gaur (*Bos gaurus*) (1.9.5 + castrated males)

Group has been successfully mixed for 15+ years (current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- These species are housed separately off exhibit and all winter.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Gaur have been exhibited in breeding and nonbreeding groups throughout the history of this mixed exhibit.
- Eld's deer breed in the winter when they are separated from the gaur but fawn when they are mixed with the gaur.



Brent Huffman

Management Challenges:

- Periodically, an Eld's deer manages to get gored by a gaur.

Items Contributing to Group's Success:

- Species largely avoid each other
- Separate night holding
- Large exhibit

Group/Exhibit Changes Over Time:

- None

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Axis Deer (*Axis axis*) (~7.15)
- Barasingha (*Rucervus duvaucelii*) (~15.25)
- Blackbuck (*Antilope cervicapra*) (~3.8)

Group has been successfully mixed for 30+ years (current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- These species are all managed as one group.

Changes/Accommodations Needed:

- They are all housed together on and off exhibit.

Reproductive Management/Breeding History:

- All species are breeding with intermittent contraception.

Management Challenges:

- Axis deer are pugnacious and sometimes gore others, but this is rare.
- Male-male aggression in blackbuck also happens occasionally.

Items Contributing to Group's Success:

- Large space

Group/Exhibit Changes Over Time:

- None

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Formosan Sika Deer (*Cervus nippon taiouanus*) (~0.8)
- Hog Deer (*Axis porcinus*) (~5.10)
- Indian Muntjac (*Muntiacus muntjak*) (~1.1)
- Nilgai (*Boselaphus tragocamelus*) (~2.3)
- Sambar Deer (*Rusa unicolor*) (~5.5)

Group has been successfully mixed for 20+ years (current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- All species are managed as one group – all are kept together on and off exhibit.

Changes/Accommodations Needed:

- A few lean-to sheds and areas for smaller deer to run to are provided.

Reproductive Management/Breeding History:

- These species have been managed as breeding and non-breeding groups.

Management Challenges:

- A hand-reared male nilgai was once very aggressive to sambar and had to be permanently removed.

Items Contributing to Group's Success:

- Large space

Group/Exhibit Changes Over Time:

- None

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Nubian Ibex (*Capra nubiana*) (4.0 - 6.0)
- Gelada (*Theropithecus gelada*) (various groups)
- Rock Hyrax (*Procavia capensis*) (various groups)

Group has been successfully mixed for 30+ years (current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Hyrax live in the exhibit 24/7 during the summer.
- Geladas and ibex come off exhibit to separate holdings each day.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Gelada and Hyrax were bred, ibex were not.

Management Challenges:

- Young ibex sometimes sparred with the gelada, resulting in wounds. One ibex had to be fitted with prosthetic rubberized horn tips until things calmed down. Once the novelty of the situation wears off, there are virtually never long term problems.

Items Contributing to Group's Success:

- They don't bother each other
- Plenty of space

Group/Exhibit Changes Over Time:

- Red-billed pintails, blue-winged geese, yellow-billed ducks, and cape teal were all housed in this exhibit at various times over the years but they were removed because of sporadic aggression from the baboons.
 - Nubian Ibex (*Capra nubiana*)
 - Blue-winged Goose (*Cyanochen cyanoptera*)
 - Cape Teal (*Anas capensis*)
 - Gelada (*Theropithecus gelada*)
 - Red-billed Pintail (*Anas erythrorhyncha*)
 - Rock Hyrax (*Procavia capensis*)
 - Yellow-billed Duck (*Anas undulata*)



Brent Huffman

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Aardvark (*Orycteropus afer*) (1.0 or 0.1)
- Maxwell's Duiker (*Philantomba maxwellii*) (1.1 or 1.0)
- White-faced Scops Owl (*Ptilopsis leucotis*) (1.1.2 or 1.1)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We have to make sure one species doesn't enter the other's shift door when moving animals on and off exhibit.

Changes/Accommodations Needed:

- The exhibit was built for aardvark specifically and is a nocturnal exhibit.
- The floor is 2.5 feet of sand/soil mix which should be changed every 1-2 years due to aardvarks liking to bury their feces.

Reproductive Management/Breeding History:

- We have not bred the duikers since mixing with aardvarks, due to phase out, and have never had more than one aardvark in this mixed species exhibit. A female aardvark with young might be too much activity for the duikers.

Management Challenges:

- It took a long time to get the duikers acclimated to this exhibit. We had to soap glass and always give them access to holding so they could run away.
- It is also a challenge to get them to shift into a dark exhibit from a lit holding area.

Items Contributing to Group's Success:

- Taking plenty of time to let the duikers feel comfortable in the exhibit before making changes (e.g. locking them on exhibit, adding aardvark)
- Aardvarks are largely inactive and not a threat

Group/Exhibit Changes Over Time:

- Maxwell's duiker used to be exhibited with black-cheeked lovebirds. This group was successful for 10+ years.
 - Maxwell's Duiker (*Philantomba maxwellii*) (1.1 or 1.0 or 0.1 or 1.1.1)
 - Black-cheeked Lovebird (*Agapornis nigrigenis*) (0.0.4 – 0.0.8)
- The duikers bred in this exhibit but the love birds were not permitted to breed.
- The number and age of individuals within the group varied over the years.

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Greater Malayan Chevrotain (Greater Mouse-Deer) (*Tragululs napu*) (1.1 or 1.1.1 or 1.0 or 0.1)
- Sunda Slow Loris (*Nycticebus coucang*) (1.1 or 1.0 or 0.1)
- Pygmy Slow Loris (*Nycticebus pygmaeus*) (1.1 or 1.0 or 0.1)

Group has been successfully mixed for 20+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Over the years many different ages and sexes have been put together with no issues.
- Lorises are largely inactive and don't go to the ground.

Changes/Accommodations Needed:

- All animals live in the exhibit 24/7 but the chevrotain have a small den box that they can shift into for exhibit servicing.
- This is a nocturnal exhibit.

Reproductive Management/Breeding History:

- Breeding has been allowed and successful in all species, though our chevrotain have bred best off exhibit.

Management Challenges:

- The exhibit is small and servicing it requires having the different species in their respective nest boxes.

Items Contributing to Group's Success:

- Animals ignore each other

Group/Exhibit Changes Over Time:

- Various ages and sexes of animals have been mixed in this group over the years.

Bronx Zoo, Bronx, NY – Current Exhibit

Current Species:

- Père David's Deer (*Elaphurus davidianus*) (10.11)
- Whooper Swan (*Cygnus cygnus*) (1.1.1)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The exhibit has a stream/moat as the main barrier in the front.
- Swans are in the exhibit 24/7.
- The deer come off exhibit for the night.

Changes/Accommodations Needed:

- Feeders for swans are on the opposite side of the moat from the deer.
- We need to keep the stream from freezing in the winter and providing an escape hazard.

Reproductive Management/Breeding History:

- Both species have bred in this exhibit together.

Management Challenges:

- The swans sometimes get very aggressive to the keepers and sometimes to the deer. We have seen the swans attack sparring male deer. This is not a frequent occurrence.

Items Contributing to Group's Success:

- Large size
- Species got used to each other

Group/Exhibit Changes Over Time:

- It used to be only the Père David's Deer in this exhibit.
- Tundra Swans have also been kept in this exhibit with the Père David's Deer.
 - Père David's Deer (*Elaphurus davidianus*) (10.11)
 - Tundra Swan (*Cygnus columbianus*) (1.1.1)

Bronx Zoo, Bronx, NY – Historical Exhibit

Species:

- Arabian Oryx (*Oryx leucoryx*) (1.0 or 1.1)
- Slender-horned Gazelle (*Gazella leptoceros*) (1.4 or 0.4)

Group was successfully mixed for 10+ years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- We never got the male slender-horns and male oryx together but could do all other possible combinations.

Reproductive Management/Breeding History:

- Slender-horned gazelle were bred.
- We have not bred oryx in the last 12 years.

Management Challenges:

- Despite size differences we were unsuccessful mixing the male slenders with the male oryx.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Installation was closed

Group/Exhibit Changes Over Time:

- None

Bronx Zoo, Bronx, NY – Historical Exhibit

Species:

Maxwell's Duiker (*Philantomba maxwellii*) (1.1 or 1.1.1)
Guereza Colobus (Mantled Guereza) (*Colobus guereza*) (2.0)

Group was successfully mixed for 2 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals were introduced as adults.
- This was a seasonal exhibit that was open only in the summer.
- The colobus were two old males.

Reproductive Management/Breeding History:

- No primate breeding in this exhibit.
- We are unsure whether the duiker bred here or not – it is likely they were on mga.

Management Challenges:

- The colobus occasionally picked on/chased the duiker, but never seriously. We never had any injuries; it probably helped that the colobus were geriatric.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We switched over to the Angolan colobus, which didn't want to mix well with anything.

Group/Exhibit Changes Over Time:

- The Guereza Colobus were housed here alone for many years.

Bronx Zoo, Bronx, NY – Historical Exhibit

Species:

- Bay Duiker (*Cephalophus dorsalis*) (1.1 or 1.1.1 or 1.0 or 0.1)
- Moholi Galago (Mohol Bushbaby) (*Galago moholi*) (1.1.1 or 2.0 or 3.0)
- Prehensile-tailed Porcupine (*Coendou sp.*) (1.1 or 1.0 or 0.1)
- Rodriguez (Flying Fox) Fruit Bat (*Pteropus rodricensis*) (various groups)

Group was successfully mixed for 20+ years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This is a nocturnal exhibit, simulated forest with tree trunks, vines, fake foliage, etc.

Reproductive Management/Breeding History:

- The galagos and duikers bred, the porcupines and bats may have bred also.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Our “World of Darkness” exhibit was closed down.

Group/Exhibit Changes Over Time:

- None

Brookgreen Gardens, Murrells Inlet, SC – Current Exhibit

Current Species:

- Spanish Goat (*Capra aegagrus hircus*) (11.0 or 1.5)
- Eastern Wild Turkey (*Meleagris gallopavo*) (1.0)
- Mute Swan (*Cygnus olor*) (1.1)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- We do not put out any food when they are all together.
- There is pasture grass and a roll of hay, plus a large pond in the center.

Changes/Accommodations Needed:

- The goats are locked in a holding pen at night to be fed, and the birds are fed on exhibit.

Reproductive Management/Breeding History:

- This exhibit is used to house our male goats separate from the females. At breeding season we usually put one male with his designated females in this exhibit, so the number of goats drops to 1.5.

Management Challenges:

- Making sure they all get fed without any competition is a challenge. Removing the goats at night helps a lot.

Items Contributing to Group's Success:

- Not over-crowded
- Exhibit is large, space to get away from each other
- Holding pens for goats

Group/Exhibit Changes Over Time:

- Before 2006 there were just turkeys in this exhibit. In 2010 we started housing and breeding this group of Spanish goats.

Buffalo Zoo, Buffalo, NY – Current Exhibit

Current Species:

Addax (*Addax nasomaculatus*) (1.3)

Roan Antelope (*Hippotragus equinus*) (1.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- When temperatures are above 50 F animals can have 24 hour access to exhibit. Below 50 F they are shifted in overnight. During the day they can have access if temperatures are above 25 F.

Changes/Accommodations Needed:

- There are separate barns and bull pens for each species. There is also a lean-to at the back of the yard for on-exhibit shelter.
- The yard is flat with a moat. There are several clumps of trees/shrubs/vegetation as well as rock piles and deadfall trees to break up the view.

Reproductive Management/Breeding History:

- Males are only present with females during breeding season. Males are never in the yard together.
- Male roan can be with female addax. Male addax cannot be with female roan.
- It should be noted that all variations of groupings have been tried over the years. Recently some pairings that had been fine in the past resulted in injuries so we've adjusted arrangements.

Management Challenges:

- Having to keep the genders separated and rotate everyone through the exhibit results in lots of shifting and significant amounts of time indoors for all individuals.

Items Contributing to Group's Success:

- Space – they can all mostly get away from each other and not interact if they so choose.

Group/Exhibit Changes Over Time:

- All genders had been together in the past.

Buffalo Zoo, Buffalo, NY – Current Exhibit

Current Species:

Axis Deer (*Axis axis*) (1.7)

Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (0.2)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The deer are a non-breeding herd (castrated males).
- All current deer were born in the exhibit.
- All deer were present in the yard when the rhino were first introduced to the exhibit.
- Rhino shift in every night.
- Deer have access to the yard and the barn at all times.



Buffalo Zoo

Changes/Accommodations Needed:

- The deer are fed before the rhino go out for the day so they have a chance to eat.
- Hay is also spread widely so everyone has opportunities.
- The yard has a moat that is easily accessible (deer are often down there) and a pool.

Reproductive Management/Breeding History:

- The only breeding management relates to conflict between male rhino and the deer during sparing season.

Management Challenges:

- The deer cannot be with the male rhinoceros (he's in a separate exhibit) as the deaths of at least two deer are attributed to a previous male.

Items Contributing to Group's Success:

- Space – the rhino yards are some of the largest exhibits in the zoo
- Free choice for the deer
- Temperament of the rhinos

Group/Exhibit Changes Over Time:

- Gaur have been in the exhibit with deer and rhino but were removed because of chronic escapes. Peafowl also shared the exhibit as free-ranging animals. At one point there was a barn dog.
 - Axis Deer (*Axis axis*)
 - Gaur (*Bos gaurus*)
 - Greater One-horned Rhinoceros (*Rhinoceros unicornis*)
 - Blue (Indian) Peafowl (*Pavo cristatus*)
 - Domestic Dog (*Canis lupus familiaris*)

Buffalo Zoo, Buffalo, NY – Historical Exhibit

Species:

- Domestic Goat (*Capra aegagrus hircus*) (1.1)
- Domestic Pig (*Sus scrofa domesticus*) (2.0)
- Donkey (*Equus africanus asinus*) (1.0)
- Zebu (*Bos taurus indicus*) (0.1)

No information was provided about how long this group was successfully mixed.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- The goats would harass the donkey during breeding.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- When we closed a former "children's zoo" many of the remaining animals were moved into one exhibit together. We no longer hold any of the involved species.

Group/Exhibit Changes Over Time:

- No information provided.

Busch Gardens Tampa Bay, Tampa Bay, FL – Current Exhibit

Current Species:

- Addax (*Addax nasomaculatus*) (0.4)
- Cape Eland (*Taurotragus oryx oryx*) (1.8)
- Grevy's Zebra (*Equus grevyi*) (0.6)
- Impala (*Aepyceros melampus*) (0.18)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.15)
- Common Ostrich (*Struthio camelus*) (0.1)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This is a 26 acre display that is open year round.
- These species have been together since the early 1970s and have been on display since 1996.
- Each species is shifted into night holding most nights.

Changes/Accommodations Needed:

- The exhibit is slightly rolling grass pasture with concrete pond, several drinkers, trees, deadfall, and sandy spots.
- The exhibit has high and low feeders and drinkers.
- We have shifting locations for night holding to allow specialized feeding.

Reproductive Management/Breeding History:

- Bulls are rotated to prevent aggression.
- Male giraffe and eland are neutered and not part of a breeding group at this time.
- Male giraffe is house adjacent to giraffe barn and females are rotated in with him based on age and breeding desirability.
- Impala male is introduced in back holding and left in with females for 2 months for breeding.
- Grevy's zebra male is housed with females but has been removed from time to time for periods of aggression with females.
- Young are introduced to the exhibit at 1 to 2 weeks of age, with the exception of the giraffe. The giraffe are held off exhibit with the dam for up to 2 months.

Management Challenges:

- Housing Grevy's zebra with neonates of other species is a challenge. This is managed by holding species calving up during and a few days after to prevent aggression by zebras.
- There are no other major concerns.

Items Contributing to Group's Success:

- Space and night holdings
- History with the species (3 and 4 generations mixed species display)

Group/Exhibit Changes Over Time:

- None

Busch Gardens Tampa Bay, Tampa Bay, FL – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (1.6)
- Grant's Gazelle (*Nanger granti*) (0.6)
- Grant's Zebra (*Equus quagga boehmi*) (1.7)
- Greater Kudu (*Tragelaphus strepsiceros*) (0.13)
- Sable Antelope (*Hippotragus niger*) (0.4)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.4)
- Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for 15 years (since the 2000, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This is a 24 acre rolling grass pasture.
- Each species is shifted in night holding most nights.
- Young are introduced as early as possible but this varies depending on species and at times specimen (usually 1-2 weeks).

Changes/Accommodations Needed:

- We have night holding for each species.
- The perimeter is 8' chain-link fence. 10 feet inside of that is a 6' cable fence to prevent rhinos' access to chain-link. This also creates a buffer zone if needed.
- The exhibit has numerous large trees, two natural ponds, mud wallows, and sand patches.

Reproductive Management/Breeding History:

- Hoofstock males are rotated to prevent aggression and to allow for better management of herds and calving.
- Females are separated for calving.
- Male rhino lives with crash year round.

Management Challenges:

- Monitoring is the challenge, at times one new member can change the dynamics of the group and upset interactions of other species.
- Zebra aggression towards neonates is a challenge. This is minimized by holding calves with dams in holding for a few weeks.
- Introductions of males can vary depending on male and reactions by same and other species.

Items Contributing to Group's Success:

- Separate night holding
- Space
- Species selection – history and understanding of species

Group/Exhibit Changes Over Time:

- None

Busch Gardens Tampa Bay, Tampa Bay, FL – Historical Exhibit

Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (0.3)
- Impala (*Aepyceros melampus*) (4.0)
- Nyala (*Tragelaphus angasii*) (1.6)
- Scimitar-horned Oryx (*Oryx dammah*) (1.9)

Group was successfully mixed for 15 years (from May 2000 to March 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Each species shifted into separate night holding.
- Introductions were done with new specimens and same species first, then we added remaining species days later.

Reproductive Management/Breeding History:

- No breeding was done on this display.
- The male scimitar-horned oryx was neutered.
- The impala were managed as a bachelor group.

Management Challenges:

- We had to expand points of feeding to reduce aggression.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This area was closed down.

Group/Exhibit Changes Over Time:

- None

Buttonwood Park Zoo, New Bedford, MA – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (0.2)
- White-tailed Deer (*Odocoileus virginianus*) (2.0)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- White-tailed deer were introduced as juveniles when bison cows were adults.

Changes/Accommodations Needed:

- Bison are shifted off exhibit into a holding barn and yard at night.

Reproductive Management/Breeding History:

- These are single-sex groups.

Management Challenges:

- One of the white-tailed bucks needs to be shifted off for keepers to access the yard, along with shifting off both bison cows.

Items Contributing to Group's Success:

- Temperament of the bison cows

Group/Exhibit Changes Over Time:

- In the past we maintained different numbers of bison (1.2) and deer (2.1). Management was the same.

Caldwell Zoo, Tyler, TX – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.0)
- Common Warthog (*Phacochoerus africanus*) (0.3)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.12 + offspring)
- Grevy's Zebra (*Equus grevyi*) (0.3 + offspring)
- Impala (*Aepyceros melampus*) (1.0)
- Soemmerring's Gazelle (*Nanger soemmerringii*) (1.0)
- Common Ostrich (*Struthio camelus*) (0.1)
- Crowned Crane (*Balearica sp.*) (0.0.15)
- Helmeted Guineafowl (*Numida meleagris*) (0.0.15)
- Sacred Ibis (*Threskiornis aethiopicus*) (0.0.6)

Group has been successfully mixed for approximately 30 years (since the mid-1980s, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Most animals in this exhibit were either introduced at an early age or born on site and introduced to the exhibit at a later date.
- All of the animals in this exhibit are shifted off the exhibit daily and housed in a night barn.
- One thing we have learned is individual personalities play a huge part in the success of this exhibit. Within a species, not every individual may work and could have to be removed. The wildebeest will get aggressive with a mature greater kudu bull but not the females or young offspring.



Brent Huffman

Changes/Accommodations Needed:

- The warthogs will kill and eat the bird species so we alternate them on exhibit.
- If the wildebeest become too aggressive with the bull kudu, we will pull them and keep in holding. One bull we had would stand up to them and fight so they eventually left him alone.

Reproductive Management/Breeding History:

- The male zebra is kept in holding and the females are pulled off exhibit for breeding. Once bred the females are placed back on exhibit. All females are separated for calving and later placed back on exhibit with calf.
- The greater kudu are kept as a breeding herd on exhibit and the impala were too when we had females.
- When we first introduce dam and calf back onto the exhibit, we will pull the zebra and introduce one zebra at a time until all 3 are back on exhibit. The zebra will chase a new calf if you just put them all out together right away.

Management Challenges:

- Zebra are aggressive with the new calves.

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- Wildebeest are aggressive towards bull kudu.
- Warthogs will kill and eat the bird species.
- Individual personalities can create challenges.

Items Contributing to Group's Success:

- Patience and time spent watching the animals closely and how they respond to each other
- Size of exhibit
- Selection of species

Group/Exhibit Changes Over Time:

- We once had Topi in this exhibit and they worked well.
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*)
 - Common Warthog (*Phacochoerus africanus*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Grevy's Zebra (*Equus grevyi*)
 - Impala (*Aepyceros melampus*)
 - Soemmerring's Gazelle (*Nanger soemmerringii*)
 - Topi (*Damaliscus korrigum jimela*)
 - Common Ostrich (*Struthio camelus*)
 - Crowned Crane (*Balearica sp.*)
 - Helmeted Guineafowl (*Numida meleagris*)
 - Sacred Ibis (*Threskiornis aethiopicus*)

Caldwell Zoo, Tyler, TX – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (0.2)
- Texas Longhorn Cattle (*Bos taurus*) (2.0)
- White-tailed Deer (*Odocoileus virginianus*) (15.14)
- Eastern Turkey (*Meleagris gallopavo silvestris*)
- Sandhill Crane (*Grus canadensis*)
- Waterfowl (assorted species)

Group has been successfully mixed for approximately 30 years (since the mid-1980s, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The deer, bison, and longhorn are brought off exhibit daily and housed in a barn or holding pen.
- The deer are bred and raised on site.
- The bison and longhorn were introduced at young ages.

Changes/Accommodations Needed:

- The intact buck deer is kept separate due to aggressive behavior, especially when in rut.
- The waterfowl have large bodies of water and islands to seek safety if threatened by the hoofstock.

Reproductive Management/Breeding History:

- The intact buck deer is kept off exhibit and does are placed with him during breeding season.
- The does are separated for calving and later re-introduced back onto exhibit.

Management Challenges:

- An aggressive buck especially when in rut can create challenges.

Items Contributing to Group's Success:

- Species selection
- Close observation of the animals and their behaviors
- Size of exhibit

Group/Exhibit Changes Over Time:

- Elk were once on exhibit but were removed because they were very aggressive towards the waterfowl and other species. See Caldwell Zoo Unsuccessful Exhibit.
 - American Bison (*Bison bison*)
 - Elk (*Cervus canadensis*)
 - Texas Longhorn Cattle (*Bos taurus*)
 - White-tailed Deer (*Odocoileus virginianus*)
 - Eastern Turkey (*Meleagris gallopavo silvestris*)
 - Sandhill Crane (*Grus canadensis*)
 - Waterfowl (assorted species)

Caldwell Zoo, Tyler, TX – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.1)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (0.1)
- Colobus Monkey (*Colobus guereza*) (6.2)
- Waterfowl (assorted species) (2.3)

Group has been successfully mixed for 20+ years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The exhibit has been together since the early 1990s. However, the particular group has been together for 3.5 years.
- The exhibit holds a breeding pair of bongo and 8 non-breeding colobus and 1 female yellow-backed duiker.
- All of the animals are brought in daily and locked inside night barns.

Changes/Accommodations Needed:

- Our male duiker charges and strikes our male bongo. Therefore we cannot exhibit them together. See Caldwell Zoo Unsuccessful Exhibit.

Reproductive Management/Breeding History:

- The female bongo is separated from the male bongo once she is bred until she gives birth.

Management Challenges:

- The female bongo becomes scared of the male bongo once she gets bred.
- The male duiker and male bongo cannot be put together.

Items Contributing to Group's Success:

- Size of exhibit
- Selection of animals

Group/Exhibit Changes Over Time:

- None



Brent Huffman

Caldwell Zoo, Tyler, TX – Historical Exhibit

Species:

- Gunther's Dik-Dik (*Madoqua guentheri*) (1.4 + offspring)
- Birds (assorted species)
- Crowned Crane (*Balaerica sp.*) (1.1)

Group was successfully mixed for many years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The dik-dik were locked inside the barn if the temps dropped below 50 F but were otherwise left on exhibit year round.

Reproductive Management/Breeding History:

- All aspects of reproduction took place on exhibit.
- Crowned cranes were a breeding pair.

Management Challenges:

- There were conflicts between the male dik-dik and the breeding pair of crowned cranes when they had babies.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We no longer have dik-dik. However, I am working on getting red-flanked duiker for this exhibit.

Group/Exhibit Changes Over Time:

- None

Calgary Zoo, Botanical Garden & Prehistoric Park, Calgary, Alberta, Canada – Current Exhibit

Current Species:

- Giraffe (*Giraffa camelopardalis*) (1.1)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.2)
- African Crowned Crane (*Balearica sp.*) (1.1.2)
- Common Ostrich (*Struthio camelus*) (0.3)

Group has been successfully mixed for 12 years (since 2003, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- This group has consisted of different individuals (and previously housed Grevy's zebra), but this composition or similar has been exhibited since 2003.
- Giraffe are shifted away every night (due to setup, not necessarily required for interspecies management).
- Giraffe are not mixed in the winter (due to climate and setup) and introductions are generally pretty straightforward with all species.

Changes/Accommodations Needed:

- Cranes have spots where they can duck under rails to find nesting locations.
- Large trees and some varied terrain allow different species to find their own space.

Reproductive Management/Breeding History:

- We have not bred zebra yet so we are unsure if management will need to change.
- Historically, there have been no problems with giraffe calves.

Management Challenges:

- Sometimes shifting all the animals when needed is difficult.

Items Contributing to Group's Success:

- Decent amount of space
- Good varied space
- Good temperament of individuals

Group/Exhibit Changes Over Time:

- We have held up to 4 giraffe previously with no difference in management.
- Previously, only female Grevy's zebra were in this group instead of a mixed sex Hartmann's group; the exhibit worked the same.
 - Giraffe (*Giraffa camelopardalis*)
 - Grevy's Zebra (*Equus grevyi*)
 - African Crowned Crane (*Balearica sp.*)
 - Common Ostrich (*Struthio camelus*)

Calgary Zoo, Botanical Garden & Prehistoric Park,
Calgary, Alberta, Canada – Current Exhibit

Current Species:

- Dall's Sheep (*Ovis dalli*) (2.0)
- Rocky Mountain Goat (*Oreamnos americanus*) (1.2.3)

Group has been successfully mixed on and off for 2 years (since 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- We have mixed these 2 species with all sexes and age ranges of Rocky Mountain goat (mature males, moms with kids, etc.).
- The animals are shifted into a back holding area for feeding and processing as needed.

Changes/Accommodations Needed:

- A good mountain-type exhibit is fine.

Reproductive Management/Breeding History:

- Goats generally kid in another area, but are introduced to the Dall's sheep at a young age. We don't think it would be a problem kidding on exhibit; we just haven't done it due to other exhibit needs.

Management Challenges:

- Each species is dominant at different times of the year, which sometimes makes it a challenge to ensure appropriate feed intake for individuals; it can also make shifting animals a challenge.

Items Contributing to Group's Success:

- Very little competition for resources
- Good amount of space

Group/Exhibit Changes Over Time:

- Previously these species were only managed individually.

Cameron Park Zoo, Waco, TX – Current Exhibit

Current Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (1.1)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.1)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (0.1)
- Southern Gerenuk (*Litocranius walleri walleri*) (1.1)
- Crowned Crane (*Balearica sp.*) (1.1)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- This group of individuals has been exhibited together since March of 2014 but these species have been exhibited in this exhibit since 2005.
- We really have very few challenges with this exhibit. No incidents during introductions, regardless of age.



Natalie Lindholm

Changes/Accommodations Needed:

- We have a few areas that the giraffe can't access but all of the other species can; I don't think these areas are a necessity, more an added feature.

Reproductive Management/Breeding History:

- None at this time. Most females and offspring are kept off exhibit during the birth and for the following few days but we have had no issues with introductions of calves.

Management Challenges:

- The only real challenge is our kudu bull that was hand-reared. He is very confident and social so he likes to shift into any area that is opened, including the giraffe barn. We have to make shifting arrangements concerning him. He also likes to run the giraffe away from the feeding platform so he can have the lion's share of leaves dropped by the public.

Items Contributing to Group's Success:

- Exhibit size
- Size difference of the species
- Design of the exhibit incorporating lots of foraging options and space

Group/Exhibit Changes Over Time:

- From 1992-1997 Grevy's zebra were part of the exhibit in place of the gerenuk. They wreaked



Brent Huffman

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havoc and caused several euthanasia of offspring. See Cameron Park Zoo Unsuccessful Exhibit.

- Greater Kudu (*Tragelaphus strepsiceros*)
 - Grevy's Zebra (*Equus grevyi*)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
 - Crowned Crane (*Balearica sp.*)
 - Marabou Stork (*Leptoptilos crumenifer*)
- The Grevy's Zebra were transferred out and replaced with Springbok from 1997-2005. No real incidents with them and the other species, just injuries and fatalities due to flighty nature.
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
 - Springbok (*Antidorcas marsupialis*)
 - Crowned Crane (*Balearica sp.*)
 - Marabou Stork (*Leptoptilos crumenifer*)

Cameron Park Zoo, Waco, TX – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (2.3)
- Wild Turkey (*Meleagris gallopavo*) (1.1)

Group has been successfully mixed for 23 years (since 1992, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- This current group has been together since July 2013. These species have been exhibited together since 1992.
- We have to make seasonal accommodations when the buck is in rut.

Changes/Accommodations Needed:

- The group does well until rut. One of the males is vasectomized and one is castrated. Once the male with the vasectomy begins rut we sometimes have to separate a few of the females because he targets them. He will also go after the turkey but they usually instigate the issue.

Reproductive Management/Breeding History:

- This is a nonbreeding herd.

Management Challenges:

- The rutting male deer are a challenge. One of the males is trained to shift independently without staff entering with him.

Items Contributing to Group's Success:

- Exhibit size
- Night house size
- Operant conditioning program

Group/Exhibit Changes Over Time:

- This exhibit used to include 0.2 Javelina. The first group we had from 1993-2005 were hand-reared and did well; they even socialized with the deer. The last group we had from 2005-2008 were parent-reared and aggressive to all exhibit-mates.
 - Collared Peccary (*Pecari tajacu*) (0.2)
 - White-tailed Deer (*Odocoileus virginianus*) (2.3)
 - Wild Turkey (*Meleagris gallopavo*) (1.1)

Cameron Park Zoo, Waco, TX – Current Exhibit

Current Species:

- Gunther's Dik-Dik (*Madoqua guentheri*) (1.0)
- Kori Bustard (*Ardeotis kori*) (1.1)

Group has been successfully mixed for 15 years (since 2000, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- This current group has been exhibited together since 2014; however these species have been grouped together since 2000.
- This is a stable exhibit with no issues.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- Exhibit design
- Diversity of species
- Barn setup

Group/Exhibit Changes Over Time:

- There was 1.4 Gunther's dik-dik and 1.1 crowned cranes. The crowned cranes were added to the big Africa yard to allow space for the Kori Bustards and Dik-Dik exhibit. The crowned crane numbers slowly dwindled due to age and there were no animals to replace them.
 - Gunther's Dik-Dik (*Madoqua guentheri*) (1.4)
 - Crowned Crane (*Balaerica sp.*) (1.1)

Cape May County Park Zoo, Cape May Court House, NJ – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (2.2)
- Elk (*Cervus sp.*) (0.1)

Group has been successfully mixed for 20+ years (current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- This specific group of animals has been together for about 7 years.
- Animals were introduced at varying degrees of maturity with no issues.
- They shift together into a smaller paddock without incident.
- The elk, in general, doesn't hang out with the bison but they can often be found in close proximity without incident.

Changes/Accommodations Needed:

- No changes/accommodations needed.

Reproductive Management/Breeding History:

- The bison actively breed without interference or problems with the elk.
- When we have calves the elk doesn't bother them.

Management Challenges:

- None

Items Contributing to Group's Success:

- The elk is assertive enough to get her fair share of resources; she doesn't allow the bison to bully her.
- Our bull bison is pretty laid back; he isn't very aggressive.

Group/Exhibit Changes Over Time:

- We had 2 female elk for a period of time prior to our older animal dying. An additional elk didn't change the group dynamic.
- Many years ago we kept 1.1 rhea in this exhibit. It worked okay for about 2 years until our previous bull bison killed one of the rhea. See Cape May County Zoo Unsuccessful Exhibit.
 - American Bison (*Bison bison*) (2.2)
 - Elk (*Cervus sp.*) (0.1)
 - Greater (American) Rhea (*Rhea americana*) (1.1)

Cape May County Park Zoo, Cape May Court House, NJ – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (3.2)
- Scimitar-horned Oryx (*Oryx dammah*) (4.2)
- Crowned Crane (*Balearica sp.*)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- We originally introduced a 4 year old Watusi steer and a 2 year old Watusi cow with 1.2 scimitar-horned oryx.
- The animals all shift together and eat together.

Changes/Accommodations Needed:

- We provide four separate barn stalls for everybody. The oryx tend to all stay in one stall together and the Watusi spread out amongst the other three.

Reproductive Management/Breeding History:

- The oryx successfully bred many times and there haven't been any problems with the Watusi.
- We separate the female oryx when they are getting ready to calve. We reintroduce the mothers and calves around the time they would be weaned (8-12 weeks). The Watusi couldn't care less.

Management Challenges:

- Have had past conflicts between Watusi and Crowned Cranes; have lost some cranes to trauma.

Items Contributing to Group's Success:

- All Watusi males are castrated
- We recently castrated all oryx males
- They have lots of room to get away from each other

Group/Exhibit Changes Over Time:

- This exhibit, in its current form has never been different.
- We have had varying numbers of African crowned crane in this exhibit. We've lost a couple to trauma from the Watusi but they tend to get away from everyone if needed.

Cape May County Park Zoo, Cape May Court House, NJ – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.1)
- Grant's Zebra (*Equus quagga boehmi*) (1.3)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- The female bongo was born into this exhibit. The male was introduced about 3 years ago without a problem.
- Two of our zebra were born here (about 15 years ago) and the others are the sire and dam.

Changes/Accommodations Needed:

- The bongo are brought into the barn and separated at night. They have access during the day.

Reproductive Management/Breeding History:

- This current bongo pair has bred but has not conceived.
- We've recently had aggression from the male bongo toward the female and have had to separate them.
- The zebra are all sterile

Management Challenges:

- The zebra and bongo don't really interact; everyone keeps to themselves.

Items Contributing to Group's Success:

- Castrated zebra

Group/Exhibit Changes Over Time:

- It's always been zebra and bongo, just different numbers and animals. It never really changed anything.

Capron Park Zoo, Attleboro, MA – Current Exhibit

Current Species:

- Alpaca (*Vicugna pacos*) (3.0)
- Boer Goat (*Capra aegagrus hircus*) (1.2)

Group has been successfully mixed for 2.5 years (since May 21, 2013, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Goats were introduced when they were 2 months old, 1.0 alpaca was introduced when he was 10 years old, and 2.0 alpaca were introduced when they were 7 years old.
- All are housed together year round and shifted indoors during extreme weather.

Changes/Accommodations Needed:

- There are 3-4 separate hay feeding stations established throughout the exhibit and holding in order to decrease food aggression.

Reproductive Management/Breeding History:

- Our male goat is castrated.

Management Challenges:

- The alpaca are supplemented with grain in addition to the hay/fresh grass and the male goat can be pushy toward the alpaca at feeding times.

Items Contributing to Group's Success:

- Enough space so all animals can have sufficient room away from the others if desired
- All animals are calm and even-tempered
- Variety of enrichment and feeding routines

Group/Exhibit Changes Over Time:

- Previously this exhibit housed llamas and pygmy goats from 1996 to 2012. The same management practices were implemented with both group compositions.
 - Llama (*Lama glama*)
 - Pygmy Goat (*Capra aegagrus hircus*)

Capron Park Zoo, Attleboro, MA – Current Exhibit

Current Species:

- Reeves's Muntjac (*Muntiacus reevesi*) (0.1)
- Red Crowned Crane (*Grus japonensis*) (1.1)

Group has been successfully mixed for 14 years (since April 2001, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The muntjac is shifted to a separate holding area from the cranes if necessary during extreme weather.

Changes/Accommodations Needed:

- Hiding spaces are necessary for the muntjac during the cranes' breeding season.

Reproductive Management/Breeding History:

- The cranes are allowed to nest.

Management Challenges:

- Managing aggression between the crane and muntjac during breeding season is a challenge.

Items Contributing to Group's Success:

- Enough hiding spaces for muntjac to get away from cranes, both visually and physically
- Conditioning of muntjac to shift to separate holding are (beyond the holding attached to exhibit)
- Adapting the holding to separate the cranes if needed due to post-breeding aggression

Group/Exhibit Changes Over Time:

- None

Chattanooga Zoo at Warner Park, Chattanooga, TN – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (1.3)
- Mallard Duck (*Anas platyrhynchos*) (2.1)
- Wild Turkey (*Meleagris gallopavo*) (2.0)

Group has been successfully mixed for 5-10 years (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Space to live cohesively
- Trees
- Two separate land areas divided by a pond in the middle

Group/Exhibit Changes Over Time:

- No information provided.

Chehaw Wild Animal Park, Albany, GA – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (1.1.1)
- Common Eland (*Taurotragus oryx*) (6.7.1)
- Impala (*Aepyceros melampus*) (1.0)
- Nyala (*Tragelaphus angasii*) (1.0)
- Plains Zebra (*Equus quagga*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.1)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Animals were various ages during introductions.
- 1.0 impala killed all 6 of his females over the span of 4 months after being introduced.
- 4.0 nyala were introduced as young adults. 3.0 were killed (impala is suspect).
- We plan on adding 2.0 marabou stork and 0.1 grey crowned crane this spring.

Changes/Accommodations Needed:

- This is a 35-40 acre exhibit with an additional 25 acres of holding space split into 8 different stalls, each 1-4 acres.
- The exhibit is mixed use. It is comprised of about ¼ thick woods/swamp, ¼ wooded area, and ½ open pasture. There is a large pond in the exhibit (~40' in diameter).

Reproductive Management/Breeding History:

- Females are separated off exhibit for breeding.

Management Challenges:

- We have a crazy impala.
- We have no off exhibit enclosed barns (mild winter).
- Coyotes are always a concern.

Items Contributing to Group's Success:

- Space
- Free choice feed

Group/Exhibit Changes Over Time:

- None

Chehaw Wild Animal Park, Albany, GA – Historical Exhibit

Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (2.0)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
- Black Crowned Crane (*Balearica pavonina*) (1.0)

No information was provided about how long this group was successfully mixed.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- All animals were young when introduced.

Reproductive Management/Breeding History:

- 1.1 duikers were a breeding pair.

Management Challenges:

- Breeding duiker was challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We moved the animals out to African hoofstock area.

Group/Exhibit Changes Over Time:

- None

Chehaw Wild Animal Park, Albany, GA – Historical Exhibit

Species:

- Zebra (*Equus sp.*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.1)
- Grey Crowned Crane (*Balearica regulorum*) (1.1)

Group was successfully mixed for 10+ years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 1.0 zebra had a bad stifle joint that prohibited him from breeding.
- Male and female zebra were rotated through the exhibit/holding.

Reproductive Management/Breeding History:

- Zebra were nonbreeding.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Animals were moved to African hoofstock exhibit.

Group/Exhibit Changes Over Time:

- None

Cheyenne Mountain Zoo, Colorado Springs, CO – Current Exhibit

Current Species:

- Generic Giraffe (*Giraffa camelopardalis*) (3.13)
- Cattle Egret (*Bubulcus ibis*) (0.0.12)
- Cape Griffon Vulture (*Gyps coprotheres*) (1.2)
- Eurasian Griffon Vulture (*Gyps fulvus*) (0.1)
- Helmeted Guineafowl (*Numida meleagris*) (0.6)

Group has been successfully mixed for 12 years (since 2003, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)



Ashley Arimborgo

General Management Notes:

- Animals were initially introduced when the exhibit opened in 2003. New animals (birds) of the same species have been added since then.

Changes/Accommodations Needed:

- The main portion of the exhibit (where the giraffe can go) is bordered on two sides by bird safe areas (where the giraffe can't go).
- Birds occasionally pass through the giraffe portion of the yard but they primarily hang out in the bird safe zones.

Reproductive Management/Breeding History:

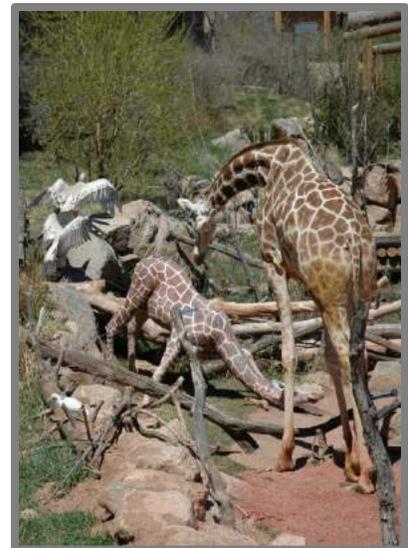
- Breeding of giraffe takes place in a separate side yard; giraffe calving takes place inside the holding areas.
- Cape vultures are managed indoors during breeding season.

Management Challenges:

- Training vultures to shift on and off exhibit took the longest, but now is not an issue.

Items Contributing to Group's Success:

- Comfortable bird safe areas
- Birds able to shift on and off exhibit without cutting through the giraffe portion of the exhibit
- Species of birds



Tracy Thessing

Group/Exhibit Changes Over Time:

- It was different, but not successfully. We tried lesser kudu with giraffe when we first opened but that didn't work so we created a separate exhibit for the kudu. We also tried marabou stork and ground hornbills but that didn't work either. Additionally, at one point an African spurred tortoise escaped into this exhibit. See Cheyenne Mountain Zoo Unsuccessful Exhibit.
 - Generic Giraffe (*Giraffa camelopardalis*) (various groups)
 - Lesser Kudu (*Tragelaphus imberbis*) (4.0)
 - Marabou Stork (*Leptoptilos crumenifer*) (1.0)

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- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)
- Sulcata (African Spurred) Tortoise (*Centrochelys sulcata*) (1.0)

Cheyenne Mountain Zoo, Colorado Springs, CO – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (1.0)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (2.0)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Okapi were moved in with the cranes in 2011.

Changes/Accommodations Needed:

- The cranes have safe spaces they can go, but they rarely utilize them.

Reproductive Management/Breeding History:

- We are currently not breeding these animals.

Management Challenges:

- No major challenges.

Items Contributing to Group's Success:

- Species choices
- Exhibit design (long, with green spaces at edges)

Group/Exhibit Changes Over Time:

- Yes, prior to moving the okapi to this new area he was housed with his brother (2.0 okapi) as well as 1.1 ground hornbills. This also worked well.
 - Okapi (*Okapia johnstoni*) (2.0)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)
- We sometimes put our Muscovy ducks in with our okapi and that works well too (except for the obvious geographic considerations).
 - Okapi (*Okapia johnstoni*)
 - Muscovy Ducks (*Cairina moschata*)

Cheyenne Mountain Zoo, Colorado Springs, CO – Current Exhibit

Current Species:

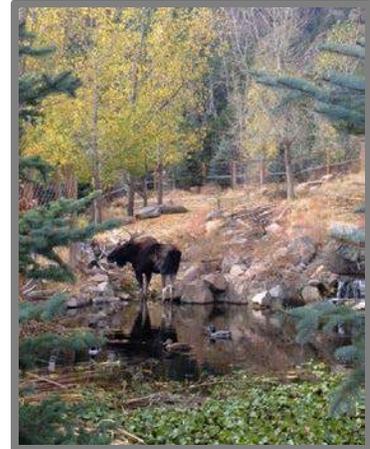
- Moose (*Alces alces*) (1.0)
- Hooded Merganser (*Lophodytes cucullatus*) (1.0)
- Mallard Duck (*Anas platyrhynchos*) (wild)
- Rio Grande Turkey (*Meleagris gallopavo*) (1.5)

Group has been successfully mixed for 7 years (since 2008, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Our barn has two sides to it. One is the moose shifting and feeding side and the other is for the turkeys. At night we shift the turkeys into their side and lock them in for the night. Moose is given access to the barn and yard overnight and in the morning he is locked out of the barn.
- Our moose will go into the pool with the ducks but the ducks stay a fair distance from him. Very little duck and moose interaction has been seen.
- We've had three sets of Rio Grande turkeys introduced to the yard. We get them as chicks and raise them to be poult size. Once large enough we introduce them to the yard and other turkeys.
- Our moose arrived at about 10 months old and is now 9.5 years. The turkeys are about 2 years old and the duck is 9 years old.



Tracy Thessing

Changes/Accommodations Needed:

- We cabled off a section of the yard for the turkeys to retreat from the moose.
- For the ducks, we installed a few nest boxes where our moose does not go as well as a few floating islands in the middle of the pool.

Reproductive Management/Breeding History:

- There is no breeding in this group.

Management Challenges:

- Moose has, on rare occasion, stomped on a turkey (injured but not killed).



Ashley Arimborgo

Items Contributing to Group's Success:

- Providing safe places for turkeys
- Providing separate night holding for turkeys
- Choosing duck species that stay in the water/don't wander around the moose yard

Group/Exhibit Changes Over Time:

- Our ducks have changed over the years and now we have wild mallards visiting the pool.

Cheyenne Mountain Zoo, Colorado Springs, CO – Current Exhibit

Current Species:

- Nile Hippopotamus (*Hippopotamus amphibious amphibious*)
- Domestic Chicken (*Gallus gallus domesticus*)

No information was provided about how long this group has been successful mixed.

Exhibit Size: No information provided.

General Management Notes:

- This is not an intentional mixed species exhibit, but sometimes our chickens wander in with the hippos and his has not been a problem.

Changes/Accommodations Needed:

- None, the chickens come and go as they please.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- None, this is not an intentional mixed species exhibit.

Items Contributing to Group's Success:

- Chickens come and go as they please

Group/Exhibit Changes Over Time:

- None

Cheyenne Mountain Zoo, Colorado Springs, CO – Historical Exhibit

Species:

- Grevy's Zebra (*Equus grevyi*) (1.2)
- Sable Antelope (*Hippotragus niger*) (0.3)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (1.1)

Group was successfully mixed for several years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Grevy's were a breeding group at one time.

Management Challenges:

- No real challenges.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The area was closed, demoed, and a new building and exhibit was built for giraffe, etc.

Group/Exhibit Changes Over Time:

- None

Cheyenne Mountain Zoo, Colorado Springs, CO – Historical Exhibit

Species:

- Mountain Tapir (*Tapirus pinchaque*) (1.1)
- Bar-headed Geese (*Anser indicus*) (1.1)

Group was successfully mixed for multiple years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Tapir were meant to breed but never reproduced in this exhibit.

Management Challenges:

- No specific challenges.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The area was closed, demoed, and new exhibits were built for other species.

Group/Exhibit Changes Over Time:

- None

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Current Exhibit

Current Species:

- Royal Antelope (*Neotragus pygmaeus*) (0.1)
- Black and White (Rufous) Giant Elephant Shrew (*Rhynchocyon petersi*) (1.0)

Group has been successfully mixed for 2 years (since December 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This is an off exhibit space.
- The animals were both adults when introduced. They were introduced for companionship (for the antelope) and to provide extra holding spaces (for the shrew).
- The animals often spend time in the same part of the enclosure. The antelope has occasionally been seen grooming the shrew. No negative interactions have been observed.

Changes/Accommodations Needed:

- We provide many hiding spaces and lots of cover to allow the individuals to get away from each other if needed. We provide hide boxes, air kennels, and branches with hay draped over them. The antelope will also use the hide boxes that we provide for the shrew if the entry door is large enough for her to get inside.

Reproductive Management/Breeding History:

- Neither of these animals is in a breeding situation.

Management Challenges:

- Both of these species can be flighty, so if one animal is startled, it will often disturb the other animal.
- The shrew requires a more humid environment than the antelope.
- The shrew will sometimes eat a small amount of the produce provided for the antelope.

Items Contributing to Group's Success:

- Similarity in disposition
- Similarity in size
- Lack of competition for food and resources between the species

Group/Exhibit Changes Over Time:

- The royal antelope has also been housed with 0.2 red-billed hornbills (both with and without shrews present).
 - Royal Antelope (*Neotragus pygmaeus*) (0.1)
 - Black and White (Rufous) Giant Elephant Shrew (*Rhynchocyon petersi*) (1.0 or 2.0 or 0.1 or 0.2)
 - Red-billed Hornbill (*Tockus sp.*) (0.2)
- The number and sex of the shrews in the enclosure has varied (see above).

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- None of these combinations has been significantly different in behavior of the animals or in management.
- We unsuccessfully attempted to introduce an older female blue duiker to the royal antelope in this same area. The duiker chased the royal antelope so these introductions were discontinued. See Brookfield Zoo Unsuccessful Exhibit.

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Current Exhibit

Current Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)
- White Stork (*Ciconia ciconia*) (1.1)

Group has been successfully mixed for 3 summers from approximately May to October each year (since 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This exhibit started as a stork exhibit. Red-flanked duikers were added later so they could be outside during warmer weather.
- The duiker are with the storks May to October.
- The duiker are shifted indoors at night and the storks remain in the exhibit. The duiker shift readily for food.

Changes/Accommodations Needed:

- We provide an area of taller grasses for the duiker to hide in or behind.
- A nesting platform is provided for the storks.
- When the storks are not nesting, the duiker sometimes shelter beneath the platform.
- The stork food (fish and mice) is elevated out of reach of the duiker.

Reproductive Management/Breeding History:

- The storks nest in the exhibit in the spring. In past years, we have waited for nesting to end before adding the duiker to the exhibit. This year, the male duiker was added before the dummy eggs were removed from the nest. There was no aggression from the storks.
- The last 2 years, a duiker calf was born each summer and was allowed on exhibit with the parents starting at about 2 weeks of age. There was no interest in the calves from the storks.

Management Challenges:

- The male stork will steal hay from the duiker to use on his nest.
- There have been no negative interactions observed between the species.

Items Contributing to Group's Success:

- Lack of competition between the species for food/resources
- Calm demeanor of the duiker and storks
- Increased activity level for the guests

Group/Exhibit Changes Over Time:

- This year, only the male duiker was exhibited with the storks (due to a new duiker exhibit opening). The last 2 summers, the duiker pair with a young calf was exhibited. There were no significant management changes between these scenarios.

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Current Exhibit

Current Species:

- Blue Duiker (*Philantomba monticola*) (0.1)
- Red-billed Hornbill (*Tockus sp.*) (0.2)

Group has been successfully mixed for 4 months (since May 2015, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This is an indoor exhibit, so animals are together year round.
- All of them were adults when introduced.
- The duiker is shifted off exhibit at night, while the hornbills remain in the exhibit.

Changes/Accommodations Needed:

- Elevated food and water platforms are provided for the birds.
- There are many potted plants and some artificial trees in the exhibit to provide shelter and hiding places.
- The duiker often rests in the open where she is easily visible to guests, while the hornbills rest on high perches.

Reproductive Management/Breeding History:

- Neither of these species is in a breeding situation.

Management Challenges:

- Shifting the duiker quickly enough to exclude hornbills from holding stalls has been challenging.
- The hornbills occasionally steal fruit from the duiker food.

Items Contributing to Group's Success:

- The species' use of different levels of the exhibit
- The calm demeanor of the duiker and hornbills
- Increased activity and visibility for the guests

Group/Exhibit Changes Over Time:

- During the winter (November to April), a family group of red-flanked duiker is housed in this exhibit with the hornbills (but not the blue duiker). The management of the group is no different for the current species. We have housed the red-flanked duiker in the exhibit with the hornbills (during the winter) since April 2013.
 - Red-flanked Duiker (*Cephalophus rufilatus*) (family group)
 - Red-billed Hornbill (*Tockus sp.*) (0.2)
- Last summer, we housed a female royal antelope with the hornbills in place of the blue duiker. Management was not different, but the royal antelope was much less visible to the guests.
 - Royal Antelope (*Neotragus pygmaeus*) (0.1)
 - Red-billed Hornbill (*Tockus sp.*) (0.2)

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Current Exhibit

Current Species:

- Common Warthog (*Phacochoerus africanus*) (0.2)
- Common Waterbuck (*Kobus ellipsiprymnus*) (1.2)

Group has been successfully mixed for 1.5 years (since Spring 2013, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Warthog were introduced to waterbuck when 1 year old. Waterbuck had previously been in mixed group (ostrich and warthog).
- Animals shift easily on and off main exhibit into holding yards and stalls.
- Both groups use their own shift gates; the warthog gate has bars added to it to restrict waterbuck from entering through it.

Changes/Accommodations Needed:

- Areas for wallows are needed for warthog.
- Multiple hay feeding areas help prevent food aggression.
- Grass substrate has held up well with use by the warthog but did not hold up as well when warthog were switched out with red river hogs. Red river hogs did much more rooting and destroyed the grass.

Reproductive Management/Breeding History:

- This is a non-reproductive waterbuck group. The waterbuck male was castrated at 16 months old, and this contributed to the success of this mixed group.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Adequate yard size
- Area has mature trees for shade and disrupting sight lines.
- Warthog are shifted into stalls for the night.

Group/Exhibit Changes Over Time:

- Previously we have had 1.2 ostrich with 0.3 warthog and 1.4 waterbuck in this same yard space and it was a very successful display for over 5 years.
 - Common Warthog (*Phacochoerus africanus*) (0.3)
 - Common Waterbuck (*Kobus ellipsiprymnus*) (1.4)
 - Common Ostrich (*Struthio camelus*) (1.2)
- Waterbuck and ostrich were a well-established group, and warthog female with 3 month old offspring were added.

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- Waterbuck and ostrich were held in holding yards and warthog had access to the new yard for several days prior to the addition of the waterbuck and ostrich.
- Warthog breeding was done indoors in December during estrus season. Warthog female gave birth in a separated yard from the mixed exhibit. The group was not reintroduced until warthog were 3 months old.
- Male ostrich were a challenge for keepers to work in the yard with due to aggression towards keepers.
- We had frequent ostrich leg injuries possibly due to the terrain of this yard that had a steep slopping moat and numerous warthog wallows.
- Winter holding areas limited the amount of animals that could be displayed in this yard space. Ostrich were discontinued in this area mainly because the lack of adequate winter holding areas.

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Historical Exhibit

Species:

- Common Waterbuck (*Kobus ellipsiprymnus*) (0.3)
- Grant's Zebra (*Equus quagga boehmi*) (3.0)
- Common Ostrich (*Struthio camelus*) (1.2)

Group was successfully mixed for 2 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Zebra were introduced as yearlings to already established group of waterbuck and ostrich.
- Zebra were shifted into catch pen area (2,000 sq ft) for night time.
- Ostrich and waterbuck were shifted off exhibit through 1 gate and zebra used their own gate.
- All animals learned shifting routines easily.
- Over winter ostrich were locked indoors.
- Stall space for winter was inadequate for zebras (200 sq ft).

Reproductive Management/Breeding History:

- These are non-reproductive groups; zebra are geldings.

Management Challenges:

- Zebra overgrazed the yard area. We tried to resolve this by shifting zebra into a catch pen at night, but the yard still was over grazed and damaged by zebra hooves.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Zebra damaged the yard too much, and it lost too much vegetation.

Group/Exhibit Changes Over Time:

- None

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Historical Exhibit

Species:

Pygmy Hippo (*Choeropsis liberiensis*) (0.1)
Birds (23 assorted species)
Guereza Colobus (Mantled Guereza) (*Colobus guereza*) (3.4)
Mandrill (*Mandrillus sphinx*) (1.3)
Red-capped (Collared) Mangabey (*Cercocebus torquatus*) (5.0 or 4.0 or 2.0)
Schmidt's Red-tailed Guenon (*Cercopithecus ascanius*) (1.3)
Sooty Mangabey (*Cercocebus atys*) (1.4)
Syke's Monkey (*Cercopithecus albogularis*) (3.2)
Talapoin (*Miopithecus sp.*) (various groups)

Group was successfully mixed for 16 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Hippo was always introduced first to new primate species.
- We have only ever maintained 1 female hippo at a time, but have had 3 different hippos here from 1982-2012.
- The addition or removal of primates had no bearing or consequence to that of the pygmy hippo at the time. We were able to train our hippos on exhibit and in a holding stall as needed prior to shifting primates out. She was a nice addition to the exhibit.
- Groups of red-capped mangabey were rotated.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- There were many issues with the primates.
- We had no problems with hippos. We loved our hippos.
- From time to time the monkeys harassed the hippo mildly to which she would return to the pool until the monkeys lost interest. Overall, all primates and ungulate coexisted nicely.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We didn't stop exhibiting the hippo in this exhibit for lack of success. We decided to exhibit pygmy hippos in just 1 area of the zoo which is why we discontinued them in Tropic World.

Group/Exhibit Changes Over Time:

- We have held various groups of Schmidt's red-tailed guenon and sooty mangabey.

Cincinnati Zoo & Botanical Garden, Cincinnati, OH – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (1.0)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (0.1)

Group has been successfully mixed for 1 year (since January 2015, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- We began howdying and working towards a gradual introduction when the duiker calf was separated from her dam at 8 months of age. The introduction progression was based on the species' responses, attitude, and demeanor.

Changes/Accommodations Needed:

- Have 2 hides within exhibit (3 ft X 5 ft) that animals can utilize if needed.
- Deadfall and rocks are inside the exhibit to keep animals back from the public viewing area.

Reproductive Management/Breeding History:

- We have only introduced the duiker to our male okapi at this time, since he has a calmer demeanor.

Management Challenges:

- We have had incidence of male okapi excessive allogrooming, but it has been monitored and he was separated as needed.

Items Contributing to Group's Success:

- Introduction started at a young age.
- We were able to do the introduction under a controlled situation inside before progressing to larger outdoor spaces.
- We kept initial introductions short in duration and only started after howdying (nose-to-nose contact) was done.

Group/Exhibit Changes Over Time:

- Before renovation, this area housed other species. See Cincinnati Zoo Historical Exhibit and Cincinnati Zoo Historical Exhibit.

Cincinnati Zoo & Botanical Garden, Cincinnati, OH – Current Exhibit

Current Species:

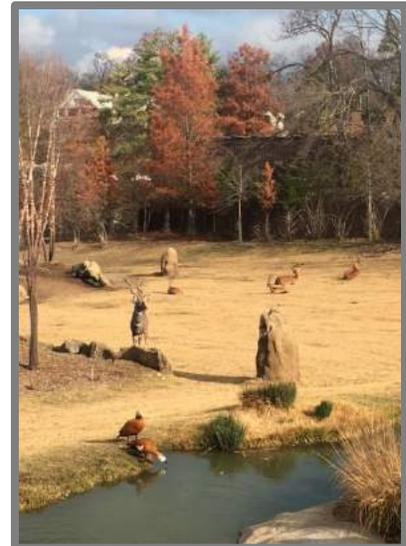
- Impala (*Aepyceros melampus*) (2.0)
- Lesser Kudu (*Tragelaphus imberbis*) (2.0)
- Thomson's Gazelle (*Eudorcas thomsonii*) (3.0)
- Common Ostrich (*Struthio camelus*) (0.2)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (3.0)
- Kenya Crested Guineafowl (*Guttera pucherani pucherani*) (6.0)
- Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
- Pink-backed Pelican (*Pelecanus rufescens*) (2.0)
- Ruddy Shelduck (*Tadorna ferruginea*) (1.1)
- Ruppell's Griffon Vulture (*Gyps rueppellii*) (1.0)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (0.1)

Group has been successfully mixed for 8 months (current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This entire group has successfully been mixed together for roughly 8 months. Some of our animals (saddle-billed stork for example) were added to the group later than others.
- The following are ages of hoofstock when introduced to exhibit: kudu (aged ~2 years), impala (aged 1 year and 2 years), Thomson's gazelle (aged 4 years, 2 years, and 1 year).
- All hoofstock are shifted from indoor holding stalls through one or more holding yards, through a mixing yard, and through a transfer yard onto exhibit. All hoofstock are shifted onto and off of exhibit every day.
- Hoofstock are housed in indoor holding stalls overnight in the following "sets" of animals: 2.0 kudu housed together, 2.0 Thomson's gazelle housed together, 1.0 Thomson's gazelle and 2.0 impala housed together (because they were shipped together and have been housed together since their arrival at Cincinnati Zoo).
- Animals are on exhibit from early spring through early winter (weather dependent).
- Animals cannot be left with access to the exhibit and indoor holding areas due to design of the shifting area.
- Since we have an all-male hoofstock group, we observe a lot of sparring (among and between all species).
- We've also observed our hoofstock "herding" our guineafowl around the exhibit at times.
- All of our hoofstock are relatively healthy and without any noteworthy medical conditions at this time.



Jenna Wingate

Changes/Accommodations Needed:

- Since we have a brand new exhibit, we have not had to make too many modifications to the exhibit.

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- We did add some additional fencing to one portion of our gunnite containment to discourage vultures from jumping from the high point of our downed log that is near the gunnite.
- Additionally, we've had several incidents where our ruddy shelducks have gone willingly over the waterfall and into the African lion moat.
- The pelicans have a submerged feed bowl as their fish-feeding station. Storks have a separate feed bowl.
- We have a hanging duck feeder that is suspended over the water so only the ducks can access it (pelicans do not steal duck food).
- The hoofstock have not required any additional accommodations.
- All shade on exhibit is provided by trees that were planted when the exhibit was built.
- Certain elements about the design of our exhibit make it difficult to herd/shift our animals into their transfer yards and off exhibit.



Jenna Wingate

Reproductive Management/Breeding History:

- Since we have an all-male hoofstock group, we have not had to do any reproductive management with that group.
- We do not currently have any breeding pairs of animals that are being housed in this exhibit.

Management Challenges:

- Shifting animals can be challenging because we do not have our animals trained to individual recall cues. Some animals (like the ostrich, kudu, and guineafowl) are more easily shifted and pushier so they tend to shift easily off exhibit when shift doors are opened. Other animals (impala and Thomson's gazelle) are more difficult and must be herded off exhibit.
- Our hoofstock tend to eat out of the cranes' feeders throughout the day and the vultures try to steal food from the saddle-billed stork when we feed her on exhibit. We are currently working on teaching our vultures to station at a specific location in the yard for their meals.
- Kudu have been extremely destructive to the plant life in the exhibit (which was no surprise to keepers but has been frustrating for horticulture staff and administrators).
- Sometimes the ostrich will run around the yard in the mornings and they can startle the hoofstock.
- Sometimes during shifting, animals will bottle-neck at narrow points and we worry about smaller animals (like guineafowl) getting trampled underfoot, though we haven't actually had an incident that resulted in injury.
- We've also had an issue with trying to house more than 2 ruddy shelducks in the space. The ducks do not get along well and all but 2 had to be relocated. This does not seem to be the result of any mixed species interactions however.



Jenna Wingate

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Items Contributing to Group's Success:

- No breeding animals on exhibit
- Amount of space (lots of room for everyone to spread out and diffuse tense moments)
- Variety of habitable space (moat for ducks and pelicans, planters for guineafowl, island for Ruppel's griffon vulture, dense vegetation for kudu, high perches for vultures, open savannah for all others)

Group/Exhibit Changes Over Time:

- When the exhibit actually opened in 2014 we had fewer animals and added to the collection in the following year, but nothing noteworthy in terms of collection plan for this area.

Cincinnati Zoo & Botanical Garden, Cincinnati, OH – Historical Exhibit

Species:

- Chapman's Zebra (*Equus quagga chapmani*) (1.2)
- Common Eland (*Taurotragus oryx*) (1.6)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.6)
- Lappet-faced Vulture (*Torgos tracheliotos*) (0.2)

Group was successfully mixed for 8 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Nothing noteworthy

Reproductive Management/Breeding History:

- No difference was required for their management.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit was phased out when the area was renovated and new species planned.

Group/Exhibit Changes Over Time:

- See Cincinnati Zoo Current Exhibit and Cincinnati Zoo Historical Exhibit.

Cincinnati Zoo & Botanical Garden, Cincinnati, OH – Historical Exhibit

Species:

- Giant Eland (*Taurotragus derbianus*) (1.12)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.6)
- Lappet-faced Vulture (*Torgos tracheliotos*) (0.2)

Group was successfully mixed for 8 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Giant eland was required to be shifted off exhibit for cleaning.

Reproductive Management/Breeding History:

- The bull eland was separated nightly, but returned to the herd in the morning.
- The female eland were separated out and housed indoors for calving (then returned to the herd situation after a week).

Management Challenges:

- The female giant eland were prone to cornering conspecifics and we had to make modifications to the entrance/exit area of the inside holding areas so this could not occur.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit was phased out when the area was renovated and new species planned.

Group/Exhibit Changes Over Time:

- See Cincinnati Zoo Current Exhibit and Cincinnati Zoo Historical Exhibit.

Cleveland Metroparks Zoo, Cleveland, OH – Current Exhibit

Current Species:

Grant's Zebra (*Equus quagga boehmi*) (0.1)

Common Ostrich (*Struthio camelus*) (1.2)

White Stork (*Ciconia ciconia*) (1.2)

Group has been successfully mixed for approximately 6 months (current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The white storks are typically out on exhibit between May and October. Their wings are clipped at the beginning of the season and clipped again if needed throughout the season.
- The 0.1 zebra and 1.2 ostrich are locked on exhibit during the day and have in/out access to the exhibit and holding at night.
- The zebra and ostrich are brought in every morning for about 1 hour and fed 1/2 their diet while the staff services the exhibit and feeds the white storks. They are also brought in for the evening, for only 30 minutes, and fed the other 1/2 of their diet while the staff checks and feeds the white storks again.
- The ostriches were originally supposed to be housed with our 1.3 Masai giraffe, but the 0.2 were frightened by them, nervously running around and into fences, so it was decided to introduce the 0.1 zebra and 0.2 ostrich together. This introduction went well and the 1.0 ostrich was introduced 2 years later.
- The ostrich and the zebra have now been housed together for about 3 years; they were just introduced to the white storks this year.

Changes/Accommodations Needed:

- There are large trees and rock formations to give visual barriers from public viewing and from other species.
- The white storks are fed in wire mesh covered stumps to prevent wild bird consumption.

Reproductive Management/Breeding History:

- We are not currently breeding any of these species.

Management Challenges:

- Both the zebra and ostrich spend quite a bit of time out of public view.
- The ostrich are habituated to people and there is a gate facing staff areas where the animals spend a lot their time. We try to minimize the amount of time staff spends standing in view of this gate.
- There have been feeding challenges with these 2 species, so staff feeds these species individually inside their holding areas.

Items Contributing to Group's Success:

- Gentle demeanor of all 3 species
- The size of the exhibit, with areas to retreat from each other

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- Animal recall to their holding locations – this allows inspection of the animals and feeding of their individual diets

Group/Exhibit Changes Over Time:

- Last year and for many years, this exhibit housed a single male breeding group of bontebok and offspring with white storks and spur-winged geese. This group was switched to a different exhibit for public viewing purposes. See Cleveland Metroparks Zoo Current Exhibit.
 - Bontebok (*Damaliscus pygargus*) (1.0 + females + offspring)
 - Spur-winged Goose (*Plectropterus gambensis*) (2.2)
 - White Stork (*Ciconia ciconia*) (1.2)

Cleveland Metroparks Zoo, Cleveland, OH – Current Exhibit

Current Species:

- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.3 + offspring)
- African Crowned Crane (*Balearica sp.*) (1.0)
- Spur-winged Geese (*Plectropterus gambensis*) (1.1)
- White Stork (*Ciconia ciconia*) (2.2)

Group has been successfully mixed for 25+ years (current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Giraffe and various birds have been mixed in the exhibit for over 25 years.
- The giraffe use the exhibit, weather permitting, and are brought off exhibit every night.
- The birds typically stay out in the exhibit from May through October; their wings are clipped.

Changes/Accommodations Needed:

- There are various rock ring areas where the birds can go for retreat; they are also fed in these areas.
- There is an area in the exhibit where 2 large fallen trees are being used to block off an area where the adult male giraffe attempted to reach the public.

Reproductive Management/Breeding History:

- The giraffe are rotated on exhibit when not in a breeding situation.
- Female giraffe are kept inside for calving and stay inside for approximately one week, depending on the temperature.
- The white storks were previously kept in a different area (a hillside adjacent to the giraffe exhibit). They were successful at breeding in that exhibit but have not breed successfully in the actual giraffe exhibit.

Management Challenges:

- There is sometimes food competition within the zoo collection of birds and outside animals, such as ground hogs, sea gulls, and turkey vultures.

Items Contributing to Group's Success:

- Size of the exhibit, with various areas for the birds to retreat
- Gentle demeanor of the giraffe
- Great viewing points from all directions

Group/Exhibit Changes Over Time:

- In the past there has been Thomson's gazelles housed with giraffe.
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
- There were ostrich in this exhibit for many years, but when 0.2 new females were brought in they were very skittish around the giraffe. They were then moved to another exhibit. See Cleveland Metroparks Zoo Unsuccessful Exhibit.

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- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
- Common Ostrich (*Struthio camelus*)
- There was a short period of time when about 20 helmeted guineafowl were kept in this exhibit, but they would continuously jump out.
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - African Crowned Crane (*Balearica sp.*)
 - Helmeted Guineafowl (*Numida meleagris*)
 - Spur-winged Geese (*Plectropterus gambensis*)
 - White Stork (*Ciconia ciconia*)

Cleveland Metroparks Zoo, Cleveland, OH – Current Exhibit

Current Species:

- Bontebok (*Damaliscus pygargus*) (1.3)
- Spur-winged Geese (*Plectropterus gambensis*) (1.1)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)
- White-backed Vulture (*Gyps africanus*) (2.2)

Group has been successfully mixed for 1 year (since 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The 1.3 bontebok have been housed with the 1.1 spur wing geese previously, but this is the first year they have been housed with vultures and marabou stork.
- Bontebok have inside/outside access overnight, weather permitting.
- Birds are typically housed outside from May to October; their wings are either pinioned or clipped, or both.

Changes/Accommodations Needed:

- There are various rock rings for bird to retreat and large perching areas for the vultures and stork.
- The marabou stork has an enclosed feeder to prevent competition from outside birds.
- The vultures are fed large pieces of chunk meat to prevent sea gulls and turkey vultures from taking off with the food.

Reproductive Management/Breeding History:

- The male bontebok has been rotated in the past due to different breeding situations, but that was not on this exhibit.
- In the past, females have been separated for calving and kept inside for a few weeks.
- This year 1.3 bontebok are being kept together 24/7 and calving could take place out on exhibit, weather permitting.
- There are 2 pregnant females that have not given birth yet.
- The vultures and marabou storks have only bred in their off-exhibit winter quarters.

Management Challenges:

- The 1.0 bontebok can be aggressive towards staff, so he is called off exhibit when servicing this area.
- There has been aggression between the 0.3 bontebok, especially when 1.0 has been separated for long periods of time.
- There has been some aggression from the marabou stork to the vultures during feeding times. There is also a lot of competition from outside birds.

Items Contributing to Group's Success:

- Size of the exhibit
- Demeanor of the bontebok
- Area is far enough from the public that animals are comfortable and still in view

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Group/Exhibit Changes Over Time:

- Traditionally zebras and various birds have been kept in this exhibit. When there was only 0.1 zebra and 1.2 ostrich with the current birds, the zebra and ostrich would be out of view for a lot of the day. We have, in the past, kept various sex ratios of zebra with the birds.
 - Grant's Zebra (*Equus quagga boehmi*)
 - Common Ostrich (*Struthio camelus*)
 - Spur-winged Geese (*Plectropterus gambensis*)
 - Marabou Stork (*Leptoptilos crumenifer*)
 - White-backed Vulture (*Gyps africanus*)
- We did keep 0.3 zebra with 0.1 Thomson's gazelle for a few months, but then there was aggression from the zebra. An introduction was also done with 1.0 Thomson's gazelle and 0.3 zebra but there was aggression from both sides. It was quickly decided that this particular group would not work together. See Cleveland Metroparks Zoo Unsuccessful Exhibit.
 - Grant's Zebra (*Equus quagga boehmi*) (0.3)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (1.1)
- When we had 0.1 zebra she was housed with 1.3 slender-horned gazelle with no problems.
 - Grant's Zebra (*Equus quagga boehmi*) (0.1)
 - Slender-horned Gazelle (*Gazella leptoceros*) (1.3)

Cleveland Metroparks Zoo, Cleveland, OH – Current Exhibit

Current Species:

- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Black and White Colobus Monkey (*Colobus sp.*) (5.0)
- Rock Hyrax (*Procavia capensis*) (0.0.5-0.0.8)

Group has been successfully mixed for 15+ years (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- This is a summer exhibit only.
- Colobus and klipspringer are shifted inside nightly.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Cleveland Metroparks Zoo, Cleveland, OH – Current Exhibit

Current Species:

- Tufted Deer (*Elaphodus cephalophus*) (1.1)
- Common Shelduck (*Tadorna tadorna*) (3.3)
- Mandarin Duck (*Aix galericulata*) (various groups)
- Redhead Duck (*Aythya americana*) (various groups)
- Red-crowned Crane (*Grus japonensis*) (1.1)
- Smew (*Mergellus albellus*) (2.2)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Tufted deer shifted into holding nightly.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Cranes are aggressive when nesting.
- There are no major issues with the tufted deer, only keeper servicing challenges.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Columbus Zoo and Aquarium, Powell, OH – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (4.3)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.5)
- Grant's Zebra (*Equus quagga boehmi*) (0.7)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.3)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (8.2)
- Reticulated Giraffe (*Giraffe camelopardalis reticulata*) (8.2)
- Slender-horned Gazelle (*Gazella leptoceros*) (5.0)
- Thomson's Gazelle (*Eudorcas thomsonii*) (5.2)
- Common Ostrich (*Struthio camelus*) (0.6)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (6.3)
- Helmeted Guineafowl (*Numida meleagris*) (0.21)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (0.2)

Group has been successfully mixed for 1 year (since May 2014, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- We introduced many of them young, hand-raised zebra and Thompson's gazelle.
- Most males are castrated with the exception of 1 giraffe, 2 damas, and 1 greater kudu.
- Most animals are shifted in daily; zebra, giraffe, and kudu are shifted in at night, everything else is shifted in the morning for feeding and checks.



Sheri Smith

Changes/Accommodations Needed:

- There are 5 bomas that are accessible to only the birds and smaller gazelle. We have used dead fall, rocks, rip rap and a hot rope (about 8 feet high) to keep the giraffe out.
- Substrate in the exhibit is grass.
- Exclusion feeders are used for the birds.
- Riprap separates the giraffe feeding yard from the savanna; there is hot grass in the feeding yard to deter the giraffe from trying to cross.

Reproductive Management/Breeding History:

- Dama females are brought inside for breeding while male damas are kept on the savanna during that time. This is how we manage any pregnancies, except for wildebeest; we will allow the wildebeest to give birth on the savanna because of space concerns inside the barn.

Management Challenges:

- Crane feeding is a challenge; most things we have tried animals use as enrichment. This year we introduce boxes with slats and it worked well for a few weeks, but then the kudu decided to break them. We have since made them sturdier, with a roof overhang, and anchored them into the ground, which is working to date.

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Items Contributing to Group's Success:

- Recalling them into separate doorways to prevent a rush of animals through the same system
- Early season introductions with burlap, lining the riprap, and only using small sections of the yard at a time
- Open barn with lots of activity which has created calmer, less flighty animals

Group/Exhibit Changes Over Time:

- None

Columbus Zoo and Aquarium, Powell, OH – Current Exhibit

Current Species:

- Tufted Deer (*Elaphodus cephalophus*) (1.2)
- White-naped Crane (*Grus vipio*) (1.1)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Individuals are all ages.
- This group stays out all year.
- This group does not shift well.

Changes/Accommodations Needed:

- We have small shelters for the deer with raised bird feeders.

Reproductive Management/Breeding History:

- We have had several calves over the years.

Management Challenges:

- This group is challenging to shift, but it is doable.

Items Contributing to Group's Success:

- Provided space

Group/Exhibit Changes Over Time:

- None

Columbus Zoo and Aquarium, Powell, OH – Current Exhibit

Current Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (0.3)
- Black-throated Laughingthrush (*Garrulax chinensis*) (2)
- Cattle Egret (*Bubulcus ibis*) (9)
- Chinese Bamboo Partridge (*Bambusicola thoracicus*) (1)
- Chinese Hwamei (*Garrulax canorus*) (2)
- Derbeyan Parakeet (Lord Derby's Parakeet) (*Psittacula derbiana*) (2)
- Golden Pheasant (*Chrysolophus pictus*) (2)
- Northern Shoveler Duck (*Anas clypeata*) (2)
- White-crested Laughingthrush (*Garrulax leucolophus*) (2)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Hand-raised animals would do great in this setting; these animals were not hand-raised, but they still do well.

Changes/Accommodations Needed:

- Bird food needs to be off the ground to prevent the muntjac from eating it.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

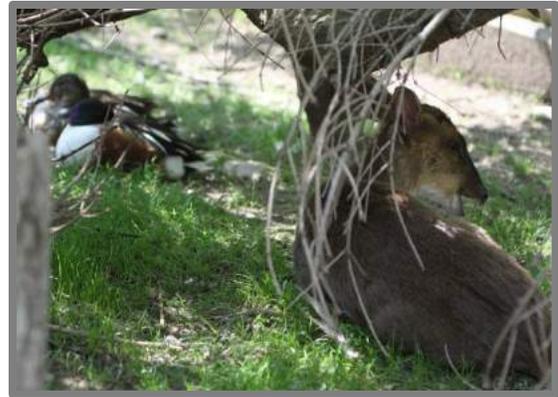
- It is difficult to get our hands on the muntjac if needed for medical attention; crate training is vital.

Items Contributing to Group's Success:

- Hiding places for the muntjac

Group/Exhibit Changes Over Time:

- None



Brent Huffman

Columbus Zoo and Aquarium, Powell, OH – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (1.1)
- Pronghorn (*Antilocapra americana*) (2.5)

Group has been successfully mixed for 20+ years (since 1990s, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- We have parasite issues with pronghorn.
- These individuals are difficult to medicate when issues arise.

Changes/Accommodations Needed:

- Shelters were built in two different parts of the yard to accommodate pronghorn.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- Parasites for pronghorn are a challenge.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Columbus Zoo and Aquarium, Powell, OH – Current Exhibit

Species:

- Black Duiker (*Cephalophus niger*) (1.1)
- Okapi (*Okapia johnstoni*) (0.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- 0.1 okapi Damisi (207045)
 - Had a pregnancy in September 2011 that was miscarried (sire: El Jewar 200042)
 - July 12, 2014 – 1.0 calf Daktari (214098) (sire: El Jewar 200042)
- 0.1 okapi Miliki (206089)
 - November 20, 2008 – 1.0 calf Mand (sire: El Jewar 200042)
 - April 12, 2012 – 1.0 calf Matoke (212021) (sire: Karatasi 962927)
 - May 7, 2016 – 0.1 calf Minazi Sasa (216034) (sire: Karatasi 962927)
- 0.1 black duiker Chelsea (207046)
 - July 6, 2011 – 0.1 calf Inde (211038) (sire: Kringle 209166)
 - May 31, 2012 – 1.0 calf Norman (212038) (sire: Kringle 209166)
 - April 1, 2013 – 0.1 calf Peep (213031) (sire: Kringle 209166)
 - November 25, 2014 – 0.1 calf Pumpkin (214138) (sire: Kringle 209166)

Management Challenges:

- Duiker are often not visible; There are a solitary “hider” species that is most comfortable in quiet, well shaded exhibits with lots of hiding spots.
- Males can be aggressive in breeding situations; some pairs do better than others.
- Dams can be aggressive toward calves, especially if there is not enough space or if calf does not nest out of site.
- Some stereotypical behaviors are exhibited, including pacing and head-rolling.
- Individuals do best in small family groups.
- Our animals have been prone to facial abscesses and overactive scent glands on the hooves that need to be cleaned out.
- This group reproduces easily, so we need to have a plan for offspring and birth control if needed.

Items Contributing to Group’s Success:

- No information provided.

Group/Exhibit Changes Over Time:

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- Yellow-backed duiker were mixed with the okapi at one point. We housed the okapi with the duiker except when breeding (they were still separated at night) and when we had a dam with a calf. Duiker and okapi have been exhibited together in an outside yard on and off for different reasons. During the time that the duiker were reproductive they had their own yard that was not mixed species.
 - Okapi (*Okapia johnstoni*)
 - Yellow-backed Duiker (*Cephalophus silvicultor*)

Columbus Zoo and Aquarium, Powell, OH – Historical Exhibit

Species:

Greater Malay Chevrotain (*Tragulus napu*)
Black Swan (*Cygnus atratus*)
Blue-faced Honeyeater (*Entomyzon cyanotis*)
Chestnut Teal (*Anas castanea*)
Crested Wood Partridge (*Rollulus rouloul*)
Eastern Rosella (*Platycercus eximius*)
Goldie's Lorikeet (*Psitteuteles goldiei*)
Jambu Fruit Dove (*Ptilinopus jambu*)
Lesser Bird-of-paradise (*Paradisaea minor*)
Magpie Goose (*Anseranas semipalmata*)
Nicobar Pigeon (*Caloenas nicobarica*)
Plumed Whistling Duck (*Dendrocygna eytoni*)
Radjah Shelduck (*Tadorna radjah*)
Straw-necked Ibis (*Threskiornis spinicollis*)
Victoria Crowned Pigeon (*Goura victoria*)
Western Cattle Egret (*Bubulcus ibis*)

Group was successfully mixed for a couple of years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We exhibited three female chevrotain in this exhibit along with various bird species.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- The chevrotain ate the bird diets.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The chevrotain were suspected of eating the bird diets

Group/Exhibit Changes Over Time:

- We moved the chevrotain to another mixed species exhibit; they did well with Prevost's squirrels and tree shrews.
 - Greater Malay Chevrotain (*Tragulus napu*)
 - Prevost's Squirrel (*Callosciurus prevostii*)
 - Tree Shrew (*Tupaia sp.*)

Como Zoo and Conservatory, Saint Paul, MN – Current Exhibit

Current Species:

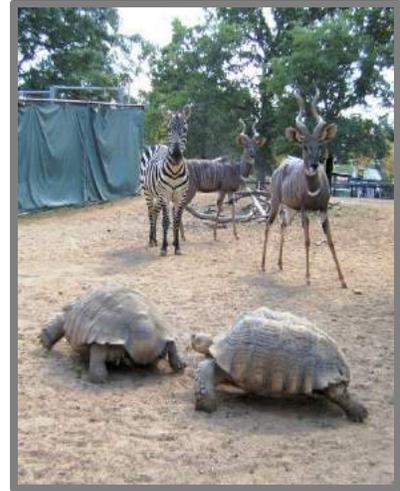
- Grant's Zebra (*Equus quagga boehmi*) (1.2)
- Lesser Kudu (*Tragelaphus imberbis*) (0.3)
- Sulcata (African Spurred) Tortoise (*Centrochelys sulcata*) (1.1)

Group has been successfully mixed for about 8 years (since 2007, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- We have always held 0.3 kudu in this exhibit; the animals have changed over time but new animals are added without issue.
- In the summer the zebra stay out at night but the kudu come into holding to better monitor their diet. In the winter the zebra and kudu have separate indoor exhibits for display.
- 1.1 Sulcata tortoises are also held in this exhibit in the summer and we plan to add 1.1 vulture next year too.



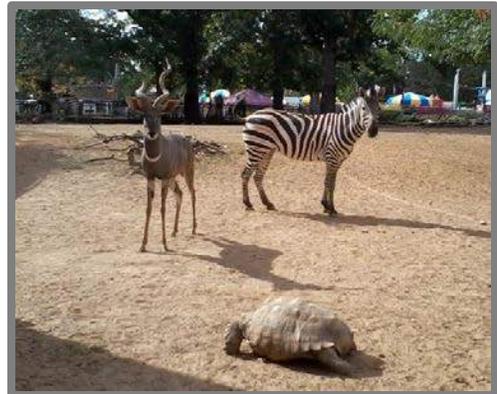
Adam Nigon

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Our stallion seasonally is run over from a different exhibit to breed; we have not had any issues with the kudu. The stallion is run back to the other exhibit when the mares are due to drop and the offspring stay out with the mares and kudu.



Adam Nigon

Management Challenges:

- This group has done well; there are no specific challenges.

Items Contributing to Group's Success:

- The animals' good demeanor
- Enough space for them to move away from each other

Group/Exhibit Changes Over Time:

- This used to be two separate exhibits with kudu in one and zebra in the other with a fence line down the middle.



Adam Nigon

Como Zoo and Conservatory, Saint Paul, MN – Historical Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (3.0)
- Demoiselle Crane (*Grus virgo*) (1.1)

Group was successfully mixed for 3-4 years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 1.1 Demoiselle cranes were exhibited with 3.0 lesser kudu in an outdoor exhibit during the summer months. During this time, the kudu were shifted off exhibit at night while the cranes stayed in the exhibit all summer.
- During the winter months the cranes were housed inside separate from the kudu.

Reproductive Management/Breeding History:

- The Demoiselle cranes did lay eggs on exhibit, but from what I can remember none of them hatched.

Management Challenges:

- It was a challenge to keep the kudu from eating the Demoiselle's food. We tried a number of different feeder designs with limited success.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- I believe the Demoiselles were moved because the landscape of this exhibit did not provide them with the optimal environment for breeding.
- We never had any issues between the Demoiselles and the kudu.

Group/Exhibit Changes Over Time:

- None

Como Zoo and Conservatory, Saint Paul, MN – Historical Exhibit

Species:

- Grant's Zebra (*Equus quagga boehmi*) (0.2)
- Lesser Kudu (*Tragelaphus imberbis*) (3.0)
- African Crowned Crane (*Balaerica sp.*) (0.2)
- Yellow-billed Stork (*Mycteria ibis*) (0.3)

No information was provided about how long this group was successfully mixed.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Connecticut's Beardsley Zoo, Bridgeport, CT – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (1.1)
- White-tailed Deer (*Odocoileus virginianus*) (1.4)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Bison are 20 and 21 years old and the deer are between 7 and 12 years of age.
- The animals have access to the main exhibit 24/7 with two areas of refuge for the deer.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- The male deer was castrated and we have not bred the bison since these species have been housed together (1998).

Management Challenges:

- Adequate holding space for the deer is a challenge.

Items Contributing to Group's Success:

- Space
- Diet offering locations
- Number of animals

Group/Exhibit Changes Over Time:

- In the past we tried Sandhill cranes with 1.1 bison and 0.2 white-tailed deer with some success. The decision was made to pull the cranes for fear of being killed by the bison. See Connecticut's Beardsley Zoo Unsuccessful Exhibit.
 - American Bison (*Bison bison*)
 - White-tailed Deer (*Odocoileus virginianus*)
 - Sandhill Crane (*Grus canadensis*)

Cosley Zoo, Wheaton, IL – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (0.2)
- Indian (Blue) Peafowl (*Pavo cristatus*) (0.1)
- Sandhill Crane (*Grus canadensis*) (1.0)
- Turkey Vulture (*Cathartes aura*) (1.0.2)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The exact ages of the vultures and the crane are unknown because they are rehab animals. The exact age of the peahen is unknown because she was a drop off. The deer were introduced around 1 year of age or less. Both were introduced to a third doe that was much older at the time.
- The crane and two of the vultures have wing injuries, which interfere with sustained flight. The remaining turkey vulture is missing one eye. They are in an open top exhibit, so the wings of the fully flighted vulture, the peahen, one other vulture, and the crane are trimmed monthly to prevent escape.
- All animals share a holding facility which can be divided in half. Turkey vultures are kept in one half during the winter. The remaining animals have access to the exhibit year round, except in cases of extreme cold when they are held inside with the turkey vultures.

Changes/Accommodations Needed:

- Perches are "ramped" or kept within 5-6 feet of the ground to provide perching areas for the peahen and vultures.
- Feeding is planned to discourage one species from trying to eat the diet of another species; they all want to eat something from someone else. Some days we are more successful than others.

Reproductive Management/Breeding History:

- We exhibit only male cranes to prevent breeding and only female deer to prevent breeding.
- It is believed that the vultures are all male, but unconfirmed by blood test.
- When the peahen nested and a peacock was present the eggs were removed, blown out, and filled with plaster before being replaced.

Management Challenges:

- Feeding is a challenge. Everyone wants to check out everyone else's food. We want to ensure that all animals are getting the proper nutrition and amounts they need.
- The holding area was not created for separating species or holding birds inside in the winter or for prolonged periods of time.
- Finding and creating enrichment items that are safe and approved for all different species is a challenge.

Items Contributing to Group's Success:

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- The mammals and birds on exhibit are rehab animals and were acquired due to a physical or behavioral impairment.
- The exhibit is large enough to allow each animal to have its own space. There is little competition between animals or species for the same space.
- Providing species appropriate enrichment items in an exhibit with natural features allows the animals to perform normal behaviors in a non-aggressive way.

Group/Exhibit Changes Over Time:

- This exact group of animals has been together since May 31, 2015 when a third vulture was added; however, this exhibit has contained multiple species since it was built in 1997 (deer, peafowl, and turkeys originally).
- The turkeys were eventually phased out after natural deaths because they were aggressive to the peafowl. Vultures were added to the exhibit in 2003 and the crane arrived in 2011. On two different occasions we had great blue heron in this exhibit as well. Introductions have been successful throughout the changes.
- Most peacocks were transferred to another facility after they became aggressive to the deer once we started operant conditioning training (peacocks would come to the session and peck at the faces of deer, who then didn't want to participate in training sessions).
- From 1997 to 2003 we exhibited white-tailed deer, wild turkey, and domestic turkey with white, pied, and Indian Blue peafowl. The white-tailed buck was ultimately euthanized due to increased aggression towards staff after all possible placement options were exhausted.
 - White-tailed Deer (*Odocoileus virginianus*) (1.2)
 - Domestic Turkey (*Meleagris gallopavo*) (0.1)
 - Indian (Blue) Peafowl (*Pavo cristatus*) (≤8)
 - Wild Turkey (*Meleagris gallopavo*) (1.1)
- From 2003 to 2009 and 2010 to 2011 white-tailed deer, turkey vultures, and Indian peafowl were housed in this exhibit.
 - White-tailed Deer (*Odocoileus virginianus*) (0.2 or 0.3)
 - Indian (Blue) Peafowl (*Pavo cristatus*) (1.1)
 - Turkey Vulture (*Cathartes aura*) (1.0.1)
- From 2009 to 2010 a great blue heron was added in the exhibit; he escaped in 2010.
 - White-tailed Deer (*Odocoileus virginianus*) (0.3)
 - Great Blue Heron (*Ardea herodias*) (1.0)
 - Indian (Blue) Peafowl (*Pavo cristatus*) (1.1)
 - Turkey Vulture (*Cathartes aura*) (1.0.1)
- From 2011 to 2013 the group consisted of white-tailed deer, turkey vultures, Indian peafowl, and a sandhill crane. One of the does died in 2012.
 - White-tailed Deer (*Odocoileus virginianus*) (0.2 or 0.3)
 - Indian (Blue) Peafowl (*Pavo cristatus*) (1.1)
 - Sandhill Crane (*Grus canadensis*) (1.0.1)
 - Turkey Vulture (*Cathartes aura*) (1.0.1)
- In 2013 another great blue heron was added to the group; he died in 2014.
 - White-tailed Deer (*Odocoileus virginianus*) (0.2)
 - Great Blue Heron (*Ardea herodias*) (0.0.1)
 - Indian (Blue) Peafowl (*Pavo cristatus*) (1.1)
 - Sandhill Crane (*Grus canadensis*) (1.0)
 - Turkey Vulture (*Cathartes aura*) (1.0.1)

Dallas Zoo, Dallas, TX – Current Exhibit

Current Species:

Addax (*Addax nasomaculatus*) (2.9 + 1.2 yearlings)
Gemsbok (*Oryx gazella*) (0.2)
Somali Wild Ass (*Equus africanus somaliensis*) (1.3)
Common Ostrich (*Struthio camelus*) (1.1)

Group has been successfully mixed for 1.5 years (since June 2014, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The Somali wild ass were introduced to the ostrich on 15 January 2014, and gemsbok on 19 January 2014. The Somali wild ass were then introduced to addax on 16 June 2014, and with ostrich on 18 June 2014. These groups have been successfully mixed ever since.
- On this mixed species exhibit, Somali wild ass can be exhibited with gemsbok and ostrich, or addax with gemsbok and ostrich. All animals are housed off exhibit in holding areas overnight, but are shifted onto exhibit daily via transfer lanes, weather permitting.
- The Somali wild ass were first introduced to the ostrich on this exhibit. Somali wild ass were nervous of ostrich, but no aggression was observed. The Somali wild ass were then introduced to the gemsbok and chased the gemsbok quite a bit. Currently, the gemsbok are dominant to the Somali wild ass on exhibit, displacing them from food resources and chasing them occasionally, but all will run away from the ostrich if they get too close. As time has gone on, the Somali wild ass have become more dominant towards the gemsbok and have been observed chasing/displacing them more often.
- The Somali wild ass and 0.7 Addax were later introduced with the addax herd on the main exhibit, and the Somali wild ass in a boma. There was some interaction, but no aggression was observed. Full introduction occurred on exhibit 10 days later. The Somali wild ass showed quite a bit of aggression towards the addax with charging and chasing, as well as attempted kicks, but no severe injuries occurred. There were several successful kicks to addax observed, a couple to the head. The animals appeared a bit dazed for several minutes, then resumed normal behavior. As they grew more accustomed with each other (i.e., the addax learned that the rear of the Somali wild ass was the dangerous end), the addax began chasing the Somali wild ass and vice versa, but with no real aggression observed.
- All animals were adults when introduced; the youngest individual addax introduced to the Somali wild ass was a year and half old, and she interacted with the Somali wild ass more often than the others. Ostrich were then introduced to this group 2 days later, with no interactions observed. Since then, the female ostrich have been observed chasing the Somali wild ass frequently, but the Somali wild ass always run away or avoid them.
- There were issues when a breeding male addax was introduced to the ostrich on exhibit. The male ostrich and male addax were immediately aggressive with each other, with a brief period of kicking from the ostrich and horning from the addax. We have not introduced another adult male addax to the ostrich since, due to other circumstances and not because of the aggression. Currently the gemsbok, Somali wild ass, and ostrich are on this exhibit daily.
- 0.5 addax were reintroduced to 0.2 gemsbok and 1.1 ostrich on this exhibit in May 2016, while the 1.3 herd of Somali wild ass were separated on another exhibit for breeding purposes. The

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addax were more aggressive towards the gemsbok than they were in the past, with increased instances of chasing/attempted sparring. This was mostly exhibited by only a couple of the lower-ranking addax females. They others generally left the gemsbok alone. The gemsbok would show no dominance towards the addax and would run away, which only encouraged the addax to increase chasing behaviors.

- 1.1 additional Somali wild ass were acquired in May 2016. The new mare was initially introduced to 0.2 Somali wild ass and exhibited on mixed species with 1.1 ostrich and 0.2 gemsbok prior to introductions to the stallion and separation from mixed species exhibits. There were no issues with the additional mare added to the mix. The stallion Somali wild ass is not expected to ever be put on a mixed species exhibit.

Changes/Accommodations Needed:

- There are several shaded and full-sun sand beds spread around across the exhibit, as well as several feeding stations and water sources to prevent competition for resources, and thereby decrease interspecific aggression. The exhibit has a main level, as well as an accessible moat, which allows the animals to have a multilevel runaround, as well as visual barriers which help to inhibit aggression.

Reproductive Management/Breeding History:

- Late-term pregnant addax are split off from the herd and kept out of the mixed species exhibit for calving. Addax calves were first introduced to this exhibit with just the addax herd at 8-9 months of age. We introduced them to the ostrich the next day with no problems.
- The addax herd was separated from the Somali wild ass for breeding purposes, and has not been reintroduced since calves were born. The goal was to allow the calves to gain more size, awareness, and agility, but then summer heat precluded the introduction. These introductions are expected to occur in the near future.
- 1.1 additional Somali wild ass were acquired in May 2016 and 1.3 Somali wild ass were bred from May to June 2016. This herd was kept off of mixed-species exhibits during breeding. They did very well breeding on this exhibit, particularly due to the available space and multilevel run-around provided by the main exhibit and moat. Once breeding commenced and the breeding group had calmed significantly, they were able to be moved to another smaller exhibit, again exhibited alone.

Management Challenges:

- Shifting the animals down to holding areas has been the greatest challenge, particularly with the Somali wild ass. Both the gemsbok and Somali wild ass initially were accustomed to being the first animals to shift off exhibit, but grew accustomed to new shifting patterns after several weeks.
- Managing aggression between the animals during introductions was initially a challenge. Providing browse or other enrichment items helped lessen this aggression.

Items Contributing to Group's Success:

- The generally dominant behavior of the gemsbok towards the Somali wild ass
- The generally neutral disposition of the ostrich
- The confident behavior of the adax towards the Somali wild ass, which greatly helped to decrease aggression between the two species.

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Group/Exhibit Changes Over Time:

- Prior to 1998, addax, addra gazelle, and ostrich were on this mixed exhibit. The male addra was observed chasing Addax into the moat.
 - Addax (*Addax nasomaculatus*) (0.8)
 - Addra (Dama) Gazelle (*Nanger dama*) (1.4)
 - Common Ostrich (*Struthio camelus*) (1.0)
- In 1999, 0.2 Grevy's zebra were exhibited with 0.7 addax and 1.0 ostrich. There was one instance of an injured addax on exhibit (cause of injury unknown) and a zebra attacked her. There were no other issues. An addax calf was also introduced to the Grevy's with no issues.
 - Addax (*Addax nasomaculatus*) (0.7)
 - Grevy's Zebra (*Equus grevyi*) (0.2)
 - Common Ostrich (*Struthio camelus*) (1.0)
- From 2002-2010, 0.7 Addax were exhibited with 1.0 Ostrich, with no problems.
 - Addax (*Addax nasomaculatus*) (0.7)
 - Common Ostrich (*Struthio camelus*) (1.0)
- From 2010-2012, 0.3 gemsbok were exhibited with 1.1 addra and 1.0 ostrich with no issues.
 - Addra (Dama) Gazelle (*Nanger dama*) (1.1)
 - Gemsbok (*Oryx gazella*) (0.3)
 - Common Ostrich (*Struthio camelus*) (1.0)

Dallas Zoo, Dallas, TX – Current Exhibit

Current Species:

Addra (Dama) Gazelle (*Nanger dama*) (1.2)
Gemsbok (*Oryx gazella*) (0.2)

Group has been successfully mixed for 1.5 years (since June 2014, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The addra group consists of a male and female breeding pair and their female calf from November 2013. This mixed species exhibit will generally consist of 0.2 addra gazelle and 0.2 gemsbok.
- The female addra calf was first introduced to this exhibit on 20 May 2014, then with the male conspecific on 28 May 2014. The male had little interest in his calf, but was very interested in the breeding female addra. These addra were again reintroduced on 03 June 2014 then introduced to the gemsbok on 04 June 2014.
- These species and individuals do very well on exhibit together, and are generally not observed interacting at all.
- The male addra gazelle was introduced on this exhibit with his female conspecifics and the gemsbok for breeding purposes, but showed extended aggression and dominance towards the gemsbok. He was relentless and the gemsbok were fearful of him, to the point where it could be difficult encouraging the gemsbok to shift up to the exhibit daily.
- These animals are also housed separately in off exhibit holding areas overnight and are shifted onto exhibit via transfer lanes daily, weather permitting.
- The addra gazelle calf was introduced with conspecifics to the exhibit and gemsbok at about 7 months of age.
- All other animals are mature adults. Due to the aggression between the male addra and the gemsbok, he was not exhibited with those animals again.

Changes/Accommodations Needed:

- This exhibit has several shaded and full-sun sand beds, as well as spread out feeding stations to prevent competition for resources and further decrease interspecific aggression.
- Other accommodations were provided for the gemsbok while on exhibit with the male addra gazelle, as he would generally keep them isolated on a gunnite patio for the entirety of the day.
- Extra water sources, feeding stations, as well as floor mats were added to increase the gemsbok's comfort.
- Since our addra gazelle receive free choice alfalfa daily, but the gemsbok receive free choice coastal hay, only coastal hay is provided on exhibit for the gemsbok's health. This has not shown to be an issue, as little to no alfalfa is consumed on exhibit when the addra are exhibited alone.

Reproductive Management/Breeding History:

- The male addra gazelle was rotated on exhibit for breeding purposes. When the breeding female addra was believed to be in late-term pregnancy, she was separated from her male conspecific for birthing and kept off exhibit until the calf was several months of age.

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Management Challenges:

- The only challenges that we have experienced with this group is when the male addra gazelle is introduced for breeding. These include difficulty shifting the gemsbok, and difficulty managing the male addra's aggression while on exhibit.

Items Contributing to Group's Success:

- The neutral disposition of the gemsbok towards the female addra gazelle, and vice versa
- Not often having the need to include the male addra gazelle in this mixed species exhibit

Group/Exhibit Changes Over Time:

- In 1990, female scimitar-horned oryx were exhibited with female slender-horned gazelle. One of the oryx gored and killed a slender-horned gazelle. Animals were successfully exhibited together for only 3 years. After goring, these groups of individuals were not exhibited together again.
 - Scimitar-horned Oryx (*Oryx dammah*) (0.6)
 - Slender-horned Gazelle (*Gazella leptoceros*) (0.3)
- In 1999, this exhibit consisted of 1.2 addra gazelle and 0.8 scimitar-horned oryx. There were no difficulties with these species. 0.3 slender-horned gazelle were introduced in 2002 with no problems.
 - Addra Gazelle (*Nanger dama*) (1.2)
 - Slender-horned Gazelle (*Gazella leptoceros*) (0.3)
 - Scimitar-horned Oryx (*Oryx dammah*) (0.8)
- In 2004, we exhibited a male addra and male slender-horned gazelle together. There was aggression between the males, so the male addra was left off exhibit and the male slender-horned gazelle was exhibited with the female addra, scimitar-horned oryx, and female slender-horned gazelle. See Dallas Zoo Unsuccessful Exhibit.
- In 2008, a male scimitar-horned oryx was introduced to the females, and no other species were on this exhibit while they were breeding.
- In 2012, the zoo no longer had any scimitar-horned oryx or sand gazelle, so 1.1 addra and 0.3 gemsbok were exhibited together.

Dallas Zoo, Dallas, TX – Current Exhibit

Current Species:

- Lesser Kudu (*Tragelaphus imperbis*) (2.0)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.0)
- Gerenuk (*Litocranius walleri*) (1.2)
- Thomson's Gazelle (*Eudorcas thomsonii*) (1.0)
- Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
- Marabou Stork (*Leptoptilos crumeniferus*) (3.4)
- Secretary Bird (*Sagittarius serpentarius*) (1.1)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.0)
- West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)

Group has been successfully mixed for 3 months (since July 2015, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The lesser kudu were introduced to the Thomson's gazelle on 30 January 2016, the male gerenuk on 31 January 2016, gerenuk females and male calf on 13 February 2016, and the male greater kudu on 01 March 2016.
- On this mixed species exhibit, all bird species are generally left on exhibit at all times, except for cases of severe weather or for health reasons. Mammal species are in off-exhibit holding areas overnight and shifted onto exhibit via short transfer lanes daily, weather permitting.
- In general, the greater kudu, lesser kudu, gerenuk, and Thomson's gazelle are on exhibit daily.
- Gerenuk have much stricter temperature guidelines, so they are not exhibited as frequently in the winter months, but the greater kudu and Thomson's gazelle are more regularly exhibited as they have proven to be a bit hardier.
- The greater kudu are rarely seen interacting with other species. Most of the interactions observed are between the male kudu and the male gerenuk. The male gerenuk will initiate sparring with the male kudu, but the kudu will generally just hold his horns down and be very patient with the gerenuk. The lesser kudu is also observed interacting with the male greater kudu frequently, mostly by initiating play-sparring bouts, and dominance mounting. Mounting is observed very often during initial introductions, then it was observed less often. The male greater kudu had debilitating joint problems, so was not highly active.
- The male gerenuk has also shown aggression towards the male Thomson's gazelle, most intensely when he was first exhibited with the female gerenuk for breeding purposes. He chased him relentlessly, and did gore him in the rear at one point, which required veterinary care. Upon reintroductions in this most recent breeding season, the male gerenuk was not observed interacting negatively with the male Thomson's gazelle at all.
- Once they were reintroduced, without the female gerenuk present, little to no aggression has been observed. The Thomson's gazelle is very "bonded" to the female gerenuk and the male calf, spending all of his time with them on exhibit.
- Mammal and bird species generally do not interact; however the marabou storks have been observed paying extra attention to the gerenuk, although no aggression has been observed.

Changes/Accommodations Needed:

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- The mammal species have a variety of food stations to prevent competition for resources.
- A large water feature runs through the middle of the exhibit, creating two distinct sections connected by a bridge for animals to spend their time.
- Large amounts of perching and nesting areas are provided for the bird species, as well as creeps and feeding stations that mammal species are not able to access.

Reproductive Management/Breeding History:

- The gerenuk are the only breeding mammal species on this exhibit. The male gerenuk is introduced to the female gerenuk on exhibit for breeding purposes, but is separated overnight in holding areas if the female gerenuk are stressed by his presence.
- When pregnant females are late term, they are separated from the male gerenuk and monitored closely for signs of labor. Females and calves are kept off exhibit after giving birth, and are generally introduced to exhibit around 3-4 months of age.

Management Challenges:

- Managing aggression between the male gerenuk and Thomson's gazelle was a huge challenge initially, mostly due to the Thomson's gazelle's tendency to spend most of his time on exhibit with the female gerenuk. Once he began to keep his distance, aggression between he and the male gerenuk decreased.
- Another challenge has been shifting. At times the exhibit's bird species have caused difficulties with shifting, particularly the secretary birds. These birds began to be shifted into holding areas prior to mammal shifting to eliminate this problem.

Items Contributing to Group's Success:

- The generally neutral behavior of the exhibit's bird species towards the mammal species
- The separate areas for species to seclude themselves to, as defined by the water feature
- The tendency for the animals to separate themselves by species, decreasing interspecific competition for resources or aggression

Group/Exhibit Changes Over Time:

- Prior to 1998, this exhibit consisted of Thomson's gazelle, impala, ostrich, lappet-faced vulture, southern ground hornbill, marabou stork, and greater kudu. It was noted that the male impala was aggressive towards the male kudu.
 - Greater Kudu (*Tragelaphus strepsiceros*) (1.4)
 - Impala (*Aepyceros melampus*) (1.10)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (3.0)
 - Common Ostrich (*Struthio camelus*) (1.0)
 - Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
 - Marabou Stork (*Leptoptilos crumeniferus*) (1.0)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)
- From 2000-2003, 2.0 bontebok were exhibited with 0.2 greater kudu, 0.9 impala, 1.1 southern ground hornbill, 1.1 lappet-faced vultures, and 1.0 marabou stork. There was aggression between the bontebok males; the more dominant male would chase the less dominant frequently.
 - Bontebok (*Damaliscus pygargus*) (2.0)
 - Greater Kudu (*Tragelaphus strepsiceros*) (0.2)
 - Impala (*Aepyceros melampus*) (0.9)

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- Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
- Marabou Stork (*Leptoptilos crumeniferus*) (1.0)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)
- In 2010, gerenuk were on exhibit with greater kudu and a single male Thomson's gazelle.
 - Gerenuk (*Litocranius walleri*) (1.2)
 - Greater Kudu (*Tragelaphus strepsiceros*) (1.2)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (1.0)
- In 2013, a female eland was also exhibited with greater kudu, gerenuk, Thomson's gazelle, and above-listed bird species; geriatric animal, no problems with other species on exhibit.
 - Common Eland (*Taurotragus oryx*) (0.1)
 - Gerenuk (*Litocranius walleri*) (2.2, 1.0 breeding male and 1.0 male calf)
 - Greater Kudu (*Tragelaphus strepsiceros*) (1.1)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (1.0)
 - Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
 - Marabou Stork (*Leptoptilos crumeniferus*) (3.4)
 - Secretary Bird (*Sagittarius serpentarius*) (1.1)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.0)
 - West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)
- The Thomson's gazelle was introduced to the greater kudu on 17 January 2013. The male gerenuk was introduced to the Thomson's gazelle on 16 January 2014 and greater kudu on 19 January 2014. The gerenuk females and male calf were introduced to the Thomson's gazelle, bird species, and greater kudu on 02 July 2015.
- In the recent past, one female yellow-backed duiker was also on this mixed exhibit with current species exhibited from 30 March 2014 to 08 June 2015 with no issues, except that she would eat the rabbits and ground meat put out for the marabou storks and vultures fairly often.
 - Gerenuk (*Litocranius walleri*) (2.2, 1.0 breeding male and 1.0 male calf)
 - Greater Kudu (*Tragelaphus strepsiceros*) (1.1)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (1.0)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (0.1)
 - Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
 - Marabou Stork (*Leptoptilos crumeniferus*) (3.4)
 - Secretary Bird (*Sagittarius serpentarius*) (1.1)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.0)
 - West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)

Dallas Zoo, Dallas, TX – Current Exhibit

Current Species:

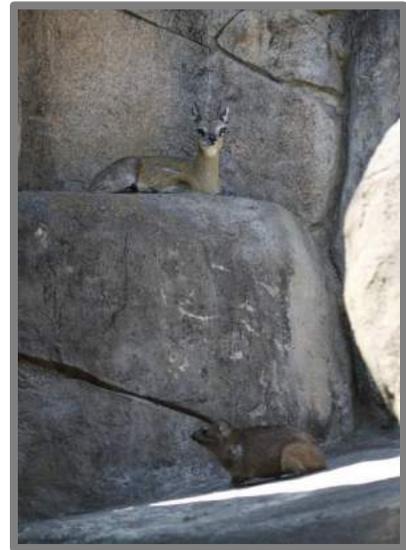
- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Rock Hyrax (*Procavia capensis*) (2.0)

Group has been successfully mixed for 3 years (since October 2012, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The animals on this mixed species exhibit are housed in off-exhibit holding areas and are shifted onto exhibit daily via guillotine doors, weather permitting. The klipspringers generally shift well onto and off of exhibit. The rock hyrax generally have to be encouraged off exhibit daily by keepers, but shift onto exhibit well on their own.
- Little interaction is observed between the two species on exhibit. Some aggression is observed from the rock hyrax towards the klipspringers in defense of resources, particularly browse. They will sometimes bite at the klipspringers' legs in these cases, and the klipspringers will quickly move away.



Brent Huffman

Changes/Accommodations Needed:

- This exhibit is comprised entirely of gunnite rock formations. Several “cubbies” are worked into the rock work, which provide shelters for the rock hyrax.
- With several levels to the exhibit, species and individuals are easily able to separate themselves.
- Due to the rock hyrax's limited ability to thermoregulate, heat lamps are provided on exhibit in colder months, and a mister system is set up on exhibit in hotter months.

Reproductive Management/Breeding History:

- The klipspringers are not a breeding pair, so no reproductive management is required.

Management Challenges:

- The main issue is aggression between the male rock hyrax. The aggression has dropped greatly since the hyrax were put on deslorelin implants.

Items Contributing to Group's Success:

- Both species tend to naturally separate themselves on exhibit, which limits aggression.
- Both species are fed their diets separately, so food competition does not exist, except in the case of food enrichment offered on exhibit.
- Lack of female hyrax and use of deslorelin with male hyrax, which helps to limit aggression between male hyrax

Group/Exhibit Changes Over Time:

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- A breeding group of hyrax used to be on this mixed species exhibit with klipspringers with no issues for several years.

Dallas Zoo, Dallas, TX – Current Exhibit

Current Species:

- Aoudad (Sudan Barbary Sheep) (*Ammotragus lervia blainei*) (4.0)
- Nubian Ibex (*Capra nubiana*) (3.0)

Group has been successfully mixed for 2 months (since April 2016, current as of 2016).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- 4.0 aoudad were given access to a 40' x 20' boma on exhibit for 4 weeks by themselves. They were all 2-3 years of age. 3.0 ibex (ranging from 2 to 6 years of age) were then given access to the boma by themselves for 2 weeks. Then both species rotated on exhibit every other day. After another week, aoudad were given access to the full exhibit and boma was removed. After 2 weeks, ibex were given access to the full exhibit. After several consecutive days of ibex on exhibit with good shifting behaviors, we began rotating ibex and aoudad on exhibit again.
- After 3 more weeks, ibex and aoudad were introduced in holding areas for 30 minutes, then shifted on exhibit together. Several low-intensity sparring bouts occurred during introductions. These sparring bouts were more commonly initiated by the 3 year old ibex. After the first few days where some minor sparring was observed, minimal negative interactions were observed between the two species. They were often observed laying together on the rock work and spending much of their time together. Some sparring observed when shifting off exhibit in the afternoon.
- We used audible shifting cues for these animals that was associated with their grain (triangle for aoudad, cowbell for ibex). They responded very well to the cues. We transitioned to only using one cue (triangle) when shifting off exhibit since all animals tended to crowd around the shift gate together and did not appear to differentiate between cues.
- The ibex and aoudad are housed separately by species in their off-exhibit holding overnight.

Changes/Accommodations Needed:

- This exhibit is comprised of a top flat area, a large series of rocky outcroppings, and a moat down a very steep hill.
- Several sand beds were placed on the rock work, which were a favorite of the aoudad. They preferred the tallest rock structure for resting on.
- There are two hay racks on exhibit, although they typically do not eat much on exhibit. When favored food items are offered, they are spread throughout the exhibits to decrease negative interactions or dominance behaviors over the food.

Reproductive Management/Breeding History:

- These are non-reproductive groups.

Management Challenges:

- The biggest challenge is shifting. The ibex are very responsive shifters and shift on and off exhibit quickly. The aoudad (particularly the oldest, most dominant male) are more difficult to shift on exhibit. They are very slow-moving and prefer their indoor holding.

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- Some challenges also occur when shifting the animals off exhibit when both species want to shift first and individuals try to shift with the other species. The transfer lane is equipped with several gates operated via pulley systems that help greatly for moving the animals where they need to go.

Items Contributing to Group's Success:

- Generally easy-going nature of the aoudad
- The ibex's willingness to stand up to the aoudad instead of simply being subordinate
- The space of the exhibit, which allows them to separate from each other

Group/Exhibit Changes Over Time:

- See Dallas Zoo Unsuccessful Exhibit.

Dallas Zoo, Dallas, TX – Current Exhibit

Current Species:

- African Bush Elephant (*Loxodonta africana*) (≤ 0.3)
- Greater Kudu (*Tragelaphus strepsiceros*) (2.0)
- Nile Lechwe (*Kobus megaceros*) (3.0)
- Plains Zebra (*Equus quagga*) (3.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (various groups)
- Common Ostrich (*Struthio camelus*) (≤ 0.5)
- Helmeted Guineafowl (*Numida meleagris*) (≤ 1.9)
- Vulturine Guineafowl (*Acryllium vulturinum*) (5.0)

Group has been successfully mixed for 6 years (since 2010, current as of 2016).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The core species of this group (zebra, giraffe, ostrich, guineafowl) have been together since 2010 with additional species being added in 2012 (elephants) and 2016 (kudu, lechwe).
- Elephants are exhibited with giraffe, zebra, ostrich, and guineafowl 1-2 days per week.
- Social groupings are changed daily; species and individual changes have occurred over the years. Some species were not successful, some species are still to be introduced.
- Most species are stationed prior to shifting, and shifting is done by species to specific recall cues.
- Giraffe bull was hand-reared and his lack of personal space created a problem when he was introduced to elephants. The choice was made not to continue introducing him to elephants for his safety.



Cathy Burkey

Changes/Accommodations Needed:

- We have break away hotwire for all species.
- We have hot wire and log creeps for smaller antelope.
- Large fallen logs create runarounds and barriers.
- Hot grass protection around trees creates safe zones for guineafowl and is used by antelope species as well.
- We are not able to keep all species with zebra.
- Substrate must be elephant friendly (not decomposed granite).
- Feeders must be safe for all species. Elephant hay bags cannot be used when giraffe are present, feeders have to be elephant proof, etc. So we scatter food on the ground and on ledges



Cathy Burkey

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instead of using feeders.

Reproductive Management/Breeding History:

- We are not able to maintain late pregnancy impala on exhibit with zebra due to injury to calves.
- We separate zebra and elephants from giraffe calves.
- The bull giraffe is kept separate from females until desired breeding, but allowed on exhibit with castrated males.
- We rotated the impala bull with female impala to control breeding.
- We have castrated non-breeding giraffe and impala males, and zebra.



Cathy Burkey

Management Challenges:

- Aggression from zebra towards all species except elephants is challenge.
- We observe nervous responses from species meeting elephants for first time.
- We observe frightened responses by elephants.
- We observe contact between elephants and some individuals (ostrich, giraffe).
- Pinch points at connecting gates and at certain points in exhibit are a challenge.
- There is uneven terrain when animals are running – particularly giraffe.
- Aggressive animals corner others or drive them into the pool.



Cathy Burkey

Items Contributing to Group's Success:

- Space
- Diversity of habitat
- Novelty of mix – we do not mix with elephants daily and zebra are not in mix daily

Group/Exhibit Changes Over Time:

- 2010-2011: zebra, giraffe, impala, ostrich, guineafowl
 - Impala (*Aepyceros melampus*) (various groups)
 - Plains Zebra (*Equus quagga*) (3.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (various groups)
 - Common Ostrich (*Struthio camelus*) (≤ 0.5)
 - Helmeted Guineafowl (*Numida meleagris*) (≤ 1.9)
 - Vulturine Guineafowl (*Acryllium vulturinum*) (5.0)
- 2012: zebra, giraffe, impala, ostrich, guineafowl, elephant (not daily)
 - African Bush Elephant (*Loxodonta africana*) (≤ 0.3)
 - Impala (*Aepyceros melampus*) (various groups)
 - Plains Zebra (*Equus quagga*) (3.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (various groups)

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- Common Ostrich (*Struthio camelus*) (≤ 0.5)
- Helmeted Guineafowl (*Numida meleagris*) (≤ 1.9)
- Vulturine Guineafowl (*Acryllium vulturinum*) (5.0)



Cathy Burkey

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Gerenuk (*Litocranius walleri*) (1.2 or 2.2 or 0.2)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (2.0)
- White-faced Whistling duck (*Dendrocygna viduata*) (0.0.10)

Group was successfully mixed for 12 years (from 1998 to 2010).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No issues other than the female gerenuk eating the crowned cranes' food.

Reproductive Management/Breeding History:

- Calves stayed off exhibit until they were 3 months old; we had to put up a barrier blocking the water feature when young calves were on exhibit.

Management Challenges:

- None, the species avoided each other on exhibit.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- There were several instances of gerenuk deaths from hitting fences resulting in cervical dislocation, so gerenuk were moved to a larger exhibit.

Group/Exhibit Changes Over Time:

- None

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Common Eland (*Taurotragus oryx*) (0.4)
- Sable Antelope (*Hippotragus niger*) (0.5)

Group was successfully mixed for 14 years (from 1990 to 2004).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Sable/eland were of varying ages – all became geriatric over time. The eland were all the same age; 0.1 sable was younger than eland by 5 years.
- Sable and eland were separated overnight and for grain feeding.

Reproductive Management/Breeding History:

- The male sable was not exhibited with the group; he remained in holding and breeding occurred in holding.

Management Challenges:

- Sable would chase eland in tighter spaced staging yard if both entered the area at the same time. Eland had to wait for sable to shift first.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Attrition

Group/Exhibit Changes Over Time:

- As the sable and eland herds shrank due to natural attrition, 1.1 bontebok were added to the display; the exhibit then consisted of 1.1 bontebok, 0.1 sable, and 0.2 eland. The group remained only for a year. The male bontebok would chase the sable; she would begin to refuse to shift out and, if out, would often remain isolated to the farthest corner of the exhibit. As the negative behaviors increased, the sable was allowed to retire from the exhibit and remain in holding.
 - Bontebok (*Damaliscus pygargus*) (1.1)
 - Common Eland (*Taurotragus oryx*) (0.2)
 - Sable Antelope (*Hippotragus niger*) (0.1)

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Bontebok (*Damaliscus pygargus*) (1.0)
- Common Eland (*Taurotragus oryx*) (0.1)
- Nigerian Dwarf Goat (*Capra aegagrus hircus*) (4.5)
- Plains Zebra (*Equus quagga*) (1.0)
- Slender-horned Gazelle (*Gazella leptoceros*) (0.2)

Group was successfully mixed for 4 years (from 2004 to 2008).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Most of the species in this group were together for 4 years (the slender-horned gazelle, goats, and eland). The bontebok was mixed into the group for 1.5 years, then the plains zebra was introduced into the group for 2 years.
- The zebra and bontebok were never exhibited together.
- The plains zebra was a subadult when introduced; the eland was geriatric.
- One of the slender-horned gazelle and the bontebok appeared bonded; the gazelle would pace when she saw the bontebok shift onto exhibit before her. The gazelle and bontebok would always lie together.
- There was not too much interaction between the eland and others; both bontebok and zebra were castrated and mild-tempered in nature.

Reproductive Management/Breeding History:

- No animals on this display were in a breeding situation.
- The bontebok and zebra were castrated.

Management Challenges:

- Shifting so many groups onto the exhibit and providing appropriate food stations were the two biggest challenges.
- The domesticated goats fought more with each other than the other animals.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Natural attrition of exotics; goats transferred to another institution
- Exhibit became a Grevy's zebra habitat.

Group/Exhibit Changes Over Time:

- For 4 years the slender-horned gazelle, goats, and eland were mixed; the bontebok was mixed into the group for 1.5 years.
 - Bontebok (*Damaliscus pygargus*) (1.0)
 - Common Eland (*Taurotragus oryx*) (0.1)
 - Nigerian Dwarf Goat (*Capra aegagrus hircus*) (4.5)
 - Slender-horned Gazelle (*Gazella leptoceros*) (0.2)
- The bontebok and zebra were not exhibited together; after the bontebok was sent to another institution, the zebra was introduced to the exhibit.

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- Common Eland (*Taurotragus oryx*) (0.1)
- Nigerian Dwarf Goat (*Capra aegagrus hircus*) (4.5)
- Plains Zebra (*Equus quagga*) (1.0, castrated)
- Slender-horned Gazelle (*Gazella leptoceros*) (0.2)

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

Addax (*Addax nasomaculatus*) (0.2)
Grevy's Zebra (*Equus grevyi*) (0.2)

OR

Common Eland (*Taurotragus oryx*) (1.2)
Grevy's Zebra (*Equus grevyi*) (0.2)

Group was successfully mixed for 2 years (from 2013 to 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The zebra and addax were displayed together for 1.5 years from 2013-2014, and then the zebra and eland were displayed together for 1 year from 2014 to 2015.
- The addax and eland were not displayed together.
- The Grevy's zebra and addax were geriatric.
- We had young male and female eland (under 5 years) with offspring.
- The addax and zebra lived together until the addax died.
- The eland were introduced without a calf at that time; the calf was born later and stayed together with zebra for 1/2 year.

Reproductive Management/Breeding History:

- Eland were breeding on exhibit; a calf was produced and introduced to the zebra at 2 months old.

Management Challenges:

- Zebra chased the geriatric addax initially. Addax then spent most of their time at the front of display (less favored spot by zebra).
- The eland male was even-tempered; no aggression was seen between the eland and zebra except some chasing around favored food stations.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Zebra were sent to another institution.

Group/Exhibit Changes Over Time:

- Zebra and addax were housed together for 1.5 years from 2013-2014.
 - Addax (*Addax nasomaculatus*) (0.2)
 - Grevy's Zebra (*Equus grevyi*) (0.2)
- 0.1 zebra died and the remaining 0.1 zebra shared the exhibit with the eland for 1 year from 2014 to 2015.
 - Common Eland (*Taurotragus oryx*) (1.2)
 - Grevy's Zebra (*Equus grevyi*) (0.1)

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Common Waterbuck (*Kobus ellipsiprymnus*) (0.2)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3)

Group was successfully mixed for 2 years (from 2014 to 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Waterbuck were geriatric.
- Bongo were all under 3 years of age.

Reproductive Management/Breeding History:

- 1.3 bongo were in a breeding situation while on display with waterbuck; no pregnancy produced while species were mixed.

Management Challenges:

- Waterbuck had access to bongo alfalfa during the day.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- 1 waterbuck died, and the other waterbuck was sent to another institution.

Group/Exhibit Changes Over Time:

- Waterbuck reduced from 0.2 to 0.1.

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Blue Duiker (*Philantomba monticola*) (1.0)
- Kirk's Dik Dik (*Madoqua kirkii*) (0.1)

Group was successfully mixed for 4 months in 2015.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The blue duiker was a subadult, recently weaned.
- The dik dik were 3 years old. The dik dik female was separated from breeding male dik dik due to aggression from the male and suspected pregnancy.

Reproductive Management/Breeding History:

- The female dik dik was pregnant at the time of introduction; the male dik dik was kept in holding.

Management Challenges:

- Both species spent most of the time apart. Towards the end of the dik dik's pregnancy, the blue duiker became attentive and was observed trying to investigate her udder area. They were separated due to the impending dik dik calf birth.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This mix was temporary due to the need to separate the male and female dik dik; 0.1 dik dik and 1.0 blue duiker were separated when the dik dik calf was due; not reintroduced due to the need to breed the dik dik again.

Group/Exhibit Changes Over Time:

- None

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Okapi (*Okapia johnstoni*) (0.1)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)

Group was successfully mixed for 2.5 years (from 2005 to 2008).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Yellow-backed duiker were both 1.1 geriatric; 0.1 okapi was breeding age, but not pregnant.
- They were introduced on exhibit after fence-line contact for 2 weeks. The okapi was shifted onto exhibit first with browse. The staff waited until okapi explored the exhibit perimeter, then shifted the 1.1 yellow-backed duiker together onto exhibit through the same gate. The facility has a "staging yard," therefore, staff could close the exhibit gate after shifting okapi, then shift duiker into staging before opening the exhibit fence. The okapi did not attempt to come back into the staging yard when the gate was opened for the duiker, but staff were present in the yards so that gate could be opened and closed quickly.
- 1.1 duiker were calm in temperament; the male was vasectomized, but did pursue the female at times (following and licking/biting her).
- Any negative interactions occurred between the duiker and did not involve the okapi.
- The okapi was a dominant animal. She was also highly reactive (meaning easily agitated). She paced frequently while on exhibit and also avoided contact with the duiker. The duiker rarely attempted interactions with her.

Reproductive Management/Breeding History:

- 1.1 yellow-backed duiker were not recommended to breed; male was vasectomized.
- 0.1 okapi was pulled off exhibit for breeding/calving and was only introduced between calves.

Management Challenges:

- This particular okapi avoided contact with the duiker.
- The exhibit is long and narrow. If the duiker lay along the fence line, the okapi would rarely pass by them. Sometimes, the duiker would lie apart from each other and, effectively, trap the okapi in a small portion of the exhibit.
- Browse or other choice food items caused friction between the okapi and the duiker, so staff had to offer a large amount or none at all. The duiker would chase the okapi off food items.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- For a 3-month period, an additional 0.1 yellow-backed duiker was added to the mix. This did not work well as the 0.2 yellow-backed duiker showed frequent aggression towards each other. See Dallas Zoo Unsuccessful Exhibit.

Group/Exhibit Changes Over Time:

- The additional 0.1 yellow-backed duiker was added to the group for a 3-month period.

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Collared Peccary (Javelina) (*Pecari tajacu*) (1.0)
- South American Tapir (*Tapirus terrestris*) (0.1)

Group was successfully mixed for 7 years (from 2008 to 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Both were singletons after the death of their partners and both geriatric.
- The tapir had impaired eyesight from cataracts.

Reproductive Management/Breeding History:

- No breeding took place.

Management Challenges:

- The collared peccary nipped at the legs of the tapir when excited, causing the tapir to run around the exhibit and the peccary to run after her. Separation for a time out usually resolved the situation quickly.
- The peccary entered the pool to be with the tapir, and the tapir pushed him out of pool.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was torn down for remodeling for giant anteaters.
- Animals were moved off exhibit and housed together for several years until the natural death of the peccary.

Group/Exhibit Changes Over Time:

- None

Dallas Zoo, Dallas, TX – Historical Exhibit

Species:

- Bighorn Sheep (*Ovis canadensis*) (≤2.4)
- Collared Peccary (Javelina) (*Pecari tajacu*) (0.2 or 1.1)

Group was successfully mixed for 2-3 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Species could be separated in separate yards and barns for feeding and as needed.

Reproductive Management/Breeding History:

- Bighorn calves were separated from peccaries until 30 days old.

Management Challenges:

- Peccaries were aggressive towards bighorn sheep, biting legs and horns, chasing at times. Bighorn sheep occasionally butted peccaries during encounters. Broken ribs resulted in one instance.
- Peccaries killed a 1 month old bighorn calf.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Species were separated after death of a bighorn calf.
- This exhibit no longer exists.

Group/Exhibit Changes Over Time:

- Exhibit housed only bighorn sheep.

Denver Zoological Gardens, Denver, CO – Current Exhibit

Current Species:

Gerenuk (*Litocranius walleri*) (1.2.1)

Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1.1)

West Africa Crowned Crane (*Balearica pavonina pavonina*) (1.1)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- For each introduction the animals were set up in a howdy-setting utilizing the yard and associated stud pen so the animals could see one another through chain link. Each species was introduced to the yard separately so they would be familiar with the space prior to putting them together. Various pairings of species were trialed before all three were put together (hornbills/cranes, gerenuk/hornbills, gerenuk/cranes).
- All of these animals are in the yard during the day (weather permitting) and brought inside for the night for protection from the resident wild fox population.
- All species have access to their own stalls during colder weather.
- Hornbill and gerenuk are very interactive with each other. The gerenuk don't mind either set of birds sharing stall space for a short period of time when needed.



Ashley Arimborgo

Changes/Accommodations Needed:

- There is a small mulch pit for the hornbills to dig in and a few branches and small logs for perching.
- We allow the grass to grow tall in some portions of the yard for variety and a more natural appearance
- We have trees with mid-height branches, which allow the gerenuk to browse.

Reproductive Management/Breeding History:

- Female gerenuk are separated for calving. The calves are not allowed in the yard until they are big enough to get up and move when the keepers approach them; this ensures that the hornbills will not hurt the calves by being too curious.
- Hornbills are given access to the barn and nest box during the incubation period and chick rearing.

Management Challenges:

- General rotation during procedures, winter holding, etc. can be a challenge.
- The fragile nature of gerenuk in general is also a challenge.

Items Contributing to Group's Success:

- Gerenuk are very calm
- Hornbill are curious
- Size and ability for individuals to get away when needed
- Variety of areas in the yard

Group/Exhibit Changes Over Time:

- This yard was previously used for single-species display.

Denver Zoological Gardens, Denver, CO – Current Exhibit

Current Species:

- Somali Wild Ass (*Equus africanus somaliensis*) (2.0 or 1.0)
- Common Ostrich (*Struthio camelus*) (1.0)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Somali wild ass were fine together until they matured, then the constant battling and potential for serious injury required permanent separation.
- The ostrich generally tried to stay out of the way if the Somalis were battling; he was never targeted by them or an instigator.
- At one point the yard would not grow anything so it became a muddy mess when wet. We were able to use a small stud pen (~8'x12') to allow the ostrich to go to when the yard was too slippery for him.

Changes/Accommodations Needed:

- We tried using deadfall at the front of the exhibit to keep the animals away from the visitors but we had to resort to a full-fledged exclusion fence because the Somali wild ass would jump over deadfall regularly.

Reproductive Management/Breeding History:

- This is an all-male group; there is no reproduction.

Management Challenges:

- Male aggression between the male Somali wild ass was a challenge.
- Another challenge is keeping them away from the public.

Items Contributing to Group's Success:

- The animals pretty much ignore each other.

Group/Exhibit Changes Over Time:

- In the past we had 1.1 ostrich with our 2.0 Somali wild ass.
- This yard used to be for a single-species exhibits only.

Denver Zoological Gardens, Denver, CO – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (1.0 or 0.1 or 1.1 or 0.2)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)
- Secretary Bird (*Sagittarius serpentarius*) (1.1)

Group has been successfully mixed for several years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- For each introduction the animals were set up in a howdy-setting utilizing the yard and associated stud pen so the animals could see one another through chain link. Each species was introduced to the yard separately so they would be familiar with the space prior to putting them together. Various pairings of species were trialed before all three were put together (okapi/secretary bird, okapi/saddle-billed stork, secretary bird/saddle-billed stork).
- All animals are brought off exhibit for the night; the birds are brought inside the holding areas and the okapi can have stall and stud pen access, weather permitting, or be completely locked inside the barn.



Ashley Arimborgo

Changes/Accommodations Needed:

- There is a small pond for the storks; the pond only has water in the warm weather.
- There are trees and shade structures for the okapi.
- We have hay feeders in various places.
- We allow the grass to grow long in spots for variety and a more natural appearance; we do need to keep it under control due to resident wild foxes.

Reproductive Management/Breeding History:

- The birds are not reproducing.
- We do not put okapi calves and mothers in this yard (at least not with the birds) after an okapi female killed a stork when it approached a calf.

Management Challenges:

- Sometimes the okapi get frisky and run around; there is some concern that they might inadvertently run the birds over.

Items Contributing to Group's Success:

- Large enclosure

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Group/Exhibit Changes Over Time:

- This exhibit used to house 0.1 okapi and calf with 1.1 saddle-billed storks. The female okapi was aggressive to the storks and ultimately killed one of them.
 - Okapi (*Okapia johnstoni*) (0.1 + calf)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)
- In the past this exhibit has been used short-term for a variety of singletons (0.1 old, lame scimitar-horned oryx, 0.1 lame ostrich, 0.1 secretary bird). This group was together for maybe a year, maybe less, until the scimitar-horned oryx died of old age.
 - Scimitar-horned Oryx (*Oryx dammah*) (0.1)
 - Common Ostrich (*Struthio camelus*) (0.1)
 - Secretary Bird (*Sagittarius serpentarius*) (0.1)
- This exhibit was also used for a single-species herd of waterbuck many years ago.

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

- Scimitar-horned Oryx (*Oryx dammah*) (0.1)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)
- Secretary Bird (*Sagittarius serpentarius*) (1.1)

Group was successfully mixed for 1 year.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The oryx died.

Group/Exhibit Changes Over Time:

- None

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

- Nyala (*Tragelaphus angasii*) (1.3 + offspring)
- East African Crowned Crane (*Balearica regulorum*) (2.0)
- Northern Ground Hornbill (*Bucorvus abyssinicus*) (0.1)

Group was successfully mixed for 3 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- Nyala eating the cranes' grain was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The nyala were sent to another institution.

Group/Exhibit Changes Over Time:

- None

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

Blesbok (*Damaliscus pygargus phillipsi*) (0.2)
Springbok (*Antidorcas marsupialis*) (1.7 + offspring)
Common Ostrich (*Struthio camelus*) (1.1)

Group was successfully mixed for a couple of years (until ~2004).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- This yard was very close to 20,000 sq ft. Our other yards in this area category (both current and historical) are more along the lines of 14,000 sq. ft.
- Only the male ostrich had to be shifted in for keepers to service the yard, although we tried to condition the blesbok and springbok to shift in as well.

Reproductive Management/Breeding History:

- The springbok group successfully reproduced.

Management Challenges:

- There was no exclusion fencing at the front of the yard. We tried cable, but the ostrich got tangled up in it, so it was removed. We ended up with a big pile of branches, but it just became a trash catcher.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We had this group together for several years until we had to ship them all out so the yard could be repurposed into the Predator Ridge exhibit (which opened in 2004).

Group/Exhibit Changes Over Time:

- Previously, this exhibit housed just springbok and ostrich. We added the blesbok after we stopped trying to breed the springbok and ostrich and needed their yard for another species.
 - Springbok (*Antidorcas marsupialis*)
 - Common Ostrich (*Struthio camelus*)

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

- Gerenuk (*Litocranius walleri*) (2.0 or 1.0)
- Steenbok (*Raphicerus campestris*) (1.1 + offspring)
- Kori Bustard (*Ardeotis kori*) (2.0 or 1.0)

Group was successfully mixed for 1 year.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All species were housed separately inside.
- At times the kori and the gerenuk were observed chasing/harassing the steenbok, but not consistently.

Reproductive Management/Breeding History:

- The steenbok did successfully reproduce, even under the stressful circumstances; they calved off exhibit.
- Eventually we had to contracept/neuter the steenbok when the offspring became difficult to place.

Management Challenges:

- Male gerenuk becoming spooked

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The gerenuk died and the steenbok were shipped out.
- Kudu recently moved to this yard. They have been howdied with 1.0 kori bustard, but not introduced yet.

Group/Exhibit Changes Over Time:

- None

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

- Kirk's Dik Dik (*Madoqua kirkii*) (0.2)
- Guineafowl (*Numididae sp.*) (~5)
- Yellow-necked Spurrow (*Pternistis leucoscepus*) (~3)

Group was successfully mixed for 3 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- All species were housed together at the same time.

Management Challenges:

- Winter housing was a challenge; we could not shift the birds away from the ungulates.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The dik dik are now in a different yard by themselves.

Group/Exhibit Changes Over Time:

- None

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

Blue Duiker (*Philantomba monticola*) (1.1 + offspring)
Silvery-cheeked Hornbill (*Bycanistes brevis*) (1.1)

No information was provided about how long this group was successfully mixed.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

- Bactrian Camel (*Camelus bactrianus*) (1.3)
- Dromedary Camel (*Camelus dromedarius*) (0.2)

Group was successfully mixed for 2 months.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All individuals were older when introduced.

Reproductive Management/Breeding History:

- The male Bactrian camel was non-reproductive.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- These species were moved back to single-species exhibits.

Group/Exhibit Changes Over Time:

- None

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

- Grevy's Zebra (*Equus grevyi*) (0.4)
- Common Ostrich (*Struthio camelus*) (1.1)

Group was successfully mixed for a couple of years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The zebra tormented the female ostrich so she was not left out in the yard with the mares unattended. The male ostrich was fine with the mares; however he was nasty to the female ostrich, so they were rotated outside. At the time it was permissible to service the yard with zebras present.

Reproductive Management/Breeding History:

- This was a single sex group of zebra.
- Since the ostrich were not compatible, they did not breed either.
- When the male zebra joined the mares the ostrich were moved elsewhere; it was deemed too dangerous to have them out with the stallion.

Management Challenges:

- The zebra and male ostrich tormenting the female ostrich was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The zebra are still present in this exhibit but the ostrich were moved elsewhere.

Group/Exhibit Changes Over Time:

- This exhibit used to house single-species groups.

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

Llama (*Lama glama*) (1.2 + offspring)

Patagonian Cavy (*Dolichotis patagonum*) (unknown group)

Group was successfully mixed for an unknown amount of time in the 1980s/1990s.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- These species got along well.
- The caviés dug tunnels underground in several spots, which is the main reason we didn't really know how many there were. This was back in the late '80s and early 90's, so records from that time are very sparse.

Reproductive Management/Breeding History:

- We had several births from both groups of animals.

Management Challenges:

- Monitoring the cavy population was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This yard now houses a herd of 1.3 Przewalski's wild horses.

Group/Exhibit Changes Over Time:

- None

Denver Zoological Gardens, Denver, CO – Historical Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.3.3)
- Lappet-faced Vulture (*Torgos tracheliotos*) (2.2 or 1.1)

Group was successfully mixed for 3-4 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- This yard housed kudu for many years. We set up a "stud pen" of sorts outside the bird barn for the kudu to see the vultures. The kudu stayed as far away from the birds as possible and barked at the birds quite a lot. Over time, they became less and less concerned. Eventually, we let the vultures into the yard. The kudu again were initially upset, but adjusted over time.
- We never observed any aggression from the birds towards the kudu (even young calves) or from the kudu towards the birds. We had to keep the vulture stud pen since the birds didn't shift well and had to be driven inside every evening. We usually brought the kudu herd in prior to shifting in the vultures, even if the kudu were going to have access overnight, just to spare them from the vultures flapping all around.



Ashley Arimborgo

Reproductive Management/Breeding History:

- The kudu remained an active breeding group before and after the introduction of the vultures.

Management Challenges:

- Mostly the problems involved proper management of the vultures. Their holding area was far too small for 4 large birds and may have contributed to their poor shifting.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Vultures eventually moved to areas where they could potentially be successful at reproduction, so the yard returned to being just kudu.
- We eventually moved kudu to another yard after they became older, non-reproductive, and their large yard was needed for another species (maned wolves). We hope to get this yard back for ungulates sometime over the next year when the maned wolf situation changes.

Group/Exhibit Changes Over Time:

- We started with 2.2 vultures for the first year and then 1.1 after the first pair moved out. Most of the time it was one pair of vultures with the kudu herd.

Detroit Zoo, Royal Oak, MI – Current Exhibit

Current Species:

- Bactrian Camel (*Camelus bactrianus*) (2.1)
- Fallow Deer (*Dama dama*) (1.8)
- Przewalski's Wild Horse (*Equus ferus przewalskii*) (1.1)
- Red Deer/White-lipped Deer Hybrid (*Cervus elaphus/Cervus albirostris*) (0.1)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- All animals were adults when introduced, except 1.0 camel was introduced to the other species when he was 10 days old. Fallow deer and camels have been together for several years, as have fallow deer, Przewalski's horses and the red deer. Physical introductions between camels and the other species occurred in spring over several days, after several days of mesh contact.
- Camels initially chased horses and the red deer, but chasing subsided over time. Camels were separated from horses and the red deer overnight for roughly one year to prevent animals from becoming trapped and injured in the building and to give our geriatric horse a "break" from the young camel attempting to play with him.
- Camels and horses are brought into holding spaces and fed grain individually. The red deer is fed grain on exhibit with the fallow deer but in a separate location. The entire group is offered hay in multiple locations on exhibit a few times a day.
- Horses and camels now spend a significant amount of time in close proximity to one another.
- There is occasional aggression between the red deer and 1.0 fallow deer, but it is mild.
- As of 2016, this mixed species exhibit is currently having questionable success. As our intact male camel is aging he is becoming increasingly aggressive towards our male horse, who is geriatric and unable to move away quickly. We have camels and horses housed separately at the moment and are unsure of what the outcome will be.



Brent Huffman

Changes/Accommodations Needed:

- The exhibit has several visual barriers created by berms, rock and log piles, and deadfall.
- 5 off-exhibit holding yards and 5 stalls in the holding building gave us the ability to easily separate animals during the beginning stages of introductions, for feeding and for overnight accommodations.
- The exhibit has 2 large sand piles, and the camels enjoy resting in them and spend a good amount of time there. This helped initially since it kept camels on one half of the exhibit and allowed the other species to enjoy the other half of the exhibit, reducing chasing.
- All of the above features were pre-existing in this exhibit.

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- We did add a shelter in one of the holding yards and a "creep" gate for the deer to give deer access to the shelter but exclude the camels. We provide multiple beds on exhibit during cold weather to ensure all animals have access to beds.

Reproductive Management/Breeding History:

- The only breeding group in this exhibit is the camels. The camels were locked off exhibit overnight in anticipation of birth, but this decision was made to provide better keeper access to the female and the calf rather than to separate the female from the other species.
- The male fallow deer is vasectomized but still experiences rut. This has not caused significant issues in the group.
- The female horse is on PZP. We have not had aggression issues from our male horse, although he is geriatric.

Management Challenges:

- It was initially challenging to provide adequate shelter to all animals (that all individuals felt comfortable using), but this resolved over time. Feeding animals separately is time consuming but not challenging. Camels and horses are brought into holding spaces to eat twice a day.
- Aggression from our intact male camel to our geriatric male horse is a challenge; these two species are separated as of 2016.

Items Contributing to Group's Success:

- Large exhibit size
- Exhibit design: our off-exhibit chain-link holding yards are adjacent to our exhibit, so we were able to do mesh introductions prior to physical introductions, and we were able to separate animals as needed during physical introductions and limit the amount of time animals were together when necessary. This also allows us to separate animals to feed and overnight.
- Good recall behavior/name recognition in camels: our male camel responds well to his name, so we were able to stop him from chasing the other species when needed. We are also able to bring our camels inside at any time.

Group/Exhibit Changes Over Time:

- We previously had taken in this exhibit with camel and deer. A previous male camel was less successful mixing with other species during his rut; he injured a male fallow deer and a young male takin. See Detroit Zoo Unsuccessful Exhibit.
 - Bactrian Camel (*Camelus bactrianus*)
 - Fallow Deer (*Dama dama*)
 - Red Deer/White-lipped Deer Hybrid (*Cervus elaphus/Cervus albirostris*)
 - Takin (*Budorcas taxicolor*)
- The number and sex composition of camels, fallow deer, and white-lipped deer has varied over time.
- We had a male white-lipped deer with camels and fallow deer for several years, but he was separated from the group each year when he went in rut after aggression/injury to camels.



Brent Huffman

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- A previous male camel was less successful mixing with other species during his rut; he injured a male fallow deer and a young male takin.
- Introductions between a different group of camels and a different male Przewalski's horse was attempted in the past, but it was not successful due to aggression from the Przewalski's horse.

Detroit Zoo, Royal Oak, MI – Current Exhibit

Current Species:

- Fallow Deer (*Dama dama*) (0.6)
- Guanaco (*Lama guanicoe*) (3.3)
- Greater (American) Rhea (*Rhea americana*) (0.2)
- Crested Screamer (*Chauna torquata*) (1.1)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Guanaco and deer were introduced when all animals were geriatric or nearly geriatric. Both species have access to the exhibit and holding building at all times.

Changes/Accommodations Needed:

- The deer will not enter the holding building, so a shelter was constructed on exhibit for them. It is surrounded by a split rail fence that serves as a "creep" so the deer can access the shelter but the guanaco cannot. The deer are fed in this shelter, and the guanaco are fed inside holding.
- The exhibit already included multiple berms, live trees and areas of deadfall that create visual barriers which seemed to aid in introductions.

Reproductive Management/Breeding History:

- Neither group is a breeding group; all male guanaco are castrated.

Management Challenges:

- The deer are very food motivated, so medicating guanaco can be challenging at times.

Items Contributing to Group's Success:

- Large exhibit size
- Multiple visual barriers (live trees, berms, deadfall)
- Nature of the animals

Group/Exhibit Changes Over Time:

- 10.8 guanaco and 1.1 tapir were together successfully for about 2 years. The species were separated overnight, with the tapir being locked in the holding building/yards. Neither group was a breeding group. Mixing tapir with rheas did not work since the female tapir was aggressive toward and injured a rhea. See Detroit Zoo Unsuccessful Exhibit.
 - Guanaco (*Lama guanicoe*) (10.8)
 - South American Tapir (*Tapirus terrestris*) (1.1)
- We had guanaco, capybaras, and rheas together. The number and sex composition of all species varied over time. Capybaras and guanaco were successfully housed together for over 15 years. Capybaras had a "creep" door that excluded guanaco from their indoor holding space.
 - Guanaco (*Lama guanicoe*)
 - Capybara (*Hydrochoerus hydrochaeris*)
 - Greater/American Rhea (*Rhea americana*)

Detroit Zoo, Royal Oak, MI – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (1.1)
- Fallow Deer (*Dama dama*) (0.9)
- African Spurred Tortoise (*Centrochelys sulcata*) (1.0)
- Cinereous Vulture (*Aegypius monachus*) (0.1)
- Griffon Vulture (*Gyps fulvus*) (1.1)
- Pink-backed Pelican (*Pelecanus rufescens*) (8.0)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)

Group has been successfully mixed for a few months (since August 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- All animals were introduced as adults. This is a seasonal habitat for many of the birds and the tortoise. The mammals live here year-round and are together whenever temperature permits.

Changes/Accommodations Needed:

- A split-rail fence was installed to serve as a "creep" to exclude the eland from the deer and tortoise feeding and shelter area. The eland are fed in the holding building. The deer and birds do not enter the holding building.

Reproductive Management/Breeding History:

- 1.1 eland are not a breeding pair.

Management Challenges:

- None

Items Contributing to Group's Success:

- Large enclosure size
- Ability to separate animals to feed (multiple feeding areas available)
- Nature of animals

Group/Exhibit Changes Over Time:

- In November 2009, 3.0 lesser kudu were introduced to 0.11 fallow deer. This was a successful group although deer and kudu occasionally chased one another.
 - Lesser Kudu (*Tragelaphus imberbis*) (3.0)
 - Fallow Deer (*Dama dama*) (0.11)
- In June 2010, we added 1.0 African-spurred tortoise.
 - Lesser Kudu (*Tragelaphus imberbis*) (3.0)
 - Fallow Deer (*Dama dama*) (0.11)
 - African-spurred Tortoise (*Centrochelys sulcata*) (1.0)
- In August 2011, we added 0.2 ostrich.
 - Lesser Kudu (*Tragelaphus imberbis*) (3.0)
 - Fallow Deer (*Dama dama*) (0.11)

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- African-spurred Tortoise (*Centrochelys sulcata*) (1.0)
- Common Ostrich (*Struthio camelus*) (0.2)
- In November 2012, the kudu group changed to 1.1 breeding pair (never successful).
- In July 2013, 1.0 young adult intact Grevy's zebra was added, but was not introduced to 1.0 kudu due to mobility/medical issues with the kudu. They rotated on exhibit. The zebra was NOT compatible with ostriches due to zebra chasing ostriches, so they also rotated on exhibit.
 - Grevy's Zebra (*Equus grevyi*) (1.0)
 - Lesser Kudu (*Tragelaphus imberbis*) (1.1 or 0.1)
 - Fallow Deer (*Dama dama*) (0.11)
 - African-spurred Tortoise (*Centrochelys sulcata*) (1.0)
 - Common Ostrich (*Struthio camelus*) (0.2)
- In April 2014, 1.0 kudu died.
- In May 2014, 1.1 eland were introduced to the exhibit. The female eland was NOT compatible with 1.0 zebra, so the zebra was moved to another habitat.
 - Lesser Kudu (*Tragelaphus imberbis*) (0.1)
 - Fallow Deer (*Dama dama*) (0.11)
 - African-spurred Tortoise (*Centrochelys sulcata*) (1.0)
 - Common Eland (*Taurotragus oryx*) (1.1)
 - Common Ostrich (*Struthio camelus*) (0.2)
- In September 2014, 0.1 kudu shipped out.
 - Fallow Deer (*Dama dama*) (0.11)
 - African-spurred Tortoise (*Centrochelys sulcata*) (1.0)
 - Common Eland (*Taurotragus oryx*) (1.1)
 - Common Ostrich (*Struthio camelus*) (0.2)

Dickerson Park Zoo, Springfield, MO – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
- Crowned Crane (*Balearica sp.*) (1.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The crowned cranes are put in a separate enclosure nightly.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Both species have reproduced.
- The crowned cranes are allowed access to the barn while nesting, which is where they have always nested.

Management Challenges:

- We really have not had any problems.

Items Contributing to Group's Success:

- Bongo's nonaggressive nature
- Lay out of the yard
- Crowned cranes were easy to train to enter night time enclosure

Group/Exhibit Changes Over Time:

- We have housed bongo/ground hornbill together in the past.
 - Eastern (Mountain Bongo) (*Tragelaphus eurycerus isaaci*)
 - Ground hornbill (*Bucorvus sp.*)

Dickerson Park Zoo, Springfield, MO – Historical Exhibit

Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (1.2)
- Impala (*Aepyceros melampus*) (1.2)
- European White Stork (*Ciconia ciconia ciconia*) (1.1)

Group was successfully mixed for several years (until 2009).

Exhibit Size: No information provided.

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Both sets of hoofstock reproduced.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We are remodeling the exhibit currently.
- It was closed due to budget cuts in 2009.

Group/Exhibit Changes Over Time:

- None

Dickerson Park Zoo, Springfield, MO – Historical Exhibit

Species:

Giraffe (*Giraffa camelopardalis*) (1.4)

Blue-necked (Somali) Ostrich (*Struthio camelus molybdophanes*) (0.1)

No information was provided about how long this group was successfully mixed.

Exhibit Size: No information provided.

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Giraffe reproduced.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit still exists, but we no longer mix the species due to space issues.

Group/Exhibit Changes Over Time:

- None

Disney's Animal Kingdom, Orlando, FL – Current Exhibit

Current Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3)

Greater Kudu (*Tragelaphus strepsiceros*) (0.3)

Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The current individuals have been together for 2 years.
- The animals are often introduced to their conspecifics in the exhibit first. On the second or third day the other species are introduced.
- If the hoofstock are born into the group they are introduced to the other species the first day they are in the exhibit, and the adult male of their species is held in for a few days. Animals not born into the group have been introduced at ages 1-10 years of age.
- All of these animals are shifted twice a day for pelleted diet. They remain in the exhibit the other 22 hours/day with weather and construction work permitting.
- Most of the animals are calm and quiet. We have had a few kudu that have been nervous and jumped out of the exhibit.



Kristen Wolfe

Changes/Accommodations Needed:

- This exhibit is heavily forested with lots of natural trees and shrubs, as well as rolling hills.
- 90% is dirt substrate with 10% being large water moats, and concrete for the ride vehicles to travel on.

Reproductive Management/Breeding History:

- Currently only the bongo and saddle-billed storks are breeding.
- The saddle-bill storks nest in the exhibit and their chicks are introduced to all animals the first day.
- In the past the kudu were bred in the holding area and only the females would go on show to limit male kudu/male bongo aggression.
- Kudu and bongo females are held in the barn for calving, and are often reintroduced when calves are 1 week of age.

Management Challenges:

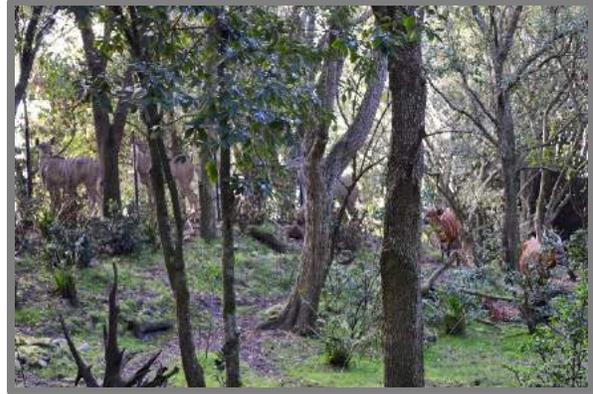
- The largest challenge has been when the saddle-billed storks are nesting. They can be territorial and the young hoofstock often get too close to the nest. They will also take hay and browse from the hoofstock for the nest, which later the hoof stock try to eat, which causes aggression from the storks.

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- Also our last 2 male bongo have bred our female kudu. This caused us to have to contracept the kudu as a precaution. This currently does not allow us to have two breeding groups at the same time.
- When one of our saddle-billed storks chicks fledged, a bongo had an interaction that caused an injury.
- Most of the other individuals have had little to no negative interactions.

Items Contributing to Group's Success:

- The calm nature of the 2 current hoofstock species
- The large size of the exhibit
- Breeding only one of the hoofstock species at a time



Katie Jones

Group/Exhibit Changes Over Time:

- Historically nyala were in this exhibit before kudu. Yellow-billed storks and helmeted guineafowl were also in the exhibit. The bongo, nyala, guineafowl, and saddle-billed storks were together 6 years.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Nyala (*Tragelaphus angasii*)
 - Helmeted Guineafowl (*Numida meleagris*)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*)
- Nyala were moved out and the kudu introduced. There were 2 breeding groups of hoofstock at one time at Disney's Animal Kingdom (nyala and bongo). That is one of the reasons the nyala were removed. When there were breeding bongo and kudu, the male kudu was often kept off exhibit and bred only in holding.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Helmeted Guineafowl (*Numida meleagris*)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*)
- The yellow-billed storks were in with bongo, kudu, and saddle-billed storks for about 8 years before removed. The saddle-billed storks were occasionally aggressive to the yellow-billed storks, and it was hard to have them all station to feed due to aggression.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*)
 - Yellow-billed Stork (*Mycteria ibis*)

Disney's Animal Kingdom, Orlando, FL – Current Exhibit

Current Species:

Okapi (*Okapia johnstoni*) (1.3.2)

Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1.1)

Group has been successfully mixed for 15 years (since 2000, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The current individuals have been together for 3 years.
- The okapi and duiker are housed individually in one of two okapi exhibits. Both exhibits are similar in size.
- There are 2 adult female okapi that currently can be housed together or we can house the male with one female on exhibit.
- In the past there have been as many as three female okapi in the exhibit, and when the duiker were breeding they were housed together in one exhibit.
- All of the animals are on exhibit from about 8am-7pm (at the latest).



Katie Jones

Changes/Accommodations Needed:

- There were several trees and shrubs as well as deadfall in both exhibits to provide blinds or roundabouts if needed.
- Both areas are soil substrate and are on a sloping hill with a dry moat on one side.

Reproductive Management/Breeding History:

- Until recently, okapi breeding was done in the barn.
- Duiker were bred in the barn and on exhibit in the past.
- Currently duiker are no longer breeding.

Management Challenges:

- The male duiker can be aggressive to young okapi calves and often tries to breed them.
- If we house 2-3 okapi females together in the exhibit for more than a few days in a row, we see an increase in aggression from the dominant female.

Items Contributing to Group's Success:

- Calm okapi male
- Tolerant okapi females (females in the past were less tolerant of other females)



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Group/Exhibit Changes Over Time:

- 2.0 Stanley cranes were in the exhibit for 3 years. They were moved due to injuries caused by okapi and SSP recommendations to breed. The cranes were housed in the exhibit overnight if weather or construction permitted.
 - Okapi (*Okapia johnstoni*) (1.3.2)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1.1)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (2.0)

Disney's Animal Kingdom, Orlando, FL – Current Exhibit

Current Species:

Common Hippopotamus (*Hippopotamus amphibius*) (1.7 or 5.0)

Pink-backed Pelican (*Pelecanus rufescens*) (9.7.2)

White-breasted Cormorant (*Phalacrocorax lucidus*) (2.2)

Group has been successfully mixed for 10-12 years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Hippopotamus have been over 5 years old when introduced to pelicans and other water fowl.
- Hippopotamus are in 2 separate exhibits of similar size. The birds can all move freely from the 2 exhibits.
- Hippopotamus are shifted twice daily and spend about 22 hours in the exhibit. They are removed for construction.
- The birds remain in the exhibit 24 hours/day and are only removed during extensive work or medical exams.



Kristen Wolfe

Changes/Accommodations Needed:

- There are several islands in the deeper water that it is hard for the hippopotamus to navigate.
- Several logs have been placed in the exhibit as safe havens for the birds away from the hippos.

Reproductive Management/Breeding History:

- Hippopotamus were breeding in these exhibits before the birds were introduced.
- Currently our castrated hippopotamus male exhibits some breeding behaviors when with the females.
- Pelican chicks are born in the exhibit on an island that it is hard for the hippos to navigate due to logs placed there.
- The cormorants are a breeding group but have never had chicks.

Management Challenges:

- The hippopotamus often become weary and territorial. We have had a few pelicans that have been attacked by the hippopotamus. They appear to be birds that are acting abnormally or get too close to the hippopotamus when they are agitated.

Items Contributing to Group's Success:

- Size of the exhibit



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- Safe haven for the birds to retreat

Group/Exhibit Changes Over Time:

- Several duck species have been housed in this exhibit in the past. Only the pelicans and cormorants have shared the exhibit with our castrated male.
 - Common Hippopotamus (*Hippopotamus amphibius*)
 - Egyptian Geese (*Alopochen aegyptiaca*)
 - Northern Pintail (*Anas acuta*)
 - Pink-backed Pelican (*Pelecanus rufescens*)
 - White-breasted Cormorant (*Phalacrocorax lucidus*)
 - White-faced Whistling Duck (*Dendrocygna viduata*)
 - Yellow-billed Duck (*Anas undulata*)

Disney's Animal Kingdom, Orlando, FL – Current Exhibit

Current Species:

Common Hippopotamus (*Hippopotamus amphibius*) (2.0)

Tufted Duck (*Aythya fuligula*) (4.2)

White-eyed (Harhead) Duck (*Aythya australis*) (1.1)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Hippopotamus were over 5 years of age when waterfowl were introduced.

Changes/Accommodations Needed:

- This is an open pool with one log for a hippopotamus resting area.

Reproductive Management/Breeding History:

- Hippopotamus were not breeding.
- Ducks were breeding. Nest boxes were placed in the exhibit and bolted to the walls so hippopotamus could not move them.

Management Challenges:

- It was a challenge keeping the ducks in the exhibit during long periods of time when the hippopotamus was not present.

Items Contributing to Group's Success:

- Single hippopotamus that are not aggressive

Group/Exhibit Changes Over Time:

- None

Disney's Animal Kingdom, Orlando, FL – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (1.4)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.3)
- Common Eland (*Taurotragus oryx*) (0.1)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.4 + 2.1 offspring)
- Sable Antelope (*Hippotragus niger*) (1.4 + 3.2 offspring)
- Springbok (*Antidorcas marsupialis*) (1.0)
- Greater Flamingo (*Phoenicopterus roseus*) (22.26)

Group has been successfully mixed for 17 years (since 1998, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This mixed-species African savanna exhibit is a part of a 26 acre space that is also a drive-through attraction with 32 passenger safari vehicles that cycle through on cement roads for approximately 7 hours a day. All the species listed above are mixed in the same space throughout, except the flamingo island which is isolated by a water moat.
- Currently, the Masai giraffe, common eland, ankole cattle, sable and flamingo are in breeding situations. We maintain a large 'shipping and holding' facility on grounds in another area of the park that supports these programs, so species numbers can vary greatly throughout the year.
- New animals or species are introduced in early morning hours, prior to the guest vehicles starting to acclimate to the spaces first. It is not an option to close the savanna to guest vehicles during operating hours without a true emergency, so the animals are monitored for several days with multiple roaming animal staff vehicles during introductions. The keeper staff also installs temporary burlap visual barriers around the perimeter of the exhibit to aid hotwire blossoms in teaching the animals where their boundaries are, as well as potential danger points (dry moats).
- Calves are generally introduced to the savanna between 4-8 weeks old if they follow mom closely. This savanna exhibit is supported by 4 (soon to be 5) different hoofstock barns that are located out of sight around the exhibit. Each species is trained to recall to their respective barn holding space with a distinct cue, as dictated by our current shifting protocols.
- Currently, the giraffe and sable antelope are the only 2 species that spend full night hours inside barns, as dictated by the need to reduce their exposure to grazing parasites. The cows, eland, springbok, and wildebeest are less susceptible to the parasites, so they are trained to recall to barns at different 2-hour time periods throughout the day. During those times keepers can get visuals, train, and feed grain/supplemental hay diets.
- Due to the safari drive-through nature of this exhibit, we have developed management strategies to encourage animals to remain visible but off the truck path. This is more of a challenge with the giraffe than any other species, so we have keepers and field trucks scheduled during operating hours to respond to animal stops. This also requires a lot of communication



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and training with the truck drivers themselves, who undergo training to prevent animal or guest injury. The keepers use various browse, grain, and produce feeders and cue the animals with distinct sounds to move them out of an undesirable location. Great care is taken not to associate the keeper truck with negative or positive reinforcement.

Changes/Accommodations Needed:

- Adequate space to co-habitat is the primary exhibit need for this group. The exhibit also contains many different types of plants, trees, shrubs, and man-made termite mounds. There are 2 man-made ponds available as well as 4 nelson drinkers. Certain individuals utilize vegetative 'hides' more than others, such as the common eland. The giraffe appreciate the tall trees during rain storms.
- The grasses on the savanna are extensively maintained by the horticulture team. Seeding and plantings are done at least twice per year. Mowing schedule varies throughout the year, as needed.



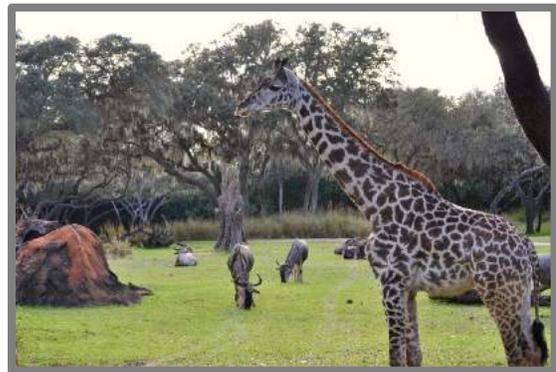
Katie Jones

Reproductive Management/Breeding History:

- The breeding male giraffe is managed with the herd and all adult females have produced at least 1 offspring with our current bull. Females are separated in holding stalls prior to parturition.
- The breeding male eland is managed with 3 new females in a holding facility. Females will calve out in holding, then the full group will be re-introduced to the savanna exhibit again.
- The current male cattle is non-breeding (castrated), but 3 new females acquired this year arrived pregnant. The 1.4 adult group is managed together, but shifts into a holding space where the pregnant females are separated out for feeding. Closer to parturition they will be held off the savanna in these spaces.
- The breeder male springbok is a sole animal on the savanna exhibit currently after successfully breeding this year; the females are separated for calving. The female group of 0.12 + offspring will be relocated when the breeder male is de-acquisitioned later this fall. A future breeder male is scheduled to arrive and mixed with specific females in the spring.
- The breeder male sable is mixed with the female herd and offspring, until SSP recommendations will replace the breeder with another. Females are separated for calving. Non-breeding females have been contracepted in the past with PZP.

Management Challenges:

- The inter-species hierarchy can be challenging when you are trying to manage individual animals that may negatively interact. The collecting planning priorities have often dictated which species work best mixed together. We have prioritized breeding Masai giraffe in our history with this exhibit, and the bull giraffe is occasionally too curious about other species. For example, we had to move a



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bull eland off the savanna when the two were observed interacting in a manner that might cause injury.

- Unexpected potential for injury is always present when flighty animals get spooked.
- Animal recall shift training can breakdown occasionally, and is more challenging for some species than others.
- The giraffe are the most likely species in this group to block the safari ride-through vehicles by standing in the road. Keepers have to respond to these situations by training incompatible behaviors and also being mindful of disassociating keeper trucks as food reinforcers.
- Larger herds mask subtle changes to health.
- Medicating individuals that live in a larger herd can be difficult.
- Some of the more agile species (springbok, sable) have infrequently crossed over the cattle guard/hot chain system we have to contain them in the appropriate section of the savanna. We have procedures to address these situations.
- Visibility for paying guests can be an issue for some species, but generally all complement each other well.



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Items Contributing to Group's Success:

- The species listed will generally co-habitate with the other species by occupying different 'niches' in the exhibit.
- Large exhibit space as well as multiple barns to shift animals around each other
- Breeding is selectively managed, sometimes with the use of a completely separate shipping/holding facilitate (affords more flexibility).



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Group/Exhibit Changes Over Time:

- Springbok (most recent addition) were added in 2010.
- Waterbuck have been exhibited on and off for the last several years. We rotate this species successfully with other savannas as dictated by breeding needs. Males can sometimes become protective of females and spar with other species. Providing adequate space for all has helped mitigate this.
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*)
 - Common Eland (*Taurotragus oryx*)
 - Common Waterbuck (*Kobus ellipsiprymnus*)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Sable Antelope (*Hippotragus niger*)
 - Springbok (*Antidorcas marsupialis*)
 - Greater Flamingo (*Phoenicopterus roseus*)

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- Thomson's gazelle were part of the original grouping of hoofstock when the park opened, later to be replaced by the springbok. The Thomson's gazelle were a breeding group, and the most difficult aspect of their management was calving out on the savannas. Some of the other hoofstock posed a threat to the small calves, and keepers had more trouble finding them in the space provided.
- Crowned cranes were also included in the original opening of this exhibit, and they were a problem with the guest vehicles because some would get too comfortable and wander into dangerous scenarios. They were eventually phased out of this exhibit but are one we are considering trying again.
- Ostrich were exhibited in 1998 for a few years. Females were more successful than males for a longer period of time, but this species was eventually phased out of this exhibit because they were more successful in a different mixed-species exhibit. The majority of challenges had to do with some individuals that were too friendly with the safari vehicles.
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*)
 - Common Eland (*Taurotragus oryx*)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Sable Antelope (*Hippotragus niger*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Greater Flamingo (*Phoenicopterus roseus*)
 - Common Ostrich (*Struthio camelus*)
 - Crowned Crane (*Balearica sp.*)
- Common zebra were exhibited in this exhibit for a few years, but had intermittent problems with some other species, especially calves. In their history, this species killed a wildebeest, ran down and injured a sable calf and killed a pregnant Thomson's gazelle. For this reason, this species was phased out of this exhibit and placed in another where hoofstock are not bred as frequently.
- Pelicans were maintained for a short time across from our flamingo flock, but would often cross the vehicle path to visit the flamingo island and pose a threat to being run over. They were removed and relocated to a safer exhibit for this reason.
- Impala were maintained for a short time and did well with all the space, however were more endangered by the dry moats surrounding the exhibit than other species.
- Reticulated giraffe (in/out various time frames as needed) mixed successfully with the Masai giraffe when animal management has recommended breeding with the Masai male. They were managed the same as the Masai giraffe.
- A large herd of 8.10 wildebeest (with castrated males) has been added since the survey was submitted.
- 1.4 common eland + offspring have been added since the survey was submitted.
- 0.17 springbok have been added since the survey was submitted.

Disney's Animal Kingdom, Orlando, FL – Current Exhibit

Current Species:

- Addax (*Addax nasomaculatus*) (6.0)
- Bontebok (*Damaliscus pygargus*) (2.0)
- Plains Zebra (*Equus quagga*) (0.3)
- Southern White Rhinoceros (*Ceratotherium simum*) (1.5 + 1.1 offspring)
- Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for <1 year (since August 2015, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- White rhinoceros are managed out of a separate barn and runway than the other hoofstock. This species have been the primary focus for breeding in this exhibit for the last 17 years since opening. We have had 10 calves born successfully to date, including 2 earlier this year. The barn is designed with 10 indoor holding stalls, 2 adjoining outdoor stalls, a hydraulic-squeeze training chute, and exclusion yard between the barn and the exhibit runway. Calves are introduced after approximately 2 months when they are old enough to follow mom, meet other members of the rhinoceros herd, and learn the pathways of the exhibit. Because of the ride-thru nature, keepers monitor newly introduced calves very closely for the first few weeks in cooperation with the guest operations partners. Breeding bulls are introduced selectively as management recommendations dictate. It is not unusual to run 2 groups of rhinoceros out of the same barn, alternating days or times on exhibit. The rhinoceros are trained to shift off exhibit via sound cue, and most are generally motivated to do so for their PM diet. Staff are trained not to separate the herd, especially mothers and calves, as that action is the most likely to cause aggression toward vehicles in the exhibit space. Once established, the rhinoceros tend to follow a pattern of behavior that will move them between their favorite resting spots, wallow, and feed pads. In the dog days of summer, a few of the herd might be more motivated to spend the night out on the savanna, and if they do not shift in within the designated cue time, they will be left out there and the savanna will be on lockdown from all work crews or other activity that might be scheduled overnight. The rhinoceros present the biggest safety challenge in this exhibit, and staff follow established protocols when working in the area.
- This group of zebra is small and established which makes them successful in this exhibit. They are generally calm and move as a cohesive herd. They shift in/out of a barn with the other hoofstock reliably to an established sound cue. A stallion would likely not work in our current set up, but the mares do well. Management can be challenging especially during the rainy season due to high fungus present in the environment which can lead to hoof problems. Training these animals to walk through foot bath solutions prescribed by our veterinarians has been a great tool to improved hoof health.



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- These 2 bontebok males are very calm and easily managed in our mixed species exhibit. We have done well with surplus males, but may think about breeding in the future. They shift in/out of our hoofstock barn for only a few hours each day, and spend overnight out on the savanna. Occasionally they need to be treated for high parasite load, and we are able to do this with a drop-chute tamer easily.
- Addax have lived in our exhibit on/off for the past 5 years or so. They are fairly calm also, and easy to manage. The only challenges we tend to have with this group is that they are really desensitized to any vehicles and can cause traffic jams by standing in/crossing the guest vehicle path slowly. They are food motivated and shift in/out of the same hoofstock barn as the other species (minus rhinoceros). We occasionally see minor aggression between conspecifics, but they tend to do well as a cohesive herd. The species really likes having sunny, sandy spots to lay down, so we create this type of mini-ecosystem for them within the exhibit.
- This exhibit has done well with female ostrich in small groups. The individuals that do best are habituated to people and activity, so they are not spooked by the other species or the guest ride vehicles. The biggest challenge we face with this species is that they really do like hanging out by the keepers, so they are not always in places that they are visible to the guests. We change up our enrichment and feeding strategies to help with this as able.

Changes/Accommodations Needed:

- The rhinoceros need at least 1 large mud wallow that is maintained with periodic water/substrate changes. The rhinoceros and addax like the sand pit areas.
- We have vegetation and topography changes that provide hides for the various species when they need a break from each other or the public vehicular traffic, however all the feed pads are in areas that display the collection to encourage a good guest experience.
- There are 3 separate barns that help maintain this collection together, 1 for the rhinos, 1 for the hoofstock, and another that the ostrich shift into.
- Our horticulture department does a great job maintaining the exhibit for both animal consumption and beautification needs.
- There are 2 water feature drinkers spread in different locations, as well.



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Reproductive Management/Breeding History:

- The white rhinoceros male is generally rotated on exhibit for breeding, selectively as needed per SSP recommendations. The females are separated out for calving, staying off exhibit at least one month prior to the expected parturition date. We set up the stalls with baby-proofing bars, hay bedding, as well as camera monitoring. We have had 10 calves born successfully here since opening the park in 1998, all born from natural conception. The most recent calf, born March 2015, was the first 3rd generation rhinoceros calf born here. In our history and cooperation with nearby zoological institutions, we have successfully hand-reared 2 rhino calves and re-integrated them back into a social situation before they were sent to other facilities.

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Management Challenges:

- Space can be a challenge for this group, as the main pathways between different locations in the exhibit are generally used by all the species.
- The guest vehicles can be a challenge because some of the species must cross over the ride pathway to enter/exit their holding barns. It takes good cooperation and guidelines for the operations partners and the animal partners to make it work well.
- The rhinoceros are at the top of the hierarchy, and it is important to set them up with adequate space and think about where they will move in accordance to food locations in the space. The other species will follow behind them and graze on the leftover food. Rhinoceros calves can be rambunctious, so introductions need special care to be set up for success and some species may be held off for a while to build up the collection around new calves over time.

Items Contributing to Group's Success:

- Focus on selectively breeding species and using that as a guide to build the rest of the collection around focus species
- Space and hides built for various niches each species needs
- Generally docile dispositions of the species exhibited to handle the high activity of the exhibit during the day

Group/Exhibit Changes Over Time:

- In the past a few different species were tried in this exhibit with various success: common eland, greater kudu, fringe-eared oryx, blesbok, klipspringer.
- The klipspringer was not successful at all; they were too small and quick, and jumped into dry moats surrounding the carnivore exhibits.
- All others were successful for a short time, depending on the composition of the other species on exhibit with them and general collection planning. In general, animals that are too bold with the rhinoceros do not do well, and those that are too timid are also ill-suited because they might be too stressed with the high activity level that the safari guest and/or nearby carnivore exhibit bring.

Disney's Animal Kingdom, Orlando, FL – Current Exhibit

Current Species:

- Asiatic Water Buffalo (*Bubalus bubalis*) (0.3)
- Blackbuck (*Antelope cervicapra*) (5.8)
- Eld's Deer (*Rucervus eldii*) (1.2)
- Bar-headed Goose (*Anser indicus*) (5.5)
- Javan Green Peafowl (*Pavo muticus*) (1.2)
- Ruddy Shelduck (*Tadorna ferruginea*) (1.1)
- Sarus Crane (*Grus antigone*) (1.1)

Group has been successfully mixed for 17 years (since 1998, current as of 2015).



Katie Jones

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Some different ungulate specimens (new youngsters or addition of new male) have been in this group, but the core group of species has been together since park opening in 1998.
- The sarus cranes, though different specimens, have been here since 1998.
- The waterfowl have only been in this exhibit for about 10 years.
- Mostly all were adults when introduced though the water buffalo were juveniles.
- All animals are shifted in at night.
- We have an issue with parasite loads.

Changes/Accommodations Needed:

- The exhibit was designed and built to eliminate sight lines which necessitated hills and berms that the ungulates had to walk up and down to shift to the barns. This has allowed erosion to occur as well as older animals have difficulty on the steeper inclines.
- The exhibit is one long run and should have been built with a separation (temporary/hidden, etc.) that could be used when introducing new animals or separating aggressive ones.

Reproductive Management/Breeding History:

- We have only ever had either 1 adult breeding male with several females or multiple young males (non-breeding) or castrated and/or vasectomized males.
- There was no need to separate males except by surplusting multiple young male offspring.
- Females gave birth on exhibit or were held in the barn area for calving.
- Both species of ungulates bred, except the banteng.
- Current male blackbuck are castrated.



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Management Challenges:

- Dealing with the aggressiveness of the male Eld's deer when in rut, not only aggression towards other animals but also towards keepers (safety issue) is a challenge.

Items Contributing to Group's Success:

- The breeding success was due to experienced husbandry and ability to shift animals.
- Truthfully, for many husbandry and visibility reasons, it is not very successful.



Katie Jones

Group/Exhibit Changes Over Time:

- Historically, we had additional Eld's deer females.
- In the past we exhibited 1.1 banteng. As they aged the slope of the exhibit made it difficult to climb and descend the hill. When they passed we substituted the water buffalo.
 - Banteng (*Bos javanicus*) (1.1)
 - Blackbuck (*Antilope cervicapra*) (5.8)
 - Eld's Deer (*Rucervus eldii*) (1.2)
 - Bar-headed Goose (*Anser indicus*) (5.5)
 - Javan Green Peafowl (*Pavo muticus*) (1.2)
 - Ruddy Shelduck (*Tadorna ferruginea*) (1.1)
 - Sarus Crane (*Grus antigone*) (1.1)

Disney's Animal Kingdom, Orlando, FL – Historical Exhibit

Species:

- Tufted Deer (*Elaphodus cephalophus*) (1.1)
- Duck (assorted species) (various groups)

No information was provided about how long the group was successfully mixed.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- None

Management Challenges:

- There were no management issues specific to housing the waterfowl.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was determined to be too small.

Group/Exhibit Changes Over Time:

- None

Disney's Animal Kingdom, Orlando, FL – Historical Exhibit

Species:

Impala (*Aepyceros melampus*) (3.6)

Marabou Stork (*Leptoptilos crumeniferus*) (~14 + offspring)

Group was successfully mixed for 12 years (from 1998 to 2010).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- All were adults when introduced.
- The marabou storks successfully bred while there was the herd of impala for part of the day in the 1.5 acre area.
- These 2 species only shared the exhibit at night or when needing to be held off the larger savanna.
- The breeding group of impala lived with many other species on a larger exhibit (~23 acres) but were brought into a smaller area in the evening (1.5 acres).
- The group got along well.

Reproductive Management/Breeding History:

- Some of the calves were pulled and hand reared to be more tractable for exhibit in another area of the institution.
- There were different breeder males rotated in and they also lived with a couple castrated males.

Management Challenges:

- The male sometimes initiated aggression with other species.
- Where the group came into at night was rather moist and there were hoof issues as a result.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Even after designating a smaller area with a harder and drier substrate that the impala were brought into at night, getting them off of the lush grass, they still had overgrown, unhealthy hooves in which one required a toe amputation. She recovered well from the procedure, but ultimately the group was moved to another area due to that and to redesign their space for another species. It now displays zebra.

Group/Exhibit Changes Over Time:

- None

Disney's Animal Kingdom, Orlando, FL – Historical Exhibit

Species:

Gerenuk (*Litocranius walleri*) (1.3 + offspring)
Kori Bustard (*Ardeotis kori*) (1.1)

Group was successfully mixed for 6 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The gerenuk shifted into a barn every night.
- The exhibit was ~¼ acre, and gerenuk shared this space with 1.1 kori bustard that were secured in their own pen nightly.

Reproductive Management/Breeding History:

- The male was with the group most of the time and the females were separated for calving when imminent, but some were left with the herd with positive interactions. The male was separated nightly. They were a successful breeding group.

Management Challenges:

- In later years it became very challenging to manage a parasite issue that the herd was very susceptible to. It would have required major exhibit modification to attempt to eradicate. Also, this was the area considered for a zebra habitat, so it has thus been modified to be a part of a larger zebra exhibit.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- They lived together for ~6 years, and the female kori bustard passed away due to a bone disorder and the male was de-acquisitioned.

Group/Exhibit Changes Over Time:

- This exhibit contained gerenuk for about 15 years.
- The decision was made to de-acquisition the last surviving animal and dedicate that exhibit to a new species.

Disney's Animal Kingdom, Orlando, FL – Historical Exhibit

Species:

Gunther's Dik Dik (*Madoqua guentheri*) (1.1 + offspring)
Meerkat (*Suricata suricatta*) (1.4)

Group was successfully mixed for 4 years (from 1998 to 2002).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- 2 adult Gunther's dik dik and their 1.1 juvenile offspring were introduced to the ~1900 square feet exhibit to 1.4 Meerkats (~6 months old). They were shifted off show in the evening to a barn with outside paddocks.
- The dik dik are very cautious, slow moving animals where patience is a necessity.
- The meerkats had tunnels to escape to in the exhibit. They got along well.

Reproductive Management/Breeding History:

- Before being introduced to the exhibit they had 1.1 offspring that were introduced. The other 1.0 born after that was held back at the barn with the dam, while the others went on show. She was held in prior to parturition due to concerns of her calving with the meerkats.
- The breeding male unfortunately passed away in an anesthesia-related event during a routine exam.

Management Challenges:

- Earlier in 2001 there were a couple suspect spider/snake bite injuries that had to be managed, and unfortunately we were not able to eradicate the cause, one of which led to a partial amputation of one of their legs.
- Keepers had to constantly fill holes created by the meerkats, but of course they had their tunnels that had to remain but were closer to the gunite termite mounds.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- It was decided to ship the dik dik out and maintain it solely as a meerkat exhibit.

Group/Exhibit Changes Over Time:

- The exhibit now contains only meerkats.

Disney's Animal Kingdom Lodge, Orlando, FL – Current Exhibit

Current Species:

Common Waterbuck (*Kobus ellipsiprymnus*) (0.3)
Impala (*Aepyceros melampus*) (0.3)
Nyala (*Tragelaphus angasii*) (1.8)
Okapi (*Okapia johnstoni*) (0.1)
Red River Hog (*Potamochoerus porcus*) (6.4)
Steenbok (*Raphicerus campestris*) (1.1)
Thomson's Gazelle (*Eudorcas thomsonii*) (0.3)
Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.2)
East African Crowned Crane (*Balaerica regulorum gibbericeps*) (4.0)
Egyptian Goose (*Alopochen aegyptiaca*) (3.0)
Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (1.1)

Group has been successfully mixed for 7 years (since 2008, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- This savanna has been open since 2008, and it has changed over the years, but the core group has remained the same. Individual animals have changed and so have interactions based on this, but the core group of species on this savanna has been the same for the past 7 years.
- The okapi was born here and was introduced to all of these animals at about 6 months of age. She currently shifts off the savanna at 6:30 in the morning and is released back onto the savanna 2 to 3 hours later. She then remains on the savanna the rest of the day and night. During the cooler months if temperatures fall below 50 degrees overnight she will be held in the barn with supplemental heat. She is about 2 years old and is very tractable and overall a very calm animal that coexists with all other on the savanna. Initial introductions with several of the other species (nyala, red river hog) did have some moments of concern due to her curiosity, but no aggression noted.
- 2 of these 3 waterbuck females are close to 20 years old, the other is younger who we recently added, with little difficulty. The 2 older girls have been on this savanna since it was opened in 2008. They also shift in at 6:30 every morning and are released several hours later. There are no seasonal issues with them. The 2 older girls are under a lot of geriatric care and receive medication to help with their issues; they spend a lot of their time laying down and just relaxing as opposed to interacting with any of the other animals.



Lindsay Kirkman



Mel Covey

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- All 3 impala females are over 15 years old, and like the waterbuck don't move around as much as they used to. They shift in at 6:30 and will stay longer in the barn to be able to get all of their medicated grain into them. 2 of the 3 were hand-raised and will come right up to you, the third was not and she is a little more wary of people, although she has calmed considerably over the years as a product of being with the other 2.
- All 3 Thomson's gazelle were born here and introduced to this savanna shortly after birth. They have shared this savanna with a male. They also shift in at 6:30 and are in for a couple of hours. All 3 were hand-raised and are very calm. There are no seasonal issues with them.
- This is a family group of red river hogs, one adult male and the other 5 males are juveniles, with 2 adult females and 2 juvenile females. The 3 adults were about 2 years of age when they arrived and were placed on savanna. The young ones hit the savanna at about 4 months of age.



Mel Covey

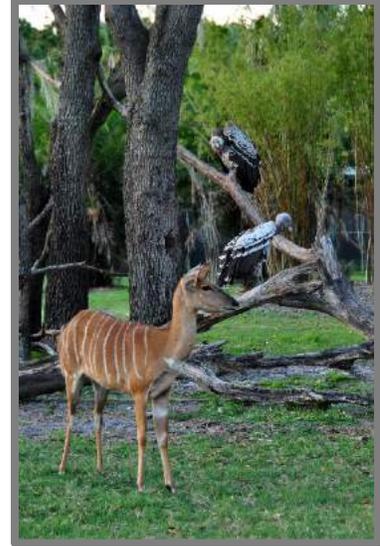
- There have been a lot of changes with the management of these hogs. They had been on the savanna and then we had to pull them off due to breeding. They have recently gone back onto the savanna. They go out each day around 9am and are brought back in between 2-3 pm. They spend the rest of their time in a large yard by themselves. In cooler months at night they will be held in if temperatures drop below 50 F. The hogs are very curious and spend all of their time exploring the savanna and wallowing. Most of the other animals are scared of them and give them their space. Only when cornered will other animals turn to face off with the hogs. Currently now we watch for about 30 minutes right when we release hogs out, but they are out the rest of the time unsupervised and all is going well. We do not feed treats out on the savanna when the hogs are out due to possible food aggression with other animals.
- We have a breeding group of steenbok; they are pretty reclusive and they get along with everyone. They cue in at 6:30 each morning and are released several hours later. They will be held in during the cooler months if temperatures get below 40 degrees F. We pull offspring and hand raise, whether male or female. Currently we have had one female offspring and the adult female is pregnant and due in October. The adult female was also hand-raised and is very tractable; the male was not and is more flighty.
 - We have a breeding group of nyala; all but the male were born here and introduced to the savanna as calves. The male was full grown when he was introduced. They shift in at 6:30 each morning and are released several hours later. We have no seasonal issues with them. They are a cohesive group, coexist well with all other animals, and only have tense moments with hogs. The male did posture when he first met the okapi but that quickly resolved itself with no issues. All of these animals were parent-reared, but keepers have done extensive training with them so they are considerably calm.



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- The East African crowned cranes were just put on the savanna, but they have lived on mixed species exhibits. They are shifted into a pen each morning for a short time as we are training them to go over on the safari ride at Animal Kingdom next year. All 4 are pinioned.
- The Egyptian geese were added last year and shift in each morning as well for a short time, so we have the ability to grab them and trim their wings when we need to. They are very mobile and move around the savanna a lot, but spend the majority of their time at the dump and fill pool in the exhibit. All 3 are pinioned.
- We have a breeding pair of hornbills with one female offspring. This pair has successfully bred the past 4 years; last year the female had a pair of chicks at the same time that we successfully assisted her in raising. They are typically pulled from the savanna twice a day due to male (hand-raised) following and harassing keepers when they are on savanna. The female and the chick are parent-reared. There are no issues with hornbills and any of the other animals. They are very mobile and prolific hunters. The male is fully flighted and we trim his wings; the female and the chick are both pinioned.
- We have a breeding group of vultures, but they have yet to breed. They cue in each day at 3pm for their feeding. The rest of the time they are either perched or sunning. They coexist fine with all other species. They are pinioned.



Katie Jones

Changes/Accommodations Needed:

- Only in the winter, which is usually mild, will we hold hogs, okapi, and steenbok.
- The savanna is well planted so there are many locations for all of the animals to find seclusion and shade.
- We have plenty of perching for all of the birds as well.

Reproductive Management/Breeding History:

- Nyala, steenbok, okapi, red river hog, Thomson's gazelle, impala, and hornbills have all bred on this savanna.
- In the past we have had to rotate the male impala and the male nyala (neither of those animals are still here) due to their interactions.
- We do hold off for several months on putting calves on savanna due to other animals. Nyala calves are the youngest to hit the savanna at about 1-2 months old. We have had the adult females become more aggressive notably to the hogs when they have young calves with them. Where normally the females walk away from where the hogs are, when they have calves they do not back down and will charge the hogs.
- With our steenbok male, he has not been on the savanna when we have had a male Thomson's gazelle or male impala, but he is currently out with the male nyala.



Mel Covey

Management Challenges:

- Having babies is the hardest part (i.e., having to hold them off savanna for extended periods where if they were by themselves on exhibit they could be placed out sooner). We have never had any issues with young being harmed by another species, but we haven't really taken any extreme chances with animals that are too young.

Items Contributing to Group's Success:

- The size of the savanna
- Our management of several of the species, by hand-raising them they are calmer and less aggressive
- We take chances. I realize this could go wrong, but sometimes you need to take a chance to see if things will work. We have been extremely lucky, but we have done many howdies and many introductions, and I think our experience with these things is a huge factor in our success.



Mel Covey

Group/Exhibit Changes Over Time:

- 2 years ago the savanna was 5 acres larger, but was cut in half by a fenceline and they are now on the 6 acre portion. The 5 acre portion that was cut off is now another smaller savanna with a different group of species.
- We have had different sex ratios of these species I have listed above, including male impala, male okapi, and male Thomson's gazelle. We were unable to successfully have a breeding male Thomson's gazelle with a breeding male impala. They got to the point they were having too much conflict so we would have to rotate them to be able to successfully breed.
- We have had ankole cattle on this savanna in the past (0.2), but we moved them to another location. The Thomson's gazelle and the nyala were terrified of them and did not like to be in the vicinity of them, which when cueing into the barn made it very difficult to shift them in.
- We have also successfully had spur-winged geese, Stanley cranes, and a wattled crane mixed with the ungulates through the years.
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - Common Waterbuck (*Kobus ellipsiprymnus*)
 - Impala (*Aepyceros melampus*)
 - Nyala (*Tragelaphus angasii*)
 - Okapi (*Okapia johnstoni*)
 - Red River Hog (*Potamochoerus porcus*)
 - Steenbok (*Raphicerus campestris*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*)
 - Egyptian Goose (*Alopochen aegyptiaca*)
 - Ruppell's (Griffon) Vulture (*Gyps rueppellii*)
 - Spur-winged Goose (*Plectropterus gambensis*)
 - Wattled Crane (*Bugeranus carunculatus*)

Disney's Animal Kingdom Lodge, Orlando, FL – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (0.4)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (6.0)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.7)
- Impala (*Aepyceros melampus*) (6.0)
- Nyala (*Tragelaphus angasii*) (2.0)
- Reticulated/Rothschild's Giraffe Hybrid (*Giraffa camelopardalis reticulata/rothschildi*) (1.4)
- Roan Antelope (*Hippotragus equinus*) (2.0)
- Scimitar-horned Oryx (*Oryx dammah*) (2.0)
- Common Ostrich (*Struthio camelus*) (0.2)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (4.0)
- Marabou Stork (*Leptoptilos crumenifer*) (3.0)
- Spur-winged Goose (*Plectropterus gambensis*) (2.0)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- All mammals and ostrich are shifted from the 18 acre savanna into the barn each morning. They are shifted into either individual stalls in the barn or some groups, such as wildebeest and oryx, shift in together into larger yards within the barn.
- There is some fluidity with this savanna and some of the individuals have been moved around but in general the species grouping has been together since 2012. The wildebeest group was added in 2013 as young castrated individuals to replace an older trio of female wildebeest that were moved to another area.



Mel Covey

Changes/Accommodations Needed:

- The 18 acre savanna is relatively flat with some raised planted berms mainly to hide holding areas from guest viewing.
- The savanna is surrounded by 2 resort hotels. These buildings make up the majority of the containment.
- There are 2 small sections of chain link fencing at the 2 entrance gate locations as well as a double chain link fence between this savanna and the adjoining savanna.
- Species and individuals are only separated while shifting into the barn. They are in the barn



Vickie Shaw

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between 2-4 hours each morning but remain on the savanna for the rest of the day and overnight.

Reproductive Management/Breeding History:

- There is no current breeding on this savanna at this time.
- The Hartmann's mountain zebra are currently a nonbreeding group with a 2 year old male, (2) 2 year old females, a 3 year old female and 4 females ranging in age from 13 years to 17 years old. 3 of the females are currently pregnant but the breeding occurred on another area. The breeding male was housed separately and the females were brought to him for breeding.



Katie Jones

Management Challenges:

- There are some social issues within the Hartmann's herd which has made shifting into the barn challenging at times.
- Also there are some social issues (chasing and displacing) within the wildebeest herd as they get older.

Items Contributing to Group's Success:

- Large open area
- Ability to hold or move animals if individuals aren't working out

Group/Exhibit Changes Over Time:

- The species composition has changed over time. The exhibit was initially 11 acres and housed giraffe, bongo, waterbuck, Thomson's gazelle, ostrich, and Ankole cattle.
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - Common Waterbuck (*Kobus ellipsiprymnus*)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Reticulated/Rothschild's Giraffe Hybrid (*Giraffa camelopardalis reticulata/rothschildi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Common Ostrich (*Struthio camelus*)
- In 2005-2007 red river hogs also lived on this savanna.
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - Common Waterbuck (*Kobus ellipsiprymnus*)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Red River Hog (*Potamochoerus porcus*)
 - Reticulated/Rothschild's Giraffe Hybrid (*Giraffa camelopardalis reticulata/rothschildi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Common Ostrich (*Struthio camelus*)
- In 2007 Hartmann's mountain zebra were added.



Mel Covey

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- Ankole (Watusi) Cattle (*Bos taurus*)
- Common Waterbuck (*Kobus ellipsiprymnus*)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*)
- Reticulated/Rothschild's Giraffe Hybrid (*Giraffa camelopardalis reticulata/rothschildi*)
- Thomson's Gazelle (*Eudorcas thomsonii*)
- Common Ostrich (*Struthio camelus*)
- In 2009 the exhibit was enlarged to the current 18 acres.

Disney's Animal Kingdom Lodge, Orlando, FL – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (0.3)
- Common Waterbuck (*Kobus ellipsiprymnus*) (2.6)
- Impala (*Aepyceros melampus*) (1.9)
- Plains Zebra (*Equus quagga*) (0.2)
- Red River Hog (*Potamochoerus porcus*) (1.1)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.2)
- Roan Antelope (*Hippotragus equinus*) (3.0)
- Thomson's Gazelle (*Eudorcas thomsonii*) (0.5)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
- Egyptian Goose (*Alopochen aegyptiacus*) (3.0)

Group has been successfully mixed for 15 years (since 2001, current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This exhibit has been open since 2001.
- Animals remain in it for approximately 22 hours daily. They shift through several yards each morning at about 09:30 to enter their barn. The animals remain in the barn for about 2 hours and are then shifted back into the habitat where they remain overnight.
- Over the years this has been a very fluid group of animals. We have made many changes based on breeding, aggression, health issues etc.
- Most young animals are typically introduced after at least 8 weeks of age due to vaccination schedules. This is also dependent upon the species.

Changes/Accommodations Needed:

- Currently we do not allow the red river hogs to remain on the savanna overnight. They seem to cause much more rooting damage to the habitat if they are left out overnight so we shift them into a special holding area located underneath our hotel for the evening.
- The savanna contains dump and fill pools for drinking and wading along with an easy access drinker.
- We have several large concrete (themed) pads on which to provide hay to the animals residing in the savanna.
- We make sure to keep perching available for the birds to either stand on or hide under if needed.

Reproductive Management/Breeding History:

- Currently the only groups breeding out there are the waterbuck and the giraffe.
- The male waterbuck resides with the group and does not show any aggression towards any of the other species at this point in time.
- The giraffe bull is about 2.5 years old and is just starting to become interested in the cows in this herd. We expect he will be able to breed in the very near future.
- During the past 3 years we did have a breeding impala group. The male did live with this group for a short time until he became problematic with his aggression towards the roan antelope at

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which time he was pulled off the savanna for his safety. This seems pretty typical of the impala males overall no matter where they are placed for breeding.

- For the past 8 years or so we have actively been breeding the East African grey crowned cranes. They have nested well in the savanna though we have run into challenges with high chick mortality due to native avian predators. We will shift in the cranes and their chicks into a covered holding until chicks are large enough to return to the savanna.

Management Challenges:

- During the summer months, daily shifting tends to slow down due to the heat and savanna plant growth.
- Parturition can sometimes be challenging. As we near birthing time, we try and hold the expecting females in the barn to monitor closely. Sometimes the separation from the group for an extended period of time can cause re-introduction problems later on.
- We also pull female impala for hand rearing so this is a big time commitment for our team.

Items Contributing to Group's Success:

- Selection of the collection
- Size of the habitat
- Daily management of the group, more importantly the shifting into the barn

Group/Exhibit Changes Over Time:

- This savanna has changed over the years. We have seen species changes as well as just individual animal changes. Some of the reasons behind the changes include health issues, aggression, visibility needs, AZA recommendations, etc.
- The exhibit used to be about 11 acres in size until about 2 years ago when we created a smaller sub-exhibit to act as a buffer zone between this savanna and another.
- Over the years we have had gemsbok, a larger herd of wildebeest, ankole, 2 species of pelicans, blue-winged geese, blue cranes, greater kudu, a larger herd of zebra, several species of guinea fowl, and bongo in various combinations.



Courtney Janney



Mel Covey

Disney's Animal Kingdom Lodge, Orlando, FL – Current Exhibit

Current Species:

- Addax (*Addax nasomaculatus*) (7.0)
- Ankole (Watusi) Cattle (*Bos taurus*) (1.2)
- Impala (*Aepyceros melampus*) (1.6)
- Lesser Kudu (*Tragelaphus imberbis*) (2.0)
- Reticulated/Rothschild's Giraffe Hybrid (*Giraffa camelopardalis reticulata/rothschildi*) (1.3)
- Scimitar-horned Oryx (*Oryx dammah*) (1.0)
- Somali Wild Ass (*Equus africanus somaliensis*) (2.0)
- Springbok (*Antidorcas marsupialis*) (1.0)
- African Spoonbill (*Platalea alba*) (3.0)
- Common Shelduck (*Tadorna tadorna*) (1.0)
- Grey Crowned Crane (*Balearica regulorum*) (1.1 + 0.2 offspring)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (4.0)
- South African Shelduck (*Tadorna cana*) (2.0)
- Spur-winged Goose (*Plectropterus gambensis*) (0.2)



Mel Covey

Group has been successfully mixed for 2 years (since 2014, current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The exhibit is somewhat fluid with some animals being moved in or out as needed for management purposes. In general, this group has been together for over 5 years with the exception of the addax which have been added over the last 2 years.
- All of the ungulates are shifted into the barn each morning for 2-4 hours. In the barn the animals are either divided into individual stalls for their diet or in some cases, addax for example, are fed as a group in a larger yard.

Changes/Accommodations Needed:

- This group is separated when shifting into the barn, but is housed together all other times while on the savanna.
- Since the exhibit is pretty large there is space for the animals to spread out on exhibit.
- There are trees planted, berms, and a drop and fill pool.

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- Concrete hay pads are located in several locations within the exhibit for feeding stations.
- Feeder tubs and browse hanging devices are positioned high for giraffe and out of reach of the other hoofstock.

Reproductive Management/Breeding History:

- There is not current breeding on this savanna. All groups are single sex or non-breeding.

Management Challenges:

- The main challenges currently are with the Somali wild ass. Both are intact males that have reached maturity. They have been housed together since a young age, but once mature they have started chasing and showing aggression toward each other and other species on the savanna.

Items Contributing to Group's Success:

- Size of the habitat

Group/Exhibit Changes Over Time:

- This exhibit has changed over the years since established in 2001. During that time 6.0 bongo have lived on this savanna as well as 3.0 greater kudu, Thomson's gazelle, 3.0 nyala, 3.0 common eland, and other species of birds including waterfowl and guinea fowl.



Mel Covey

Ellen Trout Zoo, Lufkin, TX – Current Exhibit

Current Species:

Bay Duiker (*Cephalophus dorsalis*) (1.2)

West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)

Group has been successfully mixed for 6 years (since 2010, current as of 2016).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Duiker successfully breed and the calf is normally on exhibit with the cranes within a week.

Changes/Accommodations Needed:

- We provide huts for the duiker to hide in with bamboo and palm frond roofs. The cranes enjoy climbing on the huts.

Reproductive Management/Breeding History:

- The female duiker have been separated when calving, but only for a short time. Other times, the birth was earlier than expected, and there was no separation.
- The cranes have laid eggs many times over the years, but we haven't had any fertile eggs yet from this pair.
- If the cranes are especially aggressive while they have eggs, they can be locked in a holding enclosure with their nest.

Management Challenges:

- If there is a male calf born, we have to be able to separate the calf from the male when he becomes aggressive.
- The cranes in this exhibit are aggressive, so the keeper always has to keep that in mind when working the exhibit.

Items Contributing to Group's Success:

- The duikers we have are fairly laid back
- We have a holding pen for cranes and one for duikers so they can be separated when needed
- Cranes seem more interested in attacking keepers than duiker

Group/Exhibit Changes Over Time:

- We have had four different groups of duikers with the cranes. Each time it was until the duiker calves were old enough to breed, and then they were moved out.
 - 1.1 duiker, 1.1 West African crowned crane
 - 2.1 duiker, 1.1 West African crowned crane
 - 3.1 duiker, 1.1 West African crowned crane
 - 1.2 duiker, 1.1 West African crowned crane (lost female calf at 6 months due to illness)

Fort Wayne Children's Zoo, Fort Wayne, IN – Current Exhibit

Current Species:

- Eastern Blue (White-bearded) Wildebeest (*Connochaetes taurinus albojubatus*) (0.4)
- Grant's Zebra (*Equus quagga boehmi*) (0.3)
- Common Ostrich (*Struthio camelus*) (0.2)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (2.2)

Group has been successfully mixed for 35 years (since 1980, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This mixed species exhibit exists only in the summer season (April through October).
- In the off-season, each species is housed separately in their winter holding areas.



Fort Wayne Children's Zoo

Changes/Accommodations Needed:

- We shift the zebra to an adjacent yard each night to make feeding strategies easier; this enables us to make sure the wildebeest, ostrich, and zebra are fed adequately.

Reproductive Management/Breeding History:

- Males are mixed in with their respective females in the off-season.
- We do not exhibit any males in the mixed species exhibit.
- Zebra are shifted off the exhibit for several weeks when we are expecting wildebeest calves. They are not permitted to be mixed with the calves until the calves are at an appropriate size.

Management Challenges:

- Feeding strategies are the toughest.
- It usually takes a week or so until the zebra shift reliably.

Items Contributing to Group's Success:

- We have figured out how to manage feeding strategies appropriately.
- We have various ponds, etc on the savanna and we do not have any 'dead ends'.

Group/Exhibit Changes Over Time:

- Throughout the years, we've had various species exhibited; this has included dama gazelle, Thomson's gazelle, and white storks. At this time our pasture consisted of about 22 acres.



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- Addra (Dama) Gazelle (*Nanger dama*)
- Eastern Blue (White-bearded) Wildebeest (*Connochaetes taurinus albojubatus*)
- Grant's Zebra (*Equus quagga boehmi*)
- Thomson's Gazelle (*Eudorcas thomsonii*)
- Common Ostrich (*Struthio camelus*)
- Marabou Stork (*Leptoptilos crumenifer*)
- White Stork (*Ciconia ciconia*)

Fort Wayne Children's Zoo, Fort Wayne, IN – Current Exhibit

Current Species:

- Sitatunga (*Tragelaphus spekii*) (0.3)
- Grey Crowned Crane (*Balearica regulorum*) (1.2)

Group has been successfully mixed for 8 years (since 2008, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These two species are only exhibited together during the 6-month summer season (April to October).
- These species coincide well together.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- None; only females are displayed in this mixed-species setting.

Management Challenges:

- The sitatunga prefer to consume the crane diet over their ADF-16 Herbivore diet.
- Regularly wing-trimming is necessary for the crowned cranes.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- The number of sitatunga and crowned cranes exhibited each year varies.



Fort Wayne Children's Zoo

Fort Worth Zoo, Fort Worth, TX – Current Exhibit

Current Species:

- Common Waterbuck (*Kobus ellipsiprymnus*) (0.2 + offspring)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.1 + offspring)
- Crowned Crane (*Balearica sp.*) (2.0)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The female bongo do ok with the waterbuck; however, the adult male waterbuck started chasing the bongo when the female waterbuck were cycling. Ultimately, the male waterbuck had to be removed from the group.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The male waterbuck was removed from the group.

Management Challenges:

- The only problem we had was the male waterbuck's aggression.

Items Contributing to Group's Success:

- Size of exhibit
- Removing the male waterbuck

Group/Exhibit Changes Over Time:

- We used to house a male waterbuck in this exhibit but he was removed due to aggression towards the bongo.

Fort Worth Zoo, Fort Worth, TX – Current Exhibit

Current Species:

- Gerenuk (*Litocranius walleri*) (1.3 + offspring)
- Lesser Kudu (*Tragelaphus imberbis*) (1.6 + offspring)
- Hornbill (*Bucerotidae sp.*) (1.1)

Group has been successfully mixed for 10+ years (since 2005, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- None

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The females and calves are kept inside for 1-5 days after the birth. If the calf is doing well, they are let out with all the other animals.



Brent Huffman

Management Challenges:

- The size of the exhibit is a challenge; the exhibit could be bigger.

Items Contributing to Group's Success:

- Both species are calm and not aggressive

Group/Exhibit Changes Over Time:

- In the beginning we had 2.0 gerenuk with the kudu and eventually the male gerenuk stopped getting along. It was determined that we can only have one male gerenuk in the exhibit at a time.

Fossil Rim Wildlife Center, Glen Rose, TX – Current Exhibit

Current Species:

- Blackbuck (*Antilope cervicapra*) (25.75.40)
- Blesbok (*Damaliscus pygargus phillipsi*) (1.0)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (1.25.20)
- Roan Antelope (*Hippotragus equinus*) (1.3.3)
- Scimitar-horned Oryx (*Oryx dammah*) (1.15.12)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.4)
- White-tailed Deer (*Odocoileus virginianus*) (6.10.10)
- Common Ostrich (*Struthio camelus*) (0.3)

Group has been successfully mixed (with minor changes) for 30+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This is the current structure in our 100 acre "Front Pasture".
- With minor changes, this pasture has been the same for about 30 years. We have moved some new species in and other species out, but overall these species work well in this space.
- All of the herds with males included are breeding groups. There are a couple of other animals that aren't breeding, but have been in this pasture for a long time (e.g. blesbok, ostrich).
- The white rhinos are contained within a 10 acre pasture in this 100 acre pasture, but the animals in the larger pasture can access the white rhino yard.



Lezley Norris

Changes/Accommodations Needed:

- There are ample areas for hiding and separating.
- This pasture contains forested areas, lakes, and several additional yards that can be used as necessary. For example, we can separate species for medical attention and/or deworming. These catch yards can also be used to mass capture animals or dart in a more controlled environment.

Reproductive Management/Breeding History:

- Females all remain in the groups year round.
- In the scimitar-horned oryx and roan herds we rotate males between intact and vasectomized for breeding windows.
- The wildebeest have an annual breeding window, so all calves are always born about the same, and we don't have to manage the bulls in this herd.
- The blackbuck bulls are always with the females and this group breeds year round.
- The white-tailed deer have a rut.

Management Challenges:

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- Occasionally the roan, scimitar-horned oryx and/or wildebeest males will seek each other out for conflict, but it is rare. As long as the herds remain intact and the breeding is continuous, the bulls tend to stay with their own species.

Items Contributing to Group's Success:

- Large space
- Knowledge of the natural history of the chosen species
- Attentive animal care observations

Group/Exhibit Changes Over Time:

- We have historically housed a bachelor herd of scimitar-horned oryx (not with a breeding group), bachelor addax (also not with a breeding group of scimitar-horned oryx), bachelor fallow deer, bachelor guanaco (as a predator deterrent that we didn't think was successful and they were hard on the breeding blackbuck as they pestered the calves). We have also housed single waterbuck males in this pasture.
 - Addax (*Addax nasomaculatus*) (bachelor group)
 - Blackbuck (*Antilope cervicapra*) (breeding group)
 - Blesbok (*Damaliscus pygargus phillipsi*) (bachelor group)
 - Common Waterbuck (*Kobus ellipsiprymnus*) (bachelor group)
 - Fallow Deer (*Dama dama*) (bachelor group)
 - Guanaco (*Lama guanicoe*) (bachelor group)
 - Roan Antelope (*Hippotragus equinus*) (breeding group)
 - Scimitar-horned Oryx (*Oryx dammah*) (bachelor group)
 - Southern White Rhinoceros (*Ceratotherium simum simum*) (breeding group)
 - White-bearded Wildebeest (*Connochaetes taurinus*) (breeding group)
 - White-tailed Deer (*Odocoileus virginianus*) (breeding group)
 - Common Ostrich (*Struthio camelus*) (female group)

Fossil Rim Wildlife Center, Glen Rose, TX – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.7.4)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3.2)
- Greater Kudu (*Tragelaphus strepsiceros*) (0.2)
- Emu (*Dromaius novaehollandiae*) (0.0.7)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- All of these groups have been in this pasture since 2004 and the addra/kudu were housed together prior to the introduction of the bongo in 2004.
- All individuals remain in the pasture at all times; occasionally new animals are introduced and others are removed.



Jan Bussey

Changes/Accommodations Needed:

- The pasture includes lakes, trees, catch yards, sheds, grass, and hills.

Reproductive Management/Breeding History:

- Male kudu and addra are rotated. The bongo males are in the exhibit year round.
- The females remain in the pasture with the offspring year round.

Management Challenges:

- This is a relatively easy group to manage in this 50 acre pasture.
- The critical aspect is providing warm housing during the winter to the cold sensitive addra and kudu. This is accomplished by providing multiple heated sheds, so that all animals have access and the subordinate animals aren't displaced.

Items Contributing to Group's Success:

- Small groups/large acreage
- Long history of working with these species in this situation
- Attentive animal care staff

Group/Exhibit Changes Over Time:

- We have also housed nearly 100 blackbuck in this pasture and sandhill cranes occasion the pasture as well. The bongo are relatively new to the exhibit (ten years) and the kudu have been in a non-breeding situation for several years due to an inability to acquire a suitable



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breeding bull.

- Addra (Dama) Gazelle (*Nanger dama*)
- Blackbuck (*Antilope cervicapra*)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
- Greater Kudu (*Tragelaphus strepsiceros*)
- Emu (*Dromaius novaehollandiae*)
- Sandhill Crane (*Grus canadensis*)

Fossil Rim Wildlife Center, Glen Rose, TX – Current Exhibit

Current Species:

Addax (*Addax nasomaculatus*) (1.50.20)
Axis Deer (*Axis axis*) (15.25.20)
Common Waterbuck (*Kobus ellipsiprymnus*) (1.12.5)
Fallow Deer (*Dama dama*) (80.100.100)
Gemsbok (*Oryx gazella*) (1.20.16)
Sable Antelope (*Hippotragus niger*) (1.15.15)
White-tailed Deer (*Odocoileus virginianus*) (10.20.20)

Group has been successfully mixed for 30+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This 425 acre pasture has approximately 40% grazing (open space) and 60% wooded space.
- All species have the opportunity to get away from others.
- All species have been in this situation for over 30 years and seem to get along well with the occasional interspecific fights between gemsbok, addax and sable; these are rare, and only on a couple of occasions caused deaths. One particular gemsbok male was removed for unusually aggressive behavior towards other species.



Jennifer Doong

Changes/Accommodations Needed:

- There is lots of space in this exhibit.

Reproductive Management/Breeding History:

- All animals are in constant breeding situations.
- Fallow and white-tailed deer have a rut, axis do not, and gemsbok, addax, sable and waterbuck bulls are all managed on a rotating basis between intact and vasectomized males.
- Females separate themselves during calving and rejoin the herds shortly thereafter.

Management Challenges:

- Keeping track of the bulls and monitoring calves in these large spaces is a challenge.
- The species themselves seem to do well together with only occasional issues.

Items Contributing to Group's Success:

- Huge space with lots of opportunity to escape
- Long history of managing in this style
- Animal keeper knowledge and attentiveness to the collection

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Group/Exhibit Changes Over Time:

- This pasture has remained largely unchanged over the history of Fossil Rim. Some of the herd numbers have fluctuated (some larger, some smaller) over the years, but the species composition is mostly the same.

Fossil Rim Wildlife Center, Glen Rose, TX – Current Exhibit

Current Species:

- Aoudad (Barbary Sheep) (*Ammotragus lervia*) (10.1)
- Arabian Oryx (*Oryx leucoryx*) (1.12)
- Fallow Deer (*Dama dama*) (5.75.50)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (2.6)
- Red Deer (*Cervus elaphus*) (0.40 + 20 castrated males)
- Reticulated/Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*) (2.5.2)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This group has been largely unchanged for over 30 years. The Arabian oryx were a recent addition (about 10 years) and the mountain zebra came in to fill the niche formerly filled by common zebra.
- The red deer are all vasectomized so we have no breeding currently with that group.
- The giraffe, mountain zebras and Arabian oryx are all breeding groups.
- The giraffe are conditioned to come into a smaller yard and barn for management purposes, but otherwise all animals live on 260 acres year round.



Kristen Culp

Changes/Accommodations Needed:

- The giraffe have a heated barn and yard.
- The rest of the environment consists of trees, grass, lakes, hills, and sheds throughout the pasture.

Reproductive Management/Breeding History:

- We rotate the male Arabian oryx.
- The giraffe bull and zebra stallion are in for several years prior to changing them out.

Management Challenges:

- The red deer are challenging during the rut and we have lost animal in the past due to aggression by these stags. This is in part the reason that we no longer breed them. Also, the cervid movement ability in captivity is restrictive enough to keep us from being able to move 30-40 calves per season. We have been non-breeding for over 5 years and ultimately this herd will all die of old age and not be replaced.

Items Contributing to Group's Success:

- Large space
- Different species that don't overlap in behavior or niche (cervid, bovid, equid)

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Group/Exhibit Changes Over Time:

- There have been some subtle differences, but this is mostly the same over the last 30 years. We've also housed wildebeest, bontebok, and common zebra.
 - Aoudad (Barbary Sheep) (*Ammotragus lervia*) (10.1)
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (1.2 + offspring)
 - Bontebok (*Damaliscus pygargus*) (bachelor group)
 - Fallow Deer (*Dama dama*) (5.75.50)
 - Common Zebra (*Equus quagga*) (10.20.15)
 - Red Deer (*Cervus elaphus*) (20.40)
 - Reticulated/Rothschild's Giraffe (*Giraffa camelopardalis*) (2.5.2)



David Oberbeck

Fossil Rim Wildlife Center, Glen Rose, TX – Current Exhibit

Current Species:

Addax (*Addax nasomaculatus*) (4.10)
Addra (Dama) Gazelle (*Nanger dama*) (5.0)
Arabian Oryx (*Oryx leucoryx*) (1.1)
Guanaco (*Lama guanicoe*) (2.0)
Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.0)
Red Deer (*Cervus elaphus*) (1.0)
Sable Antelope (*Hippotragus niger*) (1.1)
Common Ostrich (*Struthio camelus*) (0.1)

Group has been successfully mixed for 30+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This is a pasture that we have coined the "Retirement Pasture". Generally it is a place for the older animals to go where they don't have to compete as hard for survival as they do in the other pastures with conspecifics and other species.
- We also have a variety of other non-retired animals living here. The 1.0 red deer is a castrated, antlerless stag that was causing trouble in the herd – he has been in the Retirement Pasture for several years.
- We have our bachelor herd of damas, an ostrich female that didn't function well in the public part of the park, our back-up sable bull and an ancient female sable, as well as very old addax and Arabian oryx.
- There is also a mountain zebra currently housed here for future sale.
- This pasture changes often based on older animals coming in, old animals dying, and swapping out dama and sable bulls. Overall, the species remain the same, but individuals and numbers change throughout the years.

Changes/Accommodations Needed:

- As with all other pastures at Fossil Rim, this 40 acre exhibit has pastureland, trees, lakes, sheds and hills.

Reproductive Management/Breeding History:

- This is not a breeding pasture. We attempt to introduce groups of animals when we can so that nobody is introduced singly.

Management Challenges:

- Mainly this pasture was designed for 'no heroics' – this means that animals are very old and we aren't going to set a broken leg in a 19 year old addax. The challenge is that we still need to get eyes on all animals every day and there are approximately 20 acres of thick woods, so often if the animals don't come out for feed (common in addax and Arabian oryx) we end up on foot looking for them.
- Amongst themselves, however, there have been virtually no conflicts.

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- At feeding time there is a dominance hierarchy, but all the individuals know this and eat in their proper order.

Items Contributing to Group's Success:

- Large space
- Non-breeding groups of generally geriatric animals
- Animal care attention to detail and protocol for managing geriatric animals

Group/Exhibit Changes Over Time:

- Because of the structure here, this pasture is much more fluid than most at Fossil Rim. That said, however, we tend to remain virtually the same in regard to numbers and species inhabiting this pasture.

Fresno Chaffee Zoo, Fresno, CA – Current Exhibit

Current Species:

- Addax (*Addax nasomaculatus*) (0.2)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (4.0)
- Common Eland (*Taurotragus oryx*) (0.3)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.2)
- Impala (*Aepyceros melampus*) (0.2)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (3.2)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.1)
- Speke's Gazelle (*Gazella spekei*) (1.0)
- Springbok (*Antidorcas marsupialis*) (0.2)
- Abdim's Stork (*Ciconia abdimii*) (2.0)
- Common Ostrich (*Struthio camelus*) (0.3)
- Pink-backed Pelican (*Pelecanus rufescens*) (0.0.6)
- Yellow-billed Stork (*Mycteria ibis*) (0.0.1)



Renee DeMatei

The kudu, impala, and springbok have been successfully mixed for 6 months. The other species are in the process of being introduced now (current as of 2015).

Exhibit Size: 1 acre - 3 acres

General Management Notes:

- The exhibit is 3 acres and can be split into 2 acres and 1 acre with a gate/creep. All animals can move between the two areas except the giraffe and rhino.
- The rhino and giraffe are never in the same area; these particular giraffes are too flighty around the rhinos.
- There are three buildings – rhino, giraffe, and ungulate. The ungulate barn houses the ungulates and is where all the other mammals and ostrich go into every morning.
- All birds except the ostrich stay in the exhibit and do not come into holding.



Jessica Watters

Changes/Accommodations Needed:

- We added additional barriers so the smaller animals can't move into the adjacent elephant area.

Reproductive Management/Breeding History:

- 0.2 giraffe are on contraception as SSP recommendation. 2.0 giraffe are castrated.
- 0.3 Eland are on contraception to prevent hybridization with the kudu.
- No reproduction in the kudu yet.

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Management Challenges:

- Consistency in staff for training a recall with the animals into their appropriate location has been a challenge.
- We had to wait until the grass went dormant before the wildebeest would shift in consistently. We are waiting to see what happens when the grass comes back.



Jessica Watters

Items Contributing to Group's Success:

- Minimum number of males to begin with
- Large exhibits allowing animals to be comfortable in their own space
- Now that staff is consistent in recalling the animals, we are able to pull all mammals in every day

Group/Exhibit Changes Over Time:

- None



Jessica Watters

Fresno Chaffee Zoo, Fresno, CA – Historical Exhibit

Species:

- Bactrian Camel (*Camelus bactrianus*) (1.0)
- Common Eland (*Taurotragus oryx*) (0.3)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.3.2)
- Speke's Gazelle (*Gazella spekei*) (2.0)
- Common Ostrich (*Struthio camelus*) (0.2)

Group was successfully mixed for 12 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Individual ages varied greatly.
- Births occurred on exhibit.
- A new eland went through the cable hot wire during an introduction.



Jessica Watters

Reproductive Management/Breeding History:

- The eland and giraffe reproduced on exhibit.

Management Challenges:

- Poor holding space was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We moved animals to a new, larger mixed exhibit.

Group/Exhibit Changes Over Time:

- None

Gladys Porter Zoo, Brownsville, TX – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.5)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (4.4 or 3.5)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 10,000-45,000 sq ft (~22,000 is 1 acre)

General Management Notes:

- We have separate inside holding for both species. Both are brought inside nightly, although the addra will occasionally stay out overnight.
- The addra have an entrance to their holding and giraffe have a separate entrance. We have never had a problem with one going into the others' holding.
- We have introduced adults and infants of both species to the exhibit at varying times without any problems.
- Addra will eat leftover alfalfa from under the giraffe feeder when the giraffe are around; we have never seen aggression.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Both species have bred successfully and have given birth both in holding and on exhibit.
- Giraffe and addra females that calf are separated out and kept separate from the group for at least 30-60 days.

Management Challenges:

- The giraffe once abused a new born addra gazelle, but I believe it was more out of curiosity than malicious.
- The male dama started challenging the giraffe and we were afraid he was going to get himself hurt, so he is presently kept separate. The giraffe have kicked the male addra, but no serious injuries have occurred.

Items Contributing to Group's Success:

- Two relatively peaceful species
- A decently large enough exhibit so they can get away from each other
- Separate holding

Group/Exhibit Changes Over Time:

- 1.1 bontebok have also been tried with the giraffe (without addra) and that did not go as well. The male bontebok was aggressive and sparred with the giraffe. See Gladys Porter Zoo Unsuccessful Exhibit.
 - Bontebok (*Damaliscus pygargus*) (1.1)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (4.4 or 3.5)

Gladys Porter Zoo, Brownsville, TX – Current Exhibit

Current Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (2.3)
- Common Ostrich (*Struthio camelus*) (0.3)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: No information provided.

General Management Notes:

- These species have been together for a long time.

Changes/Accommodations Needed:

- None.

Reproductive Management/Breeding History:

- Baby kudu and dam are kept separate for 30 days.

Management Challenges:

- At least one of the female kudu starting plucking the ostrich for fun – to the degree that some ostriches were half bald. The ostrich may also have been plucking each other. In any case, the ostrich being plucked never seemed to care.

Items Contributing to Group's Success:

- We probably should use more enrichment, although the exhibit is large enough to give everyone plenty of space.

Group/Exhibit Changes Over Time:

- None

Gladys Porter Zoo, Brownsville, TX – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3)
- Crowned Crane (*Balearica sp.*) (1.1)
- Guinea Fowl (*sp.*) (0.0.9)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The bongo have their own barn and are brought in nightly.
- Guinea fowl and crowned cranes have holding, but are not usually brought in on a daily basis.

Changes/Accommodations Needed:

- We have a creep for the birds.

Reproductive Management/Breeding History:

- We have had bongo calves on exhibit.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Bird species
- Exhibit space

Group/Exhibit Changes Over Time:

- The yellow-backed duiker/bongo mix was successful for over 10 years when the aggression became enough to separate them. We had seen some minor aggression before, but it became serious when the male bongo died and the female bongo were by themselves. All the aggression was from the female bongo towards the yellow-backed duiker. We have not tried the yellow-backed duiker back on exhibit since the new male arrived and was introduced to the exhibit.
- The duiker had their own separate barn and were brought in nightly.
- The creep was used by the duiker to stay away from the bongo.
- Duiker calves were born on exhibit.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
 - Crowned Crane (*Balearica sp.*) (1.1)
 - Guinea Fowl (*sp.*) (0.0.9)



Brent Huffman

Great Plains Zoo & Delbridge Museum of National History, Sioux Falls, SD – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (1.1 or 2.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.2)
- Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for 13 years (since 2002, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Both the giraffe and the zebra are brought off exhibit into barns overnight.
- The ostrich are brought into a corral connecting to the exhibit at night, but occasionally have access to the exhibit overnight.
- During the winter months the exhibit remains closed and ostrich are brought to the hoofstock barn.
- As new offspring are born, they are slowly introduced to the exhibit and both different individuals and different species at a very young age.
- Currently ostrich are not on exhibit because we are taking precautions due to the avian influenza and are housed in the hoofstock building (their winter holding).

Changes/Accommodations Needed:

- There are both living trees and deadfall giving the animals areas to hide/get away from other animals.
- There is also an area with low cable that the zebra and ostrich can fit under to get away from giraffe.
- There is hot wire around the exhibit to keep them away from the public which was also used as a safe zone for the crowned cranes when they were in the exhibit.
- The exhibit is relatively flat.
- There is a pool.

Reproductive Management/Breeding History:

- Both the zebra and giraffe have been housed in a breeding situation on and off. Females are held in the barn for calving and are kept inside with their offspring for a couple weeks while the calf gains strength. They are slowly introduced to different individuals and species both in corral areas and on exhibit, eventually going on exhibit with everyone.
- In the past we had crowned cranes on exhibit. They had two sets of chicks that were born on exhibit, but pulled off a few days later. They built their nest by the pool; keepers blocked off the pool from other animals. Another year they built their nest on the other side of the hot wire.

Management Challenges:

- We used to have 2.2 zebra on exhibit, separated from our 1.0 breeding male, but our 2.0 zebra offspring, now 4 years old, can no longer go on exhibit with our 0.1 breeding female zebra. We

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currently house and exhibit them as two separate groups. It can be difficult housing them in the same barn and special precautions have been made for shifting them by each other.

- We also currently have 1.0 giraffe offspring, now 3 years old that is occasionally starting to challenge our breeding male giraffe.
- There have been past issues concerning our 1.0 breeding zebra chasing giraffe when he was on exhibit without other zebras.

Items Contributing to Group's Success:

- It is a fun exhibit for visitors as there are many different species interacting and always something to see.
- There are getaway areas for the ostrich and zebra if they need a break from the giraffe.
- We have options to put different groups together and keeping different individuals off exhibit due to outside off exhibit holding.

Group/Exhibit Changes Over Time:

- We had 1.2 zebra, 1.1 giraffe, 1.2 ostrich, 1.1 crowned crane, 1.2 bongo. This mix worked well (the group was also successful without the crowned crane.)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
 - Grevy's Zebra (*Equus grevyi*) (1.2)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.1)
 - Common Ostrich (*Struthio camelus*) (1.2)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)
- Giraffe calves and zebra foals were added.
- Bongo were removed from the exhibit to keep all the animals "savannah" animals and because they hid on exhibit. They also had a calf while on exhibit with all the animals. Calf introductions did not go well.
- We have tried housing zebra and ostrich together on exhibit overnight, but it was not successful.
- More female ostrich were added.
- Crowned cranes were removed from exhibit once we had 3.4 giraffe on exhibit.
- At most we had 2.2 zebra, 2.3 (up to 3.4 with 2 zebra) giraffe, 1.3 ostrich, and 3.2 crowned cranes.
 - Grevy's Zebra (*Equus grevyi*) (≤ 2.2)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (≤ 3.4)
 - Common Ostrich (*Struthio camelus*) (1.3)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*)(1.1)

Great Plains Zoo & Delbridge Museum of National History, Sioux Falls, SD – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (0.1)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (0.1)

Group has been successfully mixed for a few years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- They are shifted off exhibit overnight into a barn. Sometimes the cranes are left on exhibit by themselves.
- They were introduced as adults.
- They remain off exhibit once temperatures get too cold and stay off for the winter.
- The crane has wings clipped and pinned.
- During winter months, cranes and bongo are put together in our off exhibit arena area.

Changes/Accommodations Needed:

- There are live trees and lots of deadfall for them to get away from each other and have hiding spots from visitors.
- The exhibit is farther away from the visitors compared to most of our exhibits.

Reproductive Management/Breeding History:

- We have had up to 2.3 bongo on exhibit, three being offspring. Females are kept inside for calving, but introduced to the other females off exhibit right away. Offspring were introduced to the exhibit after they were a couple weeks old and then introduced to the males.
- Cranes were still on the savannah exhibit until we only had 1.1 crane and 1.1 bongo. Then they were introduced together in the bongo yard. Crane colts were never in with bongo.

Management Challenges:

- There were no challenges related to the bongo.
- The cranes occasionally jump/fly out if their wings are not clipped in time, especially when we have high winds.

Items Contributing to Group's Success:

- Gentle demeanor of bongo
- Gentle demeanor of cranes
- Plenty of deadfall for hiding spots and to get away from each other

Group/Exhibit Changes Over Time:

- We previously had 1.1 crane with 0.2 zebra. This mix worked well.
 - Grevy's Zebra (*Equus grevyi*) (0.2)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)

Great Plains Zoo & Delbridge Museum of National History, Sioux Falls, SD – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (6.9)
- Sandhill Crane (*Grus canadensis*) (2.0)

Group has been successfully mixed for a few years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The bison were all different ages, and cranes were young.
- Bison and cranes shift into different locations when keepers go out to clean the yard.
- They all remain on exhibit year round with each other.
- They tend to ignore each other.
- Cranes do have a spot to get away from the bison with their own shelter and food.

Changes/Accommodations Needed:

- There is a small area blocked off that only the cranes can fit in for shelter and food.
- There are live trees.
- Bison have a shelter.
- The bison have a chute with a squeeze at the end they shift through every day when the keepers move them off exhibit to clean. This makes for easy vaccinations and checks on them when they need it.

Reproductive Management/Breeding History:

- The bison have been breeding until this year. We have currently put the females on PZP to prevent breeding because the area we shift them into, so keepers can clean, is getting too small for that many bison.
- Females give birth out in the bison exhibit, usually separating themselves from the herd. They usually remain away from the herd for a few days. There have not been issues with them giving birth on exhibit.

Management Challenges:

- The bison herd is getting larger. Our oldest male offspring out there is 3 years old and starting to challenge our breeding male. Their off exhibit area is getting too small for that many bison, but they usually only remain in there for up to 2 hours. They do get pellets and hay while off exhibit to keep them occupied.
- Large enrichment items are challenging. They can only have hanging enrichment or smaller enrichment objects, as they will push enrichment into fences or under fences and can break the fences.
- All animals have to be shifted off exhibit for keepers to clean. This gets challenging right after bison births as females and their calves do not shift off exhibit for a few days.
- For feeding they need multiple hay piles and grain piles to prevent competing for food.

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Items Contributing to Group's Success:

- The large size of the herd is fun for guests (although more challenging for keepers).
- The large exhibit space allows for calving and older males to find their own space.
- We have different ages out there as normally some of the females give birth each year.

Group/Exhibit Changes Over Time:

- We had bison (1.1), elk (1.3), white-tailed deer (multiple females) for several years. There was no off exhibit area so when keepers wanted to go out they used a pickup truck. All the animals were fed the same diet. Multiple piles were placed throughout the exhibit. They seemed to separate themselves in the exhibit. They did well together.
 - American Bison (*Bison bison*) (1.1)
 - Elk (*Cervus canadensis*) (1.3)
 - White-tailed Deer (*Odocoileus virginianus*) (female group)
- We had bison (1.3 + offspring) with pronghorn (1.1) for a few years. The pronghorn shifted into an off exhibit area overnight. Pronghorn were fed off exhibit, but they all received hay on exhibit together. At one point the male pronghorn got gored by a bison; this may have had to do with being in rut. The female passed away from natural causes.
 - American Bison (*Bison bison*) (1.3 + offspring)
 - Pronghorn (*Antilocapra americana*) (1.1)
- We previously had bison (1.3 + offspring) and sandhill cranes (3.3) for less than 2 years. Slowly the cranes died from different things – predator issues and aggression from two males and hail storm. There were never issues between species, but the cranes had aggression towards the other cranes.

Great Plains Zoo & Delbridge Museum of National History, Sioux Falls, SD – Historical Exhibit

Species:

- Alpaca (*Vicugna pacos*) (0.2)
- Greater (American) Rhea (*Rhea americana*) (2.2)

Group was successfully mixed for 1 summer.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Both species were younger animals.
- They were only together for 1 summer.
- Alpaca did not seem to enjoy it.

Reproductive Management/Breeding History:

- Rhea eggs were pulled.

Management Challenges:

- We designed special feeders for the different species so they could not eat each other's food.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This was just a temporary exhibit. We moved the alpaca to fill up other exhibit space.

Group/Exhibit Changes Over Time:

- None

**Great Plains Zoo & Delbridge Museum of National History,
Sioux Falls, SD – Historical Exhibit**

Species:

- Miniature Donkey (*Equus africanus asinus*) (1.1)
- Miniature Horse (*Equus ferus caballus*) (2.0)

Group was successfully mixed for 1-2 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- They were all younger/middle aged animals.

Reproductive Management/Breeding History:

- None

Management Challenges:

- The 1.0 miniature donkey was a little aggressive towards animals and keepers.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We no longer have these species.

Group/Exhibit Changes Over Time:

- None

Great Plains Zoo & Delbridge Museum of National History, Sioux Falls, SD – Historical Exhibit

Species:

- Cow (*Bos taurus*) (0.2)
- Miniature Horse (*Equus ferus caballus*) (0.1)

Group was successfully mixed on and off for a few summers.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All where adults.
- The miniature horse was shifted in to eat separately both in the morning and at night for an hour or two.
- They seemed to separate themselves in the yard and did not interact much.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Feeding them separately was a challenge.
- If there was inclement weather we had to separate them so all would have plenty of access to shelter.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This mix was temporarily for maintenance of different exhibits. We separated them to fill more exhibits.
- It is also easier on keepers to not have to separate for feeding.

Group/Exhibit Changes Over Time:

- None

Great Plains Zoo & Delbridge Museum of National History, Sioux Falls, SD – Historical Exhibit

Species:

- Clydesdale Horse (*Equus caballus*) (0.1)
- Emu (*Dromaius novaehollandiae*) (0.2)

Group was successfully mixed for 1 summer.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All of them were younger animals.
- The horse was shifted to an off exhibit area overnight.
- We had a small barn that only the emus could fit in for their food.

Reproductive Management/Breeding History:

- None

Management Challenges:

- They ignored each other.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This mix was temporary for construction of new farm exhibit.

Group/Exhibit Changes Over Time:

- None

Happy Hollow Zoo, San Jose, CA – Current Exhibit

Current Species:

- Donkey (*Equus africanus asinus*) (0.1)
- Miniature Horse (*Equus ferus caballus*) (0.3)

Group has been successfully mixed for 21 years (since 1994, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The donkey is 28 years old, the oldest miniature horse is 21 and has been with the donkey since she was born. The next oldest miniature horse was introduced in 2003, and is 15 years old now. The last miniature horse is 8 years old and has been with this group since birth.
- The group is housed in an off exhibit pen at night and then moved into the main barn/contact pen during the day.
- The donkey has recently been retired and spends her day in our large grazing pen, sometimes with one or more of the female miniature horses, and sometimes with our miniature horse stallion, and occasionally one of our male Navajo Churro sheep.

Changes/Accommodations Needed:

- The donkey and 15 year old miniature horse must be separated at feeding times because of diet restrictions.

Reproductive Management/Breeding History:

- Our 15 year old mare was bred with our miniature stallion and produced the 8 year old female. Since then he was put with the older mare with no success. We now keep him separate from the females as we do not have the space for more at this time.

Management Challenges:

- This group is pretty easy to manage. The feeding is the only "challenge," but very easy to manage.

Items Contributing to Group's Success:

- The longevity of their time together
- They are tractable contact animals
- Some are related

Group/Exhibit Changes Over Time:

- This group has lived/been exhibited in these enclosures since we remodeled our facility in 2010. They lived/were exhibited in a different location of the zoo previous to that, but the situation was the same.
- Occasionally the donkey is housed with one of our male Navajo Churro sheep.
 - Donkey (*Equus africanus asinus*) (0.1)
 - Navajo Churro Sheep (*Ovis aries*) (1.0)

Happy Hollow Zoo, San Jose, CA – Current Exhibit

Current Species:

- Miniature Horse (*Equus ferus caballus*) (1.0)
- Navajo Churro Sheep (*Ovis aries*) (1.0)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Miniature stallion is 13 years old, and the Navajo Churro Sheep is 5 years old. They were introduced at the end of 2010. We are able to walk each on a lead, as they are part of our contact animal collection. They are shifted to our large grazing pen occasionally and spend the day with our retired domestic jenny.

Changes/Accommodations Needed:

- We separate for feeding.

Reproductive Management/Breeding History:

- The stallion was bred with one of our mares and produced a filly. No breeding has been done since then because we do not have space for more at this time.

Management Challenges:

- This group is fairly easy to manage.

Items Contributing to Group's Success:

- The amount of time that they have been together
- These two animals are pretty mellow and tractable
- They are contact animals

Group/Exhibit Changes Over Time:

- Our Navajo Churro ram used to be housed with them until August 5, 2014, when he was euthanized.
- Occasionally these animals and the donkey are housed together in our large grazing pen. See Happy Hollow Zoo Current Exhibit.
 - Donkey (*Equus africanus asinus*) (0.1)
 - Miniature Horse (*Equus ferus caballus*) (1.0)
 - Navajo Churro Sheep (*Ovis aries*) (1.0)

Happy Hollow Zoo, San Jose, CA – Current Exhibit

Current Species:

- Dwarf Zebu (*Bos taurus indicus*) (0.1)
- Navajo Churro Sheep (*Ovis aries*) (3.1)

Group has been successfully mixed for 9 years (since 2006, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The dwarf zebu is 15 years old. All of the Navajo Churro sheep have lived with her their entire lives. Two of the eldest males were introduced in October of 2006, and are now 8 years old. The other male was introduced in January 2008. The female was introduced to this group in March 2010. The two eldest sheep are related, and the other male and little female are related.
- All of the males are castrated.

Changes/Accommodations Needed:

- The zebu has to be separated for feeding because of diet restrictions.
- This group is easy to maintain.

Reproductive Management/Breeding History:

- All males are castrated.

Management Challenges:

- The zebu gets a little pushy with the sheep sometimes, but otherwise, this is an easily manageable group.

Items Contributing to Group's Success:

- The amount of time the group has been together
- The sheep think that the zebu is their mother and follow her everywhere
- They are all part of the contact animal collection and are all trained to walk on a lead

Group/Exhibit Changes Over Time:

- The mother of the two youngest sheep lived with this group until her death on March 14, 2010. The ram also lived with this group prior to the renovation of our facility and prior to the birth of the youngest lambs.

Henry Vilas Zoo, Madison, WI – Historical Exhibit

Species:

- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.1)
- Marabou Stork (*Leptoptilos crumenifer*) (2.0)

Group was successfully mixed for 7 years (from 1995 to 2002).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Animals were together whenever the weather was appropriate for both species.
- Storks were put on exhibit first and taken off exhibit last.

Reproductive Management/Breeding History:

- The giraffe bred and we did not have any issues while sharing the exhibit with the storks.
- The storks did not breed.

Management Challenges:

- The only challenge was that the storks had to be put out first and brought in last.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The storks were transferred to another institution for breeding.
- The exhibit moat was removed.

Group/Exhibit Changes Over Time:

- None

Henry Vilas Zoo, Madison, WI – Historical Exhibit

Species:

- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.2)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)

Group was successfully mixed for 6 years (from 1996 to 2002).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Cranes were put on exhibit first and brought into holding last.
- Animals were together when temperatures allowed the cranes to be outdoors.
- The cranes were kept indoors at all times in the winter.
- The zebra were on exhibit most of the year except during bitter cold.

Reproductive Management/Breeding History:

- The cranes were no hindrance to zebra reproduction.
- The cranes did not reproduce.

Management Challenges:

- The sequence of putting them on and off exhibit was the only challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The zebra trampled a crane when a visitor's dog spooked the zebra; it was the only time in six years that this happened. We are a free zoo with no attendant at our entry gates so sometimes a careless visitor comes in with a dog. Afterward, the cranes were removed from the exhibit and two years later the zebra were moved to another institution in order to make room for zoo improvements

Group/Exhibit Changes Over Time:

- None

Henry Vilas Zoo, Madison, WI – Historical Exhibit

Species:

- Alpaca (*Vicugna pacos*) (6.6)
- Greater (American) Rhea (*Rhea americana*) (1.1)

Group was successfully mixed for 8 years (from 1996 to 2004).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- No management issues in this exhibit.

Reproductive Management/Breeding History:

- Alpaca reproduced without incident.
- The rhea were not allowed to reproduce.

Management Challenges:

- Rhea were separated in bitter cold weather.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was removed for zoo improvements.
- The animals moved to other locations in zoo, but not together.

Group/Exhibit Changes Over Time:

- None

Honolulu Zoo, Honolulu, HI – Current Exhibit

Current Species:

- Plains Zebra (*Equus quagga*) (1.1)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.1)
- Common Ostrich (*Struthio camelus*) (0.1)

Group has been successfully mixed for 17 years (since 1998, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The giraffe were born here and the zebra have been with them for the giraffe's entire lives.
- The species go into their separate, assigned barns/holding in the evening.

Changes/Accommodations Needed:

- The ostrich has an area that for most of the week is separate from the giraffe and zebra exhibit, but on weekends we allow the giraffe and zebra to enter. This is mainly so they don't eat and trample the grass to dirt.

Reproductive Management/Breeding History:

- Historically, we had a breeding pair of giraffe that produced the three individuals we have now. This pair passed away and the offspring males were castrated.

Management Challenges:

- There are no challenges related to group dynamics.

Items Contributing to Group's Success:

- Outdoor all year around
- Control and monitoring of when animals are introduced
- Keeping a consistent routine when releasing and locking up

Group/Exhibit Changes Over Time:

- We also had white rhinos at one time and would like to add this species to the exhibit again in the future.
 - Plains Zebra (*Equus quagga*)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
 - Southern White Rhinoceros (*Ceratotherium simum simum*)
 - Common Ostrich (*Struthio camelus*)

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Gerenuk (*Litocranius walleri*) (2.2)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (0.2)

Group has been successfully mixed for 1.5 years (since May 21, 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Initially the gerenuk would get startled when they saw the duikers moving around, but they calmed down fairly quickly.
- The gerenuk shift inside the barn for food most of the time, but occasionally keepers need to go out and herd them inside.
- Staff must be careful not to startle the duiker and get them running around.

Changes/Accommodations Needed:

- We planted some bamboo plants around the fencing of the yard and both animals are able to use these plants for hiding spots.

Reproductive Management/Breeding History:

- The female gerenuk was brought inside the barn for calving.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Some hiding spots are available.

Group/Exhibit Changes Over Time:

- From 2008 to 2013 1.1 okapi was exhibited with 1.2 duiker and 1.1 Stanley cranes. When the cranes produced an egg there was aggression around the nest.
 - Okapi (*Okapia johnstoni*) (1.1)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.2)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (2.3)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.0)

Group has been successfully mixed for 3 years (since July 19, 2012, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Duiker was introduced to the bongo at 5.5 years old.
- This individual duiker is very skittish and likes to hide.
- Bongo individuals have changed through the years, but the results have typically been the same.

Changes/Accommodations Needed:

- There are several areas of bamboo that the duiker can go behind to get away from the bongo if needed.
- There are also numerous trees and large rocks that limit open field running.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- Duiker can get spooked very easily, so making sure they have several places to hide is a good idea.

Items Contributing to Group's Success:

- Hiding spots
- Exhibit furnishing that limit open field running

Group/Exhibit Changes Over Time:

- None

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Baird's Tapir (*Tapirus bairdii*) (1.1)
- Capybara (*Hydrochoerus hydrochaeris*) (1.2)
- Greater (American) Rhea (*Rhea americana*) (0.4)

Group has been successfully mixed for 1 year (since December 9, 2014, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Rhea were introduced on in December 2014 to the male tapir and capybara group. The female tapir was introduced in July 2015. The last capybara was introduced in July 2015 as well.
- The rhea were introduced at 4 months old. They are very curious but are able to run away easily if they sense danger.
- The male tapir was 4 years old when he was introduced to the group.
- The capybara were 1-2 years old at the time of the introduction.

Changes/Accommodations Needed:

- There are some plants and rocks that the animals can hide behind.
- There is a large mound of dirt that they can climb up on.
- There is a large pool in the exhibit. This pool was modified to have 2 points of entry or exit.

Reproductive Management/Breeding History:

- All of these animals get along very well.
- The female capybara are separated when they have babies (to help them to bond), but then go back out onto exhibit.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Large pool with two exit and entry ways

Group/Exhibit Changes Over Time:

- This exhibit used to be two separate exhibits. One exhibit held tapirs and trumpeter swans and they got along great. The other exhibit held only maned wolves.
 - Baird's Tapir (*Tapirus bairdii*)
 - Trumpeter Swan (*Cygnus buccinator*)

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (0.2)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (3.0)

Group has been successfully mixed for 2 years (since November 20, 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- When introduced, the rhinos were 2-3 years old and the kudu were 1 year old and 5 years old.
- The kudu were used to another group of rhinos, so the introduction from their side went fine.
- The rhinos had never been with another species, so they were interested in the kudu but the kudu were able to get away from them in they needed.

Changes/Accommodations Needed:

- The exhibit is shaped in an L configuration, so the animals can go around the corner to get out of sight if necessary.

Reproductive Management/Breeding History:

- This is a nonbreeding group.

Management Challenges:

- There have been no real challenges – just concern over the rhinos spooking the kudu.

Items Contributing to Group's Success:

- The kudu are able to run away if the rhinos get too close.
- The exhibit is in an L configuration and allows the animals to be out of sight of each other if necessary.

Group/Exhibit Changes Over Time:

- In the past we had 1.2 rhinos with a male adult kudu, a sub-adult male kudu, and 2-3 female kudu; all individuals got along fine. On occasion, the adult male kudu would spar with the rhinos, but would run away if any of the other rhinos joined in.

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (0.1)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (6.4)
- Common Ostrich (*Struthio camelus*) (0.4)

Group has been successfully mixed for 3 years (since July 29, 2012, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The zebra was 29 years old when introduced, the giraffe were between 1 and 15 years old, and the ostrich were approximately 5 years old.
- The zebra was cautious around the giraffe but both species were very curious about the other. The ostrich did not seem to factor in very much.

Changes/Accommodations Needed:

- There are a couple of deadfall branches that break up the exhibit.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- The number of giraffe in the exhibit has changed through the years. We started with two ostrich and have added two more. We also had a second zebra in the group for about a year, but she passed away of old age.

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Giant Eland (*Taurotragus derbianus*) (0.3)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Group has been successfully mixed for 2 years (since June 5, 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The eland were 4 and 6 years old when they were introduced to the stork. The youngest eland was born on exhibit with the stork.
- There has been little interaction between the animals except for when the baby eland were born. The storks tend to pay close attention to the babies, but the babies tend to stick close to their moms, so no contact has ever been made.

Changes/Accommodations Needed:

- There is a hill on the exhibit and plenty of logs and furnishings to keep the animals busy. The stork likes to sit on top of the logs off the ground.

Reproductive Management/Breeding History:

- This is a nonbreeding group.

Management Challenges:

- There have not been any challenges with this group.

Items Contributing to Group's Success:

- The stork has locations where he can climb up and be out of the way.

Group/Exhibit Changes Over Time:

- We had 1.1 warthog, 3.2 giant eland, 1.1 Grant's zebra together for over a year. There was some aggression that started from the adult male eland, so he ended up being separated. The warthogs and zebra got along with everything.
 - Common Warthog (*Phacochoerus africanus*) (1.1)
 - Giant Eland (*Taurotragus derbianus*) (3.2)
 - Grant's Zebra (*Equus quagga boehmi*) (1.1)

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Nyala (*Tragelaphus angasii*) (2.7)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Group has been successfully mixed for 2 years (since May 20, 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The marabou was introduced to the nyala herd at around 8 years old.
- The nyala herd has consisted of animals from a variety of age ranges (from 1 week old to 11 years old).

Changes/Accommodations Needed:

- It has been important to have areas for the nyala babies to cache themselves. We have used tall grass and bamboo plants.

Reproductive Management/Breeding History:

- The female nyala are separated for calving.
- The calves are introduced on exhibit with the stork when they are old enough to stay alongside their mom.
- The nyala can be aggressive to the stork if he gets too close to the baby.

Management Challenges:

- The only challenge has been watching the stork with the small baby nyala, ensuring that he does not hurt the babies and does not get hurt from the upset mother nyala.

Items Contributing to Group's Success:

- Places for the babies to cache themselves

Group/Exhibit Changes Over Time:

- None

Houston Zoo, Inc., Houston, TX – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (1.1)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group has been successfully mixed for 2 years (since May 5, 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The okapi were 14 years old and 9 years old when introduced.
- The duiker were 22 years old and 5 years old when introduced.
- The Stanley cranes were introduced when they were 25 years old.
- The Stanley cranes are only aggressive if they have a nest with an egg.

Changes/Accommodations Needed:

- The duiker have an area that is separated from the exhibit by some cabling that they are able to get behind, but the okapi cannot.
- There are also a few hills and some tall grass.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- The duiker have an area to get away from the other animals if they need.

Group/Exhibit Changes Over Time:

- None

Idaho Falls Zoo at Tautphaus Park, Idaho Falls, ID – Current Exhibit

Current Species:

- Plains Zebra (*Equus quagga*) (1.2 + offspring)
- Helmeted Guineafowl (*Numida meleagris*) (13 individuals)

Group has been successfully mixed for 5+ years (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No special management needed.

Changes/Accommodations Needed:

- Guineafowl have access to a separate roosting barn, which also holds their food and water supply.

Reproductive Management/Breeding History:

- The zebra are in a breeding group and both mares produce a foal about every year. The mares are not separated for foaling. The foals remain with the group for about one year and then are sent off to other institutions.
- In general, all guineafowl eggs are removed as they are discovered. If the flock decreases substantially then we will allow a guineafowl nest to hatch.

Management Challenges:

- None.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Idaho Falls Zoo at Tautphaus Park, Idaho Falls, ID – Current Exhibit

Current Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)
- Silvery-cheeked Hornbill (*Bycanistes brevis*) (1.1 + offspring)

Group has been successfully mixed for 5+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The duiker remains on exhibit year round, with access to a small heated barn.
- The hornbills are on exhibit during the summer season (mid-May to the end of September) and then are moved to an indoor area for winter. They have a roofed area with a heat source on exhibit.

Changes/Accommodations Needed:

- The exhibit has grass substrate with several small trees and a small pool.
- The hornbills are flighted and spend most of their time in the trees or on built-in perching structures.
- The duiker has several areas where he can hide and he can retreat into his barn if desired.

Reproductive Management/Breeding History:

- In years when hornbills are allowed to nest, they are taken to an off-exhibit area for nesting and then returned to the exhibit once the nestlings have fledged.

Management Challenges:

- The silvery-cheeked hornbills have a diet with lots of fruit. They tend to drop a good bit of their diet, making it accessible to the duiker. There is the potential for bloat if the duiker were to eat too much fruit. To alleviate this problem we have installed a catch-tray below the hornbill feeding station. The hornbills will harass the duiker on occasion so he is always left with access to his barn. The entry aisle prevents the hornbills from following him in.

Items Contributing to Group's Success:

- Food catch-tray below hornbill feeding station
- Separate/private barn for the duiker
- Tall grass and shrubs for the duiker, numerous perches for hornbills

Group/Exhibit Changes Over Time:

- None

Idaho Falls Zoo at Tautphaus Park, Idaho Falls, ID – Current Exhibit

Current Species:

Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.3)

Demoiselle Crane (*Grus virgo*) (1.1)

Mandarin Duck (*Aix galericulata*) (2.2)

Group has been successfully mixed for a few months (current as of 2016).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This basic grouping has been together for over five years.
- Ducks are removed from exhibit during the winter.
- Previously there were 0.2 muntjac on exhibit. This year a male was added for breeding and a female fawn was born this spring.

Changes/Accommodations Needed:

- Muntjac have a heated barn and a small back area. The cranes have a separate barn into which they are locked when temperatures are below freezing at night.
- The animals all have access to a small pond in the exhibit.
- The ducks have small nesting houses. If the ducks nest successfully then mother and hatchlings are removed to an off-exhibit area before they leave the nest box. This is to protect the ducklings from predation by the cranes.
- While the cranes are allowed to breed, they have never had a successful nest. All birds in this exhibit are pinioned.

Reproductive Management/Breeding History:

- We had a successful muntjac birth this year (a female fawn), which was the first birth we have had in 5 years.
- The ducks have successfully nested 2-3 times in recent history.

Management Challenges:

- There is little to no interaction among the species. The primary challenge is keeping the muntjac out of the bird food. This is accomplished with some creative caging around the duck feeding station and by elevating the crane feeding station above the reach of muntjac.

Items Contributing to Group's Success:

- Separate barns
- Separate feeding stations
- Compatible species

Group/Exhibit Changes Over Time:

- Bar-headed geese were recently removed from the exhibit as they proved to be too hard on the vegetation, particularly the grass. They were in this group for about 3 years and were a nice addition from a collection standpoint and got along well with the other animal species. They were removed from the exhibit in the winter

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- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.2)
- Bar-headed Geese (*Anser indicus*) (1.1)
- Demoiselle Crane (*Grus virgo*) (1.1)
- Mandarin Duck (*Aix galericulata*) (2.2)

Indianapolis Zoological Society, Inc., Indianapolis, IN – Current Exhibit

Current Species:

- Eastern Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (0.2)
- Grant's Zebra (*Equus quagga boehmi*) (0.2)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.4)
- Marabou Stork (*Leptoptilos crumenifer*) (0.1)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (1.1)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Any or all of the three hoofstock species (kudu, wildebeest, zebra) can be in the main exhibit yard, weather permitting. During the winter months, usually only one species goes out at a time to minimize damage to the yard during muddy and dormant grass conditions. There are two smaller yards adjacent to the exhibit that are used when species are separated.
- All hoofstock are brought inside each night. All birds stay outside from May-October or until the nighttime lows are consistently below 40°F.
- Birds have their wings trimmed before going outside in the spring and are caught up at least one additional time over the summer to re-trim.
- Kudu calves are not introduced to the other hoofstock species until they are at least 3-4 months of age. Zebra, especially, like to harass young calves and get them to run. Our wildebeest tend to displace any new animals or calves (except for birds) for a day or two until the thrill wears off.
- If all three species are on exhibit together, one is brought off a little earlier than the others (typically zebra – faster and recall better than the others) to prevent potential aggression at the gate or animals being chased back on exhibit if they all come into the barn at the same time.

Changes/Accommodations Needed:

- Large, mature trees on exhibit and vegetation around the exhibit perimeter provide multiple shady spots and reduce competition for shade.
- The exhibit is in an "L" shape, which relieves some viewing pressure as visitors have five different views to visit in order to see the entire exhibit.
- One side of the exhibit borders a dry moat adjacent to another exhibit.
- Large rocks and deadfall are in several spots, providing an escape for birds.
- A pool sits at one end of the exhibit and provides a water source (in addition to the hidden automatic horse waterer at the other end) and a place for waders to cool off.

Reproductive Management/Breeding History:

- The male kudu is housed overnight in a separate stall from the females so breeding does not occur inside (and potential splaying from poor traction is avoided). Aggression is not an issue. Our male kudu is only separated from the females for a few days at a time when they are in estrus and a planned pregnancy is desired (i.e., wanting calves in the fall instead of the summer), otherwise they are allowed to breed whenever the females are cycling.
- Female kudu close to calving are housed in sanded stalls to give traction to help the calf stand easily until its legs are steadier, usually for about a week. The calf is kept separated with the

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dam at least for the first day, to ensure successful nursing and bonding. The calf is introduced to the rest of the herd as early as the following day, and can go outside to the barn's transfer yard within a few days. Introduction to adjacent exhibit yards occurs as the calf gets steadier and follows the dam and herd well.

- The zebra are not currently in a breeding situation; however, in the past, whenever zebra foals were born, they were kept inside with the dam the first day and then put with the herd within the next few days. No issues were reported with zebra foals being put with other hoofstock species, as zebras were the dominant animals (wildebeest were not present at the time, but ostrich were).
- Vultures are given the opportunity to nest over the winter inside the barn and are given plenty of privacy and nesting material. Their nesting season is December-March so nothing occurs on exhibit.

Management Challenges:

- Each hoofstock species is usually kept in separate exhibit yards adjacent to each other during the winter to preserve the integrity of the main exhibit yard – they still have visual contact with one another. Sharing the same yard again after a few months apart can cause some excitement and brief bouts of chasing/running on exhibit. The wildebeest have gored a male kudu (which required hernia surgery) during one of these reintroductions.
- Birds can fly out of the exhibit if flight feather trimming has been neglected too long.
- Periodic predation by foxes, raptors, and mink have changed what kinds of birds are able to be exhibited in this yard.

Items Contributing to Group's Success:

- Kudu are generally non-aggressive (unless calves are threatened) and get along with all other species
- Exhibit size and shape
- A lot of species variety in one exhibit makes for a good visitor experience

Group/Exhibit Changes Over Time:

- Ostrich were exhibited with all hoofstock species until they passed away (all were gone by 2013).
 - Eastern Blue (White-bearded) Wildebeest (*Connochaetes taurinus*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Common Ostrich (*Struthio camelus*)
 - Marabou Stork (*Leptoptilos crumenifer*)
 - Ruppell's (Griffon) Vulture (*Gyps rueppellii*)
- When the exhibit first opened, it had 1.2 ostrich, 0.3 eland, and 1.1 topi (mother and calf). After a few years the topi and eland were replaced with kudu and zebra.
 - Common Eland (*Taurotragus oryx*) (0.3)
 - Topi (*Damaliscus korrigum jimela*) (0.1 + calf)
 - Common Ostrich (*Struthio camelus*) (1.2)
- An older male addra gazelle that had to move from his exhibit (he was related to all females and a new male was coming in) got along well with the kudu, zebra, and ostrich. He only had to be rotated with the male kudu on exhibit once the male kudu matured and injured the addra while sparring.

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- Addra (Dama) Gazelle (*Nanger dama*)
- Grant's Zebra (*Equus quagga boehmi*)
- Greater Kudu (*Tragelaphus strepsiceros*)
- Common Ostrich (*Struthio camelus*)
- There have also been whistling tree ducks, Egyptian geese, East African crowned cranes, and guineafowl on this exhibit with all species – these species were only removed because of predation issues.
 - Eastern Blue (White-bearded) Wildebeest (*Connochaetes taurinus*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*)
 - Egyptian Goose (*Alopochen aegyptiacus*)
 - Marabou Stork (*Leptoptilos crumenifer*)
 - Ruppell's (Griffon) Vulture (*Gyps rueppellii*)
 - Whistling Tree Duck (*Dendrocygna autumnalis*)

Indianapolis Zoological Society, Inc., Indianapolis, IN – Current Exhibit

Current Species:

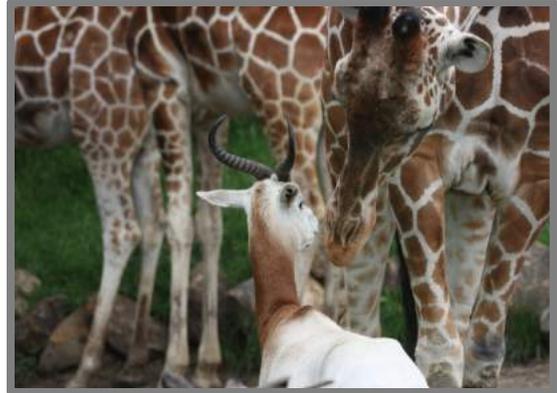
- Addra (Dama) Gazelle (*Nanger dama*) (1.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
- Speke's Gazelle (*Gazella spekei*) (1.0)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Giraffe and gazelle go on exhibit daily, weather permitting, and are brought inside every night. 1.0 addra and 1.0 Speke's are rotated on exhibit to prevent male aggression. The other gazelle can be in the adjacent runway space from the barn to exhibit, which also can be split into two yards to hold separate gazelle species or for gazelle calf introductions to the exhibit.
- Gazelle are put on exhibit first, then giraffe go out next. We used to always bring giraffe off exhibit first then gazelle, but when we added the Speke's they started running through the giraffe's legs to get inside first. This caused an issue since they have to enter their holding through different doors, and if we had to walk a gazelle in we couldn't enter the same space with the giraffe safely. To avoid this, we started bringing Speke's off first by just opening the gate a few feet to let them slip out.
- When we had female addra, our bachelor group of Speke's were always on exhibit with them, and the male addra was kept in the runway.
- Weather permitting, we typically introduce addra gazelle calves to the giraffes on exhibit at 3-4 weeks of age. We usually give them a day on exhibit by themselves. Giraffe calves are introduced to the exhibit at around 3 weeks of age, and usually have 1 or 2 days out by themselves before they meet the gazelle on exhibit.



Brent Huffman

Changes/Accommodations Needed:

- We have two copses of mature trees surrounded by deadfall branches to provide escape for the gazelle, as well as a low lying area with some shrubbery & tall grasses blocked off by logs/large rocks that also provides a safe haven for the gazelle.
- The slope of the hillside along the north perimeter is too steep for the giraffe to walk on, so the gazelle utilize this space to keep from being under foot when they're waiting near the gate at the end of the day.

Reproductive Management/Breeding History:

- We used to keep 1.0 addra with female addra in holding and on exhibit, but had to separate him out permanently due to aggression. He was only put together with a female in holding for breeding during the day, but had to be watched carefully during that time period.

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- We had to start keeping female gazelle off exhibit when parturition was imminent because of aggression shown by one giraffe female to newborn calves.
- Female addra were kept together for calving. We only had to separate out older male addra juveniles overnight in holding when they became too rough with the new calves.
- Giraffe can breed on exhibit or in off-holding yards, not inside the barn. Giraffe are kept in visual sight in adjacent stalls or yard when one is calving.

Management Challenges:

- We have only had aggression issues between male addra and the Speke's, so we have to exhibit them separately.

Items Contributing to Group's Success:

- Indifferent demeanor of the giraffes
- Corral areas and topography that allow the gazelle to retreat from the giraffe
- Size of exhibit allows for animal activity and visitor viewing in multiple places

Group/Exhibit Changes Over Time:

- Thomson's gazelle were mixed with giraffe and addra when the new location opened in 1998. They were kept in this exhibit until the Thomson's passed away, and then we replaced them with Speke's (since the SSP needed more institutions to hold them).
 - Addra (Dama) Gazelle (*Nanger dama*) (1.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (1.0)
- Until a few years ago we had white storks, crowned cranes, ruddy shelducks, and guineafowl on this exhibit with no issues; however, predation by fox and mink caused us to keep the birds off exhibit, since we couldn't bring them on and off exhibit easily every day. The only aggression observed between the hoofstock and the birds was from 0.2 giraffe that would try to stomp guineafowl chicks that had hatched from a nest on exhibit.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
 - Speke's Gazelle (*Gazella spekei*)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*)
 - Helmeted Guineafowl (*Numida meleagris*)
 - Ruddy Shelduck (*Tadorna ferruginea*)
 - White Stork (*Ciconia ciconia*)

Jackson Zoological Park, Jackson, MS – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (1.2)
- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Spur-winged Goose (*Plectropterus gambensis*) (2.0)
- Wattled Crane (*Buggeranus carunculatus*) (1.0)

Group has been successfully mixed for approximately 1 year (since 2014, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- We have occasional problems with the male Grevy's zebra during breeding.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- We have observed copulations with both zebra and klipspringer (recent for this species) but no births to date.

Management Challenges:

- The male zebra is a challenge; we were forced to remove 1.2 ostrich from this group. They got along fine for some time but then the male zebra began turning on them.
- The female wattled crane suffered an injury, possibly from the male zebra.

Items Contributing to Group's Success:

- Few species that do not occupy the same space
- Male zebra moved inside at night
- Observations by staff

Group/Exhibit Changes Over Time:

- Originally, 1.2 ostrich were also housed in this exhibit; however, they removed when the zebra stallion became aggressive towards them. See Jackson Zoo Unsuccessful Exhibit.
 - Grevy's Zebra (*Equus grevyi*) (1.2)
 - Klipspringer (*Oreotragus oreotragus*) (1.1)
 - Common Ostrich (*Struthio camelus*) (1.2)
 - Spur-winged Goose (*Plectropterus gambensis*) (2.0)
 - Wattled Crane (*Buggeranus carunculatus*) (1.0)

Jackson Zoological Park, Jackson, MS – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (0.2)
- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Sable Antelope (*Hippotragus niger*) (1.0)
- Springbok (*Antidorcas marsupialis*) (2.3)
- Common Ostrich (*Struthio camelus*) (1.2)
- Marabou Stork (*Leptoptilos crumenifer*) (2.0)
- Spur-winged Goose (*Plectropterus gambensis*) (2.0)

Group has been successfully mixed for approximately 1 year (since 2014, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Various animals are moved in and out as needed, but this group has been stable for over a year.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The springbok breed readily in this exhibit.
- The addra gazelle have breed in the past.
- We have observed recent copulations with the klipspringer.

Management Challenges:

- Males in rut are trained to shift into stalls, allowing staff to clean.

Items Contributing to Group's Success:

- Compatible groups
- Large area
- Keeper observations

Group/Exhibit Changes Over Time:

- In the past we had male addra and pairs of sable antelope. No major issues were encountered.

Jacksonville Zoo and Gardens, Jacksonville, FL – Current Exhibit

Current Species:

- Babirusa (*Babirusa celebensis*) (1.1)
- Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

Group has been successfully mixed for 1.5 years (since March 2014, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Both babirusa were 2 years old and both otters were approximately 5 years old when introduced.
- They all shift well and were incorporated into the routine very quickly.
- They each have their own holding space.

Changes/Accommodations Needed:

- The otters have an area they can enter but the pigs cannot, but this is not necessary.
- Separate holding is important.

Reproductive Management/Breeding History:

- We are trying to breed but have not had success thus far.

Management Challenges:

- We have not encountered many challenges with this exhibit.
- Aggression is rare and in the worst cases has only resulted in superficial scratches on the babirusa.
- We have to make sure the otters are not accidentally shifted into babirusa holding, as containment is not designed for otters. If the animals need access to holding due to weather, the otters have to be locked in.

Items Contributing to Group's Success:

- Large exhibit size (relative to normal pig/otter exhibits)
- Complexity of exhibit with topographical changes and swimming opportunities
- Compatible species

Group/Exhibit Changes Over Time:

- None

Jacksonville Zoo and Gardens, Jacksonville, FL – Current Exhibit

Current Species:

- Bontebok (*Damaliscus pygargus*) (1.0)
- Greater Kudu (*Tragelaphus strepsiceros*) (2.2)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.0)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (0.3)
- Egyptian Goose (*Alopochen aegyptiacus*) (1.2)
- Marabou Stork (*Leptoptilos crumenifer*) (2.2)

Group has been successfully mixed for 4 months (since July 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This exhibit has had numerous groupings over the years and 1.1 rhinos have been part of that for the last 20 years. We introduced a 3 year old 0.1 rhino a little over a year ago (July 2014).
- This exhibit has been a revolving door of kudu. The females have been at the zoo for years. One of the males was born here 2 years ago (October 2013) and the other was introduced at 2 years old last year (October 2014).
- The bontebok is a new species for us and was introduced this past summer (July 2015). He integrated very well and very quickly. We shift the bontebok in at night to feed him a diet different than the kudus.
- The birds have all been in this exhibit for many years and through many groupings.
- The kudu stay on exhibit all the time and are only brought into the barn if there is a medical concern. The rhinos are shifted off at night, mostly for ease of exhibit maintenance.
- The bontebok and ostrich rotate on exhibit due to bontebok aggression towards the ostrich.

Changes/Accommodations Needed:

- We have creep opportunities built in for the birds, but currently they don't need to use them.
- The kudu have elevated hay/grain feeders to make their diet available to them only.

Reproductive Management/Breeding History:

- We've had multiple kudu calves. They normally give birth on exhibit. We'll shift the dam off exhibit when we do the neonatal exam and keep them off exhibit for a couple of days to monitor the calf. They are put back on exhibit once we feel things are going well.
- A long time ago the rhinos had calves too, but the grouping was different back then.
- Most recently we've had marabou stork chicks 2 years in a row.
- We plan on getting a female bontebok to breed.

Management Challenges:

- We've been lucky and have had very few challenges. There is a little diet cross over with the hoofed animals getting bird food, but this doesn't appear to be a significant issue.
- Recently, the bontebok started chasing the ostrich around. The ostrich did not like this and would get stressed out. We did find wounds on the ostrich once, and they appeared to be gore

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wounds, most likely from the bontebok. Because of this, we decided to separate them and rotate who is on exhibit.

Items Contributing to Group's Success:

- Accommodating demeanor of species and individuals
- Large space
- Little niche crossover resulting in little to no competition between species

Group/Exhibit Changes Over Time:

- We number of individuals has varied greatly over the years.
- Bontebok and ostrich used to reside in this exhibit together until we had to separate them due to bontebok aggression towards the ostrich. They now rotate who is on exhibit.
- We used to have 1.1 Goliath heron, as well as multiple duck species (yellow-billed, shelduck, etc.)
 - Bontebok (*Damaliscus pygargus*) (1.0)
 - Greater Kudu (*Tragelaphus strepsiceros*) (3.3)
 - Southern White Rhinoceros (*Ceratotherium simum simum*) (1.2)
 - Common Ostrich (*Struthio camelus*) (1.0)
 - East African Crowned Crane (*Balearica regulorum*) (0.3)
 - Egyptian Goose (*Alopochen aegyptiacus*) (1.2)
 - Goliath Heron (*Ardea goliath*) (1.1)
 - Marabou Stork (*Leptoptilos crumenifer*) (2.2)
 - Ruddy Shelduck (*Tadorna ferruginea*) (various groups)
 - Yellow-billed Duck (*Anas undulata*) (various groups)

Jacksonville Zoo and Gardens, Jacksonville, FL – Current Exhibit

Current Species:

- Southern Pudu (*Pudu puda*) (0.1)
- Sandhill Crane (*Grus canadensis*) (1.0)

Group has been successfully mixed for 3 years (since September 2012, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- This exhibit has an attached holding yard as well as 2 dens. We are able to separate/lock in individuals as needed. Our pudú has a grain allergy, so this is also helpful for feeding.
- Howdys were used as needed during introductions.

Changes/Accommodations Needed:

- There is a large grassy area, lots of foliage, and a small pond (with a semi-steep edge).
- Necessary changes to the exhibit include adding a gradual grade to the pond, adding more hiding spaces toward the front of the exhibit for guest viewing, and changing the mesh from chain link to smaller mesh to prevent items from being dropped into the exhibit.

Reproductive Management/Breeding History:

- None

Management Challenges:

- The only management challenge is some rare displacement for food.

Items Contributing to Group's Success:

- Personalities
- Space
- Exhibit Layout

Group/Exhibit Changes Over Time:

- Due to geriatric and medical issues this space has been used to house a variety of uncommonly mixed-species. With the layout of this particular exhibit, we have been able to separate individuals for feeding and medication, as well as howdy situations. The holding space is visible to the public off a side path and large enough to hold smaller species if needed.
- White-tailed deer were housed here with pudú and sandhill crane from September 2012 to June 2014. A klipspringer was also on exhibit from March 2014 to January 2015.
 - Klipspringer (*Oreotragus oreotragus*)
 - Southern Pudú (*Pudu puda*)
 - White-tailed Deer (*Odocoileus virginianus*)
 - Sandhill Crane (*Grus canadensis*)



Lynde Nunn

Jacksonville Zoo and Gardens, Jacksonville, FL – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (0.2)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group has been successfully mixed for a few months (current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The cranes were introduced to the bongo exhibit in the spring of 2015 when there were 0.3 bongo. The cranes and bongo were all older; however, these cranes and bongo also lived together in the same exhibit over 5 years ago.

Changes/Accommodations Needed:

- None, but a creep area for the cranes would be nice.

Reproductive Management/Breeding History:

- Other species have been in this exhibit with the bongo and the bongo have successfully bred in the past.

Management Challenges:

- Bongo eating the birds' grain
- Cranes getting in the way of shifting the bongo

Items Contributing to Group's Success:

- Species demeanor
- Individual demeanor
- Large size of exhibit

Group/Exhibit Changes Over Time:

- In the last 5 years the bongo herd has consisted of 9 individuals in a variety of sex ratios (mostly female).
- Before the Stanley cranes were moved back to the exhibit, there were Egyptian geese (1.1) for many years and pink-backed pelicans (0.6) for about a year or two. The pelicans didn't work out and were moved because they didn't eat well on this exhibit and we felt their welfare was compromised.
 - Eastern Mountain Bongo (*Tragelaphus eurycerus isaaci*) (0.2)
 - Egyptian Goose (*Alopochen aegyptiacus*) (1.1)
 - Pink-backed Pelican (*Pelecanus rufescens*) (0.6)

Jacksonville Zoo and Gardens, Jacksonville, FL – Historical Exhibit

Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (0.3)
- Klipspringer (*Oreotragus oreotragus*) (0.2)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.6)
- Leopard Tortoise (*Stigmochelys pardalis*) (1.0)
- Wattled Crane (*Bufo carunculatus*) (0.1)

Group was successfully mixed for 2 years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- One of the male giraffe was born here but was sent to another institution before he reached maturity.
- The kudu and klipspringer were shifted into a separate barn from the giraffe at night.

Reproductive Management/Breeding History:

- The giraffe were the only breeding species in this exhibit.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The species in the exhibit moved around and changed.

Group/Exhibit Changes Over Time:

- We had a breeding herd of giraffe and the numbers fluctuated – we had up to 11 giraffe with 4 juveniles at one time. During that time we had 1.1 saddle-billed storks and white-backed vultures along with all other species listed above. The young giraffe were very playful with each other and while running one day stepped on a stork and killed it. The young giraffe, about a year old, appeared to stomp down on the stork as it ran by. See Jacksonville Zoo and Gardens Unsuccessful Exhibit.
 - Greater Kudu (*Tragelaphus strepsiceros*) (0.3)
 - Klipspringer (*Oreotragus oreotragus*) (0.2)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (3.8)
 - Leopard Tortoise (*Stigmochelys pardalis*) (1.0)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)
 - Wattled Crane (*Bufo carunculatus*) (0.1)
 - White-backed Vulture (*Gyps africanus*) (1.1)

Jacksonville Zoo and Gardens, Jacksonville, FL – Historical Exhibit

Species:

- Okapi (*Okapia johnstoni*) (1.1)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)

Group was successfully mixed for 5 months (from spring 2013 to summer 2013).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- 0.1 okapi was about 23 years old, 1.0 okapi was about 14 years old, and the marabou stork was over 20 years old.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- There was a creep area for the storks to go through if needed.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- It worked great, but there wasn't a good location for the breeding pair of storks to nest, so they were relocated to another exhibit with a nesting area.

Group/Exhibit Changes Over Time:

- None

John Ball Zoological Garden, Grand Rapids, MI – Current Exhibit

Current Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (2.1)

Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

White-backed Vulture (*Gyps africanus*) (1.0)

Group has been successfully mixed for 5+ years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All individuals are adults, except for our 1.0 juvenile bongo who was added to the exhibit in May/June 2015. These species do very well together and there is generally very little aggression.
- We introduced our juvenile 1.0 bongo and his mother to the adult 1.0 (his father) when he was several months old. This group did extremely well and so far no problems have occurred.
- 1.1 southern ground hornbills can occasionally become a little aggressive and pesky to others in the group, especially 1.0 white-backed vulture.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- We separated 0.1 bongo from the exhibit when we could see signs of labor. After calving, she spent a couple months off exhibit with her calf. We reintroduced the adult female and adult male bongo separate from the juvenile male for a couple weeks off exhibit. This went well and we then did introductions with 2.1 bongos off exhibit several times before putting them back on exhibit together.
- Our adult male bongo is still pretty well-natured during breeding season, but he is very intensely focused on the female.

Management Challenges:

- The minor aggression from 1.1 hornbills is the only challenge in this group. The aggression usually only happens for a day or so and generally we can use enrichment to occupy them and keep them from picking on the other animals in the exhibit.

Items Contributing to Group's Success:

- Lots of space
- Lots of "furniture" to pick through (i.e. branches, tall grasses, etc.)
- Providing enrichment on exhibit to occupy the group

Group/Exhibit Changes Over Time:

- Previously we had an additional 0.1 white-backed vulture. The vultures would become defensive around their nest during breeding season, even when no eggs were present. There used to be about 20 helmeted guineafowl and 1.0 duiker, as well. I worked minimally when this exhibit was mixed, but I do remember there was aggression between the males.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.1)

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- Duiker (*sp.*) (1.0)
- Helmeted Guineafowl (*Numida meleagris*) (group of 20)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)
- White-backed Vulture (*Gyps africanus*) (1.1)

Kansas City Zoo, Kansas City, MO – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (1.4)
- Lesser Kudu (*Tragelaphus imberbis*) (3.5)
- Scimitar-horned Oryx (*Oryx dammah*) (7.15)
- Springbok (*Antidorcas marsupialis*) (4.0)

Group has been successfully mixed for 14 years (since 2001, current as of 2015).

Exhibit Size: No information provided.

General Management Notes:

- Animals are various ages, including juveniles.
- Animals shift on/off exhibit together.
- Animals are put on exhibit once it reaches 40°F until late November.
- Breeder males are housed separately.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Breeding males are housed off exhibit, separate from the females.
- Breeding females are pulled for 1-2 months for breeding, and again for calving.
- Males are pulled from various herds at a little over 1 year of age.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Size of the exhibit
- No aggression amongst the species that are housed together

Group/Exhibit Changes Over Time:

- In the past, Masai giraffe, sable antelope, beisa oryx, greater kudu, impala, Nile lechwe, Thomson's gazelle, and Grant's zebra were housed in this exhibit before it was subdivided. See Kansas City Zoo Historical Exhibit.
 - East African (Beisa) Oryx (*Oryx beisa*) (0.6)
 - Grant's Zebra (*Equus quagga boehmi*) (0.2)
 - Greater Kudu (*Tragelaphus strepsiceros*) (2.6)
 - Impala (*Aepyceros melampus*) (1.14)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.3)
 - Nile Lechwe (*Kobus megaceros*) (1.5)
 - Sable Antelope (*Hippotragus niger*) (0.6)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (0.4)

Kansas City Zoo, Kansas City, MO – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (0.5)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.3 or 3.1)
- African Crowned Crane (*Balearica sp.*)

Group has been successfully mixed for various amounts of time over the years.

Exhibit Size: No information provided.

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- Giraffe are fed with elevated feeders.
- Zebras have a bunker on the ground.
- Crowned cranes have hanging buckets.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- We have had issues in the past with zebra chasing giraffe.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Kansas City Zoo, Kansas City, MO – Current Exhibit

Current Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.0)
- Common Ostrich (*Struthio camelus*) (1.3)

Group has been successfully mixed for 2 years (since 2014, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Animals are put on exhibit when the temperatures are appropriate and left out for the seasons.
- The male ostrich is aggressive to keepers.
- The male kudu is laid-back.

Changes/Accommodations Needed:

- The exhibit is full of brush with lots of hiding areas.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- Dealing with the ostrich's aggression can be challenging.
- Servicing the exhibit in a truck is also a challenge.

Items Contributing to Group's Success:

- Ability of animals to separate from each other in the brush
- Different feeding strategies – ostrich are fed from hanging buckets
- Laid back nature of the kudu male

Group/Exhibit Changes Over Time:

- An addax male was with the ostrich for 2 months this summer. There was possible aggression from the ostrich to addax.
 - Addax (*Addax nasomaculatus*) (1.0)
 - Common Ostrich (*Struthio camelus*) (1.3)
- A female group of zebra have also been housed with the addax male and ostrich.
 - Addax (*Addax nasomaculatus*) (1.0)
 - Grant's Zebra (*Equus quagga boehmi*) (female group)
 - Common Ostrich (*Struthio camelus*) (1.3)
- A female group of zebra have also been exhibited with a kudu male and ostrich. Kudu and addax have not been exhibited together.
 - Lesser Kudu (*Tragelaphus imberbis*) (1.0)
 - Grant's Zebra (*Equus quagga boehmi*) (female group)
 - Common Ostrich (*Struthio camelus*) (1.3)

Kansas City Zoo, Kansas City, MO – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.0)
- African Crowned Crane (*Balearica sp.*) (1.1)

Group has been successfully mixed for a few years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The species shift separately on and off exhibit.
- Animals are all very calm.
- The female crane is only 4 months old and has been housed with the bongo for most of her life.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Cranes are held off exhibit for nesting and chick rearing.

Management Challenges:

- None

Items Contributing to Group's Success:

- Temperament of the animals
- Large space

Group/Exhibit Changes Over Time:

- The number of individuals in this group has changed. We had 1.1 bongo and 0.2 bongo at various times, as well as 1.2 cranes.

Kansas City Zoo, Kansas City, MO – Current Exhibit

Current Species:

- Yellow-backed Duiker (*Cephalophus silvicultor*) (0.1)
- Helmeted Guineafowl (*Numida meleagris*) (0.1.1)

Group has been successfully mixed for 3+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Species shift on and off exhibit separately.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- Temperament of animals
- Guinea fowl get along anywhere

Group/Exhibit Changes Over Time:

- We had 1.1.1 guinea fowl in with the duikers, and until recently we had 1.1 duiker in this exhibit.

Kansas City Zoo, Kansas City, MO – Current Exhibit

Current Species:

- Kirk's Dik Dik (*Madoqua kirkii*) (1.1)
- Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- These groups go on exhibit together, but have separate inside holding areas at night.
- There are days when the groups are separated due to aggression between the males.

Changes/Accommodations Needed:

- We have hide boards to allow the species to separate themselves.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Previous aggression issues

Items Contributing to Group's Success:

- Temperament of animals
- Fairly large exhibit with many hides
- Ability to separate as needed into two separate yards

Group/Exhibit Changes Over Time:

- We have had 1.1 red-flanked duiker previously.

Kansas City Zoo, Kansas City, MO – Historical Exhibit

Species:

- East African (Beisa) Oryx (*Oryx beisa*) (0.6)
- Grant's Zebra (*Equus quagga boehmi*) (0.2)
- Greater Kudu (*Tragelaphus strepsiceros*) (2.6)
- Impala (*Aepyceros melampus*) (1.14)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.3)
- Nile Lechwe (*Kobus megaceros*) (1.5)
- Sable Antelope (*Hippotragus niger*) (0.6)
- Thomson's Gazelle (*Eudorcas thomsonii*) (0.4)

Group was successfully mixed for 6 years (from 1995 to 2001).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Giraffe and zebra were put in holding at night. The remainder of the herd had access to the exhibit, corridor, and holding at night.
- We had to put oryx out before sable or the sable would push the oryx back to holding.
- The male lechwe was aggressive to keepers.

Reproductive Management/Breeding History:

- Breeding males were held off exhibit.
- Breeding females were put with males for 1-2 months and pulled for calving.
- Young males were pulled from various herds at a little over 1 year old.

Management Challenges:

- Johne's Disease exposure to the exhibit was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Exhibit was disinfected to solve the Johne's Disease problem and was subdivided.

Group/Exhibit Changes Over Time:

- None

Kansas City Zoo, Kansas City, MO – Historical Exhibit

Species:

- Gunther's Dik Dik (*Madoqua guentheri*)
- Red-crowned Crane (*Grus japonensis*)

No information was provided about how long this group was successfully mixed.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- I know that these species were housed together, but I don't know anything about the management of this exhibit.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We no longer house any animals in this area.

Group/Exhibit Changes Over Time:

- None

Kansas City Zoo, Kansas City, MO – Historical Exhibit

Species:

African Bush Elephant (*Loxodonta africana*)
Burchell's (Damara) Zebra (*Equus quagga burchellii*)
Common Eland (*Taurotragus oryx*)
East African (Beisa) Oryx (*Oryx beisa beisa*)
Greater Kudu (*Tragelaphus strepsiceros*)
Gunther's Dik Dik (*Madoqua guentheri*)
Impala (*Aepyceros melampus*)
Thomson's Gazelle (*Eudorcas thomsonii*)
East African Crowned Crane (*Balearica regulorum gibbericeps*)
Egyptian Goose (*Alopochen aegyptiaca*)
White-backed Vulture (*Gyps africanus*)

Group was successfully mixed for approximately 20 years (from the early 1970s to 1994).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- All species were together during the day, but most were housed separately at night.
- We had small numbers of each species.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Africa exhibit opened in another area of the zoo. Elephant holding is now located in this area, but facilities are different.

Group/Exhibit Changes Over Time:

- None

Kansas City Zoo, Kansas City, MO – Historical Exhibit

Species:

- American Bison (*Bison bison*)
- American Elk (*Cervus canadensis*)
- White-tailed Deer (*Odocoileus virginianus*)

Group was successfully mixed for approximately 20 years (from the early 1980s to 2005).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This exhibit was a large, open park with a shelter and no stalls for shifting.
- The animals were all fed in several areas.

Reproductive Management/Breeding History:

- These species were never separated and were housed together 24/7.

Management Challenges:

- It was difficult separating an animal if needed.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit was in a city park, off of zoo property.

Group/Exhibit Changes Over Time:

- None

Kansas City Zoo, Kansas City, MO – Historical Exhibit

Species:

Blesbok (*Damaliscus pygargus phillipsi*)
Common Ostrich (*Struthio camelus*)

No information was provided about how long this group was successfully mixed.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Currently this space is dedicated to elephant holding.

Group/Exhibit Changes Over Time:

- None

Kansas City Zoo, Kansas City, MO – Historical Exhibit

Species:

East African (Beisa) Oryx (*Oryx beisa beisa*)
Greater Kudu (*Tragelaphus strepsiceros*)
Giraffe (*Giraffa camelopardalis*)
Impala (*Aepyceros melampus*)
Nile Lechwe (*Kobus megaceros*)
Sable Antelope (*Hippotragus niger*)
Thomson's Gazelle (*Eudorcas thomsonii*)
Zebra (*Equus sp.*)
Cattle Egret (*Bubulcus ibis*)
Common Ostrich (*Struthio camelus*)
East African Crowned Crane (*Balearica regulorum gibbericeps*)
Egyptian Goose (*Alopochen aegyptiaca*)
Guineafowl (*sp.*)

Group was successfully mixed for 5-10 years (from 1995 to the early 2000s).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Some species were taken off exhibit into holding each night, while others were left with access to the building through a very long corridor.

Reproductive Management/Breeding History:

- Females were separated for calving at the barn.

Management Challenges:

- Some animals were aggressive to staff.
- Birds were taken by native predators.
- Some aggression was observed between species, especially when young animals were present.
- The exhibit had a water barrier on one side and the Nile lechwe swam out.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was divided into 2 smaller areas, and then later into 3 separate areas.

Group/Exhibit Changes Over Time:

- The number and species of animals in this exhibit changed over the years.

Kansas City Zoo, Kansas City, MO – Historical Exhibit

Species:

Gunther's Dik Dik (*Madoqua guentheri*)
Bare-faced Go-away Bird (*Corythaixoides personatus*)
Brown-breasted Barbet (*Lybius melanopterus*)
Crested Barbet (*Trachyphonus vaillantii*)
Common Bulbul (*Pycnonotus barbatus*)
Golden-breasted Starling (*Lamprotornis regius*)
Hamerkop (*Scopus umbretta*)
Hottentot Teal (*Anas hottentota*)
Lilac-breasted Roller (*Coracias caudatus*)
Pin-tailed Whydah (*Vidua macroura*)
Purple Grenadier (*Uraeginthus ianthinogaster*)
Red-tailed Laughing Thrush (*Trochalopteron milnei*)
Superb Starling (*Lamprotornis superbus*)
White-cheeked Turaco (*Tauraco leucotis*)
White-faced Whistling Duck (*Dendrocygna viduata*)

Group was successfully mixed for 17 years (from 1995 to 2012).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The dik dik had a hide box on exhibit, and sometimes had access to a holding stall.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- The dik dik were afraid of the public and rarely seen. This is a walk-through aviary.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The dik dik were afraid of public and rarely seen. This is a walk-through aviary.

Group/Exhibit Changes Over Time:

- Other species at various times included: white-headed buffalo weaver, orange bishop, white-backed mouse bird, marbled teal, gold-breasted waxbill, vulturine guineafowl, fairy bluebird and masked lovebird.
 - Gunther's Dik Dik (*Madoqua guentheri*)
 - Bare-faced Go-away Bird (*Corythaixoides personatus*)
 - Brown-breasted Barbet (*Lybius melanopterus*)
 - Crested Barbet (*Trachyphonus vaillantii*)
 - Common Bulbul (*Pycnonotus barbatus*)
 - Fairy Bluebird (*Irena puella*)
 - Golden-breasted Starling (*Lamprotornis regius*)
 - Gold-breasted Waxbill (*Amandava subflava*)

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- Hamerkop (*Scopus umbretta*)
- Hottentot Teal (*Anas hottentota*)
- Lilac-breasted Roller (*Coracias caudatus*)
- Marbled Teal (*Marmaronetta angustirostris*)
- Masked Lovebird (*Agapornis personatus*)
- Orange Bishop (*Euplectes franciscanus*)
- Pin-tailed Whydah (*Vidua macroura*)
- Purple Grenadier (*Uraeginthus ianthinogaster*)
- Red-tailed Laughing Thrush (*Trochalopteron milnei*)
- Superb Starling (*Lamprotornis superbus*)
- Vulturine Guineafowl (*Acryllium vulturinum*)
- White-backed Mousebird (*Colius colius*)
- White-cheeked Turaco (*Tauraco leucotis*)
- White-faced Whistling Duck (*Dendrocygna viduata*)
- White-headed Buffalo Weaver (*Dinemellia dinemelli*)
- The Gunther's Dik Dik was later replaced with Kirk's Dik Dik.
 - Kirk's Dik Dik (*Madoqua kirkii*)
 - Bare-faced Go-away Bird (*Corythaixoides personatus*)
 - Brown-breasted Barbet (*Lybius melanopterus*)
 - Crested Barbet (*Trachyphonus vaillantii*)
 - Common Bulbul (*Pycnonotus barbatus*)
 - Golden-breasted Starling (*Lamprotornis regius*)
 - Hamerkop (*Scopus umbretta*)
 - Hottentot Teal (*Anas hottentota*)
 - Lilac-breasted Roller (*Coracias caudatus*)
 - Pin-tailed Whydah (*Vidua macroura*)
 - Purple Grenadier (*Uraeginthus ianthinogaster*)
 - Red-tailed Laughing Thrush (*Trochalopteron milnei*)
 - Superb Starling (*Lamprotornis superbus*)
 - White-cheeked Turaco (*Tauraco leucotis*)
 - White-faced Whistling Duck (*Dendrocygna viduata*)

Knoxville Zoological Gardens, Knoxville, TN – Current Exhibit

Current Species:

- Common Waterbuck (*Kobus ellipsiprymnus*) (0.4)
- Grant's Zebra (*Equus quagga boehmi*) (2.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (0.2)
- Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (1.0)
- Thomson's Gazelle (*Eudorcas thomsonii*) (1.2)

Group has been successfully mixed for 6 months (current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The female giraffe (28 & 14 years old) are a mother/daughter pair and were both born here. The male is 11 years old and arrived three years ago. At that time, giraffe, waterbuck (all 14 years old) and Thomson's gazelle (females are 16 & 11 years old, male is 11 years old) had been exhibited together without incident for about ten years. Most of these animals (plus two greater kudu that have since died) were about two years old when first introduced to each other and this exhibit.
- In January 2015, the two male zebra (13 & 9 years old) were moved to this exhibit from their own because rhinos had to move to the zebra's exhibit. We introduced them to the giraffe after several weeks of howdying through chain-link fencing. This went on longer than we had intended due to successive ice storms. For the first couple weeks, the zebra chased the giraffe (mostly the females) fairly intensely and persistently at times. Eventually, they eased off and now the younger female displaces/chases the zebra, but this is only an occasional thing.
- We used the same technique to introduce the zebra to the waterbuck, but the zebra chased them so aggressively that we opted to discontinue any introductions, at least until cooler weather arrived (this was in late spring/early summer). Currently, the giraffe are exhibited with the zebra four days a week, and with the waterbuck/gazelle for the other three days.

Changes/Accommodations Needed:

- More good sources of shade would be nice. There are times of the day in mid-summer when shade is limited, and species/individuals that prefer to keep their distance from other species are hard-pressed to find a comfortable spot to hang out.

Reproductive Management/Breeding History:

- The only reproduction we've had in this exhibit in its current state has been with the Thomson's gazelle. The last calves were born 11 years ago. We kept the male separated from the females after parturition, as both females gave birth only days apart. If memory serves, the herd was reunited before the calves had their first day on exhibit.
- The zebra and Thomson's gazelle males are castrated.

Management Challenges:

- The biggest challenge has been trying to integrate the zebra into this group. The zebra that we have were never before housed with anything other than other zebra. With having just two

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males with no harem to watch over, they have no distraction from whatever mayhem they want to create with the other species.

- Other than this, the group is well enough established that all individuals know their place in the hierarchy, know where/when to shift, and when to get out of the way of a bigger animal.

Items Contributing to Group's Success:

- Relatively few animals for a large exhibit – we're limited by barn/corral space
- Other than the zebra, the species tend to keep to their own kind
- Most individuals are at least middle-aged

Group/Exhibit Changes Over Time:

- When the exhibit first opened (and before the zebra were added) we had greater kudu and guineafowl in the exhibit. The guineafowl were not contained by the exhibit fence and eventually succumbed to predation over the first year or so the exhibit was open. Greater kudu were in the exhibit for a while but have since died.
 - Common Waterbuck (*Kobus ellipsiprymnus*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
 - Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Guinea fowl (*sp.*)

Knoxville Zoological Gardens, Knoxville, TN – Historical Exhibit

Species:

- Arabian Oryx (*Oryx leucoryx*) (1.2)
- Cape Eland (*Taurotragus oryx oryx*) (0.3)
- Grant's Zebra (*Equus quagga boehmi*) (1.1)
- Greater Kudu (*Tragelaphus strepsiceros*) (2.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2 + calves)

Group was successfully mixed for approximately 20 years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The giraffe had their own corral and barn stalls, as did the oryx.
- The zebra, eland and kudu shared a corral and barn stalls.

Reproductive Management/Breeding History:

- We had a number of giraffe calves born over the years. The female was separated into a barn stall for parturition and kept apart from the herd until the calf was a few days old. I don't think the dam and calf were put with the male until the calf was 4 or 5 months old.
- Historically, the zebra bred in this exhibit as well, though that was long before my time. I know the male was kept apart from the mare/foal until the foal had some size/age on it.

Management Challenges:

- I vaguely recall that the oryx could be difficult to shift off exhibit or into their barn stall, but that was a long time ago.
- Our giraffe bull used to displace the male zebra for thirty minutes or more at a time, not chasing but just slowly walking after him so the zebra couldn't settle anywhere.
- There was only one time I know of that the giraffe bull physically assaulted the stallion, but no one witnessed what instigated it.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit, corrals and barn stalls were majorly renovated about 12 years ago.
- The oryx went to another zoo, while the zebra and eland were moved to another exhibit and new animals were brought in to be with the giraffe.

Group/Exhibit Changes Over Time:

- In the distant past, this group also included sable antelope, ostrich and Thomson's gazelle. I don't know if all of these species plus the above ones shared the exhibit at one time, or if any of them weren't here until one of the past species had left.

Lee G. Simmons Conservation Park and Wildlife Safari, Ashland, NE – Current Exhibit

Current Species:

American Bison (*Bison bison*) (14.22)
Elk (*Cervus canadensis*) (0.6)

Group has been successfully mixed for 6 years (since 2009, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The bison are shifted off exhibit every night.
- We are closed during the winter months, so the bison are left out from November to March.

Changes/Accommodations Needed:

- This is a very large exhibit with open pasture, heavy trees, and varying topography, which allows the animals to stay away from each other.

Reproductive Management/Breeding History:

- The bison are on MGA feed so they are not breeding.
- The elk breed in the fall after the bison are shifted off during the winter. A male is brought over at that time and moved back once the bison are brought back in the spring.

Management Challenges:

- If we need to bring a male elk in for breeding before the bison are moved off during the winter we cut the elk's antlers off to avoid any fighting.

Items Contributing to Group's Success:

- Moving the bison off every night to avoid competition for food
- Not keeping a bull elk in the exhibit year round

Group/Exhibit Changes Over Time:

- None

**Lee G. Simmons Conservation Park and Wildlife Safari,
Ashland, NE – Current Exhibit**

Current Species:

- Sable Antelope (*Hippotragus niger*) (1.0)
- Common Ostrich (*Struthio camelus*) (0.5)

Group has been successfully mixed for 12 years (since 2003, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Animals are together year round.
- They share the same barn space in the winter.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- There is no reproduction in this group.

Management Challenges:

- There are no challenges in this group.

Items Contributing to Group's Success:

- Large space

Group/Exhibit Changes Over Time:

- None

Lee G. Simmons Conservation Park and Wildlife Safari, Ashland, NE – Current Exhibit

Current Species:

- Llama (*Lama glama*) (0.1)
- Nile Lechwe (*Kobus megaceros*) (0.1)
- Sable Antelope (*Hippotragus niger*) (2.12)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- These species spend the entire year together and share two barns in the winter.

Changes/Accommodations Needed:

- They do not like to share the same barn space so in the winter we offer multiple areas to come inside.

Reproductive Management/Breeding History:

- Only the sable are allowed to breed, but we do not separate during calving.
- Different males are brought in for breeding.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Multiple barn spaces during the winter
- Large area

Group/Exhibit Changes Over Time:

- None

Lee Richardson Zoo, Garden City, KS – Current Exhibit

Current Species:

- Addax (*Addax nasomaculatus*) (1.3)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (0.2)
- Crowned Crane (*Balearica sp.*) (1.0)
- Demoiselle Crane (*Grus virgo*) (1.0)

Group has been successfully mixed for 9 years (since 2006, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The addax and cranes have been mixed in various groupings since about 2006.
- These species are together year round.
- Some addax have shown aggression or experienced a conflict with the cranes if both are in the holding pen or have holding pen access. Anytime access is given we make sure the pathway is a complete circle (through the pens, into the barn, and out another door).

Changes/Accommodations Needed:

- The large exhibit keeps interactions to a minimum.

Reproductive Management/Breeding History:

- 0.2 addax calves were born with cranes present.

Management Challenges:

- Holding space is a challenge if all species need to be in the barn.

Items Contributing to Group's Success:

- Large yard
- Nature of cranes
- Exclusion feeders preventing addax from eating cranes' diet

Group/Exhibit Changes Over Time:

- None

Lee Richardson Zoo, Garden City, KS – Current Exhibit

Current Species:

- Chinese Goral (*Naemorhedus griseus*) (2.4)
- Hooded Crane (*Grus monacha*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- We received a new pair of cranes this year (2015); the previous pair had been with the goral since 2004.
- These species share the yard well.
- Exclusion feeders are used to prevent the goral from eating the cranes' diet.

Changes/Accommodations Needed:

- The animals share this space well.

Reproductive Management/Breeding History:

- The goral have bred successfully the last 2 years.
- The previous hooded crane pairing would nest, but never produced any fertile eggs (possibly due to the male's leg injury).

Management Challenges:

- The cranes enjoy wet areas and puddles but the goral do not; keeping that balance can be challenging.

Items Contributing to Group's Success:

- Temperament of species
- Exclusion feeders

Group/Exhibit Changes Over Time:

- None

Lee Richardson Zoo, Garden City, KS – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (1.1)
- Elk (*Cervus canadensis*) (1.3)

Group has been successfully mixed for 12 years (since 2003, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Males of both species are usually shifted into a service yard.
- These individuals are together year round.

Changes/Accommodations Needed:

- Trees and deadfall are used to break up the exhibit and give hides/barriers.

Reproductive Management/Breeding History:

- There is no breeding in this exhibit; both males are castrated.

Management Challenges:

- The bison tend to be more territorial. At times they will attempt to eat the elk's grain if left on exhibit. The bison will chase the elk and have contacted them on occasion; however, no significant injuries have been sustained.

Items Contributing to Group's Success:

- Size of exhibit
- Deadfall and trees
- Multiple feeding stations

Group/Exhibit Changes Over Time:

- None

Lee Richardson Zoo, Garden City, KS – Current Exhibit

Species:

- Karakul Sheep (*Ovis aries*) (1.1)
- Silkie Chicken (*Gallus gallus domesticus*) (1.3)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This exhibit has a small barn and yard. There is only one stall in the barn.
- These individuals are kept together year round.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- There is no breeding in this exhibit.

Management Challenges:

- No information provided.

Items contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- For 8 years (from 2004 to 2012) there was 0.1 domestic yak in this exhibit with 0.1 Karakul sheep and the silkie chicken. The sheep was 2 years old when introduced to the 1 year old yak. These original individuals are now deceased.
 - Domestic Yak (*Bos grunniens*) (0.1)
 - Karakul Sheep (*Ovis aries*) (0.1)
 - Silkie Chicken (*Gallus gallus domesticus*) (1.3)

Lehigh Valley Zoo, Schnecksville, PA – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (0.2)
- Common Ostrich (*Struthio camelus*) (1.1)

Group has been successfully mixed for 18 years (since 1997, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Each animal is shifted into a holding area off exhibit every night: the zebra are kept in one area, the female ostrich are kept in one area, and the male ostrich are kept in another area.
- The zebra shelter has the option of adding a wind block to protect the sheltered space from the cold air; it is put up once temperatures start to drop, and it stays up until winter is over.

Changes/Accommodations Needed:

- So far, no extra accommodations have needed to be made in order to satisfy the needs of either species.

Reproductive Management/Breeding History:

- The zebra are two mares, so no breeding occurs.
- The ostriches display breeding behavior but whenever eggs are laid they are pulled by staff.

Management Challenges:

- The only issues that have occurred are due to shifting these animals on and off exhibit. The male ostrich is a no-contact animal, so any issues that arise have to be solved without being in the same space.

Items Contributing to Group's Success:

- Natural existence of these species together in the wild
- Each animal has its own space off exhibit
- Different feeding stations, leading to zero competition

Group/Exhibit Changes Over Time:

- We had a 1.2 breeding group of zebra for 6 years. Any offspring were sent to other institutions; one male died, but the females remained.

Lehigh Valley Zoo, Schnecksville, PA – Current Exhibit

Current Species:

- Scimitar-horned Oryx (*Oryx dammah*) (2.2)
- West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Currently in this exhibit we have 4 oryx: one adult male, two adult females, and one male calf.
- The oryx are shifted onto exhibit every morning and into a holding area every night. At night they have access to an indoor holding area and an outdoor yard. Holding is arranged so that, if necessary, certain animals can be kept separate (i.e. females can be separated for calf rearing).
- Cranes also have a separate, indoor shelter that they are shifted into every night. The temperature is regulated in this shelter to maintain a safe range.

Changes/Accommodations Needed:

- There does not need to be many exhibit changes to make this exhibit successful. The oryx and cranes have not shown any interspecies issues.

Reproductive Management/Breeding History:

- When a calf is present, the dam and calf are kept separate from the herd until the calf is deemed large enough and healthy enough for the reintroduction.

Management Challenges:

- The only issues that arise are with the management of the cranes. This must be done when the oryx are off exhibit because the oryx are non-contact animals.

Items Contributing to Group's Success:

- Natural existence of these species together in the wild
- Ease of separating out any individuals that cannot be on exhibit
- Neither of these species have extreme needs, except for temperature

Group/Exhibit Changes Over Time:

- We originally had an all-male bachelor herd of three adult male oryx for three years. Then we had a bachelor herd of two males for three years, until one of them was sent out for breeding. Three females were introduced for breeding, and two are currently still on exhibit.

Lehigh Valley Zoo, Schnecksville, PA – Historical Exhibit

Species:

- Sika Deer (*Cervus nippon*) (0.2)
- Indian (Blue) Peafowl (*Pavo cristatus*) (1.3)

Group was successfully mixed for 5 years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Deer were shifted onto exhibit every morning and into a shelter at night.
- The peafowl remained on exhibit at night.

Reproductive Management/Breeding History:

- The peafowl bred in this exhibit.

Management Challenges:

- There were no specific challenges with this group; the keepers were able to have contact with both species if needed, and the deer shifted easily.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit no longer exists because of changes in the zoo's collection. It originally encompassed an Asian section, but once all of the animals died out, that section was not continued.

Group/Exhibit Changes Over Time:

- None

Lehigh Valley Zoo, Schnecksville, PA – Historical Exhibit

Species:

- White-tailed Deer (*Odocoileus virginianus*) (1.2)
- Wild Turkey (*Meleagris gallopavo*) (1.1)

Group was successfully mixed for approximately 12-15 years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Both species were on exhibit at all times. They had a shelter for cover and bedding down, but shifting was unnecessary.

Reproductive Management/Breeding History:

- There was active breeding between the male and female deer. The offspring were kept until they reached sexual maturity and then were sent to other institutions.
- The turkeys laid eggs, but the eggs were pulled.

Management Challenges:

- The main challenge in this exhibit was dealing with the male deer during rut because there wasn't a space to shift him off exhibit.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Deer and turkeys were phased out of the collection plan through attrition.

Group/Exhibit Changes Over Time:

- The sex ratio changed based on offspring; however, that was a temporary change until those offspring needed to be sent to different institutions.

Lincoln Park Zoo, Chicago, IL – Current Exhibit

Current Species:

- Alpaca (*Vicugna pacos*) (2.2)
- Muscovy Duck (*Cairina moschata*) (1.0)

Group has been successfully mixed for 2 years (since October 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals were introduced as adults in the fall; there were no issues with the introduction.

Changes/Accommodations Needed:

- The duck is unable to utilize the heated Nelson waterers that the alpaca use for drinking water in the winter. We need to offer water in tubs specifically for the duck in the winter as exhibit pools are empty at that time.

Reproductive Management/Breeding History:

- There is no breeding in this exhibit. The alpaca group is non-breeding and we have a single male duck.

Management Challenges:

- We have to use an excluder to keep the alpaca out of the duck's food – the duck's food is tucked into a varikennel that the duck will enter to eat.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Lincoln Park Zoo, Chicago, IL – Current Exhibit

Current Species:

- Grant's Gazelle (*Nanger granti*) (1.1)
- Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for 1.5 years (since July 2014, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals were introduced as adults. There was minor displacement behavior and chasing from one of the ostrich towards the gazelle.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Both species are non-reproductive.

Management Challenges:

- There are no noteworthy challenges within this group.

Items Contributing to Group's Success:

- A portion of the yard is sectioned off using a "wall" of tree branches and limbs that the gazelle can easily pass through, but effectively excludes the ostrich. The gazelle choose to spend their time in the exclusion area to avoid harassment from the ostrich.

Group/Exhibit Changes Over Time:

- None

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

- Alpaca (*Vicugna pacos*) (1.1)
- South American Tapir (*Tapirus terrestris*) (1.1)
- Aldabra Tortoise (*Aldabrachelys gigantea*) (1.4)
- Brown Pelican (*Pelecanus occidentalis*) (5.4.15)
- Greater (American) Rhea (*Rhea americana*) (2.4)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- No animals are shifted on a regular basis. They live in this exhibit together 24/7. Animals are conditioned to go into holding pens if capture is necessary.
- The tapir have grown up in this exhibit.
- Pelicans are typically adults that are non-releasable rehabilitation birds and rarely, if ever, have difficulty integrating into this exhibit.
- Tortoises were introduced as adults.
- Some rheas were introduced as adults, others as chicks.
- Alpaca were introduced as adults.
- Tortoises and marabou will roam into adjacent (African-themed) sections on a regular basis but will return to this section.

Changes/Accommodations Needed:

- Alpaca are provided sand pits for rolling.
- Tortoises are provided soft substrate in hopes they will begin egg-laying.
- Pelicans are given an island to deter predators.
- Alpaca (and historically llama) are slightly skittish around tapir, but the large size of the section allows them to move away from the tapir at any time.

Reproductive Management/Breeding History:

- Female alpaca are separated as they near parturition.
- 1.1 tapir are a non-breeding pair.

Management Challenges:

- None

Items Contributing to Group's Success:

- Space of the exhibit
- Several long term resident animals help "guide" others.

Group/Exhibit Changes Over Time:

- Llama were previously housed in this exhibit

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- Alpaca (*Vicugna pacos*)
- Llama (*Lama glama*)
- South American Tapir (*Tapirus terrestris*)
- Aldabra Tortoise (*Aldabrachelys gigantea*)
- Brown Pelican (*Pelecanus occidentalis*)
- Greater (American) Rhea (*Rhea americana*)
- Marabou Stork (*Leptoptilos crumenifer*)
- This is a fluid collection.
- At the species level, the group has been together for about 2 years (alpaca are the newest species to the exhibit, but llama had been housed in this section for 10+ years).
- The newest individual residents have been in the section for 6 months (a few of the pelicans).

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

- Aoudad (Barbary Sheep) (*Ammotragus lervia*) (0.2)
- Common Waterbuck (*Kobus ellipsiprymnus*) (3.0)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.20)
- Impala (*Aepyceros melampus*) (0.13)
- Nile Lechwe (*Kobus megaceros*) (1.0)
- Water Buffalo (*Bubalus bubalis*) (1.0)
- Common Ostrich (*Struthio camelus*) (2.4)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Most are introduced through birth.
- Waterbuck, some kudu and water buffalo were introduced as adults.
- Aoudad are geriatric animals.
- For the most part, animals live in this section 24/7 – no daily shifts with these species.

Changes/Accommodations Needed:

- We have a lake maintained for 1.0 water buffalo (geriatric – ostracized and removed from his original herd).

Reproductive Management/Breeding History:

- In recent years, impala and kudu are the only breeding herds. Males are rotated out, or sterilized when deemed necessary. All females are conditioned to go into holding pens for calving.
- Once calves are old enough (impala are ~3 weeks old, kudu are 3-4 weeks old) they are released out into the section.

Management Challenges:

- Male impala can be rough on female impala, especially in smaller areas.
- Kudu calves can be difficult about shifting or navigating in general, especially if they are spooked and separated from the dam.

Items Contributing to Group's Success:

- Long term resident animals
- Consistency in routine and conditioning
- Experienced keepers knowledgeable in animal behavior

Group/Exhibit Changes Over Time:

- Species have remained the same for the past 15 years.
- Outside of the occasional difficult individual animal, this exhibit has remained relatively calm.
- Aoudad were a problem for younger kudu in the past, in their current geriatric state, they are no longer a problem.

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

- Nile Lechwe (*Kobus megaceros*) (8.5)
- Scimitar-horned Oryx (*Oryx dammah*) (7.20)
- White-bearded Wildebeest (*Connochaetes taurinus*) (1.4)
- Common Ostrich (*Struthio camelus*) (3.4)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- This group of species has been successfully mixed since September of 2014 when wildebeest (the newest residents) were introduced. Before that, the Oryx were introduced to the section on 10/21/13.
- Wildebeest were introduced ~1 year ago (0.4 were adults at the time, 1.0 was less than 2 months old at the time).
- Wildebeest seldom have medical issues. If necessary, animals are chemically immobilized.
- Most scimitar-horned oryx were introduced as adults when acquired about 2 years ago. Younger animals that have been born here are usually born in holding pens and released at around 2 weeks old.
- Oryx are easily conditioned into holding pens and barns. They generally have parasite, over conditioning, and hoof-related issues. When breeding, they were prolific.
- All but the breeding male Nile lechwe were born in the section. The breeding male was introduced to the section as a sub-adult.
- Lechwe are difficult to condition into pens, so they are darted in the field for any medical intervention needs or moves. They have calves, without issue, in the field. They generally hide calves in a heavily wooded area part of the section. Multiple males have been exhibited successfully and unsuccessfully in the past. They do well here and seldom have medical management issues.
- Ostrich were introduced when a few months old.

Changes/Accommodations Needed:

- A heavily wooded area allows females that are nearly to parturition to hide calves. Also, animals that have been ostracized seek refuge in this area.

Reproductive Management/Breeding History:

- Nile lechwe are a breeding group.
- Female oryx are generally separated for calving.
- Oryx and lechwe males are sterilized or disbursed for breaks in breeding or to introduce a new male for breeding.
- 1.0 white-bearded wildebeest is a young male, not of breeding age.

Management Challenges:

- No inter-species related challenges come to mind. Most challenges involve individuals of the same species or medical management challenges.

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Items Contributing to Group's Success:

- Slow introductions of Species 'B' to Species 'A' with species 'A' already having established itself into the exhibit
- Staff that is experienced in monitoring/reading species' behavior

Group/Exhibit Changes Over Time:

- A nonbreeding group of gemsbok was housed with Nile lechwe and ostrich for 10+ years.
 - Gemsbok (*Oryx gazella*)
 - Nile Lechwe (*Kobus megaceros*)
 - Common Ostrich (*Struthio camelus*)
- Scimitar-horned oryx replaced this aging gemsbok herd but oryx and gemsbok were never mixed.

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

- Kulan (*Equus hemionus kulan*) (7.15)
- Nilgai (*Boselaphus tragocamelus*) (1.3)
- Water Buffalo (*Bubalus bubalis*) (1.5)

Group has been successfully mixed for 8 months (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This specific group has been together since March of 2015 when young buffalo were introduced, but we have housed this species in this section with nilgai (20+ years) and with kulan (6+ years).
- Most kulan were introduced as adults; 8 have been born into the herd.
- The current water buffalo were introduced at ~1 year old.
- All nilgai were introduced as adults.
- Kulan and buffalo are easily caught into holding areas for foaling/calving or medical procedures.
- Nilgai are a little more difficult to catch in holding but are never chemically immobilized in the field (unless emergent) due to their propensity to run into water.

Changes/Accommodations Needed:

- Buffalo are given access to wallows at all times.

Reproductive Management/Breeding History:

- Males are castrated or disbursed for breeding breaks or a new breeder is introduced.
- Kulan are currently non-breeding but have bred in the past.
- Nilgai are non-breeding.
- Water buffalo are all intact but too young to breed.

Management Challenges:

- There are no challenges between species. Any challenges are related to conspecific interactions.

Items Contributing to Group's Success:

- Size of exhibit
- Long history of species management in this exhibit and established animals guiding new animals and species
- Knowledgeable staff to monitor mixes and introductions

Group/Exhibit Changes Over Time:

- This exhibit was part of a larger exhibit until 2010. At that time, the exhibit was divided in half to separate kulan from blackbuck. Kulan and blackbuck were mixed for about 1 year. Kulan began to chase and harass blackbuck so the two species were separated by a fence.
 - Blackbuck (*Antelope cervicapra*)
 - Kulan (*Equus hemionus kulan*)

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

Blackbuck (*Antilope cervicapra*) (~50.50)

Nilgai (*Boselaphus tragocamelus*) (7.14)

Water Buffalo (*Bubalus bubalis*) (10.7)

Group has been successfully mixed for 15+ years (current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Most blackbuck are born into this established herd. Some have been successfully introduced, both individually and in groups successfully with little to no howdy time.
- All nilgai were introduced through birth to this exhibit.
- Water buffalo were introduced by birth and as adults to this exhibit without issue.

Changes/Accommodations Needed:

- Hides are accessible for blackbuck calving.
- Blackbuck are also given exclusive feeding locations that nilgai and water buffalo cannot access.
- All species are conditioned into holding areas for mostly medical management.
- Buffalo are given wallows.
- Nilgai and water buffalo are given access to wooded areas accessible by canals, which blackbuck cannot access.

Reproductive Management/Breeding History:

- Buffalo and nilgai are nonbreeding.
- Blackbuck males are sterilized when the male adult population reaches a population too great for the space provided to quell aggression and breeding. New breeders are occasionally acquired for new genetics.

Management Challenges:

- There are no challenges between different species other than competition for food. Exclusive feeders help overcome that challenge.
- Most challenges involve conspecifics or are medical-related (blackbuck have parasite problems).

Items Contributing to Group's Success:

- Size of exhibit
- Long established individuals and groups
- Knowledgeable staff

Group/Exhibit Changes Over Time:

- This exhibit was part of a larger exhibit until 2010. At that time, the exhibit was divided in half to separate kulan from blackbuck. Kulan and blackbuck were mixed for about 1 year. Kulan began to chase and harass blackbuck so the two species were separated by a fence.
 - Blackbuck (*Antilope cervicapra*)
 - Kulan (*Equus hemionus kulan*)

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

- Giraffe (*Giraffa camelopardalis*) (2.10)
- Greater Kudu (*Tragelaphus strepsiceros*) (6.0)
- Nyala (*Tragelaphus angasii*) (3.0)

Group has been successfully mixed for 1.5 years (since April 2014, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The last species to be introduced to the exhibit, the nyala, were introduced in April 2014. Kudu were first introduced in July 2012.
- Giraffe are typically introduced at 3 months old.
- Some giraffe will follow kudu, but there is no major aggression. They will simply shoo them away at times.
- 4.0 kudu were introduced as adults, 2.0 were introduced at 1 year old.
- 3.0 nyala were introduced at 1 year old.
- The oldest nyala will sometimes move with kudu instead of other nyala.
- All species are shifted off display at night.

Changes/Accommodations Needed:

- The exhibit has a wooded area with thick cover that the nyala and kudu go to each day.
- Giraffe are given food on a high feeder and browse is hung daily.

Reproductive Management/Breeding History:

- Kudu and nyala are bachelor groups.
- Giraffe cows are brought to the breeder male when breeding is desired.
- Male giraffe that are exhibited with females are either young (too young to breed) or sterilized.

Management Challenges:

- There are no specific challenges related to interspecies housing other than giraffe will sometimes run kudu off. Kudu have learned to keep their distance.
- All species were easily conditioned to shifting.
- Other challenges are related to species-specific health issues or individual animal behavior (1 young nyala likes to wander outside of exhibit barriers).

Items Contributing to Group's Success:

- Slow, methodical planning and introductions
- Strong, calm "leader" animals to introduce newer animals to the exhibit
- Consistent routine, conditioning, and knowledgeable keepers

Group/Exhibit Changes Over Time:

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- A herd of ~15 zebra were kept with giraffe for 10+ years until ~2008/ 2009. The only concern was zebra were aggressive towards young giraffe, so giraffe calves were kept separate from zebra until deemed appropriate to mix.
 - Giraffe (*Giraffa camelopardalis*) (2.10)
 - Plains Zebra (*Equus quagga*) (group of ~15)

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

- Jackson's Hartebeest (*Alcelaphus buselaphus lelwel*) (2.0)
- Plains Zebra (*Equus quagga*) (19.46)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.10)
- White-bearded Wildebeest (*Connochaetes taurinus*) (12.2)

Group has been successfully mixed for 3 years (since December 2012, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The most recent addition of hartebeest occurred in December 2012. The second newest species added to this section was wildebeest which occurred prior to January 2002.
- Most zebra are introduced at birth.
- Zebra are left in the exhibit 24/7, but are given access to additional pasture at night.
- White rhinoceros are introduced to the exhibit around 4 months old; some are introduced as adults.
- Rhinos are shifted into night pens at night. The current male is kept separate from females at night.
- Hartebeest were introduced as adults.
- Hartebeest are shifted off display at night.
- Male wildebeest were introduced to the exhibit as young adults, females as adults.
- Wildebeest are left on exhibit 24/7 and given access to additional pasture at night.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- White rhinoceros are encouraged to breed and are fairly successful.
- Rhinoceros females are separated for calving and are left separate until the calf is ~4 months old.
- Zebra are currently a breeding herd and are successful. Females are not separated as they near parturition, but if they exhibit behaviors indicating they want to separate (go through gates to adjacent pasture) they are given that opportunity.
- Zebra will show aggression towards rhinoceros calves and other zebra foals.
- Hartebeest and wildebeest are non-breeding.

Management Challenges:

- We observe zebra aggression with conspecifics and young rhinoceros.
- If male zebra become plentiful, aggression among males often warrants sterilization or surplus.

Items Contributing to Group's Success:

- Size of exhibit

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- Experienced staff
- Established herds over time

Group/Exhibit Changes Over Time:

- None

Lion Country Safari, Loxahatchee, FL – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (2.0)
- Common Eland (*Taurotragus oryx*) (4.21)
- Common Waterbuck (*Kobus ellipsiprymnus*) (20.23)
- Gemsbok (*Oryx gazella*) (2.0)
- Impala (*Aepyceros melampus*) (4.0)
- White-bearded Wildebeest (*Connochaetes taurinus*) (2.5)
- Common Ostrich (*Struthio camelus*) (6.10)

Group has been successfully mixed for 15+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- All species generally remain on exhibit 24/7.
- Most eland were introduced as young animals. They are easily conditioned to be caught into holding when needed, but normally stay on exhibit 24/7.
- Most wildebeest were introduced at birth. The adult male was introduced as an adult. We are unable to catch them into holding. If removal from exhibit is necessary, animals are chemically immobilized.
- Ankole were introduced as adults. They are easily conditioned to catch into holding when needed/warranted.
- Impala were introduced as sub-adults. We are unable to shift/condition this group.
- Waterbuck are difficult to catch in holding. Older animals were introduced at birth; a few adults have been introduced to this herd in recent years.
- Ostrich were introduced as chicks. Most are conditioned to catch in holding if needed.
- Gemsbok were introduced as geriatric adults. They are easily conditioned and caught in holding pens if needed.

Changes/Accommodations Needed:

- Side holding pens are available for certain species to be caught as they near parturition.

Reproductive Management/Breeding History:

- Eland are currently selectively bred. Females are brought to intact male when breeding is desired.
- Wildebeest are an active breeding herd.
- Eland and ankole are kept separate from young wildebeest calves to limit risk of MCF transmission.
- Waterbuck are an active breeding herd.

Management Challenges:

- Ankole and eland can cause trauma to young calves in the field. If a dam is unable to be caught as she nears parturition, eland and ankole are often separated to reduce the risk of harm to calves in the field.

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Items Contributing to Group's Success:

- Size of exhibit
- Long history of species management in this exhibit and established animals guiding new animals and species
- Knowledgeable staff to monitor mixes and introductions

Group/Exhibit Changes Over Time:

- No information provided.

Lion Country Safari, Loxahatchee, FL – Historical Exhibit

Species:

- Dromedary Camel (*Camelus dromedarius*) (2.0)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.0)

Group was successfully mixed for 4 years (from 2010 to 2014).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- All individuals were adults when introduced to this exhibit (rhinoceros was about 40-45 years old and camel were between 7-15 years old) when the camel exhibit was under construction.
- Camel appeared a bit fearful of rhinoceros at the start. They would avoid close contact and make wide berth to move around him. After a few weeks/month, the camel grew accustomed to the rhinoceros and showed no fear and would often be seen laying and rubbing on him (using him as a scratching post).

Reproductive Management/Breeding History:

- There was no reproduction history with camel.
- The rhinoceros was a retired breeding male.

Management Challenges:

- There were no mixed species related challenges.
- Camel had access to canals and developed skin conditions due to their propensity to spend a lot of time in the water.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Camel were eventually moved to their planned exhibit.

Group/Exhibit Changes Over Time:

- This was an old African elephant exhibit that has been used for miscellaneous large animal housing since the departure of the elephants.

The Living Desert, Palm Desert, CA – Current Exhibit

Current Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (3.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (5.2)
- Common Ostrich (*Struthio camelus*) (0.1)

Group has been successfully mixed for 5 years (since 2011, current as of 2016).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Three of the giraffe arrived as sub-adults and were introduced to the ostrich at the completion of the initial quarantine period. All other giraffe have been introduced to the ostrich/kudu at the completion of quarantine or 1-2 weeks after birth.
- The ostrich were sub-adults when introduced.
- The kudu ranged in age from 1-2 years old when introduced to the established herd of giraffe, which were a mix of juveniles and adults at the time.
- Everyone gets along well.
- All animals are shifted off exhibit in the afternoon and put in separate holding areas for each species.



Diane Brabec

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The giraffe are the only breeding group on the exhibit. The females are taken off exhibit for calving.
- Once stable, the giraffe calf and cow are reintroduced into the herd in less than a week. The other species are removed from the exhibit while the calf learns the layout of the exhibit and how to shift on/off exhibit.
- The ostrich and kudu are reintroduced to the giraffe herd when the calf is deemed old enough.
- The giraffe herd is managed by SSP recommendations; it may be divided at times to make specific breeding pairs.

Management Challenges:

- The main challenges revolve around the intact greater kudu being aggressive toward the other species on the exhibit. We had a previous male kudu that was separated before being sent to another facility due to aggression towards the giraffe on several occasions.
- It can be a challenge shifting giraffe, kudu, and ostrich separately in the morning and afternoon.

Items Contributing to Group's Success:

- The large size of the exhibit
- Having only one species breeding

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- Demeanor of the animals
- Plenty of food for all

Group/Exhibit Changes Over Time:

- Reticulated giraffe and common ostrich were successfully mixed in this exhibit for approximately 8-9 years (since late 2002 or early 2003) before the introduction of the kudu in 2011.
- The exhibit also used to contain groups of multiple ostrich, males and females in varying numbers at different times.
- In the past Egyptian geese were part of the exhibit for several years. They coexisted well with the other species but were lost to predation by wild coyotes. A small bachelor group of Cuvier's gazelle were also part of the exhibit for 1 year but were also removed due to predations issues. Gazelle were in exhibit with giraffe, ostrich and Egyptian geese, but were removed before arrival of greater kudu.
 - Cuvier's Gazelle (*Gazella cuvieri*)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
 - Common Ostrich (*Struthio camelus*)
 - Egyptian Goose (*Alopochen aegyptiaca*)

OR

- Greater Kudu (*Tragelaphus strepsiceros*)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
- Common Ostrich (*Struthio camelus*)
- Egyptian Goose (*Alopochen aegyptiaca*)

The Living Desert, Palm Desert, CA – Current Exhibit

Current Species:

- Slender-horned Gazelle (*Gazella leptoceros*) (1.3)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (2.2)
- Yellow-billed Stork (*Mycteria ibis*) (2.1)

Group has been successfully mixed for 17 years (since 1999, current as of 2016).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- This exhibit has been a mixed species group for many years.
- New animals have been introduced to each other as individuals are born or pass away.
- Most of our gazelle were introduced shortly after birth.
- The birds were adults when put on the exhibit.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Slender-horned gazelle are the only species reproducing in this exhibit.
- The male slender-horned gazelle is off exhibit when we do not want to breed or have calves on exhibit. The females give birth on exhibit.

Management Challenges:

- We have one male crane that is currently shifted off exhibit during the day because he has imprinted on humans; we keep him off exhibit when the guests have access to the open platform overlooking the exhibit.
- All of the cranes protect their nesting sites from the gazelle, but other than that the group gets along well.
- Keeping the birds from eating each other's food is another challenge.

Items Contributing to Group's Success:

- Large space
- Relatively mellow species
- No competition for resources

Group/Exhibit Changes Over Time:

- Addra gazelle were also a part of the exhibit and were successfully mixed with slender-horned gazelle from 1984-2009.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Slender-horned Gazelle (*Gazella leptoceros*)
- Abyssinian ground hornbills were also part of the exhibit from 1987-1996.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Slender-horned Gazelle (*Gazella leptoceros*)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*)

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- Slender-horned gazelle and East African crowned crane have been successfully together since 1996 (with addra present until 2009).
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Slender-horned Gazelle (*Gazella leptoceros*)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*)
- Yellow-billed Stork were added to the exhibit in 1999.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Slender-horned Gazelle (*Gazella leptoceros*)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*)
 - Yellow-billed Stork (*Mycteria ibis*)

The Living Desert, Palm Desert, CA – Current Exhibit

Current Species:

Cuvier's Gazelle (*Gazella cuvieri*) (2.1)

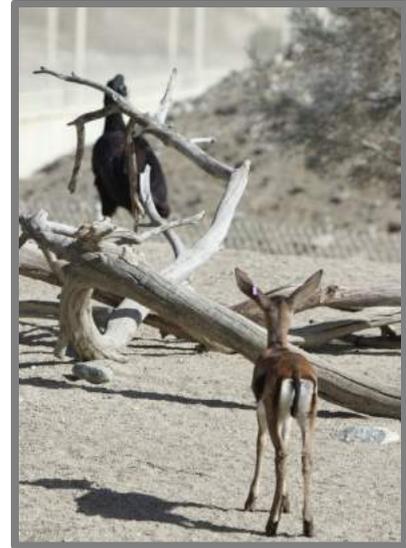
Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (0.1)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The hornbill has been on exhibit since hatching.
- Gazelle (1.1 breeding pair) were adults when introduced.
- All animals shift off exhibit overnight.
- These species get along well, although the hornbill likes to play with the gazelle and block pathways.



Brent Huffman

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Past females have calved in holding or on exhibit depending on time of day.

Management Challenges:

- The gazelle can be difficult to shift off exhibit, but other than that the animals get along well.

Items Contributing to Group's Success:

- Social bird
- Exhibit size
- Gazelle demeanor with birds

Group/Exhibit Changes Over Time:

- There used to be more hornbills, but not much else has changed.

Living Desert Zoo & Gardens State Park, Carlsbad, NM – Current Exhibit

Current Species:

- Bison (*Bison bison*) (0.4)
- Elk (*Cervus sp.*) (1.0)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- 1.0 elk was neutered before he was 4 months old so that he would not grow antlers.
- The neutered male has been with the bison since he was approximately 2 years old. He is now 12 years old.
- The bison and elk shift daily for exhibit cleaning/feeding.
- All of these animals get along well with both species instigating some chasing/running.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- 1.0 elk was young when introduced to 0.4 bison
- Not having any male bison in the exhibit

Group/Exhibit Changes Over Time:

- None

Living Desert Zoo & Gardens State Park, Carlsbad, NM – Historical Exhibit

Species:

- Mule Deer (*Odocoileus hemionus*) (1.0)
- Wild Turkey (*Meleagris gallopavo*) (1.0)

Group was successfully mixed for at least a few years.

Exhibit Size: 1 acre- 3 acres

General Management Notes:

- The mule deer and turkey were very compatible and were often together. The turkey would eat alongside the mule deer.

Reproductive Management/Breeding History:

- 1.0 mule deer was always very calm, even when in rut, so he never bothered the turkey.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Both animals died.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Current Exhibit

Current Species:

- Black Duiker (*Cephalophus niger*) (1.1)
- Lady Ross Turaco (*Musophaga rossae*) (1.1)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals were introduced as adults.
- The duiker have a holding area and barn behind the exhibit that they have access to at night.
- The turacos sometimes roost in the barn when the weather is cold.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Both species have reproduced.
- Duiker calves are usually pulled for hand-rearing, per our protocol.
- Chicks have fledged in this exhibit, but we have also pulled eggs for artificial incubation.

Management Challenges:

- None

Items Contributing to Group's Success:

- The exhibit is densely planted with lots of hide areas for both species.

Group/Exhibit Changes Over Time:

- We have had as many as 7 turacos and 1.1 buffalo weavers. The weavers were taken out because of a rat problem.
 - Black Duiker (*Cephalophus niger*) (1.1)
 - Lady Ross Turaco (*Musophaga rossae*) (group of 7)
 - White-headed Buffalo Weaver (*Dinemellia dinemelli*) (1.1)
- For 10 years (from 2000 to 2010) we had 1.1 black duiker with 1.1 violaceous turaco and 1.1 buffalo weaver. All individuals were adults and all species reproduced. There were as many as 5 turacos in the exhibit at a time.
 - Black Duiker (*Cephalophus niger*) (1.1)
 - Violaceous Turaco (*Musophaga violacea*) (1.1 + offspring)
 - White-headed Buffalo Weaver (*Dinemellia dinemelli*) (1.1)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Current Exhibit

Current Species:

- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.0)
- Lesser Kudu (*Tragelaphus imberbis*) (4.0)
- Common Ostrich (*Struthio camelus*) (1.0)

Group has been successfully mixed for 6 months (since December 2015, current as of June 2016).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All individuals were adults when introduced.
- One of the kudu was hand-raised.
- Keepers shift the ostrich into the barn before cleaning the exhibit.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- This is a non-breeding exhibit.

Management Challenges:

- None

Items Contributing to Group's Success:

- The kudu are a non-aggressive species that give space to the ostrich when he approaches and displays.

Group/Exhibit Changes Over Time:

- None



Elaine Chu



Elaine Chu

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.1)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (2.1)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All individuals were adults when introduced, except for 1.0 duiker.
- All animals are shifted into barns at night.
- Currently all duiker are separated and take turns on exhibit; the species manager doesn't want any breeding between these individuals.



CM – Los Angeles Zoo

Changes/Accommodations Needed:

- There are large boulders that create a hide area, but the duiker seldom use it.

Reproductive Management/Breeding History:

- The bongo are a non-breeding group.
- The duiker have reproduced multiple times. The calves are out on exhibit as early as 1 month old, but are sometimes kept in the back for a little longer because of aggression from the female duiker towards the keepers when the calves are young.

Management Challenges:

- We have witnessed occasional aggression from the female duiker towards keepers when the calves are young. We have direct contact with all animals when shifting because of our set up, so this becomes a challenge.

Items Contributing to Group's Success:

- Compatible species
- Large exhibit

Group/Exhibit Changes Over Time:

- We have had additional female bongo and addition female yellow-backed duiker and offspring. The bongo have not reproduced in recent history.
- For 7 years (from 1979 to 1986) 1.5 bongo (plus offspring), 1.2 yellow-backed duiker (plus offspring) and 1.4 bat-eared fox were housed in this exhibit. Most individuals were adults and the bongo and duiker both reproduced during this time. The bat-eared fox had little management and it was impossible to deal with medical issues when they occurred. At least one fox got out of the exhibit and was hit by a car. The fox made extensive burrows around and

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inside a ring of large boulders in the exhibit. Sometimes it was dicey dealing with the bongo with calves because of the close contact needed to shift animals. There were also some aggressive bongo cows at the time. The fox were ultimately removed from the exhibit.

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.5 + offspring)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.2 + offspring)
- Bat-eared Fox (*Otocyon megalotis*) (1.4)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Current Exhibit

Current Species:

- Black Duiker (*Cephalophus niger*) (1.1)
- White-crested Turaco (*Tauraco leucolophus*) (1.1)

Group has been successfully mixed for 6 years (since 2009, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals in the exhibit are adults.
- The duiker have access to a heated stall. When it's cold the turacos will sometimes roost in the stall.
- We have never had a duiker eat a chick.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- All individuals are reproductive.
- The duiker calves are pulled for hand-rearing, per our protocol.

Management Challenges:

- There has been some concern that when chicks fledge they may get stepped on by the duiker (the duiker are very flighty when keepers go in to service the exhibit), but so far that has not been a problem.

Items Contributing to Group's Success:

- The exhibit is densely planted with lots of hide areas for both species.

Group/Exhibit Changes Over Time:

- There were superb starlings in the exhibit but we think they were predated upon by rats so they were removed.
 - Black Duiker (*Cephalophus niger*) (1.1)
 - Superb Starling (*Lamprotornis superbus*) (1.1)
 - White-crested Turaco (*Tauraco leucolophus*) (1.1)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Current Exhibit

Current Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.0)
- Francois's Langur (*Trachypithecus francoisi*) (2.2)

Group has been successfully mixed for 6 years (since November 2009, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals were adults during the initial introduction.
- This mixed-species exhibit was originally initiated with a single male Reeves's muntjac, 2 male Francois's langurs, and a male Lady Amherst pheasant (the pheasants are no longer in this exhibit).
- Langurs have a holding area that is below the enclosure (not underneath) via a ramp from the enclosure to the holding. The muntjac do not have a holding area and remain on exhibit 24/7. The pheasants did not have a holding area either and used to always stay on exhibit.
- Access to a crate from the keeper work area (located under the visitors viewing platform) was created for the muntjac in case we needed to secure him or move him out of the exhibit.
- The pheasant was removed from the enclosure within a few months of the exhibit opening due to the langurs harassing the pheasant. There have not been any negative interactions between the langurs and muntjac; this remains the case today with 2.2 langurs and 1.0 muntjac.

Changes/Accommodations Needed:

- The crate access for the muntjac had to be created; an A-frame hide was also created for the muntjac.
- In addition, deadfall was placed in front of the ramp the langurs use to go to the holding in order to prevent the muntjac from going down the ramp (which he did once).
- The enclosure has thick vegetation that provides plenty of cover for the muntjac.

Reproductive Management/Breeding History:

- The langurs just recently produced their first offspring since this mixed-species enclosure opened.

Management Challenges:

- Lack of holding area for the muntjac is problematic. We have to rely on getting the muntjac trained to go into the crate, otherwise we have to dart or net the muntjac to remove him from the enclosure.

Items Contributing to Group's Success:

- Space utilization – langurs in trees and muntjac on the ground
- Lots of ground cover and thick vegetation for the muntjac and lots of vertical space and trees for the langurs

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- Single muntjac may contribute to the ease of this working – the exhibit dynamics and management might be different with a breeding pair of muntjac

Group/Exhibit Changes Over Time:

- There used to be Lady Amherst's pheasants in the exhibit but they were removed in 2011 when a new male langur and another young male were brought in. The young male started going after the pheasants and pulling feathers out. Also prior to this, eggs would hatch and langurs would kill them. See Los Angeles Zoo Unsuccessful Exhibit.
 - Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.0)
 - Francois's Langur (*Trachypithecus francoisi*) (2.1)
 - Lady Amherst's Pheasant (*Chrysolophus amherstiae*) (1.1)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Current Exhibit

Current Species:

- Greater Malay Chevrotain (*Tragulus napu*) (1.2)
- Prevost's Squirrel (*Callosciurus prevosti*) (1.1.2)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This mixed species enclosure was originally created with 0.2 chevrotain and 0.2 Prevost's squirrels. The enclosure is a square shaped enclosure with an all glass front (from floor to ceiling) for visitor viewing. There is no holding area.
- Squirrels are provided nest boxes, which are also used to enclose and move them when needed. The chevrotain are provided nest boxes on the floor (one for each).
- Deadfall is used to create visual barriers for the chevrotain. The enclosure is perched with branches and fake vines for the squirrels.
- All individuals were adults when introduced.
- After the death of the two female chevrotain we introduced a breeding pair of chevrotain that produced three young. A second female chevrotain was added to the enclosure and one of the female squirrels was replaced with a male to establish a breeding pair of squirrels in the exhibit.
- This specific group of individuals has been together for a little less than one year, with the exception of the squirrel offspring.

Changes/Accommodations Needed:

- There are hide boxes and other areas of cover for the chevrotain and nest boxes for the squirrels.
- Deadfall was also added as a visual barrier for the chevrotain.

Reproductive Management/Breeding History:

- Both species are reproductive.
- With the addition of the male squirrel we had an incident where the squirrels attacked a newly born chevrotain that later died from injuries inflicted by the squirrels (bite wounds to the hind legs that caused paralysis and infection). This was the only interaction we have ever had between the squirrels and the chevrotain. The squirrels have never bothered the adult chevrotain. Due to this incident, we now remove the female chevrotain from the enclosure prior to giving birth in order to avoid a repeat of this incident. The squirrels have raised three offspring since being established as a pair in this enclosure.

Management Challenges:

- The last chevrotain calf was attacked by the squirrels and later died. We now have to move the chevrotain to another area before they give birth.
- There is no holding area for this exhibit.

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Items Contributing to Group's Success:

- Space utilization (chevrotain on the ground and squirrels above)
- Hides and deadfall

Group/Exhibit Changes Over Time:

- The number and sexes of each species has varied, as described above.
- For 10 years (from July 2001 to January 2012) this exhibit housed 0.1 Sunda slow loris with 0.2 greater Malay chevrotain. The chevrotain were introduced to the slow loris about two months after the arrival of the loris. Nest boxes were provided for each species and dead fall was used as a visual barrier for the chevrotain. There was no breeding and no interaction between the two species. The slow loris died and was replaced with the Prevost's squirrels in 2012.
 - Greater Malay Chevrotain (*Tragulus napu*) (1.2)
 - Sunda Slow Loris (*Nycticebus coucang*) (0.1)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (0.1)
- White-crested Turaco (*Tauraco leucolophus*) (1.1)

Group was successfully mixed for 7 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals were adults when introduced.

Reproductive Management/Breeding History:

- We only had one duiker, but the turacos reproduced.

Management Challenges:

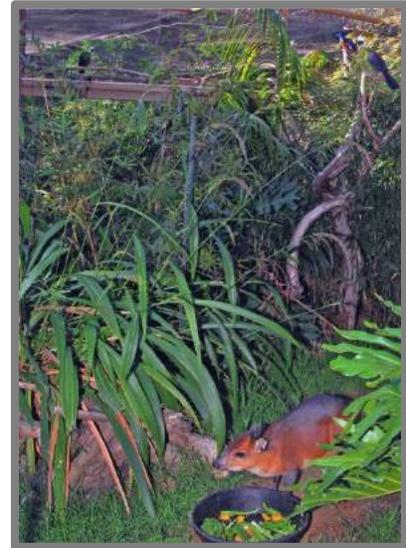
- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- After the red-flanked duiker died we could not find any individuals that could handle being exhibited in this enclosure; they were too high strung and stressed out.

Group/Exhibit Changes Over Time:

- None



Los Angeles Zoo

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

Lesser Kudu (*Tragelaphus imberbis*) (5.0)

Southern Steenbok (*Raphicerus campestris campestris*) (1.1)

Group was successfully mixed for 4 years (from 2011 to 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All individuals were adults when introduced.
- The steenbok were provided with two catch cages where they were fed that the kudu couldn't access.

Reproductive Management/Breeding History:

- The steenbok reproduced and the calves were hand-reared.

Management Challenges:

- Bobcat predation of steenbok was a challenge. We could not secure the steenbok in a safe place overnight because they would go nuts if they were locked in the catch-cage. They were left in the yard and despite being in an exhibit that was hotwired, one was found dead and partially eaten and another was found injured and later died as a result of these injuries.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- After we lost 2 steenbok to bobcat predation our other set of steenbok was sent to another institution.

Group/Exhibit Changes Over Time:

- Several different steenbok were managed in this exhibit.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

Gerenuk (*Litocranius walleri*) (3.0)

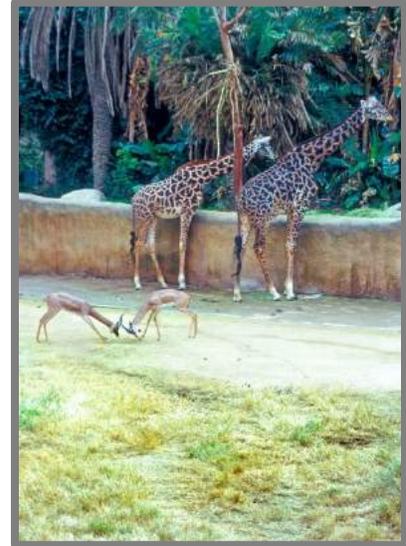
Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.3)

Group was successfully mixed for 3-4 years (from 1985 to 1988 or 1989).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The giraffe were adults when introduced to the juvenile gerenuk (3-6 months old). The gerenuk were hand-raised.
- Introductions were done slowly with visual access for approximately one week. A gate in the aisle way leading to the barn was split to make a "Dutch door" that provided the gerenuk with a safe zone.



Los Angeles Zoo

Reproductive Management/Breeding History:

- The gerenuk were kept in a bachelor group.
- The giraffe reproduced towards the end of the period when this group was mixed.

Management Challenges:

- As the gerenuk got closer to sexual maturity things started to fall apart; there was lots of chasing and several jumped out of the exhibit.
- Also, when the giraffe started having calves they would chase the gerenuk relentlessly, often going under Dutch doors to pursue them into the barn.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This mixed-exhibit was successful for the first three years that the species were together; however, once the gerenuk reached maturity and the giraffe began reproducing, the species and certain individuals needed to be separated.
- No deaths occurred, but one gerenuk sustained a broken leg from one of the giraffe kicking him; it was successfully repaired. This particular gerenuk would spar relentlessly with giraffe but the fracture occurred one day when he got his horn caught in the fence and then a giraffe walked over and kicked him.
- Overall, there was too much intra- and interspecies conflict. It is a very small exhibit and may have worked better long-term with greater space, safe zones, and a single male/female gerenuk herd.

Group/Exhibit Changes Over Time:

- There were 9 different gerenuk that rotated into the exhibit.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.2)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.0)

Group was successfully mixed for 4 years (from 1980 to 1984).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All individuals were adults when introduced.

Reproductive Management/Breeding History:

- No individuals reproduced in this exhibit.

Management Challenges:

- If the birds' wings were not kept properly trimmed they would fly out of the exhibit. We had to herd them in daily, which was a little stressful.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The stork occupied a giraffe stall at night and we needed more space for the giraffe.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Nyala (*Tragelaphus angasii*) (1.4)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.0)

Group was successfully mixed for 5 years (from 1979 to 1984).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The nyala were various ages when introduced to the adult saddle-billed stork.

Reproductive Management/Breeding History:

- The nyala were reproductive in this exhibit.

Management Challenges:

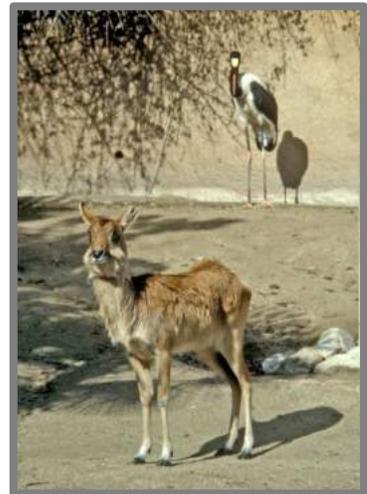
- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The bird died due to old age. The Nyala were moved out to make space for a pair of Jentink's duiker.

Group/Exhibit Changes Over Time:

- 1.3 Nile lechwe were housed with 1.1 saddle-billed stork for 4 years until the lechwe were moved and the nyala were brought into the exhibit. I don't recall if the lechwe were reproductive. The female stork died after the lechwe left and before the nyala arrived.
 - Nile Lechwe (*Kobus megaceros*) (1.3)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)



Los Angeles Zoo

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Black Duiker (*Cephalophus niger*) (1.1)
- Okapi (*Okapia johnstoni*) (1.0)

Group was successfully mixed for 10 years (from 2000 to 2010).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All individuals were adults when introduced.



Tad Motoyama

Reproductive Management/Breeding History:

- During most of the time when this exhibit was mixed we only had one male okapi.
- The duiker were reproductive.

Management Challenges:

- Once we got the female okapi, the male duiker started sparring with the male okapi and he was trampled; he was beat up and lost a hoof wall.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit was separated because of aggression between the male okapi and duiker after the female okapi arrived.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.0)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.1)

Group was successfully mixed for 2 years (from 1980 to 1982).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The giraffe were juveniles and the kudu were adults when introduced.
- All individuals were brought into the barn at night.
- The kudu pocketed food in their cheek pouches and had to be restrained so we could pull the food out daily.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The kudu were sent to another institution.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Black Duiker (*Cephalophus niger*) (1.1 + offspring)
- Kewel Bushbuck (*Tragelaphus scriptus*) (1.2 + offspring)

Group was successfully mixed for 16 years (from 1987 to 2003).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All individuals were adults when introduced.
- Everyone was shifted into the barns at night.
- The bushbuck were the craziest ungulates I have ever worked with in my 30+ years.



Los Angeles Zoo

Reproductive Management/Breeding History:

- Both species were reproductive.
- The females were separated and kept in the back for some time before going on exhibit with their calves.

Management Challenges:

- The male bushbuck attacked a male keeper, which resulted in a pretty serious arm injury.
- Overall, this exhibit worked pretty well, other than the challenges of working with highly fractious bushbuck. We had a couple that flew out of the exhibit (they could dance on ceilings) but they were recovered successfully.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The bushbuck died out and okapi were brought into the exhibit.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
- Goliath Heron (*Ardea goliath*) (1.1)

Group was successfully mixed for 6 months (in the late 1970s).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- The bongo were reproductive.

Management Challenges:

- The herons did not thrive in this mixed-species exhibit.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The herons died.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2 + offspring)
Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)

Group was successfully mixed for 4 years (from 1979 to 1983).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All were adults when introduced.
- All were shifted into the barns at night.

Reproductive Management/Breeding History:

- The bongo were separated and kept in the back with their calves for a period of time.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The birds were removed and set up in an exhibit where they could have some chance at reproduction.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

Nubian Ibex (*Capra nubiana*) (1.5 + offspring)
Gelada Baboons (*Theropithecus gelada*) (1.3)

Group was successfully mixed for 6 years (from 1977 to 1983).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All individuals were adults when introduced.
- These animals were exhibited in an old, dry, moated, rock exhibit.
- All animals were hard to lock up in the back.

Reproductive Management/Breeding History:

- The ibex were reproductive and the baboons were not.

Management Challenges:

- Locking individuals up was a challenge.
- The male gelada started challenging the male ibex and the ibex rammed him into the moat and killed him.
- After that, the females started climbing up and out of the moat.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit no longer exists because of the challenges listed above.

Group/Exhibit Changes Over Time:

- After the gelada were removed from the exhibit 1.2 rock hyrax were housed with 2.4 ibex (plus offspring). All individuals were adults. The ibex were a reproductive group, while the hyrax were not. The group was successful for three years (from 1984-1987) until the exhibit was deemed unsuitable for the hyrax. They lived under faux rocks, there was no dirt, and the exhibit was hosed daily.
 - Nubian Ibex (*Capra nubiana*) (2.4 + offspring)
 - Rock Hyrax (*Procavia capensis*) (1.2)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Aoudad (Barbary Sheep) (*Ammotragus lervia*) (1.4)
- Barbary Macaques (*Macaca sylvanus*) (1.3)

Group was successfully mixed for 5 years (from 1980 to 1985).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All were adults when introduced.
- The animals were exhibited on a water-filled, old moated rock exhibit. The exhibit had a waterfall that recirculated water from the moat.
- It was hard to trap animals in the back.
- All feces were housed into the moat and down the waterfall.

Reproductive Management/Breeding History:

- Both species reproduced.

Management Challenges:

- These species were hard to manage in this exhibit.
- Exhibit sanitation was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was torn down to build a new exhibit.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Nubian Ibex (*Capra nubiana*) (2.4)

Group was successfully mixed for 1 year (from 1978 to 1979).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The ibex were young and the klipspringer were adults.

Reproductive Management/Breeding History:

- The ibex were reproductive.
- There was one klipspringer calf born, but I think it was prior to the ibex.

Management Challenges:

- No one locked up in the back.
- The klipspringer hung out behind the mountain and were seldom visible; they may have been under stress.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The klipspringers were sent out or died.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

Aoudad (Barbary Sheep) (*Ammotragus lervia*) (group of 6)
Bat-eared Fox (*Otocyon megalotis*) (1.2)
Mona Monkey (*Cercopithecus mona*) (0.1)
Vervet Monkey (*Chlorocebus pygerythrus*) (1.3 - 1.4)

Group was successfully mixed for 3 years (from 1971 to 1974).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No one locked up in holding.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Nubian ibex were brought in for the exhibit. The Barbary sheep were moved to another exhibit. The primates dispersed (were either sent out or moved). The bat-eared fox were drowned when someone left the pool on and flooded them out.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Springbok (*Antidorcas marsupialis*) (1.5 + offspring)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.0)

Group was successfully mixed for 2 years (from 1976 to 1978).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All were adults when introduced.

Reproductive Management/Breeding History:

- The mixed species exhibit ended when the springbok started reproducing.

Management Challenges:

- All went ok until the springbok gave birth and the yellow-backed duiker was observed carrying the calf in its mouth; it subsequently died.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- See management challenges above.

Group/Exhibit Changes Over Time:

- Nile lechwe were in the mix at some point but I'm not sure when.
 - Nile Lechwe (*Kobus megaceros*) (1.2)
 - Springbok (*Antidorcas marsupialis*) (1.5 + offspring)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.0)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- American Bison (*Bison bison*) (1.1)
- American Pronghorn (*Antilocapra americana*) (1.6)

Group was successfully mixed for 22 years (from 1974 to 1996).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The bison were juveniles and the pronghorn were young too.
- The bison were shifted into back holding at night. We had to be careful not to allow any pronghorn in or else the bison would corner them. I think at least 1 was killed.



Los Angeles Zoo

Reproductive Management/Breeding History:

- I don't think the bison ever reproduced; I don't remember why but they may have been contracepted.
- The pronghorn were very prolific and all fawns were hand-reared.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The species died off, zebra were brought in to fill the exhibit, and we got involved with peninsular pronghorn.

Group/Exhibit Changes Over Time:

- Before the bison/pronghorn exhibit was created a mismatch of animals (primarily surplus hoofstock) were housed in this exhibit from 1967 to 1973. From 1969-1970 this exhibit contained greater kudu, red lechwe, springbok, crowned crane, rock hyrax, and secretary birds. The kudu were non-reproductive and the cranes were brought in at night. The management of these animals was difficult; we only had a two-stall barn in the back (but there was a pretty sizable holding area). Challenges in this exhibit included: relentless sparring between the springbok and male kudu, difficulty shifting animals, and one time a keeper was gored by a male kudu.
 - Greater Kudu (*Tragelaphus strepsiceros*) (1.2)
 - Red Lechwe (*Kobus leche leche*) (1.0)
 - Springbok (*Antidorcas marsupialis*) (1.0)
 - Crowned Crane (*Balearica sp.*) (1.1)
 - Rock Hyrax (*Procavia capensis*) (group of 5-6)
 - Secretary Bird (*Sagittarius serpentarius*) (1.0)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Angolan Giraffe (*Giraffa camelopardalis angolensis*) (1.2)
- Plains Zebra (*Equus quagga*) (1.2)

Group was successfully mixed for 3 years (from 1972 to 1975).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All were adults when introduced.
- The giraffe were locked in the barn at night.

Reproductive Management/Breeding History:

- None

Management Challenges:

- The male zebra would not lock up, which made management difficult.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The zebra were removed because of management challenges.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Axis Deer (*Axis axis*) (1.3)
- Blackbuck (*Antelope cervicapra*) (1.3)
- Gaur (*Bos gaurus*) (1.2)

Group was successfully mixed for 20 years (from 1976 to 1996).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The gaur were juveniles and the other species were adults.
- The blackbuck were introduced to the gaur first and then later the axis deer; there was lots of chasing at first, but all calmed down after a couple of days.
- The axis deer were introduced without a ripple.
- The gaur were shifted to back holding so keepers could service the exhibit.



Los Angeles Zoo

Reproductive Management/Breeding History:

- All species reproduced.
- We had as many as 6 or 7 gaur at one time.
- We had high mortality with deer fawns until we started holding them off exhibit before fawning and keeping them in holding for a period of time.
- There were blackbuck calves born in this exhibit.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The gaur became really problematic to place, as did the other species. At some point we brought the Sumatran rhino into this exhibit.

Group/Exhibit Changes Over Time:

- The number of individuals of each species varied.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Suni (*Neotragus moschatus*) (1.1)
- Leopard Tortoise (*Stigmochelys pardalis*) (group of 2)
- Schmidt's Spot-nosed Guenon (*Cercopithecus petaurista*) (1.2)

Group was successfully mixed for 2 years (from 1987 to 1989).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All were adults when introduced.
- The tortoises spent the winter in the barn.

Reproductive Management/Breeding History:

- None



Los Angeles Zoo

Management Challenges:

- The monkeys were too high energy for the suni and they rode on their backs. The suni spent a lot of time in the cave out of the guenon's range. The keeper thought the suni were stressed. One suni was injured by a monkey.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The suni were on loan from the Hunt's and they took them back.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Plains Zebra (*Equus quagga*) (1.2)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.1)

Group was successfully mixed for approximately 1 year (in the mid to late 1970s).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The animals were introduced over a period of 2 months, gradually with visual contact.
- The yard was separated by telephone poles that the rhinos could not get through.

Reproductive Management/Breeding History:

- None

Management Challenges:

- The zebra did not lock up into holding well and keepers had to work in a relatively small area with them.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The white rhinos were sent out and replaced with black rhinos. The zebra were also shipped to another institution.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

Chinese Water Deer (*Hydropotes inermis inermis*) (1.0)
Sarus Crane (*Grus antigone*) (0.1)

Group was successfully mixed for 3 years (from 2011 to 2014).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Both were adults when introduced.
- The exhibit was separated by bamboo poles. The deer usually stayed on one side but could go on both sides. The crane would sometimes chase the deer out of the crane side, but they would be seen together in the same yard on occasion.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Chinese water deer was killed by a bobcat. Previously, he had been housed with his male sibling but he got hung by his canine on the stainless mesh caging (before the crane was added).

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (0.1)
- Red River Hog (*Potamochoerus porcus*) (1.1 or 0.3)

Group was successfully mixed for 5+ years (from 2002 to 2004 and then 2006/2007 to 2009/2010).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced. The bongo was old and the original pair of red river hogs were old and mellow. The female hog was missing an eye.
- All were brought in at night, which required keepers to be in close contact.
- The pair of hogs was in the exhibit for about 2 years (2002-2004) until the female died and the male was sent out.
- At some point, around 2006/2007 a trio of females were brought in. They were removed by 2009/2010.



JP – Los Angeles Zoo

Reproductive Management/Breeding History:

- None

Management Challenges:

- The pair of hogs was easier to manage, although there were some scuffles initially between the bongo and male hog. The male was hard on the barns.
- The trio was more problematic. They were younger and one was a known biter. This made lock up challenging. There were no issues between the animals.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- In December 2008 a keeper was locking up animals and one of the female hogs attacked him (it was not the known biter). She chased him on top of a cement drinker and he sustained a serious laceration on his leg. We modified the gates so lock up could be done remotely, but the system was problematic and the hogs started destroying the barn. The hogs were moved shortly afterwards.

Group/Exhibit Changes Over Time:

- There were two different groups of red river hogs.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Royal Antelope (*Neotragus pygmaeus*) (1.1)
- Superb Starling (*Lamprotornis superbus*) (1.1)
- White-crested Turaco (*Tauraco leucolophus*) (1.1)

Group was successfully mixed for a few months during Summer 2010.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals were adults when introduced.
- The royals had heated hide boxes.

Reproductive Management/Breeding History:

- The turacos and royals reproduced.

Management Challenges:

- We were concerned the royals were not warm enough. We did not attempt the following year because they were so delicate.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We were concerned that the royal antelope were not staying warm enough.

Group/Exhibit Changes Over Time:

- We attempted to add a single red-flanked duiker to the mix but she harassed the royals and was taken out after two days of attempts. See Los Angeles Zoo Unsuccessful Exhibit.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Greater Malay Chevrotain (*Tragulus napu*) (1.1)
- Indian Flying Fox (*Pteropus giganteus*) (8.7.1)

Group was successfully mixed for 9 months (from March 1987 to December 1987).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- 1.1 chevrotain (adults) were introduced to the exhibit after the bats had already been established in the exhibit for 3 years.
- Perching was provided for the bats.
- A small holding was provided for the chevrotain.

Reproductive Management/Breeding History:

- These species were non-breeding.

Management Challenges:

- It was difficult to keep the chevrotain warm, since this was an outdoor enclosure.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The chevrotain died due to cold stress.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

Japanese Serow (*Capricornis crispus*) (1.0 or 0.1)
Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (5.6)

Group was successfully mixed for 8 years (from 1980 to 1988).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- A single serow was always kept on exhibit with the muntjac (whose numbers varied between 1980 and 1988 depending on the number of births per year). The maximum number in the exhibit with the single serow was around 5.6 muntjac at one time.
- The serow was either male or female; there were brief periods when the two were put together for breeding, but they were always separated afterwards.
- Muntjac ages ranged from adults to juveniles and calves, while the serow were adults.

Reproductive Management/Breeding History:

- The muntjac reproduced every year between 1980 and 1988. They always stayed on exhibit or had access to holding.
- The serow never reproduced.

Management Challenges:

- There was limited holding for the muntjac, which made it difficult to capture them when needed.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The muntjac were all moved out of the zoo in 1988.

Group/Exhibit Changes Over Time:

- 1.0 Chinese water deer (4 years old) was house with 1.1 Japanese Serow (both over 10 years old) for 5 years from July 1993 to July 1998. There was no reproduction in the exhibit and no specific challenges with either species. The Chinese water deer died in July 1998.
 - Chinese Water Deer (*Hydropotes inermis*) (1.0)
 - Japanese Serow (*Capricornis crispus*) (1.1)

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Zebra Duiker (*Cephalophus zebra*) (1.0)
- Diana Monkey (*Cercopithecus diana*) (group of 3-4)

Group was successfully mixed for approximately 2 years (from 1979 to 1981).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals were adults when introduced.

Reproductive Management/Breeding History:

- There was no reproduction in this group.

Management Challenges:

- Keepers cannot recall any problems within this group. The monkeys were low key and did not stress the duiker like some of the guenon mixes.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The duiker moved or died.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (0.1)
- Zebra Duiker (*Cephalophus zebra*) (1.0)
- Black and White Ruffed Lemur (*Varecia variegata*) (1.1)

Group was successfully mixed for 1 year (from 1976 to 1977).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals were adults when introduced.
- The red-flanked duiker was old and placed with the zebra duiker as a companion.

Reproductive Management/Breeding History:

- There was no reproduction in this exhibit.

Management Challenges:

- There were no challenges in this exhibit.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The red-flanked duiker died and the zebra duiker was housed with the lemurs for a while after. At one point, there were several duiker with a single male lemur.

Group/Exhibit Changes Over Time:

- None



Los Angeles Zoo

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Zebra Duiker (*Cephalophus zebra*) (1.2)
- Crowned Lemur (*Eulemur coronatus*) (1.1)

Group was successfully mixed for 4 years (from 1984 to 1988).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Most individuals were adults when introduced.

Reproductive Management/Breeding History:

- The duiker were reproductive but the lemurs were not.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The lemurs were relocated to another exhibit; I cannot remember why.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (1.2)
- Brown Greater Galago (*Otolemur crassicaudatus*) (1.1 or 1.2)

Group was successfully mixed for 3 years (from 1980 to 1982).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals were adults when introduced.
- There were at least 1.2 red-flanked duiker in this exhibit, but potentially more.

Reproductive Management/Breeding History:

- The duiker were reproductive.
- I can't recall any reproduction with the galago.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit currently houses black duiker; the galago were removed.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (1.2)
- Moustached Guenon (*Cercopithecus cephus*) (1.2)
- Radiated Tortoise (*Astrochelys radiata*) (group of 1 or 2)

Group was successfully mixed for 1-2 years (from 1983 to 1985/1986).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Most animals were adults when introduced.
- The tortoises were removed during the winter and housed in a barn.

Reproductive Management/Breeding History:

- The duiker were reproductive.

Management Challenges:

- The guenons were too high strung to coexist with the duiker (they would ride on duiker's backs).
- The duiker's stress levels caused conflict between keepers about how to manage the group.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The guenons were ultimately removed because of the stress it was causing the duiker.
- This exhibit currently houses black duiker.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

North Sulawesi Babirusa (*Babyrousa celebensis*) (1.1)
Lowland Anoa (*Bubalus depressicornis*) (0.1)

Group was successfully mixed for 6-8 months at most.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The anoa was hand-reared and moved up to the babirusa exhibit when she was 8-10 months old.
- The anoa was introduced to the female babirusa (as the babirusa pair is kept separate, except for breeding). The babirusa female was an adult at this time.



Tad Motoyama

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The anoa started to become overly aggressive with the babirusa around the time the anoa's horns were becoming more prominent.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Nile Lechwe (*Kobus megaceros*) (1.3)
- Common Ostrich (*Struthio camelus*) (1.2)

Group was successfully mixed for 4 years (from 1984 to 1988).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced.
- These animals were housed together 24/7.

Reproductive Management/Breeding History:

- The Nile lechwe reproduced each year.
- The ostrich laid eggs, but no chicks hatched; this was a management decision.

Management Challenges:

- Limited holding space was an issue; we could not lock up the lechwe.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Nile lechwe were removed from the collection in 1988.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Bukharan Markhor (*Capra falconeri heptneri*) (1.4)
- Sulawesi Crested Macaque (*Macaca nigra*) (6.6)

Group was successfully mixed for 9 months (from March 1979 to December 1979).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- The markhor reproduced.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Macaques killed the markhor kids.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Père David's Deer (*Elaphurus davidianus*) (1.2)
- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (unknown group)

Group was successfully mixed for an unknown amount of time.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- None



Los Angeles Zoo

**Los Angeles Zoo and Botanical Garden,
Los Angeles, CA – Historical Exhibit**

Species:

Reeves's (Chinese) Muntjac (*Muntiacus reevesi*)
White-cheeked Gibbon (*Nomascus leucogenys*)

Group was successfully mixed for an unknown amount of time.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Gibbons harassed the muntjac and the muntjac were removed.

Group/Exhibit Changes Over Time:

- None

**Los Angeles Zoo and Botanical Garden,
Los Angeles, CA – Historical Exhibit**

Species:

- Southern Pudu (*Pudu puda*) (1.1)
- Black Howler Monkey (*Alouatta caraya*) (1.1 + offspring)

Group was successfully mixed for 5-8 years (during the mid to late 1980s).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals were adults when introduced.

Reproductive Management/Breeding History:

- Both species were reproductive.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Historical Exhibit

Species:

- Southern Pudu (*Pudu puda*) (1.1 + offspring)
- White-faced Saki Monkey (*Pithecia pithecia*) (1.1 + offspring)

Group was successfully mixed for 5 years (from 1998 to 2003).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All animals were adults when introduced.

Reproductive Management/Breeding History:

- Both species were reproductive.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The pudu moved out – I'm not sure why.

Group/Exhibit Changes Over Time:

- None

The Maryland Zoo in Baltimore, Baltimore, MD – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.3)
- Lesser Kudu (*Tragelaphus imberbis*) (3.2)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.0)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)

Group has been successfully mixed for 6 months (current as of 2016).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The storks and hoofstock species have been managed in the exhibit together for approximately 12 years (since 2004).
- Although these species (with the exception of the hornbill) have always been mixed in this exhibit, these are almost all new animals to the area due to death of animals over the years.
- 1.2 lesser kudu are ages 5, 5, and 2 years; they were introduced this past spring and we have seen breeding behaviors. These individuals do well together.
- There was some aggression from our lone addra gazelle when we first introduced the females, but it wasn't too bad and subsided after the first few days. It mostly happened when we first put them on exhibit.
- We added the two newer addra females this summer. 0.3 are ages 3, 1, and 1 years. The 3 year old is the one I mention above who had some aggression towards the kudu. There are still some issues with this female and the other two addra females. The younger ones share stalls at night but the 3 year old is separated out.
- Male kudu and addra have not been exhibited together successfully. They rotate being out with the females and depending on who we are breeding at the time.

Changes/Accommodations Needed:

- We need more holding stalls, especially for breeding.
- We need an area to put the male addra or male kudu when they are not on exhibit. A bull yard would be ideal, we only have small yards off of holding.
- Winter is very tough for animals being locked indoors due to cold or exhibit conditions.

Reproductive Management/Breeding History:

- We just started breeding with the kudu. We believe one is pregnant and have seen breeding behaviors with the other.
- We have not put the male addra with the younger addra females yet due to age and space for calves.
- Males are rotated in for social housing and breeding.

Management Challenges:

- Holding space is a challenge.
- Another challenge is herding the addra inside. There is a large berm at the back that can have bad footing; there are also tight corners around concrete rock walls and lots of pool edge that is

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sometimes hard for the hoofstock to see. The runways through the rock wall are also very dark and therefore hard for animals to transition through.

Items Contributing to Group's Success:

- Pretty large exhibit space

Group/Exhibit Changes Over Time:

- None

The Maryland Zoo in Baltimore, Baltimore, MD – Current Exhibit

Current Species:

- Plains Zebra (*Equus quagga*) (0.3)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.0)
- Common Ostrich (*Struthio camelus*) (0.1)

Group has been successfully mixed for approximately 15 years (since 2001, current as of 2016).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These current individuals have been mixed for approximately 9 years.
- I was not here when this exhibit was first put together so I am not sure how introductions went.
- There have not been very many issues between species.

Changes/Accommodations Needed:

- Each species has a runway and holding yard that they can access to get away from the other animals if needed.

Reproductive Management/Breeding History:

- We have only ever bred zebra due to holding space. The one foal that was born in this exhibit was spooked on exhibit and ended up dying from capture myopathy.

Management Challenges:

- Getting the animals all off exhibit is a challenge. The rhinos are especially challenging some days and we just have to wait them out or leave them out on exhibit.
- Lots of erosion issues due to storm water management erosion and animal foot traffic, which requires a lot of continual yard work; we can't keep grass in the yard.
- We have had issues with male zebra's inability to socialize well with the females on exhibit and the lack of holding space has not allowed for breeding of the species.

Items Contributing to Group's Success:

- Exhibit size and strong training to recall each species separately

Group/Exhibit Changes Over Time:

- The numbers have fluctuated but overall there have not been any changes to the group composition.

The Maryland Zoo in Baltimore, Baltimore, MD – Current Exhibit

Current Species:

- Sitatunga (*Tragelaphus spekii*) (4.4)
- Abyssinian Ground Hornbills (*Bucorvus abyssinicus*) (0.2)
- West African Crowned Crane (*Balearica pavonina pavonina*) (0.1)
- White Stork (*Ciconia ciconia*) (0.1)

Group has been successfully mixed for 7 years (since 2009, current as of 2016).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These current individuals have been together for roughly 4 years.
- The birds do not seem to have any issues with the sitatunga.
- These are all new animals due to births and deaths and moves within the sitatunga herd. They are not all together due to some aggression between males and females with calves.
- We rotate and mix groups of who is out in the main exhibit, in the smaller exhibit, and kept in holding yards.

Changes/Accommodations Needed:

- We need increased bird holding spaces so that we can increase the flock numbers and breed.

Reproductive Management/Breeding History:

- Sitatunga are breeding well with increased barn space.
- We have not had any luck breeding the birds; they need more holding space and birds in the exhibit have challenges like imprinting or injuries that hinder breeding.

Management Challenges:

- The male sitatunga's aggression can make accessing the exhibit to retrieve lost items/trash difficult during the day.
- The size of the exhibit (very large) can make herding animals a challenge.

Items Contributing to Group's Success:

- Large exhibit and lots of holding space to manage sitatunga groups as needed

Group/Exhibit Changes Over Time:

- A new barn was built so that we could increase the sitatunga herd size and increase breeding.
- Hornbills were added to the exhibit in 2009. Other species in this exhibit have been successfully mixed together for at least 15 years.

Memphis Zoo, Memphis, TN – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.4)
- Grant's Gazelle (*Nanger granti*) (1.5 + offspring)
- Common Ostrich (*Struthio camelus*) (0.2)
- Guineafowl (*Numididae sp.*) (0.0.14)

Group has been successfully mixed for several years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Bongo shift into a barn for grain; all other animals are left on exhibit 24/7 (unless they are given access during extreme weather when the bongo are locked in).
- Guineafowl currently shift in and are secured overnight, but we will eventually leave them on exhibit overnight.
- The ostrich are locked in when it's going to be below freezing for an extended period.
- Grain is left out during the day and pulled at night; alfalfa is fed throughout the day.



Brent Huffman

Changes/Accommodations Needed:

- The bongo have to be locked in for the Grant's gazelle to have access because otherwise they monopolize all available space.
- The exhibit ground is grass and mud, has a large pool, deadfall, and several large trees.

Reproductive Management/Breeding History:

- Bongo and Grant's gazelle both have bred well in this exhibit.
- Bongo give birth while secure in the barn, Grant's gazelle give birth on exhibit.

Management Challenges:

- A larger barn would allow Grant's gazelle more space to shift in, or if the barn had a pen (or two), that would allow us to shift the Grant's gazelle in as a herd.

Items Contributing to Group's Success:

- Lots of space
- Little competition for resources
- Good tempered male bongo

Group/Exhibit Changes Over Time:

- None for the last two years.



Courtney Janney

Memphis Zoo, Memphis, TN – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (0.3)
- Scimitar-horned Oryx (*Oryx dammah*) (0.5)

Group has been successfully mixed for several years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Animals are introduced at all ages.
- All animals are trained to shift into a barn for grain once per day.



Brent Huffman

Changes/Accommodations Needed:

- The yard is largely crushed stone/dirt with deadfall.

Reproductive Management/Breeding History:

- None – these groups are non-breeding.

Management Challenges:

- I would be afraid of zebra aggression if we had reproducing oryx, but otherwise the group does well.

Items Contributing to Group's Success:

- No competition for resources

Group/Exhibit Changes Over Time:

- None

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

- Bactrian Camel (*Camelus bactrianus*) (1.0)
- Indian Muntjac (*Muntiacus muntjak*) (1.0)

Group has been successfully mixed for approximately 10 years (since 2006, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The camel has been in this exhibit since 2006; he arrived at approximately 4 years of age. Some muntjac have been in there since the 1990s (there are lots at the zoo and they are moved around through various exhibits).
- The camel is fed inside/recalled in the morning and at night. The muntjac are recalled once a day for grain once the camel is on exhibit.
- There is a camel squeeze/chute built in to access the barn.

Changes/Accommodations Needed:

- We have calf shelters for the muntjac that are inside camel holding; the muntjac feed there as well.
- There is an additional loafing shed in the yard for the camel.

Reproductive Management/Breeding History:

- We had at one time up to 1.2 camel. The calf was a result of unintentional breeding (birth control failure).
- The muntjac group was also 1.1 plus calves at various times.

Management Challenges:

- Up until 5 years ago, with the arrival of a new animal curator, these animals were not recalled or chute trained.

Items Contributing to Group's Success:

- Available space

Group/Exhibit Changes Over Time:

- Additionally, we had 1.1 sarus cranes living in this exhibit until the last one died. This lasted approximately 5 years.
 - Bactrian Camel (*Camelus bactrianus*)
 - Indian Muntjac (*Muntiacus muntjak*)
 - Sarus Crane (*Grus antigone*)
- We also had 1.9 barasingha and 1.0 Bactrian camel in the 1990s for about 3 years. We had to separate the 1.0 barasingha from the camel when he was in run because he would get too aggressive. There were no problems when the 1.0 camel was in rut. The camel was fed separately. The barasingha had access to the barn but were never locked inside.
 - Bactrian Camel (*Camelus bactrianus*) (1.0)
 - Barasingha (*Rucervus duvaucelii*) (1.9)

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

Axis Deer (*Axis axis*) (0.2)

Sichuan (Tibetan) Takin (*Budorcas taxicolor tibetana*) (1.3)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 1-3 acres

General Management Notes:

- There is a loafing shed with barriers for feeding the axis/spotted deer.
- We shift the takin in twice per day for feed, recall, and to give the spotted deer uninterrupted access to their grain (in case a younger takin manages to get under the creep).
- We have fortified the trees with wooden fencing to keep the takin from girdling the trees.
- The spotted deer were in the exhibit before the takin were received. We started with one male takin and then added a breeding female. A calf was produced. There were no problems between species, other than the takin wanted to eat all the grain.
- We added a rock and dirt formation for the takin to climb. This is adjacent/overlooked by our Big Cats exhibit which has housed tigers, lions, and sun bears. The tigers particularly like the proximity and “stalk” the takin that seem so close. The takin herd appears to like to stand “at tiger nose height” and stare at the tiger.
- The takin are tough on doors that have to move. We regularly have to redo our pulley systems and reattach boards in the holding area.

Changes/Accommodations Needed:

- We have a loafing shed with barriers put up to try to keep the takin out of the spotted deer food.

Reproductive Management/Breeding History:

- We separate the takin male sometimes to prevent breeding post-calf. We rotate mother-calf dyad with the male on exhibit or in holding.

Management Challenges:

- The takin attempts to get to the spotted deer food, or into the loafing shed/creep even when food is not there; the young calf used to get in and then it would take her a while to get back out.
- The young takin calf also challenged the wood corrals around the trees and we had to add extra boards.

Items Contributing to Group’s Success:

- Spotted deer have seen a lot of changes over the year and seem to adapt quickly
- Lots of space with very large, diverse topography
- Temperament of the individuals of both species

Group/Exhibit Changes Over Time:

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- Before the takin, the spotted deer (then 1.3) were housed with Chinese muntjac (1.1) and varying number of Przewalski's horses (maximum of 1.2). The Przewalski's horses had various medical problems, didn't do well in the exhibit, and compacted the soil. There were no problems reported between the species. The muntjac bred on exhibit multiple times. This mix existed for about 2 years. The last Przewalski's horse was lost in 2010. The spotted deer and muntjac continued in the yard until the muntjac were removed and the takin were added.
 - Axis Deer (*Axis axis*) (1.3)
 - Przewalski's Wild Horse (*Equus ferus przewalskii*) (1.2)
 - Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.1)
- Previously, this exhibit had 1.2 nilgai, 1.4 spotted deer, 1.1 Chinese muntjac, and 1.1 Lilford cranes. This mix started in 1987 and continued for about 7 years. The male nilgai was dangerous for keepers and some of the other animals and was dehorned. The muntjac bred on exhibit and produced calves.
 - Axis Deer (*Axis axis*) (1.4)
 - Nilgai (*Boselaphus tragocamelus*) (1.2)
 - Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.1)
 - Lilford Crane (*Grus grus lilfordi*) (1.1)

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (0.2)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (0.2)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The giraffe were in this exhibit initially (since 2001 or 2002) and the zebra were added in 2007.

Changes/Accommodations Needed:

- The group is rotated between the lower yard (with grass) and the main exhibit; this allows the animals time on grass, but also preserves the grass in the lower yard. The main exhibit is compacted and denuded.

Reproductive Management/Breeding History:

- 1.0 zebra was rotated in and out for breeding (he was held in the lower yard) until about 2011, then he was kept with 0.2 zebra and 0.2 giraffe year round until his death in 2014.

Management Challenges:

- A challenge has been getting keepers to start doing shifting/recall with the zebra.

Items Contributing to Group's Success:

- Temperament of the giraffe
- Space
- Temperament of the older female zebra (she steadies the others and is a quick learner)

Group/Exhibit Changes Over Time:

- In the 1980s there were 1.2 ostrich and 1.0 Dromedary camel in this exhibit instead of giraffe and zebra. This lasted about 3 years, and they got along fine.
 - Dromedary Camel (*Camelus dromedarius*) (1.0)
 - Common Ostrich (*Struthio camelus*) (1.2)

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

- Sitatunga (*Tragelaphus spekii*) (3.5)
- White stork (*Ciconia ciconia*) (1.1)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- We shift 1.0 sitatunga off exhibit and separate him from the females in order to time births for the warmer months.
- We take 1.1 storks off exhibit during colder months.

Changes/Accommodations Needed:

- We have various methods/containers adapted to feed the storks – not because the sitatunga get into their food, but because the free-ranging peacocks are bandits and the fish (if not eaten) attract the resident gray fox into the exhibit. These modifications have stopped the fox feeding, and we caught up all the peacock due to HPAI.

Reproductive Management/Breeding History:

- 1.0 sitatunga are rotated as mentioned.
- Female sitatunga typically birth on exhibit.
- We recall the sitatunga every night so the calves are used to coming in with their moms.

Management Challenges:

- There are no problems between the species, just stork diet delivery.
- We had a hand-reared 1.0 sitatunga from San Diego that had been kept with goats when he was younger. He was a challenge because he was a risk to himself, staff, and the public; he would put his horns through the mesh toward the public. He ultimately spent more time off exhibit than on exhibit due to his behavior.

Items Contributing to Group's Success:

- Space
- Topography (hills, grass for sitatunga to hide calves in, pond)
- Temperament of most of the sitatunga females

Group/Exhibit Changes Over Time:

- From 2000-2005 we had 1.2 Thomson's gazelle, 1.10 sitatunga, and 1.1 Demoiselle cranes. This was when the exhibit was a walk through exhibit. The 1.0 gazelle and 1.0 sitatunga would challenge baby strollers – and the walk through was closed down.
 - Sitatunga (*Tragelaphus spekii*) (1.10)
 - Thompson's Gazelle (*Eudorcas thomsonii*) (1.2)
 - Demoiselle Crane (*Grus virgo*) (1.1)

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (2.1)
- Springbok (*Antidorcas marsupialis*) (1.2)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
- Common Ostrich (*Struthio camelus*) (1.2)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)

Group has been successfully mixed for a few months (since 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The hornbill was introduced to the yard in 2015.
- Springbok were added in 2011.
- The cranes were added in 2012 and 2013.
- The ostrich have been exhibited with the kudu since about 1996, when three of our yards were combined into one large yard.

Changes/Accommodations Needed:

- We created several deadfall areas, which have been popular with the kudu and springbok.

Reproductive Management/Breeding History:

- We rotate males when we want to time the breeding of certain species.

Management Challenges:

- The young female hornbill was initially timid with the male hornbill and other animals. Now she is a bit of a pest and goes up to the hoofstock, checking out their heads and pulling on the ears; the kudu tolerate her.
- The young 1.0 kudu calf made playmates out of the 0.2 springbok when he was their size. Again, they all tolerated each other.

Items Contributing to Group's Success:

- Patience and perseverance of the staff
- Space and topography
- Temperament of individual animals

Group/Exhibit Changes Over Time:

- We once had 2.2 ostrich, but 1.0 was constantly picked on by the other 1.0 and had to be removed.
- When this exhibit was divided into three exhibits (approximately 1990-1995) we had: 1.1 waterbuck, 1.1 eland, 1.2 Nile lechwe, 1.1 or 0.0.2 marabou storks, and 1.1 West African crowned cranes. The eland were reproductive and both the eland and lechwe would grab the birds' diets.
 - Common Eland (*Taurotragus oryx*) (1.1)
 - Common Waterbuck (*Kobus ellipsiprymnus*) (1.1)

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- Nile Lechwe (*Kobus megaceros*) (1.2)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1 or 0.0.2)
- West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)
- Previously, one of the divided exhibits held 2 Ankole cattle and 1.1 West African crowned cranes for about 2 years. The Ankole destroyed the yard.
 - Ankole (Watusi) Cattle (*Bos taurus*) (group of 2)
 - West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

- Baird's Tapir (*Tapirus bairdii*) (1.0)
- Capybara (*Hydrochoerus hydrochaeris*) (1.1 or 1.0 or 0.1)

Group has been successfully mixed for 7 years (since 2008, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The male capybara and tapir have been together since about 2008.
- The female capybara was added in 2010.
- 0.1 capybara became aggressive toward 1.0 capybara and 1.0 tapir in 2015; after that she was rotated on and off exhibit to try to make them all work together.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- 0.1 capybara didn't work well once she was sexually mature; 1.0 capybara and 1.0 tapir never stood their ground with her and would just head into the water. She was a terror some days.

Items Contributing to Group's Success:

- Temperament of the male tapir
- Temperament of the male capybara when he was in the exhibit
- Water features

Group/Exhibit Changes Over Time:

- There are a lot of birds in Amazonia free flight and there can be any number of them in the tapir-capybara exhibit at any time. These species include: roseate spoonbills, scarlet ibis, cinnamon teal, sunbittern, blue-gray tanagers, silver-beaked tanagers, red-crested cardinal, yellow rumped cacique, blue-crowned mot mot, and crested oropendola.
 - Baird's Tapir (*Tapirus bairdii*)
 - Blue-crowned Mot Mot (*Momotus momota*)
 - Blue-gray Tanagers (*Thraupis episcopus*)
 - Capybara (*Hydrochoerus hydrochaeris*)
 - Cinnamon Teal (*Anas cyanoptera*)
 - Crested Oropendola (*Psarocolius decumanus*)
 - Red-crested Cardinal (*Paroaria coronata*)
 - Roseate Spoonbill (*Platalea ajaja*)
 - Scarlet Ibis (*Eudocimus ruber*)
 - Silver-beaked Tanagers (*Ramphocelus carbo*)
 - Sunbittern (*Eurypyga helias*)

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- West African Crowned Crane (*Balearica pavonina pavonina*)
 - Yellow-rumped Cacique (*Cacicus cela*)
- We usually place the bird diet after shifting the tapir inside, or we have to place the bowls up higher to keep the capybara from eating them.

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

- African Pygmy Goat (*Capra aegagrus hircus*) (1.3)
- Donkey (*Equus africanus asinus*) (0.1)
- Jacob's Sheep (*Ovis aries*) (1.2)
- Miniature Horse (*Equus ferus caballus*) (1.0)
- Nigerian Goat (*Capra aegagrus hircus*) (3.2)
- Emu (*Dromaius novaehollandiae*) (2.0)
- Greater Rhea (*Rhea americana*) (1.0)

Group has been successfully mixed for a few months (since 2015, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- We mix any and all of these species with the 2.0 emu on exhibit.
- There are grazing opportunities, exercise opportunities in a larger grass yard, and also companionship for the 1.0 rhea.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Space
- Grass
- Too much going on at once with this mixed group for anyone to focus on anyone else

Group/Exhibit Changes Over Time:

- None

Mesker Park Zoo & Botanical Garden, Evansville, IN – Current Exhibit

Current Species:

- Klipspringer (*Oreotragus oreotragus*) (1.2)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (0.1)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- We place the bird diet up high so the curious klipspringer can't get to it.

Reproductive Management/Breeding History:

- The klipspringer have produced several calves when mixed with the blue cranes in two different exhibit spaces.

Management Challenges:

- Bird diet delivery is a challenge.

Items Contributing to Group's Success:

- Space
- Temperament of animals/species
- Topography

Group/Exhibit Changes Over Time:

- We had 0.2 Stanley crane when this species was first introduced to the klipspringer in this yard.

Mesker Park Zoo & Botanical Garden, Evansville, IN – Historical Exhibit

Species:

- Indian Muntjac (*Muntiacus muntjak*) (1.1)
- Sarus Crane (*Grus antigone*) (1.1)

Group was successfully mixed for approximately 5 years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Both species reproduced in this exhibit.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Mesker Park Zoo & Botanical Garden, Evansville, IN – Historical Exhibit

Species:

- Llama (*Lama glama*) (1.4)
- Black-necked Swan (*Cygnus melancoryphus*) (1.1)
- Capybara (*Hydrochoerus hydrochaeris*) (unknown group)
- Greater Rhea (*Rhea americana*) (1.2)
- Mute Swan (*Cygnus olor*) (1.1)
- Seriema (*Cariamidae*) (1.2)
- South American Black Vulture (*Coragyps atratus*) (1.1)

Group was successfully mixed for 20 years (from 1989 to 2009).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- The capybara bred freely in this exhibit – little management was needed.
- The rheas also produced eggs and fledges.
- The swans all bred; some offspring were lost to snapping turtles that were in the two large ponds in the center of this exhibit space.

Management Challenges:

- Reports indicate that the 1.0 rhea would attack some of the animals that got close to a nest, but otherwise these species seemed to coexist well.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The ponds were disgusting – not something that could be cleaned and needed to be dredged. The fencing was subpar. The new director shut it down, moved animals elsewhere in park, and tore down the fencing.

Group/Exhibit Changes Over Time:

- None

Milwaukee County Zoological Gardens, Milwaukee, WI – Current Exhibit

Current Species:

- Impala (*Aepyceros melampus*) (1.6)
- Cinereous Vulture (*Aegypius monachus*) (2.3)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Numbers of impala and vultures have varied.
- Hornbills are taken into the barn nightly.
- Impala come off the exhibit nightly and have access to off exhibit holding yards weather permitting.
- Vultures may stay on exhibit overnight weather permitting.

Changes/Accommodations Needed:

- Vultures are provided plenty of sticks for nest building.

Reproductive Management/Breeding History:

- We have bred impala in some years, but births are usually early enough that, by the time spring weather allows them to go out with the birds, they are big enough to fend for themselves.
- Both bird species are brought off exhibit for chick rearing.
- The impala male may or may not share time with females depending on breeding plans. We have also used MGA feed for the female impala so they could all be out together without producing offspring.

Management Challenges:

- We are unable to fill our pool completely with these species. There is an island in the exhibit originally intended for hyenas but the impala can easily jump to this area. Calves do not always make it and have trouble extracting themselves from the pool.

Items Contributing to Group's Success:

- The species leave each other alone.
- Trainers are very good at working with hornbills to bring them off exhibit efficiently.

Group/Exhibit Changes Over Time:

- At various times there was a bachelor group of Thompson's gazelle or a bachelor group of Speke's gazelle. Both functioned well, but were never out with the male impala.
 - Impala (*Aepyceros melampus*)
 - Speke's Gazelle (*Gazella spekei*)
 - Thompson's Gazelle (*Eudorcas thomsonii*)
 - Cinereous Vulture (*Aegypius monachus*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)

Milwaukee County Zoological Gardens, Milwaukee, WI – Current Exhibit

Current Species:

- Alpaca (*Vicugna pacos*) (0.6)
- Baird's Tapir (*Tapirus bairdii*) (1.1)
- Greater (American) Rhea (*Rhea americana*) (0.2)
- Red-footed Tortoise (*Chelonoidis carbonaria*) (not specified)
- Yellow-footed Tortoise (*Chelonoidis denticulata*) (not specified)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Tortoises and tapir are seasonal; alpaca are on exhibit year round.
- We have had male alpaca in at times and crias born on exhibit without issues. We usually pull the tapir off for a few days if there is an alpaca cria and then reintroduce.
- Tapir and rheas are brought in nightly; alpaca may be left with access.
- Tortoises stay out weather permitting.

Changes/Accommodations Needed:

- Tapir have a sand pit which the other species do not use.
- The pool is deep enough for a tapir to submerge but alpaca can also stand in it comfortably on hot days.



Cassie Sajkowski

Reproductive Management/Breeding History:

- The alpaca male is rotated with preferred breeding females only. We usually bring a male in for a year or 2 and then send him back.
- Tapir have bred in the past successfully and other species are not a threat.

Management Challenges:

- Rheas are extremely flighty, and, although not bothered by other species, they find ways to hurt themselves.
- We have a hard time keeping grass in this exhibit and need to return to previous ways of rotating animals through various parts of the exhibit.

Items Contributing to Group's Success:

- Species tend to leave each other alone.

Group/Exhibit Changes Over Time:

- Capybara were in this exhibit at one point but they were removed due to fatally injuring alpaca crias. See Milwaukee County Zoo Unsuccessful Exhibit.

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- Alpaca (*Vicugna pacos*)
- Baird's Tapir (*Tapirus bairdii*)
- Capybara (*Hydrochoerus hydrochaeris*)
- Greater (American) Rhea (*Rhea americana*)
- Red-footed Tortoise (*Chelonoidis carbonaria*)
- Yellow-footed Tortoise (*Chelonoidis denticulata*)

Milwaukee County Zoological Gardens, Milwaukee, WI – Current Exhibit

Current Species:

- Moose (*Alces alces*) (1.2)
- Sandhill Crane (*Grus canadensis*) (0.1)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Both species are exhibited year-round and on exhibit overnight.
- During hard-rack the male moose is rotated with one of the females that has health issues.

Changes/Accommodations Needed:

- A large natural pool is utilized extensively by the moose and crane.

Reproductive Management/Breeding History:

- Moose are not allowed to breed.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Moose are very calm and respond to keeper training.
- Moose leave the crane alone.

Group/Exhibit Changes Over Time:

- The number of moose has varied with time.
- Mule deer were included for many years, and they got along well with the moose.
 - Moose (*Alces alces*)
 - Mule Deer (*Odocoileus hemionus*)
 - Sandhill Crane (*Grus canadensis*)

Milwaukee County Zoological Gardens, Milwaukee, WI – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (0.2)
- Spurred Tortoise (*Centrochelys sulcata*) (0.0.3)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Tortoises are seasonal additions.
- Bongo and tortoises are left with access to the exhibit overnight weather permitting.

Changes/Accommodations Needed:

- Bongo need to be separated while tortoises are fed to avoid bongo eating all of their produce.

Reproductive Management/Breeding History:

- Bongo have been bred successfully in the past with no issues.

Management Challenges:

- The exhibit is terraced in places and tortoises occasionally flip each other over using the edges of these changes in elevation. We have not seen female bongo do this to them. When male bongo were exhibited here, they would flip the tortoises over.

Items Contributing to Group's Success:

- Species leave each other alone.
- Bongo are trained on a recall to allow tortoises to be fed on exhibit in the mornings.

Group/Exhibit Changes Over Time:

- Male bongo were previously exhibited here, but they could not be successfully exhibited with the tortoises. Male bongo would flip the tortoises over.

Milwaukee County Zoological Gardens, Milwaukee, WI – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (1.0)
- Common Waterbuck (*Kobus ellipsiprymnus*) (0.2)
- Greater Kudu (*Tragelaphus strepsiceros*) (4.4 + 2.0 offspring)
- Plains Zebra (*Equus quagga*) (0.2)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Eland, waterbuck, stork, and one female zebra are on exhibit daily. 2.0 kudu rotate with females and calves.
- All antelope are brought in nightly.
- The stork and both zebra have access overnight weather permitting.

Changes/Accommodations Needed:

- The pool is deep enough and large enough to provide security for the stork.
- Feeding stations are numerous to avoid conflict.

Reproductive Management/Breeding History:

- We currently only breed the greater kudu. The male is exhibited with females only when we choose to breed.
- Calves are introduced to the exhibit at between 3 and 4 weeks of age.

Management Challenges:

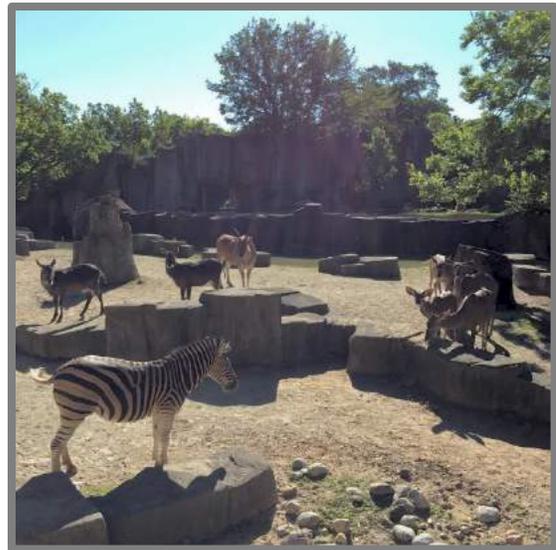
- There are 2 entrances to this exhibit at opposite ends. There are usually no conflicts as each species knows where to go, but if something sets them off on any given day we can have trouble with animals going in the wrong direction.
- Our second female zebra does not play nice with the antelope species and cannot be exhibited with them.

Items Contributing to Group's Success:

- Species leave each other alone.
- Recall training for some species
- We don't try to breed various antelopes at the same time.

Group/Exhibit Changes Over Time:

- There used to be ostrich in this exhibit, which worked for a time but the kudu male eventually became aggressive toward them.



Cassie Sajkowski

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- There also used to be a waterbuck male, but he did not have any horns and the exhibit seemed to work peacefully while he was here.
 - Common Eland (*Taurotragus oryx*)
 - Common Waterbuck (*Kobus ellipsiprymnus*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Plains Zebra (*Equus quagga*)
 - Common Ostrich (*Struthio camelus*)
 - Marabou stork (*Leptoptilos crumenifer*)

Milwaukee County Zoological Gardens, Milwaukee, WI – Historical Exhibit

Species:

- American Elk (*Cervus canadensis*) (1.3)
- Sandhill Crane (*Grus canadensis*) (0.1)

Group was successfully mixed for 1 year (from 2010 to 2011).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The crane was able to get inside tree guards to get away from the elk if she chose and was fed there also.
- Both species were exhibited year-round and on exhibit overnight.

Reproductive Management/Breeding History:

- No breeding occurred while this mix was in place.

Management Challenges:

- Elk were hard to shift off exhibit for cleaning during rutting season.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The male elk eventually killed the crane.

Group/Exhibit Changes Over Time:

- The number of elk has varied.

Minnesota Zoological Garden, Apple Valley, MN – Historical Exhibit

Species:

- Bactrian Camel (*Camelus bactrianus*) (1.6)
- Przewalski's Wild Horse (*Equus ferus przewalskii*) (1.4)

Group was successfully mixed for 2 years.

Exhibit Size: 3 acres-8 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Camels and horses were both breeding groups

Management Challenges:

- Bactrian camels were aggressive to horse foals.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Horse foals were in jeopardy.

Group/Exhibit Changes Over Time:

- None

Minnesota Zoological Garden, Apple Valley, MN – Historical Exhibit

Species:

- American Bison (*Bison bison*) (1.7)
- Pronghorn (*Antilocapra americana*) (1.8)

Group was successfully mixed for approximately 6 years (from 2010 to 2016).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- We removed pronghorn after several years of limited success.
- This is a large exhibit (6 acres) with multiple exit gates.

Reproductive Management/Breeding History:

- Both bison and pronghorn were breeding groups.

Management Challenges:

- We had some problems with shifting off exhibit at closing. We added a separate gate for the pronghorn so they would not be mingling with the bison while waiting to come in.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The pronghorn have been recently removed from this exhibit (information submitted during review period in 2016) due to some long term problems. Their weight loss and low infant survival could possibly be attributed to the added stress of being mixed with the bison every day.

Group/Exhibit Changes Over Time:

- This exhibit used to contain Rocky Mountain elk instead of pronghorn.
 - American Bison (*Bison bison*)
 - Rocky Mountain Elk (*Cervus canadensis*)
- Elk in rut were very aggressive to bison.
- Bison and elk were together for 5 years.

Minnesota Zoological Garden, Apple Valley, MN – Historical Exhibit

Species:

- Grant's Gazelle (*Nanger granti*) (1.5)
- Grevy's Zebra (*Equus grevyi*) (1.4)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.0)
- White-bearded Wildebeest (*Connochaetes taurinus*) (8.0)
- Common Ostrich (*Struthio camelus*) (0.2)

Group was successfully mixed for 1 summer only.

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Wildebeest were yearlings.
- This was a seasonal exhibit (summer only, May-September).
- Zebra were held on exhibit overnight during Fourth of July week. Stray fireworks from neighbors caused problems in holding.
- We limit the gazelle group to just one adult male.
- This is a large exhibit with multiple escape features.
- Animals love the sand pits.
- Hotwire was used to keep animals from hiding in back corners.
- Giraffe were pretty good at removing all the small trees in the exhibit.



Tony Fisher

Reproductive Management/Breeding History:

- No breeding was attempted.

Management Challenges:

- Grant's gazelle were difficult to bring into holding at night and were managed on exhibit for the summer.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Seasonal exhibit

Group/Exhibit Changes Over Time:

- None



Tony Fisher

Minnesota Zoological Garden, Apple Valley, MN – Historical Exhibit

Species:

- Addax (*Addax nasomaculatus*) (1.5)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.5)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.0)
- White-bearded Wildebeest (*Connochaetes taurinus*) (7.0)
- Common Ostrich (*Struthio camelus*) (0.5)
- Guineafowl (group of 25)

Group was successfully mixed for 1 summer only.

Exhibit Size: 3 acres-8 acres

General Management Notes:

- This was our most successful summer mix of African ungulates. We had very little trouble and all seemed to get along very well.
- All animals were shifted in at night into holding areas.
- Wildebeest were yearlings.
- This is a seasonal exhibit (summer only, May-September).
- All species were very compatible.
- Animals love the sand pits.

Reproductive Management/Breeding History:

- Bongo had calves during the summer.
- We held bongo females in holding during calving periods, and we let them back out after calves were strong enough to follow dams easily.

Management Challenges:

- Guineafowl were being preyed upon by wild red fox during the day.
- TB testing in the fall before transport was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Seasonal exhibit

Group/Exhibit Changes Over Time:

- None

Minnesota Zoological Garden, Apple Valley, MN – Historical Exhibit

Species:

- Gemsbok (*Oryx gazella*) (1.4)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.4)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.0)
- White-bearded Wildebeest (*Connochaetes taurinus*) (7.0)
- Common Ostrich (*Struthio camelus*) (0.5)

Group was successfully mixed for 1 summer only.

Exhibit Size: 3 acres-8 acres

General Management Notes:

- This is a seasonal exhibit (summer only, May-September).
- Animals love the sand pits.

Reproductive Management/Breeding History:

- Zebra were a breeding group.



Tony Fisher

Management Challenges:

- Zebra were difficult to manage in off-holding pens, so we kept them on exhibit for the summer.
- TB testing in the fall before transport was a challenge.
- Wildebeest were two years old and not as adaptable and easy to mix with the other ungulates as yearlings.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Seasonal exhibit

Group/Exhibit Changes Over Time:

- None

Nashville Zoo at Grassmere, Nashville, TN – Current Exhibit

Current Species:

- Bontebok (*Damaliscus pygargus*) (1.2)
- Common Eland (*Taurotragus oryx*) (0.3)
- Gemsbok (*Oryx gazella*) (0.3)
- Grant's Zebra (*Equus quagga boehmi*) (0.4)
- Springbok (*Antidorcas marsupialis*) (3.5)
- Common Ostrich (*Struthio camelus*) (1.2)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- This exhibit works well. All shift in and out of holding every day in hierarchical order.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Breeding males (bontebok and springbok) rotate days on exhibit.
- Females are pulled to calve in holding if possible.

Management Challenges:

- None

Items Contributing to Group's Success:

- No two species of same/similar size
- Intensely managed breeding and parturition
- Ample forage space available

Group/Exhibit Changes Over Time:

- This exhibit was originally 0.8 zebra, 1.3 eland, and 1.1 ostrich. Dynamics and species changed for exhibitory purposes. The original setup worked well also; however, it was a non-breeding situation for all species.
 - Common Eland (*Taurotragus oryx*) (1.3)
 - Grant's Zebra (*Equus quagga boehmi*) (0.8)
 - Common Ostrich (*Struthio camelus*) (1.1)

North Carolina Zoological Park, Asheboro, NC – Current Exhibit

Current Species:

Addra (Dama) Gazelle (*Nanger dama*) (1.3)
Common Waterbuck (*Kobus ellipsiprymnus*) (11.0)
Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
Fringe-eared Oryx (*Oryx beisa callotis*) (1.7)
Greater Kudu (*Tragelaphus strepsiceros*) (4.8)
Nile Lechwe (*Kobus megaceros*) (1.6)
Sitatunga (*Tragelaphus spekii*) (8.17)
Southern White Rhinoceros (*Ceratotherium simum simum*) (1.4)
Thomson's Gazelle (*Eudorcas thomsonii*) (21.0)
Common Ostrich (*Struthio camelus*) (0.2)
Spur-winged Goose (*Plectropterus gambensis*) (1.0)

*Group has been successfully mixed for approximately 30 years (since 1983/4, current as of 2016).
Addra were successfully added to this group in 2016 (submitted during review period).

Exhibit Size: Larger than 8 acres

General Management Notes:

- All herds are allowed to use the habitat as they feel. When new animals are introduced it is attempted to pull some conspecifics off the habitat and do a small introduction in a holding yard (around 1 acre in size) and then allow the new animals to head onto exhibit with the experienced companions. These companion animals help introduce the new animal(s) to the exhibit, showing them the way out to it from holding.
- All animals are fed in holding spaces every morning to facilitate shifting off the exhibit. Barns and a chute complex are used to separate animals as needed. Animals do need to be darted off the habitat periodically.
- All the herds are given access to the newer barn complex (designed to accommodate large herds simultaneously) at the end of the day, and "kicked" back out on exhibit the following morning.
- If birthing takes place off exhibit, calves and dams are re-introduced once it is clear that the calf is healthy and mobile, except during extreme winter weather.
- In winter all animals have access to multiple heat sources both on and off habitat. Animals are not locked in holding but allowed to access heat on their own terms when needed.



Brent Huffman

Changes/Accommodations Needed:

- 8 lean-to type heat structures, 1 large 3-sided heated barn, and 3 large enclosed barns are provided to allow animals to access heat.
- Habitat includes open areas, forested areas, swampy areas, dry areas, a lake, flat areas, and sloped areas. Substrate is grassy.

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- The large size and topography of the exhibit lends itself well for different species to separate themselves out.
- We designed our new barn complex with large gate openings and large, open paddocks leading to large community barns that are welcoming to wary species. There are tree circles in these paddocks for visual barriers.
- Large artificial termite mounds spread throughout the exhibit include removable, stainless steel food pans that are small enough for antelope to eat grain out of, but too small for white rhinos to access and dominate the grain rations. Rhinos are brought off exhibit daily into a boma to receive their grain ration.
- There are also a couple of creeps where antelope can be fed alfalfa, but exclude rhinos from getting alfalfa that they do not need in their diet. One of the creeps doubles as a heated shelter during the winter so that rhino can stay out overnight when temperatures are above 30 F.
- The north 10% of the exhibit has supplemental heated shelters and is opened up in the winter for the antelope. The fenceline into this area is built to allow antelope through, but not rhino. This is also true for the gates leading to the off-exhibit antelope and ostrich holding area, excluding rhino from entering these areas where they could destroy chain-link fencing and metal and wood barns.



Jade Abel

Reproductive Management/Breeding History:

- Calving is preferred to occur in holding but allowed to occur on habitat also.
- Males are not pulled to facilitate timed births. Breeding males tend to stay with their herds year round unless they are recommended to transfer to another facility.
- Young males are separated out before they can breed. Occasionally, we will separate pregnant cows out, but usually only if the weather includes low temperatures.

Management Challenges:

- Getting hands on skittish animals is a challenge. Darting animals off the exhibit is risky and has resulted in animals drowning or crashing into fences. Most animals will come off exhibit, but some are harder to "trap", e.g. waterbuck, lechwe, and individuals of other species.
- The community barns have large community stalls adjacent to smaller holding stalls for catching up individuals. If this does not work, sometimes we have to dart in the paddocks (each about an acre), where we run the risk of an animal hitting the fence.
- The chute system that connects all the barns is very lengthy with changes in elevation. A standard push board cannot keep up with an animal moving from barn to barn. We use small ATVs with push boards attached to move animals through the chute system, unless there is no urgency, when we can let them find their own way to their desired destination.



Brent Huffman

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- Male lechwe fight with waterbuck.
- Hartebeest and blesbok in the past caused aggression issues.
- Springbok in the past had hoof rot.

Items Contributing to Group's Success:

- Exhibit space (habitat is roughly 40 acres), off-exhibit space, and barn/paddock design
- Operant conditioning
- Castrating males in bachelor herds
- Allowing males to stay with herd year round presenting a more natural setting
- Avoiding breeding species that may interbreed



Gil Myers

Group/Exhibit Changes Over Time:

- Nile lechwe replaced red lechwe.
- Common waterbuck replaced defassa waterbuck.
- Sitatunga replaced nyala.
- Fringe-eared oryx replaced gemsbok.
- Springbok are no longer on the habitat (hoof rot).
- Hartebeest and blesbok are no longer on the habitat (aggression).
- Impala are no longer on the habitat.
- Various species mixes have existed over the history of this exhibit. Group 1 consists of species that have been in this exhibit within the last 10 years. Group 2 consists of species that were in this exhibit over 10 years ago.

Group 1

- Blesbok (*Damaliscus pygargus phillipsi*)
- Defassa Waterbuck (*Kobus ellipsiprymnus defassa*)
- Gemsbok (*Oryx gazella*)
- Greater Kudu (*Tragelaphus strepsiceros*)
- Nile Lechwe (*Kobus megaceros*)
- Nyala (*Tragelaphus angasii*)
- Thomson's Gazelle (*Eudorcas thomsonii*)
- Common Ostrich (*Struthio camelus*)

Group 2

- Defassa Waterbuck (*Kobus ellipsiprymnus defassa*)
- Gemsbok (*Oryx gazella*)
- Grant's Gazelle (*Nanger granti*)
- Greater Kudu (*Tragelaphus strepsiceros*)
- Impala (*Aepyceros melampus*)
- Jackson's Hartebeest (*Alcelaphus buselaphus lelwel*)
- Red Lechwe (*Kobus leche leche*)
- Sitatunga (*Tragelaphus spekii*)
- Springbok (*Antidorcas marsupialis*)
- Thomson's Gazelle (*Eudorcas thomsonii*)
- Common Ostrich (*Struthio camelus*)
- Crowned Crane (*Balearica spp.*)
- Kori Bustard (*Ardeotis kori*)



Jade Abel

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- Marabou Stork (*Leptoptilos crumenifer*)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*)
- The bird species did okay, but suffered from wounds/deaths caused by the saddle-billed storks or bobcat predation. Eventually, all were removed but saddle-billed storks and ostrich. Then the saddle-billed storks were removed so they wouldn't have to be clipped or pinioned, improving their ability to breed.
- Multiple males of the same species never seemed to work, even if all were castrated, but the breeding male, especially if females were present, e.g. lechwe, Thomson's gazelle. Even with a bachelor herd of Thomson's gazelle (no females in the collection of any gazelle species), any intact male would cause injuries to other Thomson's gazelle. Breeding blesbok males were notorious for injuring their own cows and getting into fights with other species. We castrated a male blesbok (named "Killer" for obvious reasons) after many years of being held off exhibit. He actually integrated back into the exhibit nicely after all those years. We tried a crypt-orchid Jackson's hartebeest male (without females), but we suspect he was responsible for several injuries to other antelope and the death of an ostrich.



Jade Abel

North Carolina Zoological Park, Asheboro, NC – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (1.6)
- Elk (*Cervus canadensis*) (2.6)

Group has been successfully mixed for 20 years (since 1995, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Animals are shifted off daily to maintain gating behavior.
- Introductions are done in the barn for more control.

Changes/Accommodations Needed:

- No special shelter is provided.
- Habitat is grassy with shade trees, dust wallows, flat and sloped areas.



Brent Huffman

Reproductive Management/Breeding History:

- The bison male is vasectomized.
- Elk were allowed to breed for the first time in 2015.

Management Challenges:

- Elk rut season can cause aggression between the two species.

Items Contributing to Group's Success:

- Space – habitat is 8 acres
- Species do well in climate
- Natural herd dynamics

Group/Exhibit Changes Over Time:

- None

North Carolina Zoological Park, Asheboro, NC – Current Exhibit

Current Species:

- Plains Zebra (*Equus quagga*) (1.1)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
- Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (1.0)
- Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for 40 years (since the 1970s, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- All species are housed on exhibit together during the day. Overnight zebra and ostrich have free access to the exhibit and the holding barn. Giraffe are taken off exhibit and housed in the barn and adjacent paddocks. The giraffe and zebra/ostrich holding areas are separate from each other.
- All giraffe were introduced to this mixed species exhibit when they were less than 2 years old. Zebra and ostrich were introduced as young adults.



Brent Huffman

Changes/Accommodations Needed:

- Giraffe are separated overnight due to the layout of the barn. Giraffe enter/exit the exhibit in a different area than the zebra/ostrich. If the giraffe had free access to this zebra/ostrich area they could get themselves hurt.

Reproductive Management/Breeding History:

- During the 40 year history of this exhibit we have had both zebra and giraffe offspring. Most recently we've had a giraffe calf.
- Typically, the dam is separated for calving and the dam and calf are introduced into this mixed species exhibit when the calf is around 1 month of age.
- Currently our zebra are a non-breeding pair.
- Our giraffe are on contraception.

Management Challenges:

- Our challenges are related more to the set-up of the barn and exhibit as opposed to the species. In the rare occurrence that giraffe don't come off exhibit at night, we are unable to access the exhibit or allow zebra/ostrich access to their part of the barn. In these cases zebra and ostrich have to go without their evening meal.

Items Contributing to Group's Success:

- Zebra are tractable and can be worked in a free contact situation.
- Ostrich are tractable and well-trained and can be worked in a free contact situation.
- We have a lot of space and multiple areas to feed giraffe on exhibit.

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Group/Exhibit Changes Over Time:

- This specific group of animals has been mixed for about 4 years. However, we have maintained this particular mixed species exhibit for 40 years.
- We briefly housed 0.2 bongo in this mixed species exhibit. It did not work. Mostly because of the layout of the exhibit and holding spaces as opposed to inter-species issues.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Plains Zebra (*Equus quagga*)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
 - Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*)
 - Common Ostrich (*Struthio camelus*)

North Carolina Zoological Park, Asheboro, NC – Historical Exhibit

Species:

- Kirk's Dik-dik (*Madoqua kirkii*) (0.3)
- Cattle Egret (*Bubulcus ibis*) (0.0.2)
- Leopard Tortoise (*Stigmochelys pardalis*) (0.0.2)
- Spur-thighed Tortoise (*Testudo graeca*) (0.0.2)

Group was successfully mixed for approximately 20 years (from 1980s to 1990s).

Exhibit Size: Less than 5,000 sq ft.

General Management Notes:

- Exhibit was ~300 sq ft.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The entire building is no longer suitable for housing animals.

Group/Exhibit Changes Over Time:

- At some point there were no egrets and at some point there were no dik dik, but this combination worked.
 - Kirk's Dik-dik (*Madoqua kirkii*)
 - Leopard Tortoise (*Stigmochelys pardalis*)
 - Spur-thighed Tortoise (*Testudo graeca*)

North Carolina Zoological Park, Asheboro, NC – Historical Exhibit

Species:

- Southern White Rhinoceros (*Ceratotherium simum simum*) (2.2)
- Marabou Stork (*Leptoptilos crumenifer*) (1.4)

Group was successfully mixed for approximately 5 years (from late 1980s to early 1990s).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Only 1.1 rhino were exhibited per day – alternating pairs.

Reproductive Management/Breeding History:

- Neither rhino pair reproduced, but females were later determined to have abnormal cycles.
- Marabou storks did not successfully reproduce. In fact, the male killed one of the females.

Management Challenges:

- Despite pinioning, marabou storks could get enough wind under them to "fly" next door into the elephant exhibit, where they were chased by elephants.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The rhino exhibit was converted into another elephant exhibit.
- Marabou storks were phased out of the collection.

Group/Exhibit Changes Over Time:

- There were no significant changes. The number of storks may have fluctuated, but not the number of rhinos (1.1 per day).

Northeastern Wisconsin (NEW) Zoo, Green Bay, WI – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (0.2)
- American Elk (*Cervus canadensis*) (1.1)
- Pronghorn (*Antilocapra americana*) (1.0)

Group has been successfully mixed for 7 years (since October 2008, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The current 0.2 bison were added to the exhibit on May 13, 2015 after our last elderly bison (in exhibit since 1990) passed away.
- The current 1.0 pronghorn was added to the exhibit in July 2013.
- This exhibit has contained all three species (although individuals have died and been replaced) since pronghorn were added in October 2008.
- The bull elk is shifted into the bull pen for daily exhibit cleaning during the rut season.
- The current male elk (now 3 years old) was introduced as a yearling when all other exhibit residents were mature.
- The previous male elk co-existed peacefully with the other species.
- The current male elk occasionally chases other species, but we have seen no serious aggression thus far.

Changes/Accommodations Needed:

- A fenced "creep" meant to provide a safe spot for female elk and pronghorn is on one end of the exhibit. Our current male elk does jump the fence into this area (the previous male never did).
- There is a pond surrounded by boulders (with 2 easy access points) that bison and elk wade/swim in regularly (and can retreat to if they feel threatened – the day of his introduction to the exhibit, the young male elk used the pond as an escape from the mild aggression of the two elderly female bison).
- A separate pen (with a small gate which excludes the larger species) and access to a barn stall is always available for pronghorn on the other end of the exhibit. Pronghorn come into the pen daily to eat and participate in training. This pen can be used as a separate exhibit.
- A bull pen was added this year to contain the male elk while keepers clean/feed the exhibit during the rutting season. The pen is connected to a barn stall and could be used for more long term containment if necessary.

Reproductive Management/Breeding History:

- The female elk is contracepted with PZP.
- The male pronghorn is intact, but our female died during unsuccessful birthing earlier this year.

Management Challenges:

- Our current male elk is more aggressive than the previous male was at any point during his lifetime. He is now in rut and sometimes chases the young bison and the pronghorn. He gives up the chase pretty easily. Although the other animals have safe zones, they do not, so far, feel the

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need to avoid him. We did have to install hot grass to keep this individual elk from threatening our visitors at an overlook.

Items Contributing to Group's Success:

- Large space
- Individual personalities
- Ability to separate animals

Group/Exhibit Changes Over Time:

- Before 2008, the exhibit contained only elk and bison.
 - American Bison (*Bison bison*)
 - American Elk (*Cervus canadensis*)
- At one point, we kept a sandhill crane (who had been overly aggressive towards a turkey in another exhibit) in this exhibit without any problems. Wild cranes and geese are frequent visitors to this exhibit and are tolerated well by the inhabitants.
 - American Bison (*Bison bison*)
 - American Elk (*Cervus canadensis*)
 - Pronghorn (*Antilocapra americana*)
 - Sandhill Crane (*Grus canadensis*)

Northeastern Wisconsin (NEW) Zoo, Green Bay, WI – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (3.2)
- Sandhill Crane (*Grus canadensis*) (1.0)
- Wild Turkey (*Meleagris gallopavo*) (1.0)

Group has been successfully mixed for 23 years (since 1992, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The last addition to the current group (not counting the 2.0 fawns born into the exhibit this spring) was the male deer in March of 2014. The exhibit has had the same mix of species (new animals added as others died) since before 1992.
- A small shift pen is occasionally used to contain the keeper-aggressive male turkey (it was built to contain a former resident crane who was inclined to attack keepers).
- The shelter building was used to contain the female deer for 2 weeks when they were first introduced as hand-raised fawns.
- The male deer was introduced as a yearling when the females were 2 years old without any incidents. They approached him in a bold, slightly aggressive manner, but he responded with curiosity rather than fear or aggression so everything went smoothly.

Changes/Accommodations Needed:

- The exhibit is fairly complex – there is an open area with a hill, a marshy strip, a portion with large white pines that includes several stick piles, stumps, logs that break up the space and provide hide areas.

Reproductive Management/Breeding History:

- The female deer were “contracepted” with PZP delivered via dart gun. Both produced fawns this spring. The adult male deer underwent a vasectomy recently. We plan to neuter the 2 male fawns.
- A wild female sandhill crane visits the exhibit frequently during the summer. She built nests in the past with a former captive male. Although she spends time with the remaining male, they have not nested.

Management Challenges:

- Reproductive management was a problem. Birth control delivered via dart did not work.
- The exhibit does not include a good system for capture or hands on work.

Items Contributing to Group’s Success:

- Large space
- Complex exhibit features
- Individual animal personalities

Group/Exhibit Changes Over Time:

- The species composition has always been similar in this exhibit.

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- An aggressive male sandhill crane that used to live in the exhibit was seasonally aggressive towards the deer in a minor way. He never caused any injury to the deer but drove them away from his nesting area during breeding season. This crane also was seasonally very aggressive towards the other male crane. When 2.2 cranes inhabited the exhibit, there were no problems. Groupings of 2.1 or 2.0 were incompatible if this particular male was involved. The 2.0 got along well for several years but then a persistent wild female visiting the exhibit created problems during breeding season. We moved the nonaggressive male crane out of the exhibit during breeding season (they coexisted well outside of breeding season).
- After many years of living together peacefully, aggression between the current male turkey and this same "problem" crane (instigated by the turkey) escalated to the point where the turkey was badly injured twice. The crane was moved to another exhibit and eventually another facility. The turkey coexists peacefully with the remaining male crane.

Northeastern Wisconsin (NEW) Zoo, Green Bay, WI – Current Exhibit

Current Species:

- Blue Duiker (*Philantomba monticola*) (1.0)
- Peafowl (*Pavo sp.*) (1.0)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: No information provided.

General Management Notes:

- Although this is not an intentional mixed species exhibit, our 1.0 blue duiker has developed a "friendship" with one of the many free roaming peacocks. This peacock spends a great deal of time in the exhibit in close proximity to the duiker. He solicits preening by bowing his head towards the duiker who then licks the bird's head for several minutes.

Changes/Accommodations Needed:

- None, the peacock is free roaming.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- This is not an intentional mixed species exhibit.

Group/Exhibit Changes Over Time:

- None

Northeastern Wisconsin (NEW) Zoo, Green Bay, WI – Historical Exhibit

Species:

- Moose (*Alces alces*) (1.1 + offspring)
- Egyptian Goose (*Alopochen aegyptiaca*) (0.2)
- Sandhill Crane (*Grus canadensis*) (1.1)

No information was provided about how long this group was successfully mixed.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The exhibit is wooded land wrapped in a U-shape around a building, and the pathway leading to the building. The 2 "halves" of the exhibit are connected by a shift pen accessed through a squeeze chute on one side, cattle gate on the other.
- Moose are confined to the shift pen while keepers service the yards.
- Although this exhibit now contains only moose, in the past we have kept a pair of sandhill cranes and Egyptian geese with the moose.

Reproductive Management/Breeding History:

- The male lived with the female unless she had a calf at her side. The exhibit can be managed as 2 separate exhibits in this case.

Management Challenges:

- There were no problems among the animals, but this exhibit is on the outer edge of our property (which is within a wilderness area). Wild geese, herons, and other birds are frequent visitors to the 2 ponds in this exhibit. The moose pay no attention to them.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- There were no problems between any of the inhabitants of this exhibit, but within a month predators (great horned owl) killed a goose so the other was moved to a safer portion of the facility.
- The sandhill cranes were in the exhibit for about 2 months before one was also badly injured by a predator (grey fox, we think) and was euthanized. The remaining crane was moved to a safer location.
- The exhibit still contains moose but we have not attempted to add any other species due to predation from wild animals.

Group/Exhibit Changes Over Time:

- None

Northwest Trek Wildlife Park, Eatonville, WA – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (9.11.5)
- Black-tailed Deer (*Odocoileus hemionus*) (~0.0.26)
- Californian Bighorn Sheep (*Ovis canadensis*) (8.14.13)
- Caribou (*Rangifer tarandus*) (9.7)
- North American Moose (*Alces americanus*) (2.3)
- Rocky Mountain Goat (*Oreamnos americanus*) (0.2)
- Roosevelt Elk (*Cervus canadensis roosevelti*) (10.22.7)

Group has been successfully mixed for 40 years (since 1975, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- All animals are housed year-round in a free-roaming exhibit that is 435 acres in size, comprised of forest, marsh, and meadows.
- Visitors see the animals via a tram tour that drives through the exhibit.

Changes/Accommodations Needed:

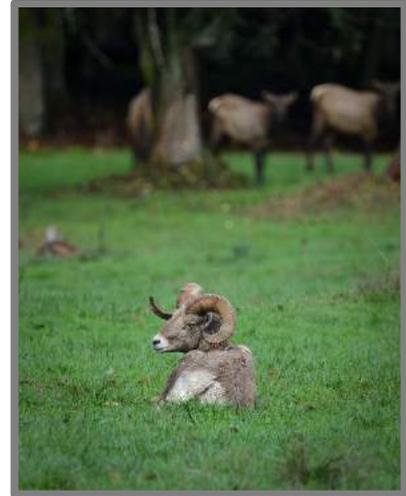
- Bighorn sheep require regular hoof care due to the damp conditions of the Pacific Northwest.
- The exhibit contains lowland marshes and lakes, midland meadows, and an elevated forested ridge.

Reproductive Management/Breeding History:

- Most species are allowed to breed, as social groupings allow. Males and females are typically housed together for the duration of the year.

Management Challenges:

- Caribou are taken off exhibit into a separate pen during rutting season for their safety and to prevent sparring with other species. Bulls/rams in general (across all species) can impact herd dynamics of conspecifics and other species during rutting season.
- All animals are managed "in the field" with no holding facilities or isolation buildings. Individually medicating/contracepting particular animals can be challenging depending on the species and individual animal.



Northwest Trek Wildlife Park



Northwest Trek Wildlife Park



Northwest Trek Wildlife Park

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Items Contributing to Group's Success:

- Large exhibit with varied terrain
- Collection of species native to region where zoo facility is located
- Observant keeper staff who recognize behavioral and physical changes in individuals



Northwest Trek Wildlife Park

Group/Exhibit Changes Over Time:

- The mixture of species and number of individual animals has fluctuated over time. Northwest Trek has maintained a free-roaming exhibit of mixed species for the duration of its 40-year history.
- Pronghorn antelope were part of this exhibit at one point, but the climate of the Pacific Northwest induced ongoing hoof and lameness issues.
 - American Bison (*Bison bison*)
 - Black-tailed Deer (*Odocoileus hemionus*)
 - Californian Bighorn Sheep (*Ovis canadensis*)
 - Caribou (*Rangifer tarandus*)
 - North American Moose (*Alces americanus*)
 - Pronghorn (*Antilocapra americana*)
 - Rocky Mountain Goat (*Oreamnos americanus*)
 - Roosevelt Elk (*Cervus canadensis roosevelti*)



Northwest Trek Wildlife Park

Oakland Zoo, Oakland, CA – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (1.3)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (3.5)
- Egyptian Goose (*Alopochen aegyptiaca*) (2.2)

Group has been successfully mixed for approximately 17 years (since about 2000, current as of 2017).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Three of our giraffe bulls are castrated, the other is intact.
- The eland bull is castrated.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- We have to sometimes separate the giraffe bull from the castrated males when a female is having a strong estrous. The aggression and chasing from the bull giraffe to the castrated males can be difficult to manage in a space this size. We rotate pulling males into holding for the day as necessary.

Management Challenges:

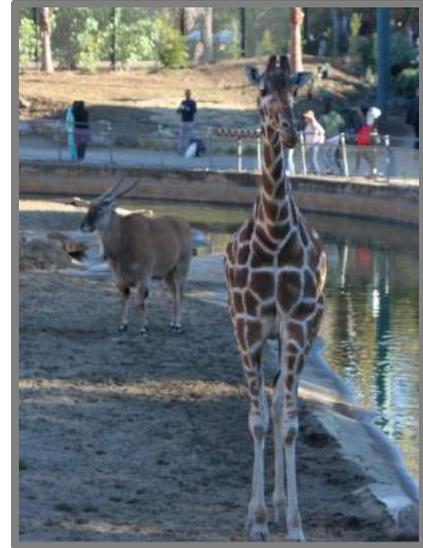
- The castrated giraffe males can be challenging.

Items Contributing to Group's Success:

- Size and complexity of the exhibit (water features, trees, rock structures)
- All easy-going, tractable species
- Animals enjoy similar enrichment and diet items

Group/Exhibit Changes Over Time:

- The exhibit has also contained many giraffe calves and a larger herd size of giraffe.
- At one point this exhibit housed addra, kudu, and several bird species. All of these species got along with one another, but the kudu and ostrich were difficult for keepers to manage with the lay out of the exhibit and human access points to the exhibit.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Kudu (*Tragelaphus sp.*)
 - Common Ostrich (*Struthio camelus*)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*)
 - Griffon Vulture (*Gyps fulvus*)
 - Helmeted Guineafowl (*Numida meleagris*)



Jessica Real



Jessica Real

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- Lappet-faced Vulture (*Torgos tracheliotos*)
- Lilford Crane (*Grus grus lilfordi*)
- Sarus Crane (*Grus antigone*)

Oakland Zoo, Oakland, CA – Current Exhibit

Species:

- American Bison (*Bison bison*) (0.6)
- Tule Elk (*Cervus canadensis nannodes*) (1.2 - 2.18)

Group has been successfully mixed for 30+ years.

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Both elk and bison were historically breeding groups, but now are not.
- The current elk male is vasectomized.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- When these species were breeding there were major aggression issues between the male elk and male bison. Once the male bison passed away the aggression improved.
- The rutting elk is always a challenge though.

Management Challenges:

- Managing aggression between males is a challenge.
- It is also challenging to manage aging animals and medical issues in this large exhibit space (especially because of the hills).

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- This exhibit used to also contain fallow deer.
 - American Bison (*Bison bison*) (1.13)
 - Fallow Deer (*Dama dama*) (group of 10-15)
 - Tule Elk (*Cervus canadensis nannodes*) (1.2 to 2.18)

Oglebay's Good Zoo, Wheeling, WV – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (0.2 + offspring)
- Common Ostrich (*Struthio camelus*) (0.1)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Animals were shifted on and off the exhibit in order, never together. Each has a different barn to take shelter off exhibit.
- Zebra are very calm and do not spook easily.
- The ostrich has been here for many years and knows the exhibit very well.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Zebra are bred off exhibit, and ostrich are kept away from foals until old enough for the mother to not be aggressive.

Management Challenges:

- As foals get older, they want to chase the ostrich to make it run. Our old hen does not spook by this, so the foal loses interest quickly.

Items Contributing to Group's Success:

- Individuals
- Animal knowledge of exhibit
- Keeper knowledge of animals

Group/Exhibit Changes Over Time:

- None

Oklahoma City Zoological Park, Oklahoma City, OK – Current Exhibit

Current Species:

Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*) (1.4)
Blue-necked (Somali) Ostrich (*Struthio camelus molybdophanes*) (0.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The giraffe group consists of reticulated giraffe and Rothschild's giraffe. We have a breeding pair, young offspring, and 2 non-breeders.
- Giraffe have access to hay and browse 24/7.

Changes/Accommodations Needed:

- None since zebra were removed.

Reproductive Management/Breeding History:

- The only thing we breed in this yard are giraffe. The calves enjoy interacting with Grant's gazelle (soon to be added, see below) and ostrich.

Management Challenges:

- None since zebra were removed.

Items Contributing to Group's Success:

- Yard size
- Separate overnight and inclement weather areas

Group/Exhibit Changes Over Time:

- We plan to add 2.0 young Grant's gazelle.
- We successfully mixed Grant's zebra into this yard, but they were a pain and limited giraffe to alfalfa source during the day. We also had guineafowl.
 - Grant's Zebra (*Equus quagga boehmi*) (1.1)
 - Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*) (1.4)
 - Guinea fowl (*Numididae sp.*) (various groups)
- The Grant's zebra had a separate barn from the giraffe. Giraffe were put out on exhibit before the zebra were, and usually the zebra were brought in off exhibit before the giraffe were. We shifted in this order due to the Grant's zebra intimidating the giraffe if the giraffe got cornered by the zebra. When in the big yard, giraffe and zebra both seemed comfortable and relaxed.
- When we felt a giraffe birth was imminent, we held zebra off exhibit if the weather permitted the giraffe to be outside. Zebra would not be introduced to the giraffe calf until all staff felt the calf was steady and strong on its feet, and the calf had learned the exhibit and had been introduced to all of the giraffe herd. Therefore, the calf would usually be between 4 and 6 weeks of age and doing well enough to be chased by the zebra a bit upon introductions.

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- Alfalfa could not be fed on exhibit in order to prevent the zebra from eating too much alfalfa and possibly foundering. We took zebra out of the exhibit for this reason.
- The Grant's zebra tended to be a bit feisty and definitely ruled the roost in the yard. The zebra were occasionally seen going up to the giraffe and trying to kick them. The giraffe just ran away from the zebra when they did. If the zebra managed to corner a giraffe, it was apparent that the giraffe started to become a bit stressed.
- In order to be able to shift the giraffe in or out of the barn, we generally had to have the zebra off exhibit so they weren't standing outside the giraffe doors and trying to push their way in.
- There used to be ostrich, lechwe, and African ground hornbills in with the giraffe. The African ground hornbills are suspicioned to have pecked an older, less-than-healthy ostrich's eye out. A lechwe broke its leg on exhibit, but keepers don't know if that happened during an interaction with a giraffe, or some other way. The bull giraffe was seen being aggressive towards the lechwe when it was down in the yard. However, they had been in there for a few years with no issues.
 - Nile Lechwe (*Kobus megaceros*)
 - Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*)
 - Blue-necked (Somali) Ostrich (*Struthio camelus molybdophanes*)
- Giraffe have historically been mixed with Griffon's vultures. Vultures got stomped by giraffe, so this was not successful. See Oklahoma City Zoo Unsuccessful Exhibit.
 - Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*)
 - Griffon's Vulture (*Gyps fulvus*)
- Giraffe have also been exhibited with lappet-faced vulture. Vultures got stomped by giraffe, so this was not successful. See Oklahoma City Zoo Unsuccessful Exhibit.
 - Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*)
 - Lappet-faced Vulture (*Torgos tracheliotos*)
- At one point, there was at least one warthog in the giraffe yard which killed an ostrich. See Oklahoma City Zoo Unsuccessful Exhibit.
 - Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*)
 - Common Warthog (*Phacochoerus africanus*)
 - Blue-necked (Somali) Ostrich (*Struthio camelus molybdophanes*)

Oklahoma City Zoological Park, Oklahoma City, OK – Current Exhibit

Current Species:

- Chinese Goral (*Naemorhedus griseus*) (1.0)
- Indian Hog Deer (*Axis porcinus*) (0.1)
- Pere David's Deer (*Elaphurus davidianus*) (0.3)
- Tufted Deer (*Elaphodus cephalophus*) (2.2)

Group has been successfully mixed for 13+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- To introduce new animals to this exhibit, we put the new animals in one of the 4 barns with a corral. Once all animals seem to have met through the fence, we then open the corral. We have not had any issues with introductions in this yard.
- The larger of our 2 corrals is set up so that only the littler species can get in. They are fed extra grain in that area. It is challenging making sure the little guys get enough grain (they tend to run on the thinner side), and that the bigger species don't get too much to eat (they tend to run on the slightly heavier side).
- There are no issues between 0.3 Père David's, 0.1 hog deer, 1.0 Chinese goral, and 2.2 tufted deer (non-productive herd, males castrated.)
- They are in a yard with a drive through choo choo train loop.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- We had a female tufted deer come to us already pregnant. That calf was born in the yard with no issues.
- 0.3 Père David's, 0.1 hog deer, 1.0 Chinese goral, and 2.2 tufted deer are a non-productive herd (males castrated).
- We've had challenges in the past with Asian deer species giving birth in this yard successfully. We think fescue grass may be inhibiting reproductive success. Animals would typically abort just before parturition and have pathology in the uterus. We stopped breeding in this yard in the early 2000s.

Management Challenges:

- Knock downs or other vet procedures are a challenge, but only because our yard is so big.

Items Contributing to Group's Success:

- Large size of yard
- Many places for individuals/different species to hide from each other

Group/Exhibit Changes Over Time:

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- We used to have a male hog deer, and 3 male sika deer as well as another female hog deer. One of the sika deer killed a female hog deer. Once we got down to just one male sika deer, aggression towards the other species has not been an issue. We also had white-naped cranes.
 - Chinese Goral (*Naemorhedus griseus*) (1.0)
 - Indian Hog Deer (*Axis porcinus*) (1.2)
 - Pere David's Deer (*Elaphurus davidianus*) (0.3)
 - Sika Deer (*Cervus nippon*) (3.0)
 - Tufted Deer (*Elaphodus cephalophus*) (2.2)
 - White-naped Crane (*Grus vipio*)
- At one time before 2006 we had takin in this yard. A train now goes through the yard and when it went in we phased out the takin. They were successful in the yard, male had a separation barn and very small corral if we needed to separate him due to behavior or breeding limitations.
 - Chinese Goral (*Naemorhedus griseus*) (1.0)
 - Indian Hog Deer (*Axis porcinus*) (1.2)
 - Pere David's Deer (*Elaphurus davidianus*) (0.3)
 - Sika Deer (*Cervus nippon*) (3.0)
 - Takin (*Budorcas taxicolor*)
 - Tufted Deer (*Elaphodus cephalophus*) (2.2)

Oklahoma City Zoological Park, Oklahoma City, OK – Current Exhibit

Current Species:

- Grant's Gazelle (*Nanger granti*) (1.0)
- Blue-necked (Somali) Ostrich (*Struthio camelus molybdophanes*) (0.2)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)
- Egyptian Goose (*Alopochen aegyptiaca*) (0.2)
- Guineafowl (*Numididae sp.*) (various groups)
- Sulcata (African Spurred) Tortoise (*Centrochelys sulcata*) (1.0)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: No information provided.

General Management Notes:

- The ostrich is shifted into a holding yard with access to her barn at night.
- Gazelle have access to a single stall and back holding yard, as well as the exhibit, at night and in inclement weather.

Changes/Accommodations Needed:

- It is difficult to get food to the cranes without the gazelle finding a way to get to it.
- The ostriches are fed in separate food buckets hung on the fence line above the gazelle's reach.
- The guineafowl are scatter fed in the large surrounding exhibits. (This helps keep pigeons out of our barns!)

Reproductive Management/Breeding History:

- We have raised a lot of gazelle in this yard; however as standards rose it was no longer appropriate to hold the male off exhibit in a small yard for most of the year. Due to the time of year we wanted calves he could only be with the herd for short periods of time.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Large size of yard
- Having separate barn space for different species

Group/Exhibit Changes Over Time:

- We used to have a breeding group of 1.3 Grant's gazelle. The male was kept off exhibit during times of not wanting them to breed.
- The Soemmering's gazelle was a new addition to our institution in 2015. He did great but due to recent circumstances he has gone back to San Diego.
 - Grant's Gazelle (*Nanger granti*) (1.0)
 - Soemmering's Gazelle (*Nanger soemmerringii*) (1.0)
 - Blue-necked (Somali) Ostrich (*Struthio camelus molybdophanes*) (0.2)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)
 - Egyptian Goose (*Alopochen aegyptiaca*) (0.2)

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- Guineafowl (*Numididae sp.*) (various groups)
- Sulcata (African Spurred) Tortoise (*Centrochelys sulcata*) (1.0)
- We would have brought in more female gazelle when we lost our females, but we were unable to find any to bring in.
- We are bringing in a third species of gazelle, slender-horned gazelle, very soon. That animal is a male, also. Ostriches used to be in the giraffe yard, then moved to the gazelle yard.
- We used to have African ground hornbills in this exhibit with the breeding group of gazelle, the cranes, and the geese and guineas. However, the hornbills would kill baby gazelle, baby guineas and even killed a crowned crane. We do not mix them anymore because they are too aggressive to other species. See Oklahoma City Zoo Unsuccessful Exhibit.
 - Grant's Gazelle (*Nanger granti*)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*)
 - Egyptian Goose (*Alopochen aegyptiaca*)
 - Guineafowl (*Numididae sp.*)

Oklahoma City Zoological Park, Oklahoma City, OK – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (1.2)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
- Egyptian Goose (*Alopochen aegyptiaca*) (1.1)
- Sulcata (African Spurred) Tortoise (*Centrochelys sulcata*) (1.0)

Group has been successfully mixed for 1 year (since 2016, current as of 2017).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- We have a multiple (3) yards that total 2 acres. We can open all gates to a roundabout or close yards off to form multiples for combinations of animals.
- At this time, we are mixing 1.1 Egyptian geese, 1.1 East African crowned cranes, and 1.0 Sulcatta tortoise very successfully.
- This is a new method of management for okapi both that they have mixed successfully with other species and they stay out with access to their barn during warm weather whereas before they were consistently kept inside at night.

Changes/Accommodations Needed:

- We added a yard gate to create the roundabout.

Reproductive Management/Breeding History:

- When we had duiker in this exhibit, the male duiker had to be separated from calves. He would throw the calves through the air. Duiker were phased out.

Management Challenges:

- We have no challenges with the current mix.

Items Contributing to Group's Success:

- Exhibit size is great!
- 3 years to fission fusion
- Male is kept separately

Group/Exhibit Changes Over Time:

- For approximately 5 years, we housed okapi with yellow-backed duiker.
 - Okapi (*Okapia johnstoni*) (1.2)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1.1)
- It was difficult to ship the duiker calves out due to having no place to send them, so we opted not to breed duiker anymore. This led to us deciding not to house duiker in this exhibit anymore so that we could free up more barn space for the okapi.
- The duiker would rotate through our 3 okapi yards and rotate which okapi they were with. The okapi and the duiker got along beautifully. We would even see them out on exhibit playing with each other.

Oklahoma City Zoological Park, Oklahoma City, OK – Historical Exhibit

Species:

- White-tailed Deer (*Odocoileus virginianus*) (2.6)
- Sandhill Crane (*Grus canadensis*) (1.1)

Group was successfully mixed for 10+ years.

Exhibit Size: No information provided.

General Management Notes:

- This exhibit still exists, but we have moved the sandhill cranes due to barn crowding and have one less male deer.
- During the rut, we often had to separate the big male white-tailed deer from the rest of the herd. Otherwise he pinned them and chased them around, causing a high level of stress amongst the herd. He is now deceased.
- The birds fit into this exhibit quite nicely. There were no issues between the deer and the birds.
- The male had his own stall so we could separate him from the rest of the herd when he continually terrorized them during the rut. He is now deceased and the yard is quiet.
- The birds had a special place that they were fed. It was fenced off from the deer and only the birds' heads fit through the fencing openings. The birds were fed inside the fenced off area, but ate standing outside the fenced off area.

Reproductive Management/Breeding History:

- We do not have a breeding group. Our youngest male was castrated. When we had the big male, we had to cut his antlers off once he dropped his velvet due to the level of aggression towards keepers and the other deer.

Management Challenges:

- Sometimes the male refused to shift off exhibit, making it impossible for keepers to clean the exhibit and difficult to feed the birds.
- We worked the big male strictly protected contact. The rest of the animals in this exhibit were worked free contact.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We moved the sandhill cranes due to barn crowding. The exhibit still exists with deer.

Group/Exhibit Changes Over Time:

- There used to be turkeys in this exhibit as well.
 - White-tailed Deer (*Odocoileus virginianus*)
 - Sandhill Crane (*Grus canadensis*)
 - Wild Turkey (*Meleagris gallopavo*)

Oklahoma City Zoological Park, Oklahoma City, OK – Historical Exhibit

Species:

- Gerenuk (*Litocranius walleri*)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*)

No information was provided about how long this group was successfully mixed.

Exhibit Size: No information provided.

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- No information provided.

Oklahoma City Zoological Park, Oklahoma City, OK – Historical Exhibit

Species:

- Greater Kudu (*Tragelaphus strepsiceros*)
- Common Waterbuck (*Kobus ellipsiprymnus*)

No information was provided about how long this group was successfully mixed.

Exhibit Size: No information provided.

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- No information provided.

Oklahoma City Zoological Park, Oklahoma City, OK – Historical Exhibit

Species:

- Blue Duiker (*Philantomba monticola*)
- Abyssinian Blue-winged Goose (*Cyanochen cyanoptera*)

No information was provided about how long this group was successfully mixed.

Exhibit Size: No information provided.

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- No information provided.

Oklahoma City Zoological Park, Oklahoma City, OK – Historical Exhibit

Species:

- Indian Muntjac (*Muntiacus muntjak*)
- South African (Cape) Shelduck (*Tadorna cana*)

No information provided about how long this group was successfully mixed.

Exhibit Size: No information provided.

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- No information provided.

Omaha's Henry Doorly Zoo and Aquarium, Omaha, NE – Current Exhibit

Current Species:

- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.6)
- Common Ostrich (*Struthio camelus*) (1.3)
- East African Grey Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
- Spur-winged Goose (*Plectropterus gambensis*) (1.1)
- White Stork (*Ciconia ciconia*) (1.3)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Giraffe are let into the enclosure daily and brought in at night.
- The bird species are left out all day and night from April until October/November.

Changes/Accommodations Needed:

- The white storks tend to stay near a water retention pond in the exhibit. The deadfall within the pond allow them a place to retreat.

Reproductive Management/Breeding History:

- Giraffe males are rotated into the herd for breeding. Females are separated for calving and return to the herd with the calf as soon as the calf is negotiating gates well – usually within a month. Quite often the ostrich will harass the new giraffe calves and cause some tension among the giraffe herd.

Management Challenges:

- The ostrich can be very aggressive when the females lay eggs in the veldt. This can make it a challenge if keepers have to enter the enclosure to retrieve items that have fallen from the skyfari ride that hangs over the exhibit.
- The spur-winged goose male is very aggressive and will meet us at the gate every morning when we put giraffe outside.

Items Contributing to Group's Success:

- Size of the exhibit allows species to get away from one another
- Small group numbers of each species
- Areas within the exhibit to retreat, like the retention pond for the geese and storks and the river rock apron around the exhibit for ostrich to get away from giraffe

Group/Exhibit Changes Over Time:

- We have always had giraffe in this enclosure, but we used to also have scimitar-horned oryx and addax as well. The oryx and addax were only in the exhibit during the summer months and moved to a separate yard with access to a heated barn for the winter. There were never any real

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issues between species; I contribute this again to relatively small group numbers (about 0.2 oryx and 0.4 addax). The exhibit barrier changed from an 8' perimeter fence to a 3' fence with a 10' rock apron on the face of the exhibit. Once the perimeter barrier changed we could no longer put oryx in the exhibit. The addax only lasted one season with the new barrier after they figured out they could negotiate the rock apron and easily jump the 3' fence.

- Addax (*Addax nasomaculatus*) (0.4)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.6)
- Scimitar-Horned Oryx (*Oryx dammah*) (0.2)
- Over the years we have also had 1.1 Egyptian geese, 1.1 Abyssinian ground hornbills, and about 25 black-footed penguins in this exhibit. There used to be a small pool next to the giraffe barn that the penguins had access to. All species mixed very well with no issues.
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.6)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
 - Black-footed Penguin (*Spheniscus demersus*) (group of 25)
 - Egyptian Goose (*Alopochen aegyptiaca*) (1.1)

Omaha's Henry Doorly Zoo and Aquarium, Omaha, NE – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (1.1)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)

Group has been successfully mixed for 6 years (since 2009, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Typically we manage the okapi in separate yards adjacent to one another. One yard has a very small rubber-lined rock pond about 18" deep, which holds about 800 gallons of water. We have to dump it once a week and refill it since it does not have a circulation system.
- During the summer, we tend to put the male okapi in the pen closer to the public, as the female tends to get agitated easily and there are fewer places to hide in that exhibit. The female yellow-backed duiker is usually also housed in this yard, as she seems to do very well in there.
- There is a short rail about 8 feet from the public fence to keep the okapi away from the public, but the yellow-backed duiker can get under the rail and hide in the plants between the rail and the public viewing. The female okapi is put out in the other yard, which is still visible to the public, but allows her to hide if she gets nervous. The male yellow-backed duiker usually shares that yard with her.
- The hornbills can get into both yards under the fence and they do so quite frequently with no issues between species. In the winter, the hornbills and duiker are moved to other barns with access to heat, since they cannot be wintered in the okapi barn due to lack of space.

Changes/Accommodations Needed:

- The female yellow-backed duiker needs a small shelter or access to a small hide when she is displayed with a calf. The duiker need to be locked in or have access at night to a barn during the summer to get out of the weather/strong storms.

Reproductive Management/Breeding History:

- The yellow-backed duiker have had two calves in this exhibit with no issues.

Management Challenges:

- The female yellow-backed duiker is easily excitable when she is with a calf.

Items Contributing to Group's Success:

- Calm demeanor of our okapi male
- Ability to separate males and females
- Places for the animals to hide within the exhibit

Group/Exhibit Changes Over Time:

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- Before 2009 we had 1.1 Egyptian geese in the yard with the small water feature with no issues. The ground hornbills would not tolerate the geese so the geese had to be moved out.
 - Okapi (*Okapia johnstoni*) (1.1)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
 - Egyptian Goose (*Alopochen aegyptiaca*) (1.1)
- At one point we tried a goliath heron in this exhibit. The ground hornbills won out when the female attacked and killed the heron.
 - Okapi (*Okapia johnstoni*) (1.1)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
 - Goliath Heron (*Ardea goliath*) (0.0.1)

Omaha's Henry Doorly Zoo and Aquarium, Omaha, NE – Historical Exhibit

Species:

Addra (Dama) Gazelle (*Nanger dama*) (1.3 + offspring)

East African Grey Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)

Group was successfully mixed for 10 years (from 2000 to 2010).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- During the summer months the gazelle were locked out into the yard with the cranes during the day and given access to the barn at night. They were only locked in overnight when the weather turned cold.
- The cranes were left out all summer and fed in the exhibit with the gazelle.

Reproductive Management/Breeding History:

- The male gazelle were rotated in the exhibit for breeding without any issues.

Management Challenges:

- If we had to lock the gazelle inside to separate one for a physical or if one needed medical attention, we often had to walk them into the barn from the yard. The cranes would have to be caught up first, otherwise they would try to hop the fences and would end up crashing into them since they were often pinioned.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We are currently constructing an African Grasslands exhibit and dama gazelle are no longer part of our collection.

Group/Exhibit Changes Over Time:

- At one time we had several young gazelle males in the exhibit and 1.0 Marabou Stork. This did not work as the young gazelle eventually cornered the stork and keepers had to rescue him from the herd. I think the age of the gazelle and their sex had much to do with the reasons that this mix did not work.
 - Addra (Dama) Gazelle (*Nanger dama*) (bachelor group)
 - Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Omaha's Henry Doorly Zoo and Aquarium, Omaha, NE – Historical Exhibit

Species:

- Grevy's Zebra (*Equus grevyi*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.1)

Group was successfully mixed for one whole season.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 1.2 adult Grevy's zebra and 1.1 ostrich were locked out in their exhibit of sand and rock with several small locust trees protected with chain link. During the summer, both species were fed in the barns and had access to barn stalls at night.

Reproductive Management/Breeding History:

- The zebra male was in with the females year round, but no successful breeding occurred due to the ages of the females.

Management Challenges:

- The zebra would occasionally chase the ostrich in the yard.
- The zebra would always try to get in the ostrich's stall to eat their evening diet.
- The yard was large enough for both species, but a dedicated barn and yard for the evening for the ostrich would have allowed for easier management of them. It was difficult to get the ostrich into the barn when the zebras were out with them.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The enclosure is being renovated into our new grasslands exhibit so it no longer exists. Grevy's zebra are no longer part of our collection.

Group/Exhibit Changes Over Time:

- At one time the group consisted of 0.2 Grevy's zebra and 1.1 klipspringer. The two species mixed very well together. The klipspringer even had a calf at the time. The klipspringer and zebra never had any issues and were often seen sharing the same barn stalls at night. The zebra eventually became very protective of the klipspringer. This lasted for one summer because the klipspringer did not display well. They were difficult to see in the yard and they never got used to the train ride that ran next to the exhibit during the summer.
 - Grevy's Zebra (*Equus grevyi*) (0.2)
 - Klipspringer (*Oreotragus oreotragus*) (1.1)

Omaha's Henry Doorly Zoo and Aquarium, Omaha, NE – Historical Exhibit

Species:

Addax (*Addax nasomaculatus*) (1.8)

East African Grey Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)

Group was successfully mixed for 7 years (from 2007 to 2014).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This was a seasonal arrangement from about 2007-2014.
- The addax were locked out in the exhibit all summer long with no access to their barn until the winter months.
- The cranes were locked out in the yard with them.

Reproductive Management/Breeding History:

- Addax males were rotated in with the females for a short time each fall for breeding. Females would calve out on exhibit.
- We never had any issues between the species, probably because the exhibit was a good size with plenty of shade and deadfall for the cranes to get up on when the addax would go for their occasional run around the exhibit.

Management Challenges:

- The only challenges were immobilizations; they had to be done out in the yard, as it was difficult to get the herd to go into the barn unless it was very cold.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This enclosure is part of our African Grasslands renovation project. We no longer have addax in our collection.

Group/Exhibit Changes Over Time:

- None

Omaha's Henry Doorly Zoo and Aquarium, Omaha, NE – Historical Exhibit

Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2 + offspring)
Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)

Group was successfully mixed for 2 summers.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The bongo herd was usually locked out of the barn on exhibit during the day and given access at night.
- During the winter the herd was given access to the barn day and night (from November-April).

Reproductive Management/Breeding History:

- The male bongo was rotated on exhibit for breeding.
- The females usually had their calves on exhibit with the herd.

Management Challenges:

- The only challenge was that the hornbills were always trying to find a way out of the exhibit; there were other hornbills in exhibits within their eyesight and they would try to get to them.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This enclosure is now part of our African Grasslands renovation project. We will maintain bongo in our future project.

Group/Exhibit Changes Over Time:

- At one time, for about 6 seasons, we had a pair of Egyptian geese with the bongo herd and never had any problems. The geese would always climb into the water bowls and make a mess until the bongo chased them out.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (breeding group)
 - Egyptian Goose (*Alopochen aegyptiaca*) (1.1)

Omaha's Henry Doorly Zoo and Aquarium, Omaha, NE – Historical Exhibit

Species:

- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.2)
- East African Grey Crowned Crane (*Balearica regulorum*) (1.1)

Group was successfully mixed for a few weeks (in 2008).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The rhino were let out on exhibit daily and locked in at night, or left access depending on the weather.
- We attempted this for only a short time because the moat surrounding the rhino enclosure was no match for the crowned cranes to jump over. Aside from this, I think they would have mixed well with the rhino due to the fact that there were several places for the cranes to escape to within the exhibit.
- The cranes never really let the rhino get close enough to mess with them.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Keeping the cranes in the exhibit was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This enclosure is also becoming part of the new African Grasslands renovation project. We will continue to manage white rhino in a new facility.

Group/Exhibit Changes Over Time:

- None

Oregon Zoo, Portland, OR – Current Exhibit

Current Species:

- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.0)
- Speke's Gazelle (*Gazella spekei*) (1.2)

Group has been successfully mixed for 2 years (since mid-2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq. ft. (~22,000 is ½ acre)

General Management Notes:

- Giraffe are 8 and 5 years old. The Speke's gazelle male is 4 years old and the females are 4 and 9 years old.
- The giraffe and Speke's are housed in different buildings, but share the same exhibit. All animals are conditioned to enter their buildings and stalls when doors are opened.

Changes/Accommodations Needed:

- The exhibit has logs and brush piles for the Speke's to move around and hide under if harassed by giraffe. The giraffe are tolerant of the Speke's and have not gone after them.

Reproductive Management/Breeding History:

- Both female Speke's have been pregnant and were separated into stalls for the birth.

Management Challenges:

- There have been no real challenges with this group. All species and individuals get along well.

Items Contributing to Group's Success:

- Temperament of the animals
- Separate buildings for housing
- Animals conditioned to come into designated buildings and stalls

Group/Exhibit Changes Over Time:

- When the exhibit opened in 1989 we had 1.2 reticulated giraffe and 1.4 impala. Soon after opening we added 2.1 marabou storks. All animals got along without incident, except one female giraffe stepped on a newborn impala. From that point on, all impala births took place in the hoofstock holding building.
 - Impala (*Aepyceros melampus*) (1.4)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
 - Marabou Stork (*Leptoptilos crumenifer*) (2.1)

Oregon Zoo, Portland, OR – Current Exhibit

Current Species:

Gerenuk (*Litocranius walleri*) (1.0)
Speke's Gazelle (*Gazella spekei*) (2.0)

OR

Bontebok (*Damaliscus pygargus*) (2.0)
Speke's Gazelle (*Gazella spekei*) (2.0)

Gerenuk and Speke's gazelle have been successfully mixed for 2 years (since 2013, current as of 2015), but the gerenuk will be shipped out soon (see below).

Bontebok and Speke's gazelle have been successfully mixed for 3 months (current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The gerenuk is 3 years old, and the Speke's are about 4 years old. 2.0 bontebok are just over one year old.
- The gerenuk and Speke's have been together for about 2 years with no problems. They are all shifted in and out of the exhibit from the same gate and are conditioned to enter specific stalls.
- The bontebok were introduced to the exhibit about 3 months ago. They get along fine with the Speke's, but the gerenuk is too stressed with the bontebok in the yard so the gerenuk and bontebok go out every other day with the Speke's.

Changes/Accommodations Needed:

- There are logs and brush piles for visual separation if they choose to use them.

Reproductive Management/Breeding History:

- None (all male groups)

Management Challenges:

- The gerenuk and bontebok do not successfully share the exhibit. It is probably because the gerenuk is the only one of its species. The gerenuk is being shipped to St. Louis Zoo.

Group/Exhibit Changes Over Time:

- When the exhibit opened in 1989 it housed 0.4 Hartmann's mountain zebra, 2.2 marabou stork, and 1.1 Egyptian geese. The zebras continuously chased the storks, killing one. The remaining storks were then moved to the giraffe exhibit.
 - Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (0.4)
 - Egyptian Goose (*Alopochen aegyptiaca*) (1.1)
 - Marabou Stork (*Leptoptilos crumenifer*) (2.2)
- Afterward, the exhibit housed 0.2 Plains zebra, 3.0 Speke's gazelle, and 2.0 gerenuk. There were no issues with this group. The zebra were very old females that did not challenge the other animals.
 - Gerenuk (*Litocranius walleri*) (2.0)

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- Plains Zebra (*Equus quagga*) (0.2)
- Speke's Gazelle (*Gazella spekei*) (3.0)

Parc Safari, Hemmingford, Quebec, Canada – Current Exhibit

Current Species:

Greater Kudu (*Tragelaphus strepsiceros*) (2.0)

Scimitar-horned Oryx (*Oryx dammah*) (3.9)

Water Buffalo (*Bubalus bubalis*) (1.5.1)

Group has been successfully mixed for 5+ years (since at least 2010, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Most individual are born into the enclosure with the other species.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Breeding is usually done in the winter quarter and only occasionally in the mixed enclosure summer quarter.
- We do not separate females for calving.
- Individuals are selected for breeding.

Management Challenges:

- We need to add more greater kudu to the collection; they will be less nervous as a bigger herd.

Items Contributing to Group's Success:

- Space
- Many individuals in the herd (except for kudu)
- Breeding herds (except kudu)

Group/Exhibit Changes Over Time:

- We have changed our herd's location many times in the last 10 years. I cannot recall all of the species compositions.

Peoria Zoo, Peoria, IL – Current Exhibit

Current Species:

Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.2)

Southern Gerenuk (*Litocranius walleri walleri*) (1.0)

Thomson's Gazelle (*Eudorcas thomsonii*) (3.0)

Group has been successfully mixed for 6 years (since June 2009, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Thomson's gazelle and gerenuk were all 1-2 years old during initial introductions.
- Each night the giraffe, gazelle, and gerenuk are transferred to separate holding areas.

Changes/Accommodations Needed:

- We have several hides for the gerenuk and gazelle in holding and on exhibit.
- There are several food stations for grain, hay, and browse on exhibit.



Dawn Petefish

Reproductive Management/Breeding History:

- Both female giraffe are on contraceptives (one on MGA and one on PZP vaccine).

Management Challenges:

- We observe continual sparring (usually a 2 against 1 situation) that occasionally results in injuries to the subordinate Thomson's gazelle. To manage this, we rotate the subordinate with the subordinate male during "on yard" time.

Items Contributing to Group's Success:

- Bachelor herds created when all animals were young
- Several indoor and outdoor areas available to separate animals when necessary

Group/Exhibit Changes Over Time:

- None

Peoria Zoo, Peoria, IL – Current Exhibit

Current Species:

Grevy's Zebra (*Equus grevyi*) (1.2)

Southern White Rhinoceros (*Ceratotherium simum simum*) (2.0)

Group has been successfully mixed for 6 years (since June 2009, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The male Grevy's is castrated and was 11 years old when introduced to our two Grevy's females and white rhinos. The rhinos and Grevy's females were all 2-3 year olds during introductions.
- The Grevy's and the rhinos are shifted into separate holding areas at night.



Peoria Zoo

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Occasional sparing between the rhinos that sometimes results in minor injuries. Reintroductions that follow sometimes require weeks of careful rotation.

Items Contributing to Group's Success:

- Exceptional keepers/trainers for the rhinos who are able to recognize behavioral patterns
- Adequate indoor and outdoor holding spaces
- Mature and mellow male zebra

Group/Exhibit Changes Over Time:

- None

Peoria Zoo, Peoria, IL – Current Exhibit

Current Species:

- Red River Hog (*Potamochoerus porcus*) (2.4)
- Colobus Monkey (*Colobus guereza*) (2.2)

Group has been successfully mixed for 6 years (since June 2009, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- We have a breeding group of hogs with a family group of Colobus.
- We have had young monkeys with young hogs and never had any interspecies issues.

Changes/Accommodations Needed:

- Large holding and indoor and outdoor spaces used for introductions.
- Many raised platforms and feeding stations for the monkeys.



Peoria Zoo

Reproductive Management/Breeding History:

- Female hogs are separated prior to giving birth and for a short time after birth before being reintroducing to the male and the monkeys.

Management Challenges:

- After separating the adult females from each other we were never able to successfully reintroduce both adult females to the adult male.
- It is difficult to manage more than three groups of pigs.

Items Contributing to Group's Success:

- Many platforms in the exhibit so that the hogs and monkeys do not have to share the same space
- Separate holding and introduction spaces

Group/Exhibit Changes Over Time:

- None

Philadelphia Zoo, Philadelphia, PA – Current Exhibit

Current Species:

- Chapman's Zebra (*Equus quagga chapmani*) (0.2)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.0)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- These animals have been together on exhibit for 3 years. The rhino was 10 years old, and the zebras were 15 years old when introduced.
- During shifting the keepers have to work as a team to ensure the zebras do not access the rhino stall.

Changes/Accommodations Needed:

- In 2010 there was one exhibit for both species, but the species were rotated and didn't share the exhibit.
- In 2011 a bollard wall with a gate was added for future introduction. Bollards were also added at the corridor to the entrance of the zebra shift door to ensure the rhino did not try to access the zebra building. Tree guards were also added to the "zebra" side in order to protect the trees from the rhino.
- In 2012 the bollards were removed to offer access for the zebra to move throughout both exhibits.
- In 2013 the gate within the bollard wall was opened for full access for both zebras/rhino on both sides of exhibit.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Our end of the day shifting required 2 keepers to be present – 1 keeper has to close the rhino door and 1 keeper has to stand on the guest side and watch to see if the zebra are in the rhino shift area. This is something we are looking to improve – the use of a camera would possibly remove this challenge.

Items Contributing to Group's Success:

- Space is more than adequate for 3 animals

Group/Exhibit Changes Over Time:

- None

Phoenix Zoo, Phoenix, AZ – Current Exhibit

Current Species:

- Gerenuk (*Litocranius walleri*) (1.4)
- Kirk's Dik-dik (*Madoqua kirkii*) (1.1)
- Kori bustard (*Ardeotis kori*) (unknown group)
- Sulcata Tortoise (*Centrochelys sulcata*) (1.2)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 20,000- 45,000 (½ acre to 1 acre)

General Management Notes:

- We added kori bustards in the enclosure when the male gerenuk was pulled out seasonally (to time gerenuk birds in the spring/summer); there have been no problems in this exhibit.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided

Items Contributing to Group's Success:

- No information provided

Group/Exhibit Changes Over Time:

- This exhibit used to house Kirk's dik-dik, addra gazelle, sulcata tortoise, and kori bustard. This group did well together until a female addra gazelle killed a kori bustard when it wandered too close to her calf.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Kirk's Dik-dik (*Madoqua kirkii*)
 - Kori Bustard (*Ardeotis kori*)
 - Sulcata Tortoise (*Centrochelys sulcata*)

Phoenix Zoo, Phoenix, AZ – Current Exhibit

Current Species:

- Southern White Rhinoceros (*Ceratotherium simum simum*) (0.2)
- Speke's Gazelle (*Gazella spekei*) (3.0)
- Orinoco Goose (*Neochen jubata*) (1.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 20,000- 45,000 (½ acre to 1 acre)

General Management Notes:

- There are no conflicts between species.
- The gazelle occasionally play spar with the rhino, although this is always mild and has never escalated.

Changes/Accommodations Needed:

- The rhino barn cannot be left open with daytime access because the gazelle wander inside.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- The gazelle are difficult to shift in at night so this process requires extra time.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Phoenix Zoo, Phoenix, AZ – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (1.3)
- Common Eland (*Taurotragus oryx*) (0.3)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (unknown group)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (unknown group)
- Thomson's Gazelle (*Eudorcas thomsonii*) (0.3)
- Common Ostrich (*Struthio camelus*) (1.3)
- East African Grey Crowned Crane (*Balearica regulorum gibbericeps*) (group of 6)
- Guineafowl (*Numididae spp.*) (unknown group)
- Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (group of 20)
- Yellow-billed Stork (*Mycteria ibis*) (1.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 3 acre- 8 acre

General Management Notes:

- 2.0 gerenuk did okay in this exhibit for a couple years, but started fighting more when they were older and were pulled from the exhibit when observed trying to breed the Thomson's gazelle.
- 1.0 Thomson's gazelle was added for breeding after the gerenuk were removed.
- The Ankole and gazelle never had any problems with any of the animals.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- When gerenuk were in the yard, they would try to spar with the giraffe. They got kicked at a couple of times and later x-rays showed that they received some bone damage to their jaws; they never showed any indication behaviorally that they had an issue, and they healed by themselves nicely (they were big, muscular gerenuk males).
- One of our young female giraffe would sometimes irritate the vultures by kicking and trying to step on them, but no major injuries or deaths occurred.
- The vultures would occasionally predate on guineafowl chicks if a nest hatched on the yard and the chicks wandered too close to the vultures.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- There used to be 2.0 gerenuk mixed in the exhibit.
 - Ankole (Watusi) Cattle (*Bos taurus*)

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- Common Eland (*Taurotragus oryx*)
- Gerenuk (*Litocranius walleri*)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
- Thomson's Gazelle (*Eudorcas thomsonii*)
- Common Ostrich (*Struthio camelus*)
- East African Grey Crowned Crane (*Balearica regulorum gibbericeps*)
- Guineafowl (*Numididae spp.*)
- Lappet-faced Vulture (*Torgos tracheliotos*)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*)
- Yellow-billed Stork (*Mycteria ibis*)

Phoenix Zoo, Phoenix, AZ – Current Exhibit

Current Species:

- Red Brocket Deer (*Mazama temama*) (1.3)
- Brown Pelican (*Pelecanus occidentalis*) (unknown group)
- Sandhill Crane (*Grus canadensis*) (1.1)
- Screamer (*sp.*) (1.1)
- White Pelican (*Pelecanus sp.*) (unknown group)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 1 acre- 3 acre

General Management Notes:

- The brocket deer swam in the pond a lot.
- There was concern over the pelicans and the size of the deer fawns, so new fawns were kept in the barn for the first 4 weeks until they were more mobile and we were no longer concerned about a pelican eating one.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- The only conflict we had in this enclosure was between the screamers and the deer. The screamers would chase the deer and block their shift door access. Eventually, the screamers were moved and I think geese were placed inside instead.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Phoenix Zoo, Phoenix, AZ – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (1.2)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 1 acre- 3 acre

General Management Notes:

- There have been no conflicts between species and both species have successfully bred.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Both species breed successfully.

Management Challenges:

- No information provided

Items Contributing to Group's Success:

- No information provided

Group/Exhibit Changes Over Time:

- None

Pittsburgh Zoo & PPG Aquarium, Pittsburgh, PA – Current Exhibit

Current Species:

Addra (Dama) Gazelle (*Nanger dama*) (1.2)

Springbok (*Antidorcas marsupialis*) (0.6)

Common Ostrich (*Struthio camelus*) (0.3)

Group has been successfully mixed for 4 years (since December 2011, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- When introductions were done we started with introducing the animal to its conspecifics and then added a species at a time until eventually all species were together.
- These animals are on exhibit together from early spring to late fall. In the winter these animals are kept in our ungulate barn separated by species.

Changes/Accommodations Needed:

- When we first added a new species to this exhibit we added visual barriers to the perimeter fencing for visibility.
- Because one side of the exhibit is a water barrier, we paid close attention to these areas so that they didn't run into the water.
- We would also add extra staff to the perimeters to interject if they appeared out of control.

Reproductive Management/Breeding History:

- Since we have only one male addra gazelle and the addra group is supposed to be breeding we did not originally use birth control on the springbok. Then in January of 2015 we had a stillbirth of a hybrid between the addra and a springbok. We have since then put all the springbok female on a contraceptive.

Management Challenges:

- The male addra gazelle has repeatedly been seen breeding the springbok, sometimes preferring them to the female addra gazelle.

Items Contributing to Group's Success:

- There is only 1 male animal in this group.
- 0.2 new ostrich are very calm in nature.

Group/Exhibit Changes Over Time:

- This species composition has been the same since 2011. The number of specimens has changed considerably since then. At one point we had male springbok in with the male addra gazelle. There wasn't much aggression between the males, but there was only one female addra or at times no females so the male addra kept to himself.
- In 2010 we had 0.2 Grant's zebra in this exhibit with 0.1 ostrich, 6.8 springbok, and 1.1 addra gazelle. The male springbok did not all get along so we had to have a male bachelor group. We would split the day on exhibit and put the bachelor group with the zebra to maintain some diversity on exhibit.

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- Addra (Dama) Gazelle (*Nanger dama*) (1.1)
- Grant's Zebra (*Equus quagga boehmi*) (0.2)
- Springbok (*Antidorcas marsupialis*) (6.8)
- Common Ostrich (*Struthio camelus*) (0.1)
- Prior to the arrival of springbok in 2008 this exhibit had 0.2 Grant's zebra, 1.0 blesbok, 0.1 Thomson's gazelle, 1.2 addra gazelle, 0.2 ostrich, and 1.3 hooded vulture. That species composition was constant from 2000-2006. The number of specimens changed from time to time.
 - Addra (Dama) Gazelle (*Nanger dama*) (1.2)
 - Blesbok (*Damaliscus pygargus phillipsi*) (1.0)
 - Grant's Zebra (*Equus quagga boehmi*) (0.2)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (0.1)
 - Common Ostrich (*Struthio camelus*) (0.2)
 - Hooded Vulture (*Necrosyrtes monachus*) (1.3)
- From 1997-1999 there were eastern bongo in this composition mix as well.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Blesbok (*Damaliscus pygargus phillipsi*)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Common Ostrich (*Struthio camelus*)
 - Hooded Vulture (*Necrosyrtes monachus*)
- From 1993-1997 there were eastern bongo, Grant's zebra, blesbok, Thomson's gazelle, ostrich and hooded vulture on exhibit together.
 - Blesbok (*Damaliscus pygargus phillipsi*)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Common Ostrich (*Struthio camelus*)
 - Hooded Vulture (*Necrosyrtes monachus*)
- In 1992 there were just bongo, zebra, Thomson's gazelle, and ostrich.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Common Ostrich (*Struthio camelus*)
- In 1991 there were common eland, bongo, zebra and ostrich.
 - Common Eland (*Taurotragus oryx*)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Common Ostrich (*Struthio camelus*)
- From 1988-1990 there were common eland, zebra and ostrich. The exhibit was built in 1988. These species compositions could change from day to day based on estrus cycles, animal behavior, age etc. but for the most part these species were exhibited together.
 - Common Eland (*Taurotragus oryx*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Common Ostrich (*Struthio camelus*)

Pittsburgh Zoo & PPG Aquarium, Pittsburgh, PA – Current Exhibit

Current Species:

- Grant's Zebra (*Equus quagga boehmi*) (1.1)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.1)

Group has been successfully mixed for approximately 1 year (since July 2014, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Animals are in this exhibit from spring to fall. In winter they are housed separately by species.
- The current group was introduced when the giraffe were between 7-8 years old, and the zebra were just about a year old.
- These zebra were hand-raised, captive born.

Changes/Accommodations Needed:

- Several feeding stations were placed around the exhibit at varying heights.

Reproductive Management/Breeding History:

- Neither group is breeding. The male zebra is castrated, and the female giraffe is contracepted.

Management Challenges:

- The species have mixed well but occasionally despite the female giraffe being contracepted the male giraffe shows interest and pursues her attempting to mount. That can be disruptive for all animals and requires temporary separation.

Items Contributing to Group's Success:

- The zebra were hand-raised.
- The zebra were young when introduced to the giraffe.
- These giraffe are mild tempered.

Group/Exhibit Changes Over Time:

- The composition was the same, but we had 2 different zebra. When we tried this combination the first time we had 0.2 zebra that were 7 and 9 years old. They were parent-reared and had challenging personalities at times. There was aggression toward the giraffe from the zebra. When we revamped the exhibit, we moved the zebra out and swapped them for younger animals and added more feeding stations.

Point Defiance Zoo & Aquarium, Tacoma, WA

The Asian forest Sanctuary at Point Defiance Zoo spans six different exhibit spaces and utilizes rotational and mixed species exhibitory (only five are mixed species ungulate exhibits). The same animals are not always mixed together, and are not in the same exhibit daily. The largest exhibit is slightly over 5,000 square feet. Primate mixes are limited to three fully meshed-in enclosures or an indoor space.

When introducing species together, we follow the normal howdy routine both in holding and on exhibit where possible. Almost all of our introductions have been done on exhibit. They were typically done in one of three exhibits (Current Exhibit, Current Exhibit, or Current Exhibit), which can be joined to form a very large space with options for separating animals. We also did observations for the first day and then intermittently for the following days as needed.

Point Defiance Zoo & Aquarium, Tacoma, WA – Current Exhibit

Current Species:

Lowland Anoa (*Bubalus depressicornis*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (1.0)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 5,000-10,000 sq. ft.

General Management Notes:

- This is our largest habitat and the one that typically houses our tigers. However, we do have other species in there from time to time.
- The exhibit has a large pool and waterfall, along with multiple levels.
- There is only one small shelter on the far side of the exhibit. As a result, we do not typically mix animals on this exhibit in poor weather. However, there are large trees in the exhibit as well which provide some shelter from the elements.
- This exhibit allows the most space, but we have still seen inter-species activity when individuals are out together.
- Primates cannot go out to this exhibit due to it having an open top.
- The animals are all shifted off exhibit at night so they never stay out together with other species overnight.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Otters can breed at any time, so we will sometimes see breeding activity when they are out with one of the hoofstock.

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- The tapir is in a non-breeding situation currently, however we have historically put out 1.1 tapir and attempted breeding has been noted.
- We house our anoa separately unless we are trying to breed them. In that case they go out onto exhibit together but do not share the space. That is not to say that they couldn't share space while breeding, we just have never tried it.

Management Challenges:

- If the animals do not share the shelter well, we sometimes have to separate them. This most likely wouldn't be an issue if the shelter space was a little larger.

Items Contributing to Group's Success:

- The otters are pair bonded, so they typically keep to themselves.
- Space for the otters (or anoa) to get away from each other is possible.
- Pools for the otters to swim in and get away from anoa if necessary.

Group/Exhibit Changes Over Time:

- We tried the otters with our male anoa as well, and he kept trying to stomp on them, so we stopped. I don't believe this is a male anoa issue necessarily, but perhaps an individual problem.
- We have been able to pair otters with multiple Malayan tapirs over the years, both male and female.



Telena Welsh

Point Defiance Zoo & Aquarium, Tacoma, WA – Current Exhibit

Current Species:

Lowland Anoa (*Bubalus depressicornis*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
Siamang (*Symphalangus syndactylus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (1.0)
Siamang (*Symphalangus syndactylus*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 5,000 sq. ft. or less

General Management Notes:

- This exhibit has a pool and has the best shelter for keeping out of the weather due to the placement of the window.
- The animals are all shifted off exhibit at night so they never stay out together with other species overnight.

Changes/Accommodations Needed:

- None



Telena Welsh

AZA Ungulate TAGs
Mixed-species Manual 2016

Reproductive Management/Breeding History:

- The primates try to breed, but they are unable to conceive.
- Otters can breed at any time, so we will sometimes see breeding activity when they are out with one of the hoofstock.
- The tapir is in a non-breeding situation.
- We house our anoa separately unless we are trying to breed them. In that case they go out onto exhibit together but do not share the space. That is not to say that they couldn't share space while breeding, we just have never tried it.

Management Challenges:

- Sometimes the primates will tease the anoa. We rarely have to intervene; typically the anoa plays back and it is a great visitor experience.
- The anoa and primates can eat similar items, so staff have to be careful about where they put each individual's food. The anoa would eat the entire primate diet if given the chance.
- If the anoa or tapir and otters do not share the shelter well, we sometimes have to separate them. This most likely wouldn't be an issue if the shelter space was a little larger.



Telena Welsh

Items Contributing to Group's Success:

- The otters are pair bonded, so they typically keep to themselves.
- Space for the otters (or tapir) to get away from each other is possible.
- Pools for the otters to swim in and get away from tapir if necessary.
- Each species utilizes a different area of the exhibit. The primates stay up high for the most part and the anoa/tapir is on the ground.
- The primates are social, so they tend to interact with each other a lot and most of the times don't pay too much attention to the anoa or tapir.

Group/Exhibit Changes Over Time:

- We tried the otters with our male anoa as well, and he kept trying to stomp on them, so we stopped. I don't believe this is a male anoa issue necessarily, but perhaps an individual problem.
- We have been able to pair otters with multiple Malayan tapirs over the years, both male and female.



Telena Welsh

Point Defiance Zoo & Aquarium, Tacoma, WA – Current Exhibit

Current Species:

Lowland Anoa (*Bubalus depressicornis*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
Siamang (*Symphalangus syndactylus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (1.0)
Siamang (*Symphalangus syndactylus*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 5,000 sq. ft. or less

General Management Notes:

- This exhibit has a pool and waterfall feature.
- This exhibit does not have shelter or a heat rock. As a result, animals must be given dayroom (see Current Exhibit below) access when there is inclement weather.
- The animals are all shifted off exhibit at night so they never stay out together with other species overnight.

Changes/Accommodations Needed:

- None



Telena Welsh

Reproductive Management/Breeding History:

- The primates try to breed, but they are unable to conceive.
- Otters can breed at any time, so we will sometimes see breeding activity when they are out with one of the hoofstock.
- The tapir is in a non-breeding situation.
- We house our 1.1 anoa separately unless we are trying to breed them. In that case they go out onto exhibit together but do not share the space. That is not to say that they couldn't share space while breeding, we just have never tried it.

Management Challenges:

- Sometimes the primates will tease the anoa. We rarely have to intervene; typically the anoa plays back and it is a great visitor experience.
- The anoa and primates can eat similar items, so staff have to be careful about there they put each individual's food. The anoa would eat the entire primate diet if given the chance.
- If the anoa or tapir and otters do not share the shelter well, we sometimes have to separate them. This most likely wouldn't be an issue if the shelter space was a little larger.

Items Contributing to Group's Success:

- The otters are pair bonded, so they typically keep to themselves.
- Space for the otters (or tapir) to get away from each other is possible.
- Pools for the otters to swim in and get away from tapir if necessary.
- Each species utilizes a different area of the exhibit. The primates stay up high for the most part and the anoa/tapir is on the ground.
- The primates are social, so they tend to interact with each other a lot and most of the times don't pay too much attention to the anoa or tapir.



Telena Welsh

Group/Exhibit Changes Over Time:

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- We have been able to pair otters with multiple Malayan tapirs over the years, both male and female.

Point Defiance Zoo & Aquarium, Tacoma, WA – Current Exhibit

Current Species:

Lowland Anoa (*Bubalus depressicornis*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
Siamang (*Symphalangus syndactylus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (1.0)
Siamang (*Symphalangus syndactylus*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 5,000 sq. ft. or less

General Management Notes:

- This exhibit has two pools and a waterfall feature.
- It has a shelter and a heat lamp area, however in inclement weather there is no corner for the individuals to tuck into; this means that if the animals don't share the shelter/heat well then sometimes we can't send them out together or else we have to separate them.
- The animals are all shifted off exhibit at night so they never stay out together with other species overnight.



Telena Welsh

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The primates try to breed, but they are unable to conceive.
- Otters can breed at any time, so we will sometimes see breeding activity when they are out with one of the hoofstock.
- The tapir is in a non-breeding situation.
- We house our 1.1 anoa separately unless we are trying to breed them. In that case they go out onto exhibit together but do not share the space. That is not to say that they couldn't share space while breeding, we just have never tried it.

Management Challenges:

- Sometimes the primates will tease the anoa. We rarely have to intervene; typically the anoa plays back and it is a great visitor experience.
- The anoa and primates can eat similar items, so staff have to be careful about where they put each individual's food. The anoa would eat the entire primate diet if given the chance.
- If the anoa or tapir and otters do not share the shelter well, we sometimes have to separate them. This most likely wouldn't be an issue if the shelter space was a little larger.

Items Contributing to Group's Success:

- The otters are pair bonded, so they typically keep to themselves.
- Space for the otters (or tapir) to get away from each other is possible.
- Pools for the otters to swim in and get away from tapir if necessary.
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Telena Welsh

Group/Exhibit Changes Over Time:

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- We have been able to pair otters with multiple Malayan tapirs over the years, both male and female.

Point Defiance Zoo & Aquarium, Tacoma, WA – Current Exhibit

Current Species:

Lowland Anoa (*Bubalus depressicornis*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Lowland Anoa (*Bubalus depressicornis*) (1.0 or 0.1)
Siamang (*Symphalangus syndactylus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (0.1)
White-cheeked Gibbon (*Nomascus leucogenys*) (1.1)

OR

Malayan Tapir (*Acrocodia indica*) (1.0)
Siamang (*Symphalangus syndactylus*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 5,000 sq. ft. or less

General Management Notes:

- This exhibit is known as the dayroom.
- This is an indoor space with padded and heated floors.
- This room can be opened up to two other exhibits (Current Exhibit or Current Exhibit) or both to create a very large space.
- The animals are all shifted off exhibit at night so they never stay out together with other species overnight.



Telena Welsh

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- The primates try to breed, but they are unable to conceive.
- Otters can breed at any time, so we will sometimes see breeding activity when they are out with one of the hoofstock.
- The tapir is in a non-breeding situation.
- We house our 1.1 anoa separately unless we are trying to breed them. In that case they go out onto exhibit together but do not share the space. That is not to say that they couldn't share space while breeding, we just have never tried it.

Management Challenges:

- Sometimes the primates will tease the anoa. We rarely have to intervene; typically the anoa plays back and it is a great visitor experience.
- The anoa and primates can eat similar items, so staff have to be careful about where they put each individual's food. The anoa would eat the entire primate diet if given the chance.
- If the anoa or tapir and otters do not share the shelter well, we sometimes have to separate them. This most likely wouldn't be an issue if the shelter space was a little larger.

Items Contributing to Group's Success:

- The otters are pair bonded, so they typically keep to themselves.
- Space for the otters (or tapir) to get away from each other is possible.
- Pools for the otters to swim in and get away from tapir if necessary.
- Each species utilizes a different area of the exhibit. The primates stay up high for the most part and the anoa/tapir is on the ground.
- The primates are social, so they tend to interact with each other a lot and most of the times don't pay too much attention to the anoa or tapir.



Telena Welsh

Group/Exhibit Changes Over Time:

- We tried the otters with our male anoa as well, and he kept trying to stomp on them, so we stopped. I don't believe this is a male anoa issue necessarily, but perhaps an individual problem.
- We have been able to pair otters with multiple Malayan tapirs over the years, both male and female.

Potter Park Zoological Gardens, Lansing, MI – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (0.2)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The hornbills are sisters and were 6.5 years old when they were first introduced to the bongo. They were originally introduced to adult bongo and over the past 3 years have also been with the calves.
- The hornbills are shifted into a covered/heated holding area each night.

Changes/Accommodations Needed:

- More logs and perches for the hornbills.
- The hornbills are fed off exhibit prior to shifting in the morning and after they are shifted in the afternoon. We have never seen the hornbills eat the bongo grain during the day.

Reproductive Management/Breeding History:

- We rotate the male bongo on exhibit for breeding; the hornbills are kept off exhibit during this time.
- When calves are introduced to the yard for the first time the hornbills are kept off the first day.

Management Challenges:

- The hornbills like to chase the calves when they are first introduced.
- Occasionally the hornbills don't want to shift into holding in the afternoon and the bongos must be shifted off exhibit so the keepers can go in the yard and get the hornbills inside.

Items Contributing to Group's Success:

- A large enough space that they do not have to be close to each other unless they choose
- Training both species to respond to a recall
- We have 0.2 hornbills so there is no breeding aggression

Group/Exhibit Changes Over Time:

- The bongo were housed alone prior to the hornbills introduction 3 years ago.

Potter Park Zoological Gardens, Lansing, MI – Historical Exhibit

Species:

- Scimitar-horned Oryx (*Oryx dammah*) (1.4)
- Common Ostrich (*Struthio camelus*) (1.2)

Group was successfully mixed for 10 years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The oryx and ostrich were adults when introduced.
- The male oryx was housed in a bull pen and the females were housed with the ostrich.

Reproductive Management/Breeding History:

- Female oryx were moved to the bull pen for breeding.
- All ostrich eggs were pulled.
- Oryx calves were on exhibit with the ostrich with no complications.

Management Challenges:

- The oryx did not shift reliably and were very nervous around keepers.
- When the oryx were locked inside for any reason, even for a short period of time, they became stressed.
- The oryx would always move to the opposite side of the yard from the ostrich.
- Temperatures were not a problem, but ice was in the winter.
- The male ostrich was aggressive towards keepers.
- The male oryx was aggressive towards keepers as well.
- When cornered by the female ostrich, the oryx would pierce the ostrich with their horns.
- The ostrich required a special feeder so the oryx could not get to the grain.
- The ostrich would eat the oryx food when given the opportunity.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- These species were phased out of the collection.

Group/Exhibit Changes Over Time:

- The ostrich were housed alone prior to the introduction to the oryx.

Potter Park Zoological Gardens, Lansing, MI – Historical Exhibit

Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.0 or 0.1)
- Tufted Deer (*Elaphodus cephalophus*) (1.1)

Group was successfully mixed for 8 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All individuals were adults when introduced.
- The male muntjac was with 1.1 tufted deer for 5 years before the males became aggressive towards each other.
- After the male muntjac was separated from the tufted deer a female muntjac was introduced and this grouping was successful for 3 years.

Reproductive Management/Breeding History:

- We did not breed any of these animals.

Management Challenges:

- After 5 years there was a sudden onset of aggression between the male muntjac and male tufted deer.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The female muntjac died and now we house the tufted deer alone.
- We have 2.0 muntjac on exhibit separately.

Group/Exhibit Changes Over Time:

- None

Prospect Park Zoo, Brooklyn, NY – Current Exhibit

Current Species:

- Tufted Deer (*Elaphodus cephalophus*) (1.4)
- Mandarin Duck (*Aix galericulata*) (1.1)
- Demoiselle Crane (*Grus virgo*) (3.0)
- Red-breasted Goose (*Branta ruficollis*) (2.0)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All the birds were adults were introduced to the tufted deer. The tufted deer were a mix of adults and juveniles.

Changes/Accommodations Needed:

- We created feeding stations that exclude the deer from eating the crane food.

Reproductive Management/Breeding History:

- The tufted deer group is a breeding group; we have had no issues nor had to make any changes to accommodate offspring.

Management Challenges:

- Keeping the deer from eating the bird diets is a challenge.

Items Contributing to Group's Success:

- Our deer are extremely calm and nothing seems to phase them.

Group/Exhibit Changes Over Time:

- None



Ryan Sigurdson

Pueblo Zoo, Pueblo, CO – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (0.2)
- Speke's Gazelle (*Gazella spekei*) (3.0)
- Common Ostrich (*Struthio camelus*) (1.0)

Group has been successfully mixed for 2 months (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- This group has only been together for about 2 months.
- The zebra mares are 2 and 6 years old and the gazelle are all around 2 years old.
- The gazelle are shifted in nightly and the zebra stay in yard, except when it is being serviced.

Changes/Accommodations Needed:

- The exhibit has a shelter, but otherwise it is open.

Reproductive Management/Breeding History:

- As of right now this is a nonbreeding group.

Management Challenges:

- The gazelle are nervous of the zebra and become stressed if either of the mares approaches them.
- As of March 2016, all individuals seem to have acclimated to the exhibit and we see very few negative interactions.

Items Contributing to Group's Success:

- Large exhibit size
- No breeding
- All animals are new to the institution, so the exhibit had not been dedicated to just one group prior to introductions

Group/Exhibit Changes Over Time:

- We've always had zebra in the yard, but in the past we housed plains zebra. Ostrich have always been here, but we had females prior to the male.
 - Plains Zebra (*Equus quagga*)
 - Common Ostrich (*Struthio camelus*)

Racine Zoological Gardens, Racine, WI – Current Exhibit

Current Species:

- Tufted Deer (*Elaphodus cephalophus*) (2.0)
- Black Swan (*Cygnus atratus*) (0.2)
- Lesser Adjutant Stork (*Leptoptilos javanicus*) (1.1)

Group has been successfully mixed for a few months (since summer of 2015, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The storks and deer live together in the exhibit with no problems every summer.
- The swans were added this summer.
- Both bird species are moved to indoor housing for the winter.

Changes/Accommodations Needed:

- We have perches on poles 16 feet in the air for the storks.
- Deer have a greenhouse.

Reproductive Management/Breeding History:

- The only breeding animals are the storks, and they are together on exhibit or in holding all the time.

Management Challenges:

- None

Items Contributing to Group's Success:

- Each species has enough of its own space

Group/Exhibit Changes Over Time:

- Previously, this exhibit only housed pelicans. It was modified to house the deer and storks in 2011.
- Deer and storks have successfully been together each summer since 2011. Swans were added in summer 2015.

Reid Park Zoo, Tucson, AZ – Current Exhibit

Current Species:

- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.0)
- Speke's gazelle (*Gazella spekei*) (3.0)

Group has been successfully mixed for 9 years (since 2006, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This group is easy to manage. The Speke's were exhibited with a female rhino for a number of years, but for the last few years have been living with a much younger male rhino and doing equally as well.
- Typically we shift Speke's in first so that they don't try to get into the rhino area.

Changes/Accommodations Needed:

- We have an area in the perimeter that serves as a creep from the smaller hoofstock.

Reproductive Management/Breeding History:

- This group contains only males.

Management Challenges:

- It really has worked beautifully between the two species. We have more trouble with the Speke's getting along with each other than we do with them getting along with the rhinos.

Items Contributing to Group's Success:

- Size of exhibit
- Individual personalities
- Ability to get away from each other

Group/Exhibit Changes Over Time:

- Yes, we had up to 5 nyala with spur-thighed tortoise and marabou storks.
 - Nyala (*Tragelaphus angasii*)
 - Marabou Stork (*Leptoptilos crumenifer*)
 - Spur-thighed Tortoise (*Testudo graeca*)

Riverbanks Zoo & Garden, Columbia, NC – Current Exhibit

Current Species:

- Plains Zebra (*Equus quagga*) (0.2)
- Common Ostrich (*Struthio camelus*) (1.3)

Group has been successfully mixed for 20+ years (since before 1995, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- When giraffe were in this exhibit and their calves were born, the zebra and ostrich were held off exhibit for several weeks, giving the giraffe calves time to adjust.

Management Challenges:

- None

Items Contributing to Group's Success:

- Species behavioral profiles

Group/Exhibit Changes Over Time:

- Our zebra and ostrich were housed with our reticulated giraffe for 12 years (from 1989 to 2001). When this group was together, managing the giraffe calves with the zebra was a challenge. Additionally, the zebra would dominate the giraffe feeding platform, which is why they were ultimately separated from the giraffe.
 - Plains Zebra (*Equus quagga*) (0.2)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.4)
 - Common Ostrich (*Struthio camelus*) (1.2)

Roger Williams Park Zoo, Providence, RI – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (0.3)
- Plains Zebra (*Equus quagga*) (0.3)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Wildebeest were 6, 7 and 8 years old when introduced to the exhibit that previously housed only zebra.
- The initial attempt to introduce the wildebeest to the 1.2 zebra failed immediately when our 10 year old stallion chased the wildebeest relentlessly. We traded him out for a third zebra mare and the subsequent introductions with 0.3 zebra (ages 3, 8, and 10 years) went smoothly.

Changes/Accommodations Needed:

- Each species has a separate shift barn and barn stalls.

Reproductive Management/Breeding History:

- None, this exhibit currently houses females only.

Management Challenges:

- None

Items Contributing to Group's Success:

- All females
- Large exhibit size
- Separate shift and holding for each group

Group/Exhibit Changes Over Time:

- This enclosure had only housed zebra previously.

Roger Williams Park Zoo, Providence, RI – Historical Exhibit

Species:

- Cuvier's Gazelle (*Gazella cuvieri*) (2.1)
- Red-flanked Duiker (*Cephalophus rufilatus*) (1.1)
- Black Crowned Crane (*Balearica pavonina*) (1.1)

Group was successfully mixed for 2+ years (until April 2006).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Details about the management of this group are unknown.

Reproductive Management/Breeding History:

- The younger male gazelle was born here and then neutered.
- The female gazelle was contracepted with PZP and then surgically sterilized.
- The female duiker was contracepted hormonally; the exact method is unclear.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit was eliminated by the construction/expansion of other exhibits.

Group/Exhibit Changes Over Time:

- None

Rolling Hills Wildlife Adventure, Salina, KS – Current Exhibit

Current Species:

- Scimitar-horned Oryx (*Oryx dammah*) (3.0)
- Water Buffalo (*Bubalus bubalis*) (2.0)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- We have separate shift buildings for both species.
- All have year round outdoor/indoor access.
- This yard is off display.

Changes/Accommodations Needed:

- We have a large pond for the water buffalo.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Food aggression from water buffalo is mitigated by a shift building that can only accommodate oryx.

Items Contributing to Group's Success:

- The large (>30 acre) exhibit

Group/Exhibit Changes Over Time:

- It was an empty field that is now being utilized for off-display hoofstock.

Rolling Hills Wildlife Adventure, Salina, KS – Historical Exhibit

Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.2)
- Generic Giraffe (*Giraffa camelopardalis*) (1.2)

Group was successfully mixed for 6 years (from 2006 to 2012).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Both species had separate shift areas in the same building.

Reproductive Management/Breeding History:

- Females were separated for calving in a holding stall.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Due to the breeding focus of the giraffe, we decided to phase out the gazelle and use their holding space for giraffe.

Group/Exhibit Changes Over Time:

- None

Roosevelt Park Zoo, Minot, ND – Current Exhibit

Current Species:

- Alpaca (*Vicugna pacos*) (2.0)
- Llama (*Lama glama*) (0.2)

Group has been successfully mixed for several years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- These species are housed together year round.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- There is no breeding in this exhibit.

Management Challenges:

- Feeding both species their appropriate diets and not allowing them to eat from each other's dishes.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- For two winters (from November to April) we housed our domestic goat and sheep in this exhibit with the llama and alpaca (because the goat and sheep summer shelters were not adequate enough for the cold winters). There was some aggression from the goats towards the other species and the sheep has to be separated at night because of this aggression. This mixed group was only necessary for two years because an appropriate, year round structure was constructed for the sheep and goats.
 - Alpaca (*Vicugna pacos*) (2.0)
 - Domesticated Goat (*Capra aegagrus hircus*) (2.0)
 - Domesticated Sheep (*Ovis aries*) (1.0)
 - Llama (*Lama glama*) (0.2)

Roosevelt Park Zoo, Minot, ND – Historical Exhibit

Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.1 or 1.2)
Black Crowned Crane (*Balearica pavonina*) (1.1)

Group was successfully mixed for approximately 4-5 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Both species were exhibited together in the summer.
- In the winter the cranes and bongo shared a barn but the cranes had a separate space inside the barn. Due to the size of the space, in the winter, the species did not interact or have access to each other.
- Currently, this space is not set up this way, but due to its success, we will be returning to this mixed species exhibit.

Reproductive Management/Breeding History:

- An area was established for the male bongo to be shifted away if necessary, although we never needed to use it.

Management Challenges:

- Making sure each species was fed the proper diet and that the diet was out of reach of the other species was a small challenge with this group.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We are currently waiting for new individuals to arrive and then this exhibit will return to the previous mixed species setup.

Group/Exhibit Changes Over Time:

- None

Roosevelt Park Zoo, Minot, ND – Historical Exhibit

Species:

- Bactrian Camel (*Camelus bactrianus*) (1.1)
- Pelican (*Pelicanus sp.*) (1.0)
- Trumpeter Swan (*Cygnus buccinator*) (0.1)

Group was successfully mixed for 2 months.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- These species were mixed one summer when we needed temporary holding for the birds.

Reproductive Management/Breeding History:

- 1.1 Camels have bred before, but never successfully.

Management Challenges:

- The camel wanted to eat the swan food so we always had to feed the birds separate from the camel.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The birds' permanent housing was fixed.

Group/Exhibit Changes Over Time:

- None

Roosevelt Park Zoo, Minot, ND – Historical Exhibit

Species:

- Fallow Deer (*Dama dama*) (group of 2-4)
- Sika Deer (*Cervus nippon*) (group of 2-5)

No information was provided about how long this group was successfully mixed.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- These species were exhibited together year round.
- We introduced males and females of varying ages of both species during the initial introductions.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- There was some aggression between individuals from time to time, however, it was mostly mild.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The zoo planned to phase out these species to make room for others.

Group/Exhibit Changes Over Time:

- None

Rosamond Gifford Zoo at Burnet Park, Syracuse, NY – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (1.2)
- Canadian Goose (*Branta canadensis*) (1.1.6)
- Helmeted Guineafowl (*Numidia meleagris*) (4.6)

Group has been successfully mixed for 6 months (current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Bison do not seem to bother any of these birds.
- This exhibit is very close to 1 acre.

Changes/Accommodations Needed:

- The guinea hens and geese tend to graze a lot; they do not use the pond very much.

Reproductive Management/Breeding History:

- We recently added a male bison to the group.

Management Challenges:

- We previously had snow geese and common mergansers in this exhibit but they were removed after one of the snow geese was suspected to have been killed by the male bison.

Items Contributing to Group's Success:

- The bison seem calm around most bird species.

Group/Exhibit Changes Over Time:

- We added a male bison to the group at the end of 2015. He is suspected of killing a male snow goose. We removed the snow goose and common mergansers from the area; the Canadian geese and the guinea fowl continue to do well.
 - American Bison (*Bison bison*) (1.2)
 - Canadian Goose (*Branta canadensis*) (1.1.6)
 - Common Merganser (*Mergus merganser*) (1.1)
 - Helmeted Guineafowl (*Numidia meleagris*) (4.6)
 - Snow Goose (*Chen caerulescens*) (1.1)
- In the past 0.2 yak were housed with same bird species.
 - Yak (*Bos grunniens*) (0.2)
 - Canadian Goose (*Branta canadensis*) (1.1.6)
 - Common Merganser (*Mergus merganser*) (1.1)
 - Helmeted Guineafowl (*Numidia meleagris*) (4.6)
 - Snow Goose (*Chen caerulescens*) (1.1 or 0.1)

Rosamond Gifford Zoo at Burnet Park, Syracuse, NY – Historical Exhibit

Species:

- American Bison (*Bison bison*) (2.6)
- Sandhill Crane (*Grus canadensis*) (1.1)

Group was successfully mixed for approximately 2 months.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The cranes could go between the bison and pronghorn exhibits at will.
- These species did well together for about 2 months and then the male bison killed the female crane.

Reproductive Management/Breeding History:

- This was a breeding herd of bison.

Management Challenges:

- Our aggressive male bison was a challenge.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was renovated to hold elephants.

Group/Exhibit Changes Over Time:

- After the bison killed one of the cranes, the male crane was only housed with the pronghorn.

Rosamond Gifford Zoo at Burnet Park, Syracuse, NY – Historical Exhibit

Species:

- American Pronghorn (*Antilocapra americana*) (2.6)
- Sandhill Crane (*Grus canadensis*) (1.1)

Group was successfully mixed for 1-2 months.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This exhibit is about 3 acres.
- The cranes could go between the bison and pronghorn exhibits at will.
- Most of the pronghorn were juveniles that were put with the cranes after they were hand-raised and weaned.

Reproductive Management/Breeding History:

- There was a lot of breeding with the pronghorn herd.

Management Challenges:

- None with this grouping; the Female crane was killed by the bison.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was renovated.

Group/Exhibit Changes Over Time:

- None.

Rosamond Gifford Zoo at Burnet Park, Syracuse, NY – Historical Exhibit

Species:

- American Bison (*Bison bison*) (2.6)
- Rocky Mountain Elk (*Cervus canadensis nelsoni*) (1.6)

Group was successfully mixed for 3-5 years.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Both bison and deer were managed together normally.
- The yard could be separated when one species had to go through annual testing without the other nearby.

Reproductive Management/Breeding History:

- Both herds bred successfully when exhibited together.

Management Challenges:

- It was sometimes hard to separate the herds for managing annual testing.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit was renovated.

Group/Exhibit Changes Over Time:

- None

Rosamond Gifford Zoo at Burnet Park, Syracuse, NY – Historical Exhibit

Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.2)
- Red Panda (*Ailurus fulgens*) (0.2)

Group was successfully mixed for 2 years.

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Pandas and muntjac had separate night holding.

Reproductive Management/Breeding History:

- The pandas did not breed.

Management Challenges:

- The pandas turned aggressive towards the muntjac after a while.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We moved the muntjac away from the exhibit.

Group/Exhibit Changes Over Time:

- After an aggressive panda got a tear on her abdomen from interacting with the male muntjac it was decided to stop sharing the exhibit. The muntjac eventually moved into new quarters.

Sacramento Zoo, Sacramento, CA – Historical Exhibit

Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.5)
- Dorca's Gazelle (*Gazella dorcas*) (0.2)
- Persian Gazelle (*Gazella subgutturosa*) (0.2)

Group was successfully mixed for approximately 10 years (from 1980s to 1990s).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- There are no significant notes in the records for this group.

Reproductive Management/Breeding History:

- Addra gazelle were kept in a breeding group.
- There are no notes about changes in the animal routines or housing with breeding.

Management Challenges:

- Keepers do not recall any issues with this mix.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Over time, animals died and they were not replaced. Several individuals were moved due to breeding recommendations.

Group/Exhibit Changes Over Time:

- This yard was converted to a nyala exhibit (although there was some overlap with nyala and a few gazelle).
- Later, this exhibit housed nyala, 0.2 eland, and 1.1 ostrich that had to move out of the mixed zebra exhibit due to an aggressive zebra stallion. The nyala were intended to be a breeding group, but several animals died quickly due to medical issues. We've never successfully bred nyala at this facility.
 - Common Eland (*Taurotragus oryx*) (0.2)
 - Nyala (*Tragelaphus angasii*) (unknown group)
 - Common Ostrich (*Struthio camelus*) (1.1)

Sacramento Zoo, Sacramento, CA – Historical Exhibit

Species:

- Common Eland (*Taurotragus oryx*) (1.2)
- Grevy's Zebra (*Equus grevyi*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.1)

Group was successfully mixed for less than 2 years (1980s).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- This exhibit was set up in the early 1980s.

Reproductive Management/Breeding History:

- Zebra mares and eland females were moved from the exhibit for calving.

Management Challenges:

- The zebra stallion was aggressive.
- Eventually the eland and ostrich moved to a different exhibit (to mix with nyala, see Sacramento Zoo Historical Exhibit) due to the aggressive stallion.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The ostrich and eland moved to the nyala yard because of the aggressive stallion.
- Once the zebra stallion died the ostrich moved back; however, the exhibit currently houses only Grevy's zebra.

Group/Exhibit Changes Over Time:

- The eland and ostrich were removed in the 1980s; the ostrich returned in the mid-1990s and the exhibit stayed that way until recently. Currently we are without ostrich due to an aggressive male ostrich attacking zebra mares and female ostrich (See Sacramento Zoo Unsuccessful Exhibit). The plan is to get more female ostrich. Historically our ostrich (both sexes) and zebra mares do great together.
- We did not replace the zebra stallion.

Sacramento Zoo, Sacramento, CA – Historical Exhibit

Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
- Red River Hog (*Potamochoerus porcus*) (1.1)

Group was successfully mixed for several years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The breeding group of 1.2 bongo were kept in the large yard with pen access; they were shifted inside during exhibit servicing).
- The breeding pair of 1.1 river hogs were closed in a separate yard at night.

Reproductive Management/Breeding History:

- The two species were housed in a separate yard and barn when the piglets were born for 1 month before introductions to the bongo in the big yard.

Management Challenges:

- Once the piglets were born and introduced to the bongo they were actively aggressive towards the bongo.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The piglets were aggressive towards the bongo.

Group/Exhibit Changes Over Time:

- See Sacramento Zoo Unsuccessful Exhibit. This exhibit was successful for many years with a breeding group of bongo and red river hogs. However, once we acquired younger bongo that did not have experience in a mixed species exhibit and we had piglets the group was no longer successful.

Safari West Wildlife Preserve, Santa Rosa, CA – Current Exhibit

Current Species:

- Addax (*Addax nasomaculatus*) (5.7)
- Bontebok (*Damaliscus pygargus*) (1.3)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (2.1)
- Grant's Gazelle (*Nanger granti*) (1.3)
- Greater Kudu (*Tragelaphus strepsiceros*) (2.13)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.2)
- Nyala (*Tragelaphus angasii*) (1.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (0.6)
- Roan Antelope (*Hippotragus equinus*) (3.6)

Group has been successfully mixed for approximately 20 years (since the 1990s, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Most of the animals have year round access to this pen.
- Because our facility allows drive through tours with tour guides our giraffe are shifted to a more private location as needed for medical attention or calving.

Changes/Accommodations Needed:

- There are natural hide holes (stick formations and dirt mounds) to allow separate areas for all species.
- We have a sectioned off area with sheltered housing to allow the antelope access to certain areas without the giraffe.
- Natural substrate is given throughout the enclosure and straw is provided as needed for winter warmth.

Reproductive Management/Breeding History:

- Certain species have been moved off exhibit during the calving season.
- The kudu and roan are brought in for a nursery period when they calve; this allows them bonding time and also ensures safety for moms and babies.
- The addax are self-sufficient and keepers have not had to intervene with their calves.
- The Grant's gazelle have not calved in the last few years. In the past we have pulled and hand-reared calves.
- Giraffe are shifted off exhibit for calving.

Management Challenges:

- Too many dominant males can create a problem.
- Shifting animals throughout other enclosures can be challenging.
- There are generally very few challenges, except for sometimes during heavy breeding seasons.

Items Contributing to Group's Success:

- Several areas of housing and feeding stations
- Minimal interactions with keepers

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- Preventative care (deworming)

Group/Exhibit Changes Over Time:

- None

Safari West Wildlife Preserve, Santa Rosa, CA – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (5.10)
- Common Waterbuck (*Kobus ellipsiprymnus*) (1.2)
- Gemsbok (*Oryx gazella*) (8.7)
- Plains Zebra (*Equus quagga*) (4.10)

Group has been successfully mixed for 15 years (since 2000, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The animals listed have year round access to roughly 90 acres of hills, trees, and flat land areas.
- Our tours have drive-through access on one side of the enclosure.
- All animals in this enclosure, if born here, are parent reared unless keepers need to step in for a medical reason.
- If a new animal is brought in they are placed in a lower area where there is a catch pen with a shifting area; this allows them to move away from keepers as needed. They will be left in this area until the keepers feel they are acclimated to the area and know where food is placed.

Changes/Accommodations Needed:

- Several different housing areas are offered as well as feeding stations, but the size of the enclosure accommodates several different species and allows them to all be housed together.

Reproductive Management/Breeding History:

- In the past our zebra stallion needed to be rotated off exhibit during calving season due to his aggressive tendencies towards the young.
- All other species seem to be self-sufficient.

Management Challenges:

- As the numbers increase, specifically the male numbers, we have experienced aggression between and within the herds; however, the majority of issues are settled without keeper intervention.

Items Contributing to Group's Success:

- Large exhibit area with areas for the animals to hide
- Successful breeding without keeper interaction
- Parasite control

Group/Exhibit Changes Over Time:

- The numbers are constantly fluctuating but these specific species have been housed together without issue for 15 years.

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (0.3)
- Common Ostrich (*Struthio camelus*) (1.1)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- We have had giraffe of all ages, from calves to geriatric animals, in this habitat with multiple ostrich and species of ungulates and they have always done well.

Changes/Accommodations Needed:

- We have trees in the habitat that can be used by the ostrich or ungulates as a barrier if needed.

Reproductive Management/Breeding History:

- This is a non-breeding habitat.

Management Challenges:

- None

Items Contributing to Group's Success:

- The demeanor of the animals involved

Group/Exhibit Changes Over Time:

- For 6 months a male gerenuk was also housed in this exhibit. When the group was introduced the addra were juveniles but all other animals were adults. There were no challenges with the group. After 6 months the gerenuk were moved to another exhibit.
 - Addra (Dama) Gazelle (*Nanger dama*) (1.0)
 - Gerenuk (*Litocranius walleri*) (1.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (0.3)
 - Common Ostrich (*Struthio camelus*) (1.1)

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

Gerenuk (*Litocranius walleri*) (1.0)

East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.2)

Group has been successfully mixed for 6 months (current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The gerenuk and breeding pair of cranes were adults for the introduction. The chick was approximately 3 months old when introduced to the gerenuk.

Changes/Accommodations Needed:

- The species are separated when secured in indoor holding.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Having enough space for all of the animals to feel comfortable

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Nyala (*Tragelaphus angasii*) (2.4)
- Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The red-flanked duiker was an adult when introduced to the nyala group. We have introduced nyala adults, juveniles and calves to the red-flanked duiker.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Females are separated for calving.

Management Challenges:

- None

Items Contributing to Group's Success:

- Having enough space for all of the animals to feel comfortable
- The demeanor of the animals
- Allowing enough howdy access to each other before the actual introduction

Group/Exhibit Changes Over Time:

- For 3 years this exhibit also housed 1.1 white stork and 1.1 East African crowned crane. The red-flanked duiker, cranes, and storks were all adults at the time of the introduction. Some of the nyala were adults and some were calves during the introduction. Females were separated for calving. After three years the white storks were phased out of the collection and the crowned cranes were moved to a different habitat.
 - Nyala (*Tragelaphus angasii*) (1.3)
 - Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
 - White Stork (*Ciconia ciconia*) (1.1)

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Banteng (*Bos javanicus*) (1.4)
- Sarus Crane (*Grus antigone*) (0.1)

Group has been successfully mixed for 18 years (since 1997, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The sarus cranes have always been adults when introduced.
- We have introduced banteng adults and calves to the cranes.

Changes/Accommodations Needed:

- We have exclusion feeders for the cranes.

Reproductive Management/Breeding History:

- Females are separated for calving.



Brent Huffman

Management Challenges:

- None

Items Contributing to Group's Success:

- Having enough space for all of the animals to feel comfortable
- The demeanor of the animals
- Providing the animals with enough howdy access prior to the introduction

Group/Exhibit Changes Over Time:

- For 2 years 1.3 banteng shared an exhibit with 1.0 white-naped crane. All animals were introduced as adults. The male banteng was with the group at all times and the females were separated for calving. After two years the crane was phased out of the collection.
 - Banteng (*Bos javanicus*) (1.3)
 - White-naped Crane (*Grus vipio*) (1.0)
- 1.3 banteng also shared an exhibit with 1.0 hooded crane for a year. All animals were adults when introduced. The male banteng was with the group at all times and the females were separated for calving. After one year the crane was phased out of the collection.
 - Banteng (*Bos javanicus*) (1.3)
 - Hooded Crane (*Grus monacha*) (1.0)

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Chinese Goral (*Naemorhedus griseus*) (1.1)
- Sichuan (Tibetan) Takin (*Budorcas taxicolor tibetana*) (1.2)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The goral have always been adults when introduced to the takin.
- We have introduced takin adults, juveniles, and calves to the goral.

Changes/Accommodations Needed:

- The goral have access to their stalls through a creep in order to keep the takin out of their stalls.

Reproductive Management/Breeding History:

- Females are separated for calving.

Management Challenges:

- None

Items Contributing to Group's Success:

- Having enough space for all of the animals to feel comfortable
- The demeanor of the animals

Group/Exhibit Changes Over Time:

- Several takin calves and juveniles grew up in this habitat and then moved on to other institutions.

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.2)
- Wattled Crane (*Bugeranus carunculatus*) (1.1)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The wattled cranes have always been adults when introduced to the gazelle.
- We have introduced addra adults, juveniles, and calves to the cranes.

Changes/Accommodations Needed:

- We provide exclusion feeders for the cranes.

Reproductive Management/Breeding History:

- Females are separated for calving.

Management Challenges:

- None

Items Contributing to Group's Success:

- Having enough space for all of the animals to feel comfortable
- The demeanor of the animals

Group/Exhibit Changes Over Time:

- Several addra calves and juveniles grew up in this habitat and then moved on to other institutions.

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Lesser Kudu (*Tragelaphus imberbis*) (0.6)
- Speke's Gazelle (*Gazella spekei*) (0.1)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The saddle-billed storks have always been adults when introduced to the kudu.
- We have introduced Speke's adults and calves to the kudu and storks.
- We have introduced kudu adults, juveniles, and calves to the Speke's and storks.



Brent Huffman

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Females are separated for calving.
- Males are rotated into the habitat for 6 months of the year.

Management Challenges:

- None

Items Contributing to Group's Success:

- Having enough space for all of the animals to feel comfortable
- The demeanor of the animals, especially the Speke's gazelle

Group/Exhibit Changes Over Time:

- Several kudu calves and juveniles grew up in this habitat and then moved on to other institutions.

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (1.0)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group has been successfully mixed for 7 years (since 2008, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- We have only introduced adult okapi and Stanley cranes to each other.

Changes/Accommodations Needed:

- The cranes are fed after the okapi is secured inside.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- Having enough space for all of the animals to feel comfortable
- The demeanor of the animals

Group/Exhibit Changes Over Time:

- 1.0 red-flanked duiker was previously housed with the okapi and Stanley crane for 2 years. All animals were adults when they were introduced.
 - Okapi (*Okapia johnstoni*) (1.0)
 - Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)
- For 1 year, 1.0 okapi was housed with 1.0 red-flanked duiker, 1.0 steenbok, and 1.1 Stanley crane. All animals were adults when they were introduced. There were no challenges.
 - Okapi (*Okapia johnstoni*) (1.0)
 - Red-flanked Duiker (*Cephalophus rufilatus*) (1.0)
 - Steenbok (*Raphicerus campestris*) (1.0)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Black Rhinoceros (*Diceros bicornis*) (1.1)
- Sacred Ibis (*Threskiornis aethiopicus*) (3.1)

Group has been successfully mixed for 6 years (since 2009, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All animals were adults when introduced to each other.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Female are separated for calving.

Management Challenges:

- None

Items Contributing to Group's Success:

- Plenty of space for both species
- Ample time to acclimate to each other prior to the introduction
- Demeanor of the animals

Group/Exhibit Changes Over Time:

- None



Sarah Riffle

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Common Hippopotamus (*Hippopotamus amphibius*) (0.4)
- Spotted Tilapia (*Tilapia mariae*) (approximately 1,000)
- Zebra Tilapia (*Tilapia buttikoferi*) (approximately 1,000)

Group has been successfully mixed for 14 years (since 2001, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The hippos were adults when introduced to the habitat.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- This is a non-breeding group of hippos.

Management Challenges:

- None

Items Contributing to Group's Success:

- None

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Current Exhibit

Current Species:

- Red River Hog (*Potamochoerus porcus*) (1.1)
- Bat-eared Fox (*Otocyon megalotis*) (4.0)
- Egyptian Goose (*Alopochen aegyptiacus*) (1.1)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals were adults when introduced to each other.

Changes/Accommodations Needed:

- The fox have a portion of the habitat that only they can access.

Reproductive Management/Breeding History:

- The female red river hog is separated to give birth.

Management Challenges:

- None

Items Contributing to Group's Success:

- Ample time to acclimate to each other prior to the introduction
- Plenty of space for all three species
- The demeanor of the animals

Group/Exhibit Changes Over Time:

- None



Liz Irwin



Liz Irwin

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Banteng (*Bos javanicus*) (1.3)
- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.1)
- Sarus Crane (*Grus antigone*) (1.1)

Group was successfully mixed for 10 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The sarus cranes were always adults when introduced to the banteng and muntjac.
- Muntjac adults and calves were introduced to the banteng and cranes.
- Banteng adults and calves were introduced to the muntjac and cranes.



Brent Huffman

Reproductive Management/Breeding History:

- Females were separated for calving.

Management Challenges:

- The only minor challenge was providing the cranes with exclusion feeders.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Muntjac were phased out of our collection.

Group/Exhibit Changes Over Time:

- For 6 months the banteng and sarus crane were housed with 1.0 Speke's gazelle. The sarus crane and Speke's were all adults during the introduction. Adult and juvenile banteng were introduced to the Speke's. Banteng females were separated for calving. This was a temporary holding for the Speke's gazelle.
 - Banteng (*Bos javanicus*) (1.3)
 - Speke's Gazelle (*Gazella spekei*) (1.0)
 - Sarus Crane (*Grus antigone*) (1.1)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Eld's Deer (*Rucervus eldii*) (0.2)
- Sarus Crane (*Grus antigone*) (1.0)

Group was successfully mixed for 5 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The crane and Eld's deer were adults when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Eld's deer were phased out of our collection.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Gerenuk (*Litocranius walleri*) (1.1)
- Gunther's Dik-dik (*Madoqua guentheri*) (1.0)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
- White Stork (*Ciconia ciconia*) (1.1)

Group was successfully mixed for 5 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The dik-dik was an adult when introduced to the gerenuk, cranes, and storks.
- The cranes and storks were adults when introduced to the dik-dik and gerenuk.
- Gerenuk adults and calves were introduced to the dik-dik, cranes, and storks.

Reproductive Management/Breeding History:

- Females were separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Gunther's dik-dik was phased out of our collection.

Group/Exhibit Changes Over Time:

- For 1.5 years this mixed exhibit contained 1.1 gerenuk, 1.1 steenbok, 1.1 East African crowned cranes, and 1.1 white storks. All animals were adults when they were introduced. The male gerenuk and steenbok were with the group all the time and the females were separated for calving. There were no issues with this group. The steenbok were phased out of our collection.
 - Gerenuk (*Litocranius walleri*) (1.1)
 - Steenbok (*Raphicerus campestris*) (1.1)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
 - White Stork (*Ciconia ciconia*) (1.1)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)

Group was successfully mixed for 7 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Bongo adults and calves were introduced to the duiker.
- Duiker adults and calves were introduced to the bongo.

Reproductive Management/Breeding History:

- Females were separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Bongo and yellow-backed duiker were phased out of our collection.

Group/Exhibit Changes Over Time:

- Several calves and juveniles of both species grew up in this habitat and then moved to other institutions.

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.2)
- Speke's Gazelle (*Gazella spekei*) (2.0)
- Wattled Crane (*Bugeranus carunculatus*) (1.1)

Group was successfully mixed for 2 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The addra gazelle and cranes were adults when introduced to the Speke's
- The Speke's males were juveniles and had never been in a breeding situation.

Reproductive Management/Breeding History:

- The male addra was with the group all the time and the females were separated for calving.

Management Challenges:

- At times 1.0 addra gazelle became aggressive towards the wattled cranes.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Speke's moved to breeding situations and the addra were phased out of our collection.

Group/Exhibit Changes Over Time:

- Addra calves and juveniles grew up in this habitat and then moved to other institutions.

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

Common Warthog (*Phacochoerus africanus*) (2.0)
Cuvier's Gazelle (*Gazella cuvieri*) (0.1)

Group was successfully mixed for approximately 1 year.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced to each other.
- They were separated when brought into indoor holding.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- There were no challenges with this group.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Cuvier's gazelle and warthogs were phased out of our collection.

Group/Exhibit Changes Over Time:

- None



Brent Huffman

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.3)
- Soemmerring's Gazelle (*Nanger soemmerringii*) (1.0)
- Common Ostrich (*Struthio camelus*) (1.1)

Group was successfully mixed for 2 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The Soemmerring's gazelle, lesser kudu and ostrich were adults when introduced to the other animals.
- Giraffe adults and calves were introduced to the Soemmerring's gazelle, lesser kudu and ostrich.



Brent Huffman

Reproductive Management/Breeding History:

- Giraffe calves grew up in this habitat and then moved to other institutions.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Soemmerring's gazelle was moved to a breeding situation.

Group/Exhibit Changes Over Time:

- We also had 0.3 or 1.2 reticulated giraffe in this exhibit for 1 year with 1.0 Soemmerring's gazelle and 1.1 ostrich. All animals were adults when they were introduced. When the male giraffe was with the group he was kept with the group at all times and the females calved in the habitat with the other animals. There were no challenges with this group. The exhibit ended when the Soemmerring's gazelle was moved into a breeding situation.
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (0.3 or 1.2)
 - Soemmerring's Gazelle (*Nanger soemmerringii*) (1.0)
 - Common Ostrich (*Struthio camelus*) (1.1)
- For 3 years 1.2 reticulated giraffe were housed with 1.0 lesser kudu and 1.1 ostrich. All animals were adults when they were introduced. The male giraffe was with the group at all times and the females calved in the habitat with the other animals. At times the lesser kudu and ostrich would show aggression towards each other. See Saint Louis Zoo Unsuccessful Exhibit.
 - Lesser Kudu (*Tragelaphus imberbis*) (1.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
 - Common Ostrich (*Struthio camelus*) (1.1)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Cuvier's Gazelle (*Gazella cuvieri*) (0.1)
- Lesser Kudu (*Tragelaphus imberbis*) (1.0)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Group was successfully mixed for 1 year.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- There were no challenges with this group.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The lesser kudu went to a breeding situation.

Group/Exhibit Changes Over Time:

- For 1 year this exhibit housed 1.0 gerenuk, 1.0 lesser kudu, and 1.0 marabou stork. All animals were adults when they were introduced. There were no challenges.
 - Gerenuk (*Litocranius walleri*) (1.0)
 - Lesser Kudu (*Tragelaphus imberbis*) (1.0)
 - Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Cuvier's Gazelle (*Gazella cuvieri*) (1.2)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group was successfully mixed for 5 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The initial group of animals were all adults when introduced. We also introduced several calves to the cranes.

Reproductive Management/Breeding History:

- The male gazelle was always with the group and the females were separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Cuvier's gazelle were phased out of our collection.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Cuvier's Gazelle (*Gazella cuvieri*) (1.0)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.0)

Group was successfully mixed for 6 months.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Both animals were adults when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- There were no management challenges with this group.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Cuvier's gazelle was moved to a breeding situation.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Gerenuk (*Litocranius walleri*) (1.0)
- Soemmerring's Gazelle (*Nanger soemmerringii*) (1.0)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Group was successfully mixed for 9 months.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All animals were adults when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Animals were moved into breeding situations.

Group/Exhibit Changes Over Time:

- This exhibit also housed 1.0 Soemmerring's gazelle, 1.0 lesser kudu, and 1.0 marabou stork for 6 months. All animals were adults when they were introduced. There were no challenges. The group was separated when the males were moved into breeding situations.
 - Lesser Kudu (*Tragelaphus imberbis*) (1.0)
 - Soemmerring's Gazelle (*Nanger soemmerringii*) (1.0)
 - Marabou Stork (*Leptoptilos crumenifer*) (1.0)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Soemmerring's Gazelle (*Nanger soemmerringii*) (1.0)
- Speke's Gazelle (*Gazella spekei*) (5.0)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group was successfully mixed for 9 months.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- At times, the cranes would show aggression towards the gazelle when they were nesting.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The animals were sent to other institutions.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.4)
- Speke's Gazelle (*Gazella spekei*) (2.0)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)

Group was successfully mixed for 1.5 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The lesser kudu and saddle-billed storks were adults when introduced.
- The Speke's gazelle were juveniles during introductions.
- We also introduced several lesser kudu calves to the group.

Reproductive Management/Breeding History:

- The male kudu was rotated on exhibit and the females were separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Speke's gazelle were moved into breeding situations.

Group/Exhibit Changes Over Time:

- Also mixed for 8 months were 0.1 Speke's gazelle, 0.6 lesser kudu, 0.1 mountain bongo, and 1.1 saddle-billed stork. The Speke's, 0.4 kudu, and storks were adults during the introduction and the 0.1 bongo and 0.2 kudu were juveniles. The bongo left the exhibit when she was sent to another institution.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (0.1)
 - Lesser Kudu (*Tragelaphus imberbis*) (0.6)
 - Speke's Gazelle (*Gazella spekei*) (0.1)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Nyala (*Tragelaphus angasii*) (1.0)
- Speke's Gazelle (*Gazella spekei*) (3.0)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
- White Stork (*Ciconia ciconia*) (1.1)

Group was successfully mixed for 6 months.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The nyala and birds were adults when introduced. The Speke's gazelle were juveniles.

Reproductive Management/Breeding History:

- This was a non-breeding group.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Speke's were sent to other institutions.

Group/Exhibit Changes Over Time:

- This exhibit also held 0.4 Speke's gazelle with 1.1 steenbok, 1.1 East African crowned crane, and 1.1 white stork. All animals were adults when introduced. The steenbok females were separated for calving. The only challenge was that the steenbok required space to hide from the Speke's in the indoor holding area. After 1 year the steenbok were phased out of our collection.
 - Speke's Gazelle (*Gazella spekei*) (0.4)
 - Steenbok (*Raphicerus campestris*) (1.1)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
 - White Stork (*Ciconia ciconia*) (1.1)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.4)
- Speke's Gazelle (*Gazella spekei*) (1.0)
- Suni (*Neotragus moschatus*) (1.0)

Group was successfully mixed for 9 months.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The suni and lesser kudu were adults when introduced.
- The Speke's was a juvenile during introductions.
- Kudu calves were also introduced to the group.

Reproductive Management/Breeding History:

- The male kudu was rotated on exhibit and the females were separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Suni was phased out of our collection and the Speke's was sent to another institution.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Speke's Gazelle (*Gazella spekei*) (1.4)
- Spur-thighed Tortoise (*Testudo graeca*) (3.0)

Group was successfully mixed for 2 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced to each other.
- Several Speke's calves were also introduced over time.

Reproductive Management/Breeding History:

- The male was with the group all the time and the females were separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit still houses ungulates but the tortoises were phased out.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Gerenuk (*Litocranius walleri*) (1.1)
- Speke's Gazelle (*Gazella spekei*) (2.0)
- White Stork (*Ciconia ciconia*) (1.1)

Group was successfully mixed for 1 year.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The gerenuk and storks were adults and the Speke's were juveniles.

Reproductive Management/Breeding History:

- The male gerenuk was with the group all the time and the female was separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The Speke's were sent to another institution.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Chinese Goral (*Nemorhaedus griseus*) (1.1)
- Indian Muntjac (*Muntiacus muntjak*) (1.1)
- Sichuan (Tibetan) Takin (*Budorcas taxicolor tibetana*) (1.2)

Group was successfully mixed for 3 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced to each other. Several takin calves and one muntjac fawn were also introduced to the group.

Reproductive Management/Breeding History:

- Males were always with the group and females were separated for calving.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Indian muntjac were phased out of our collection.

Group/Exhibit Changes Over Time:

- None



Brent Huffman

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Okapi (*Okapia johnstoni*) (1.0)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (2.0)

Group was successfully mixed for 2.5 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The hornbills were phased out of our collection.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Addax (*Addax nasomaculatus*) (1.0)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.0)

Group was successfully mixed for 5 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Both animals were adults when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The addax was moved to a breeding situation.

Group/Exhibit Changes Over Time:

- 1.4 addax were housed with 1.1 East African crowned crane for 5 years. All animals were adults when introduced, but over time addax calves were introduced to the group as well. The females were separated for calving. The exhibit ended when the birds were moved to another habitat.
 - Addax (*Addax nasomaculatus*) (1.4)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
- 1.0 addax and 1.0 Abyssinian ground hornbill were housed together for 1 year. Both animals were adults when introduced.
 - Addax (*Addax nasomaculatus*) (1.0)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.0)
- For 1 year 1.4 addax and 1.0 cinereous vulture were mixed. All animals were adults when introduced. Females were separated for calving. After 1 year the vulture was moved to another habitat.
 - Addax (*Addax nasomaculatus*) (1.4)
 - Cinereous Vulture (*Aegypius monachus*) (1.0)

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Addax (*Addax nasomaculatus*) (1.0)
- Arabian Oryx (*Oryx leucoryx*) (1.0)

Group was successfully mixed for 3 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The animals were yearlings when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Management Challenges:

- As they reached sexual maturity, aggression escalated between the two animals and they eventually had to be separated.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Increased aggression as the two males reached sexual maturity.

Group/Exhibit Changes Over Time:

- None

Saint Louis Zoo, St. Louis, MO – Historical Exhibit

Species:

- Grevy's Zebra (*Equus grevyi*) (0.3)
- Common Ostrich (*Struthio camelus*) (1.1)

Group was successfully mixed for approximately 10 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- All animals were adults when introduced to each other.

Reproductive Management/Breeding History:

- This was a non-breeding group.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The ostrich were moved to another habitat.

Group/Exhibit Changes Over Time:

- None

Salisbury Zoological Park, Salisbury, MD – Current Exhibit

Current Species:

- Llama (*Lama glama*) (1.0)
- Blue and Gold Macaw (*Ara ararauna*) (1.1)
- Capybara (*Hydrochoerus hydrochaeris*) (0.2)
- Greater (American) Rhea (*Rhea americana*) (0.3)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The macaws are shifted inside every night and are left inside if temperatures are below 40 F. Macaw introductions are tense but always sort themselves out.
- The capybaras are outside all the time and are only shifted inside when overnight temperatures start dipping down into the 40s. Capybara introductions are very hit or miss. We've had animals that scrap and are then fine, and we've had animals that want to kill each other no matter what. The capybaras are housed in the same building as the macaws.
- The rheas are outside all the time and have a shed and several places they can use to nest down or seek shelter. Rhea introductions are typically uneventful, both for them and the other animals in the exhibit. Our male rhea does tend to be more aggressive towards men and people wearing hats.
- Our llama is very relaxed and likes to eat hay and lay with the capybaras.

Changes/Accommodations Needed:

- The capybaras have a pool that is shallow and slopes down to a depth of about four feet.
- The exhibit has a moat on one side instead of a fence so that needs to be cleaned out and kept from getting too much water in it.
- Macaw ropes and perching have to be replaced periodically.

Reproductive Management/Breeding History:

- Before we lost our male rhea, our rheas laid eggs every year and those eggs were pulled because one of the females is the male's sister. We have bred non-related rheas in the past. We try to prevent the females from laying so many eggs by replacing them with dummy eggs, but this does not always work. Many times they push the dummies out of the nest, destroy them, and re-lay fresh eggs. This past year the male sat on the nest much, much longer than is typical for our group and he was starting to look very naked from plucking feathers to maintain the nest. We got him up and destroyed the nest which ended the egg laying and nesting.

Management Challenges:

- Managing the rhea eggs is not difficult but can be cumbersome when they are laying 12-18 eggs a week. Because the dummy eggs do not prevent them from laying, we allow him to sit on a particular clutch no more than a week before we pull them. It can also be difficult to explain to visitors why we are pulling the eggs.
- We have difficulty with different species eating each other's diets, especially the llama liking to eat the rhea food.

AZA Ungulate TAGs
Mixed-species Manual 2016

Items Contributing to Group's Success:

- This exhibit is one of our largest and allows ample room for a small herd of ungulates along with other species. Visitors seem to like seeing multiple species together.
- It is viewed fully from 2 sides. It has no fence lines to look through; one side utilizes a moat and the other side is an elevated boardwalk from which visitors can view the yard.

Group/Exhibit Changes Over Time:

- This yard has had basically the same composition of species; there have just been more or less of certain species at different times. We used to have a male rhea with the 3 females. Before this, we have had Darwin's rheas instead of greater. We have had a family group of capybara (male and female that had babies in the exhibit). We've had male llama and male guanaco that have had to be shifted into holding pens because of their aggression, and we've had the same that have been fine.
 - Guanaco (*Lama guanicoe*)
 - Llama (*Lama glama*)
 - Blue and Gold Macaw (*Ara ararauna*)
 - Capybara (*Hydrochoerus hydrochaeris*)
 - Lesser (Darwin's) Rhea (*Rhea pennata*)
- Since the survey was originally submitted, 1.1 Andean geese have been successfully introduced to this exhibit.
 - Llama (*Lama glama*) (1.0)
 - Andean Goose (*Neochen melanoptera*) (1.1)
 - Blue and Gold Macaw (*Ara ararauna*) (1.1)
 - Capybara (*Hydrochoerus hydrochaeris*) (0.2)
 - Greater (American) Rhea (*Rhea americana*) (0.3)

Salisbury Zoological Park, Salisbury, MD – Current Exhibit

Current Species:

Alpaca (*Vicugna pacos*) (2.9)

American White Pelican (*Pelecanus erythrorhynchos*) (6.0)

Group has been successfully mixed for 5 years (since 2012, current as of 2017).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- This exhibit is located alongside the creek that runs through the zoo, with no fencing between the animals and the water. During hot weather, the alpaca frequently bathe in the creek.
- The pelicans have access to the entire length of the creek within the zoo perimeter fence, but typically use the alpaca exhibit as their home base.

Changes/Accommodations Needed:

- None are needed. The pelicans traditionally had a shelter inaccessible to the alpaca under the section of boardwalk, but rarely, if ever, used it. They typically spend the night on the shoreline at the edge of the exhibit.

Reproductive Management/Breeding History:

- The alpaca bred in the exhibit until the male was castrated. The pelicans did not interact at all with the young.
- Pelicans are a bachelor flock, so no reproduction is taking place.

Management Challenges:

- The pelicans can be difficult to catch-up for veterinary procedures due to their ability to swim out into the creek. Occasionally, they leave the zoo grounds and must be herded back within.
- The alpaca have never shown aggression towards the pelicans. They have, however, kicked to death a wild Canada goose on one occasion, raising the possibility that aggression towards the pelicans could occur at some point.
- On occasion, the pelicans have been observed eating the alpaca grain (Mazuri Alpaca Maintenance) out of a bowl on the ground. Keepers now feed the alpaca out of hanging feeders which the pelicans cannot access.

Items Contributing to Group's Success:

- Both species are compatible, and we have had no aggression between them.
- Plenty of space for both species

Group/Exhibit Changes Over Time:

- The creek habitat is also shared with black-necked swans (*Cygnus melancoryphus*) and, previously, tundra swans (*Cygnus columbianus*). The black-necked swans never interact with the alpaca, and generally do not frequent this part of the zoo.
- On occasion, the zoo's sandhill cranes (*Antigone canadensis*) will escape from their enclosure, also located along the creek. When this occurs, the cranes are frequently recaptured by herding them into the alpaca exhibit and catching them from within there. When this occurs, no

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interactions between the alpaca, pelicans, or cranes are observed (though the pelicans often act stressed by the presence of the keepers).

Salisbury Zoological Park, Salisbury, MD – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (1.4)
- Wild Turkey (*Meleagris gallopavo*) (1.3)

Group has been successfully mixed for 10 years (since 2007, current as of 2017).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- We spot clean the exhibit daily, raking up deer and turkey feces, turkey feathers, and removing waste from the exhibit in a wheelbarrow to be composted. Uneaten diet is dumped in the wheelbarrow as well.
- The exhibit pool is drained, bleached, scrubbed, hosed out, and refilled as needed, or a minimum of once per week.
- We clean the window of the exhibit with Windex and paper towels as needed.
- Once a week, we inspect the exhibit from the public viewing area. We confirm structural integrity of the barrier fence and remove trash in front of the exhibit whenever encountered.

Changes/Accommodations Needed:

- None are needed.

Reproductive Management/Breeding History:

- The deer herd is non-breeding; the male is castrated.
- The turkey flock is reproductively active; turkey eggs are pulled from the exhibit, incubated if other institutions have expressed an interest in birds, or are otherwise discarded.

Management Challenges:

- The white-tailed deer exhibit does not have a keeper entry vestibule; keepers must be cautious when opening the door to the exhibit.
- The male turkey can be aggressive towards keepers; prior to entering the exhibit, we secure the turkey in the holding pen adjacent to the exhibit's entrance. We open the door with a pull cable, lowering it after the turkey enters the pen. We release the turkey after the exhibit has been serviced.
- During rut, the male deer may be aggressive towards keepers. Keepers carry pieces of fruit to throw as a distraction if he approaches. If he becomes very aggressive, we place the food in the exhibit and leave. Two keepers may be necessary for safe cleaning at this time of the year.

Items Contributing to Group's Success:

- Both species are compatible; we have had no aggression between them.
- Plenty of space for both species

Group/Exhibit Changes Over Time:

- Both species express some interest in the diet of the other species, but this has not been a major problem, as both largely eat their prescribed diet.

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- The exhibit has attracted a wild (non-zoo) turkey, which comes and goes as it pleases. This confuses and sometimes alarms visitors, who think that a turkey has escaped.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.7 + offspring)
- Speke's Gazelle (*Gazella spekei*) (1.10 + offspring)

Group has been successfully mixed for 5+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals are on exhibit 24/7.

Changes/Accommodations Needed:

- The topography of the exhibit is varied.

Reproductive Management/Breeding History:

- All breeding is on exhibit in the mixed group.

Management Challenges:

- Each new keeper needs to learn how best to work the animals within the exhibit.

Items Contributing to Group's Success:

- The demeanor of the animals
- The work of keeper staff
- The activity and volume in the exhibit makes it interesting for zoo guests.

Group/Exhibit Changes Over Time:

- New breeding males come into the group from time to time. Offspring from both groups come out as needed.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Malayan Tapir (*Acrocodia indica*) (1.1)
- Visayan Warty Pig (*Sus cebifrons*) (0.4)

Group has been successfully mixed for <1 year (since November 2015, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All are adults.

Changes/Accommodations Needed:

- We have hides, caves, and overhangs for sleeping.
- There are feed areas.

Reproductive Management/Breeding History:

- There is no breeding or reproduction in either group.

Management Challenges:

- Food control is a challenge (pigs are hard to keep out of areas).

Items Contributing to Group's Success:

- Age of animals
- Temperament of animals
- Activity and volume in the exhibit make it interesting for zoo guests

Group/Exhibit Changes Over Time:

- This exhibit used to house just the tapir.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Black Duiker (*Cephalophus niger*) (1.1.1)
- Okapi (*Okapia johnstoni*) (0.3)

Group has been successfully mixed for 2+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We had slow introductions over 3 weeks.

Changes/Accommodations Needed:

- This exhibit has hides, appropriate topography, and cover.

Reproductive Management/Breeding History:

- Both species are breeding and reproductive.

Management Challenges:

- Moving animals around when needed is a challenge.

Items Contributing to Group's Success:

- Exhibit type
- Keeper time
- Exhibit topography

Group/Exhibit Changes Over Time:

- This exhibit used to house just okapi.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Lowland Anoa (*Bubalus depressicornis*) (0.1)
- North Sulawesi Babirusa (*Babyrousa celebensis*) (2.0)

Group has been successfully mixed for 1+ year (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We have an old female anoa and young male babirusa.

Changes/Accommodations Needed:

- The exhibit provides sleeping covers.

Reproductive Management/Breeding History:

- There is no breeding.

Management Challenges:

- Keeper time is a challenge.

Items Contributing to Group's Success:

- Space
- Topography

Group/Exhibit Changes Over Time:

- This exhibit used to house just anoa.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Chinese Goral (*Naemorhedus griseus*) (1.0)
- Sichuan (Tibetan) Takin (*Budorcas taxicolor tibetana*) (4.0)

Group has been successfully mixed for 5+ years (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- We have young and old animals.
- Animals are all males.

Changes/Accommodations Needed:

- There is a lot of space.
- The topography is appropriate for the animals.

Reproductive Management/Breeding History:

- There is no breeding (all males).

Management Challenges:

- Giving the goral ways to avoid the takin throughout the exhibit area is a challenge.

Items Contributing to Group's Success:

- Space
- Time of introduction

Group/Exhibit Changes Over Time:

- The only changes are the addition of exhibit elements to keep animals engaged, including dirt, logs, branches, etc.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Common Warthog (*Phacochoerus africanus*) (1.0)
- Grant's Zebra (*Equus quagga boehmi*) (1.0)
- Springbok (*Antidorcas marsupialis*) (1.4)

Group has been successfully mixed for approximately 2 years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We have older zebra and warthog and young springbok.

Changes/Accommodations Needed:

- Exhibit size and topography are appropriate.

Reproductive Management/Breeding History:

- There is no breeding with zebra.
- There is breeding with springbok and warthog groups.

Management Challenges:

- Pulling off male zebra for births of other animals is a challenge.

Items Contributing to Group's Success:

- Keeper time
- Exhibit space
- Back holding

Group/Exhibit Changes Over Time:

- The only changes are related to exhibit maintenance and care.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Arabian Camel (*Camelus dromedarius*) (0.2)
- Baja California Pronghorn (*Antilocapra americana peninsularis*) (group of 2-6)

Group has been successfully mixed for 5+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We shift the male pronghorn during rut.

Changes/Accommodations Needed:

- We have barns for species separation during exhibit maintenance.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Male rut in pronghorn presents challenges.

Items Contributing to Group's Success:

- Back holding area
- Topography

Group/Exhibit Changes Over Time:

- The only changes are animal rotation as needed for population management.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- Bactrian Deer (*Cervus elaphus bactrianus*) (female groups of >6 and male groups > 4)
- Bharal (*Pseudois nayaur*) (4.0)
- Spanish Ibex (*Capra pyrenaica*) (2.0)
- Tur (*Capra cylindricornis*) (3.0)

Group has been successfully mixed for 3+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We provide many feeding areas and water areas.

Changes/Accommodations Needed:

- The size of the exhibit is appropriate.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Holding sheep and ibex is a challenge.

Items Contributing to Group's Success:

- Keeper time
- Space
- Hillside exhibit

Group/Exhibit Changes Over Time:

- Population management is needed over time.

San Diego Zoo, San Diego, CA – Current Exhibit

Current Species:

- African Forest Buffalo (*Syncerus caffer nanus*) (0.1)
- Red River Hog (*Potamochoerus porcus*) (1.2)

Group has been successfully mixed for 6+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All animals get along well.

Changes/Accommodations Needed:

- This is a dirt exhibit with a lot to do for the pigs.

Reproductive Management/Breeding History:

- Pigs get moved out for births from time to time.

Management Challenges:

- We need barn space for pigs and buffalo for exhibit maintenance.

Items Contributing to Group's Success:

- Keeper time
- Space
- Guest enjoyment

Group/Exhibit Changes Over Time:

- Changes are made as needed for pig breeding.

San Diego Zoo, San Diego, CA – Historical Exhibit

Species:

Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.4 + offspring)

Nubian Soemmerring's Gazelle (*Nanger soemmerringii soemmerringii*) (1.4 + offspring)

Group was successfully mixed for 5+ years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Animals were together 24/7.

Reproductive Management/Breeding History:

- Males were rotated.
- Females were separated within the exhibit for calving.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- No information provided.

Group/Exhibit Changes Over Time:

- There was animal movement over time for population management.

San Diego Zoo, San Diego, CA – Historical Exhibit

Species:

- Banteng (*Bos javanicus*) (1.6 + offspring)
- Eurasian Wild Pig (*Sus scrofa*) (1.3 + offspring)

Group was successfully mixed for 3+ years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- We had slow introductions over 3 weeks.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Managing pigs during banteng births was challenging.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- These species were removed from the collection.

Group/Exhibit Changes Over Time:

- Exhibit maintenance was needed due to pig activity.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (5.16)
- Cape Buffalo (*Syncerus caffer*) (3.10)
- Defassa Waterbuck (*Kobus ellipsiprymnus defassa*) (5.17)
- East African Topi (*Damaliscus korrigum jimela*) (3.6)
- Eastern Black Rhinoceros (*Diceros bicornis michaeli*) (2.2)
- Grant's Gazelle (*Nanger granti*) (6.15)
- Kenya Impala (*Aepyceros melampus rendilis*) (10.22)
- Nile Lechwe (*Kobus megaceros*) (8.19)
- Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*) (5.18)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (4.14)
- Thomson's Gazelle (*Eudorcas thomsonii*) (8.15)
- Ugandan Kob (*Kobus kob thomasi*) (4.10)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The above animals are out in the 60 acre enclosure 24/7.

Changes/Accommodations Needed:

- The enclosure is 60 acres and has rolling hills that provide visual barriers and is large enough for wildlife to get away from each other and go into other territories.



Michael Murray

Reproductive Management/Breeding History:

- Giraffe are brought into the bomas before giving birth and kept in for up to a month and then released. Giraffe are the only species routinely pulled off exhibit for calving.
- The white rhinoceros had given birth routinely without incident.

Management Challenges:

- Parasites. With animals out 24/7 is always an issue as we never get a freeze to kill off any parasites.
- The white and black rhinos were kept together without incident until the blacks calved. The black rhino started seeking out the male white rhino to fight with him after a black rhino calf was born.

Items Contributing to Group's Success:

- Space
- Site barriers
- Keeping adult males in breeding groups so you do not have inter- or intra-species aggression

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Group/Exhibit Changes Over Time:

- It was 100 acres when the park opened.
- We sectioned off a 40 acre area to allow us to hold/exhibit more species 10 years ago.
- The black rhino started seeking out the male white rhino to fight with him after a black rhino calf was born. We had to remove the black rhino from the enclosure.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (4.5)
- Cape Buffalo (*Syncerus caffer*) (2.0)
- Defassa Waterbuck (*Kobus ellipsiprymnus defassa*) (4.15)
- Fringe-eared Oryx (*Oryx beisa callotis*) (6.12)
- Grant's Gazelle (*Nanger granti*) (2.6)
- Impala (*Aepyceros melampus*) (9.20)
- Nile Lechwe (*Kobus megaceros*) (12.13)
- Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*) (5.8)
- Sitatunga (*Tragelaphus spekii*) (3.7)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (2.8)
- Thomson's Gazelle (*Eudorcas thomsonii*) (5.13)
- Ugandan Kob (*Kobus kob thomasi*) (2.0)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (group of 14)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Almost all animals are managed in the field and not shifted into holding at all or with any regularity.

Changes/Accommodations Needed:

- Managing breeding Thomson's gazelle and Grant's gazelle requires oversight as there are potential aggression issues between breeder males of each and potential of hybridization if one or the other male is removed.

Reproductive Management/Breeding History:

- See above.

Management Challenges:

- We see occasional aggression from male giraffe towards antelope neonates. There is also occasional interspecies aggression between herd breeder males.

Items Contributing to Group's Success:

- Large open space
- Natural herd structures
- Favorable weather conditions

Group/Exhibit Changes Over Time:

- This exhibit has fluctuated in composition and numbers countless times over the course of 40+ years with too much history to try to list.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (6.15)
- Common Eland (*Taurotragus oryx*) (12.14)
- Common Waterbuck (*Kobus ellipsiprymnus*) (4.13)
- Gemsbok (*Oryx gazella*) (10.16)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (4.7)
- Northern White Rhinoceros (*Ceratotherium simum cottoni*) (1.1)
- Springbok (*Antidorcas marsupialis*) (8.14)

Group has been successfully mixed for many years.

Exhibit Size: Larger than 8 acres

General Management Notes:

- All animals are left out 24/7.
- We have continually had these large groupings together for many years.
- Springbok males will tolerate youngsters in the herd up to one to one and a half years of age. They will drive them out at that time if you have room for them to set up a bachelor herd.

Changes/Accommodations Needed:

- There are rolling hills in this enclosure that provides visual barriers for species to get out of sight of others, especially when bachelor males are forming close to breeding groups.

Reproductive Management/Breeding History:

- Only the Masai giraffe are brought off exhibit to calve.

Management Challenges:

- Parasites are a challenge.

Items Contributing to Group's Success:

- Space
- Rolling hills for sight barriers
- Managing new herd sires effectively for integration

Group/Exhibit Changes Over Time:

- There have been changes over the years, but nothing out of the ordinary.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Cape Buffalo (*Syncerus caffer*) (7.11)
- Common Eland (*Taurotragus oryx*) (5.29)
- Common Waterbuck (*Kobus ellipsiprymnus*) (4.11)
- Gemsbok (*Oryx gazella*) (7.19)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (5.3)
- Northern White Rhinoceros (*Ceratotherium simum cottoni*) (1.0)
- Sable Antelope (*Hippotragus niger*) (4.10)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.0)
- Springbok (*Antidorcas marsupialis*) (9.15)
- Dalmatian Pelican (*Pelecanus crispus*) (6.11)
- Great White Pelican (*Pelecanus onocrotalus*) (7.4)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Almost all animals are managed in the field and not shifted into holding at all or with any regularity.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- There is occasional interspecies aggression among breeder males.

Items Contributing to Group's Success:

- Large open space
- Natural herd composition
- Favorable weather conditions

Group/Exhibit Changes Over Time:

- This exhibit has fluctuated in composition and numbers countless times over the course of 40+ years with too much history to try to list.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (2.2)
- Greater Kudu (*Tragelaphus strepsiceros*) (4.12)
- Red-fronted Gazelle (*Eudorcas rufifrons*) (3.0)
- Roan Antelope (*Hippotragus equinus*) (4.13)
- Ugandan Kob (*Kobus kob thomasi*) (3.12)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- These animals are out on exhibit 24/7.

Changes/Accommodations Needed:

- Rolling hills provide site barriers for mixed species as well as young males hiding from herd sires.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Space
- Rolling hills for sight barriers
- Numerous feeding locations

Group/Exhibit Changes Over Time:

- None

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Armenian Mouflon (*Ovis orientalis gmelini*) (3.8)
- Blackbuck (*Antelope cervicapra*) (12.20)
- Gaur (*Bos gaurus*) (4.15)
- Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (4.10)
- Indian Barasingha (*Rucervus duvaucelii*) (3.10)
- Malayan Sambar Deer (*Rusa unicolor equina*) (4.12)

Group has been successfully mixed for 30+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Greater one-horned rhinoceros are brought in one month prior to giving birth.
- All other species are out 24/7.

Changes/Accommodations Needed:

- Rolling hills provide site barriers for young males forming bachelor herds.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- We have no challenges.

Items Contributing to Group's Success:

- Space
- Site barriers
- Numerous feeding locations

Group/Exhibit Changes Over Time:

- None

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Armenian Mouflon (*Ovis orientalis gmelini*) (1.2)
- Bactrian Deer (*Cervus elaphus bactrianus*) (3.12)
- Blackbuck (*Antilope cervicapra*) (21.54)
- Gaur (*Bos gaurus*) (1.6)
- Gayal (*Bos frontalis*) (1.2)
- Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (2.4)
- Indian Barasingha (*Rucervus duvaucelii*) (4.4)
- Indochinese Sika Deer (*Cervus nippon pseudaxis*) (4.6)
- Malayan Sambar Deer (*Rusa unicolor equina*) (1.11)
- Nilgai (*Boselaphus tragocamelus*) (5.15)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This exhibit is 35 acres in size. Most of the species in this exhibit have been exhibited together for many years. They are all breeding herds.
- New breeding stock is generally brought in as adults. Some animals are held in bomas (smaller holding areas within the enclosures) before being released into the large exhibit.
- The majority of the animals in this exhibit have been born in this exhibit.
- There are not any "night houses" or barns as such, although bomas can be used for holding animals for medical, introductions, and birthing if necessary.



Brent Huffman

Changes/Accommodations Needed:

- This is a very large exhibit with many trees, rocky outcroppings, streams, wallows, hills and sandy flat areas. The substrate is dirt and grass. There are many areas for animals to roam.
- The size of this exhibit allows large herds to hang out together and also to get away from each other if necessary. It is possible in most cases for females to find a secluded spot to give birth and tuck their neonates safely away.
- Because of the uneven terrain this exhibit can also be dangerous for neonates as well as full grown animals depending on the situation.

Reproductive Management/Breeding History:

- All are breeding herds.
- Rhinoceros males are held in the boma and released at a time that will hopefully assure calves being born when the weather is best. Then the pregnant female is brought into the boma a short time before they give birth. This makes it easier for keepers to monitor the birth, the dam and the calf for a period of time before they are released out into the exhibit.

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Management Challenges:

- Feeding an exhibit with this many animals can be difficult at times. It is necessary to feed out enough so that all of the animals get enough but difficult to keep some animals from eating too much.
- The size and topography can make looking for babies in this exhibit extremely time consuming.

Items Contributing to Group's Success:

- Large open space – giving animals room to behave in a fairly natural way
- Smaller breeding groups are usually easier to manage.
- Most of these species live in herds and don't cause problems with other species.

Group/Exhibit Changes Over Time:

- Persian gazelle and Javan rusa were phased out of the collection.
- Bharal were moved to a smaller enclosure and housed alone. The males were especially difficult to manage as they followed trucks into drive-thru area between exhibits, got into problems with other species, and even got up on the feed trucks from time to time. One of the female bharal was hit by a rhino and didn't survive.
- Bornean bearded pigs were not exhibited for very long as one of them was hit by a gaur and came up lame for quite a while. They were observed harassing newborn deer fawns.
- The species composition in this exhibit in 2000 was as follows:
 - Altai Wapiti (*Cervus canadensis sibiricus*) (7.10)
 - Armenian Mouflon (*Ovis orientalis gmelini*) (28.44)
 - Axis Deer (*Axis axis*) (6.16)
 - Blackbuck (*Antilope cervicapra*) (6.25)
 - Bornean Bearded Pig (*Sus barbatus*) (3.0)
 - Chinese Bharal (*Pseudois nayaur szechuanensis*) (2.3)
 - Gaur (*Bos gaurus*) (14.18)
 - Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (5.8)
 - Indian Barasingha (*Rucervus duvaucelii*) (5.15)
 - Indochinese Sika Deer (*Cervus nippon*) (9.15)
 - Javan Rusa (*Rusa timorensis*) (7.11)
 - Malayan Sambar Deer (*Rusa unicolor equina*) (13.17)
 - Nilgai (*Boselaphus tragocamelus*)
 - Persian Gazelle (*Gazella subgutturosa subgutturosa*) (5.13)

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Bat-eared fox (*Otocyon megalotis*) (1.4)
- Common Warthog (*Phacochoerus africanus*) (3.3)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- Foxes have dens and holes to separate themselves when desired.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Space
- Careful introductions

Group/Exhibit Changes Over Time:

- None

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Blackbuck (*Antilope cervicapra*) (1.0)
- Eld's Deer (*Rucervus eldii*) (1.5)
- Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (0.3)
- Indian Hog Deer (*Axis porcinus*) (1.3)
- Javan Banteng (*Bos javanicus*) (1.6)
- Mandarin Sika Deer (*Cervus nippon mandarinus*) (1.2)
- Pere David's Deer (*Elaphurus davidianus*) (3.5)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Animals are managed on exhibit with little to no shifting.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- There is occasional inter-species aggression among males.

Items Contributing to Group's Success:

- Large open space
- Favorable climate
- Natural herd dynamics

Group/Exhibit Changes Over Time:

- There have been various incarnations over 40+ years.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (2.7)
- Red Lechwe (*Kobus leche leche*) (3.14)
- Sudan Red-fronted Gazelle (*Eudorcas rufifrons*) (3.9)
- Crowned Crane (*Balearica sp.*) (group of 2)
- Pink-backed Pelican (*Pelecanus rufescens*) (3.2)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The three ungulate species in here are all breeding groups. This exhibit currently housing them opened in 2007 when the new ride-path for the Safari Park was completed. The original animals came in as adults and since then many have been born and raised in this enclosure.
- The bird species are managed by the bird department at the Safari Park. There doesn't seem to be any issues with birds and mammals.

Changes/Accommodations Needed:

- African Forest exhibit is 9 acres with dirt and grass substrate.
- There are many trees, rolling hills and a large pond.
- There is also a holding area with catch-pens adjacent to this enclosure.
- There seems to be plenty of room for these 3 ungulate species in this large enclosure.

Reproductive Management/Breeding History:

- New breeding males are generally brought in every couple of years.
- Females give birth on exhibit.

Management Challenges:

- There are no particular challenges with this group.

Items Contributing to Group's Success:

- Large exhibit with plenty of space for these animals
- Natural group structures
- Favorable climate
- All non-aggressive species and they get along fine

Group/Exhibit Changes Over Time:

- There have been various incarnations over 40+ years, but no changes since the current exhibit opened in 2007.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (1.0)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (1.0)
- Defassa Waterbuck (*Kobus ellipsiprymnus defassa*) (3.0)
- Grevy's Zebra (*Equus grevyi*) (3.5)
- Nile Lechwe (*Kobus megaceros*) (3.0)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Only Grevy's zebra breed in this habitat.

Management Challenges:

- There is occasional male aggression inter- and intra-species.

Items Contributing to Group's Success:

- Large open space
- Having only antelope males with only zebra breeding
- Favorable climate

Group/Exhibit Changes Over Time:

- There have been various incarnations over 10+ years.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Barbary Sheep (*Ammotragus lervia*) (4.0)
- Somali Wild Ass (*Equus africanus somaliensis*) (1.6)

Group has been successfully mixed for a few months (current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- There are lots of rocky outcroppings.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- There is aggression from the male Somali wild ass to sheep on occasion.



Steve Metzler

Items Contributing to Group's Success:

- Exhibit complexity
- Only male sheep in exhibit
- Open space

Group/Exhibit Changes Over Time:

- None

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

Ankole (Watusi) Cattle (*Bos taurus*) (1.1)
Black Rhinoceros (*Diceros bicornis*) (0.1)
Greater Kudu (*Tragelaphus strepsiceros*) (6.18)
Red-fronted Gazelle (*Eudorcas rufifrons*) (3.0)
Roan Antelope (*Hippotragus equinus*) (5.12)
Ugandan Kob (*Kobus kob thomasi*) (4.12)
Pink-backed Pelican (*Pelecanus rufescens*) (1.2)
Dalmation Pelican (*Pelecanus crispus*) (1.0)

Group has been successfully mixed for 30+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Large open space
- Black rhinoceros shift in when needed
- Natural herd groupings for antelope

Group/Exhibit Changes Over Time:

- There have been various incarnations over 30+ years.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (3.9)
- Barbary Red Deer (*Cervus elaphus barbarus*) (0.36)
- Bontebok (*Damaliscus pygargus*) (1.0)
- Red-fronted Gazelle (*Eudorcas rufifrons*) (3.0)
- Scimitar-horned Oryx (*Oryx dammah*) (10.23)

Group has been successfully mixed for ~20 years (since the 1990s, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- We have breeding herds of oryx and ankole, most of which were born and raised in this exhibit. Usually adult male herd sires are switched out every couple of years.
- Introductions are generally straight into exhibit.
- Barbary red deer are no longer being bred here but have been in the past and most of this herd was born in this exhibit.
- The male red-fronted gazelle were pulled from the breeding herd to prevent breeding. Usually 2-3 is the top number of small male gazelle that will get along in any one species in this enclosure (or any enclosure in our experience).
- The lone bontebok was the herd sire in our bontebok enclosure but has been moved to prevent breeding. We tried another bontebok male and that did not work. They fought.

Changes/Accommodations Needed:

- This is our North Africa exhibit, and it is 25 acres.

Reproductive Management/Breeding History:

- Groups are managed as breeding herds, and the males are exhibited at all times with the herd. Females give birth on exhibit and raise their calves with the herd.

Management Challenges:

- We had problems with red deer males and the oryx male when the deer were in rut.

Items Contributing to Group's Success:

- Large exhibit with room for animals to stay away from each other if inclined
- Animals stay with their own breeding herds and don't interact with each other.

Group/Exhibit Changes Over Time:

- Originally there were addax and addra gazelle in this exhibit, but they were moved out into their own enclosure in the 1990s.
 - Addax (*Addax nasomaculatus*)
 - Addra (Dama) Gazelle (*Nanger dama*)
- In 2005 a male Somali wild ass was tried in this exhibit. He lasted 5 days before being gored by a scimitar-horned oryx.

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- Over time several small bachelor groups of different gazelle have been housed in this exhibit (slender-horned gazelle, Cuvier's gazelle, etc.). The smaller the grouping the better they seem to get along. Small male gazelle have a tendency to want to fight with each other and other animals in the exhibit. They have to be closely monitored.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (3.6)
Cape Buffalo (*Syncerus caffer*) (2.0)
Defassa Waterbuck (*Kobus ellipsiprymnus defassa*) (4.13)
East African Sitatunga (*Tragelaphus spekii spekii*) (1.8)
Fringe-eared Oryx (*Oryx beisa callotis*) (3.13)
Grant's Gazelle (*Nanger granti*) (1.7)
Kenya Impala (*Aepyceros melampus rendilis*) (7.22)
Nile Lechwe (*Kobus megaceros*) (7.13)
Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.0)
Rothschild's Giraffe (*Giraffa camelopardalis camelopardis*) (2.3)
Southern White Rhinoceros (*Ceratotherium simum simum*) (2.8)
Thomson's Gazelle (*Eudorcas thomsonii*) (6.13)
Ugandan Kob (*Kobus kob thomasi*) (2.0)
East African Crowned Crane (*Balearica regulorum gibbericeps*)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- All of these species have been managed successfully in this exhibit for many years.
- In 2006 this exhibit decreased in size by 10 acres when Central Asia was built. At this time the white-bearded wildebeest (gnu) and Ugandan kob were moved to other exhibits to enhance the guest experience and the new Journey into Africa/AfricanTram ride.

Changes/Accommodations Needed:

- This exhibit has many trees, stumps, hills covered with grass, a low lying sandy area, several wallows and stream beds.
- There is a large boma used to hold animals for medical procedures, quarantine, births and holding for shipments, etc.
- There are many natural hiding places provided naturally by the topography of this exhibit.

Reproductive Management/Breeding History:

- Usually the males are traded out for new breeding stock every few years.
- All of the animals in this exhibit give birth on exhibit except for the giraffe. The female giraffe are usually brought into the boma for calving.

Management Challenges:

- Some of the breeding groups were moved to other exhibits to enhance the Journey into Africa/Africa Tram in 2007. At this time the exhibit decreased in size, and this caused some aggression problems.
- Otherwise, there are none in particular. Weather can sometimes pose a problem as all of the animals are outside year round.

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Items Contributing to Group's Success:

- Large natural exhibits with 50 or more acres are much better for large breeding groups of animals.
- Smaller breeding groups are usually easier to manage.
- Lots of animal activity for the guests to observe.

Group/Exhibit Changes Over Time:

- When the Safari Park opened in 1972 the East Africa exhibit was 90 acres. Over the years the exhibit decreased in size due to projects such as Heart of Africa and Central Asia. Today this enclosure is approximately 55 acres.
- It seems that there were more bachelor groups of animals in the past with more room to roam.
- Jimela topi were once successfully housed in this enclosure.
- Warthogs (1.1) were introduced in 2000 but within a few months the male was gored by a rhino and had to be humanely euthanized. The female warthog also had some interactions with the rhinos and the following year she was removed. She was eventually moved to the South Africa exhibit (60 acres).
- The species composition in this exhibit in 2000 was as follows:
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (4.7)
 - Defassa Waterbuck (*Kobus ellipsiprymnus defassa*) (8.24)
 - East African Sitatunga (*Tragelaphus spekii spekii*) (5.10)
 - Fringe-eared Oryx (*Oryx beisa callotis*) (9.30)
 - Grant's Gazelle (*Nanger granti*) (9.12)
 - Jimela Topi (*Damaliscus lunatus jimela*) (2.4)
 - Kenya Impala (*Aepyceros melampus rendilis*) (20.23)
 - Nile Lechwe (*Kobus megaceros*) (8.9)
 - Rothschild's Giraffe (*Giraffa camelopardalis camelopardis*) (5.9)
 - Southern White Rhinoceros (*Ceratotherium simum simum*) (4.8)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (18.20)
 - Uganda Kob (*Kobus kob thomasi*) (1.15)
 - East African Crowned Crane (*Balearica regulorum*)

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Armenian Mouflon (*Ovis orientalis gmelini*) (3.2)
- Axis Deer (*Axis axis*) (0.2)
- Bactrian Deer (*Cervus elaphus bactrianus*) (3.10)
- Barasingha (*Rucervus duvaucelii*) (2.5)
- Blackbuck (*Antilope cervicapra*) (17.42)
- Gaur (*Bos gaurus*) (2.12)
- Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (2.3)
- Indochinese Sika Deer (*Cervus nippon*) (3.7)
- Malayan Sambar Deer (*Rusa unicolor equina*) (1.6)
- Nilgai (*Boselaphus tragocamelus*) (5.11)

Group has been successfully mixed for 40+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Only one male deer of each species keeps his antlers and the others are removed annually to reduce aggression and to help direct which will be the breeder male.

Management Challenges:

- There is occasional inter- and intra-species aggression among males.

Items Contributing to Group's Success:

- Large open space
- Favorable climate
- Natural herd structures

Group/Exhibit Changes Over Time:

- There have been various incarnations over 40+ years.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (9.16)
- Cape Buffalo (*Syncerus caffer*) (7.13)
- Common Eland (*Taurotragus oryx*) (7.28)
- Common Waterbuck (*Kobus ellipsiprymnus*) (2.10)
- Eastern Black Rhinoceros (*Diceros bicornis michaeli*) (1.0)
- Gemsbok (*Oryx gazella*) (10.22)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (5.2)
- Sable Antelope (*Hippotragus niger*) (3.12)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.0)
- Springbok (*Antidorcas marsupialis*) (9.20)

Group has been successfully mixed for 40+ years (current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- This is a very large 60 acre exhibit. It is ideal for breeding herds of animals.
- We have had many different species of mammals born and raised in this semi-natural setting.
- New animals that are introduced to the herds are sometimes held in a boma located inside the enclosure to acclimate them to the many animals in the enclosure.

Changes/Accommodations Needed:

- There are trees, ponds, hills, valleys, streams, dirt, sand and grass in this exhibit. For the most part it provides ample room for births, tucking calves, introductions, and isolation if necessary.
- Springbok and sable antelope are notorious for having herd sires that push young males from the herd at a particular age. There doesn't seem to be a specific age that this occurs and each adult male seems to have their own time frame. When this happens it is necessary for us to remove the younger male for safety and it must be done very quickly.



Luis Ochoa

Reproductive Management/Breeding History:

- The weather here in southern California is mild for the most part so we do not bring the animals into a barn. There are a couple of bomas adjacent to the exhibit. These bomas have many uses and can be used for recovery from medical procedures, introducing new animals to the exhibit, holding for any reason, and sometimes for giraffe birthing.

Management Challenges:

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- Nutrition can be a challenge as there must be ample food for all of the animals in the enclosure. Although there are several feeders and lots of food it is hard to monitor the amounts each animal receives. We have tried "exclusion feeders" that keep the large animals out leaving feed for smaller gazelles and goat/sheep species.
- Rhinoceros and giraffe can usually be "trapped" in the bomas for procedures or births which is a plus. It is almost always necessary to dart any of the other animals from a truck for medical procedures or for removal from the exhibit. Immobilizations can be a challenge for several reasons such as difficulty getting close enough to the animals to dart them. Once the animal is darted keeping them safe from other animals and obstacles in the exhibit (i.e., ponds and uneven terrain) until the drug takes total effect can be tough. It is necessary to have several 4 wheel drive vehicles and sometimes dump trucks ready to help retrieve the animal as well as keep them safe.
- From time to time there has been aggression between herd sires of different species. It must be noticed quickly and removal of the aggressor is usually the solution. Sometimes this animal can be returned to the exhibit but sometimes they are replaced with another less troublesome male. Being aware of the unique personalities of the animals is very important.
- We count all of the animals every day in each enclosure. Sometimes it is difficult to find altricial neonates in such a large enclosure with so many good places to hide.

Items Contributing to Group's Success:

- Space is the key! This is a very large approximately 60 acre enclosure with room for many animals and natural behavior.
- This is about the right amount of species to exhibit in this size enclosure. Too many animals are difficult to manage.
- There is not too much interaction between species – seems to be a good mix.

Group/Exhibit Changes Over Time:

- Hartmann's mountain zebra were once in this enclosure. They chased other species (e.g., springbok) and harassed and stepped on small babies of other species including gemsbok and eland. One zebra was gored/killed by a rhinoceros.
- A female warthog was tried in this enclosure and ended up being killed by a rhinoceros.
- A small bachelor group of slender-horned gazelle (6.0) was housed in this exhibit for a short time before being moved to another mixed-species enclosure.
- Blesbok and springbok were not a good mix. The males fought with one another and the springbok wanted to breed the blesbok females.
- There have been several bird species in this exhibit over time including several species of pelicans, blue cranes, African spoonbills, bar-headed geese, and cinereous vultures. For the most part there was very little if any interaction between birds and mammals. I do remember an unlucky cinereous vulture that got too close to a tucked gemsbok calf and the gemsbok dam attacked the vulture. It was injured and removed from the exhibit.
- The species composition in this exhibit in 2000 was as follows:
 - Blesbok (*Damaliscus pygargus phillipsi*) (2.4)
 - Cape Buffalo (*Syncerus caffer*) (2.2)
 - Common Waterbuck (*Kobus ellipsiprymnus*) (14.21)
 - Gemsbok (*Oryx gazella*) (3.20)
 - Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.4)
 - Northern White Rhinoceros (*Ceratotherium simum cottoni*) (1.2)

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- Patterson's Eland (*Taurotragus oryx pattersonianus*) (9.6)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (3.4)
 - Sable Antelope (*Hippotragus niger*) (2.8)
 - Slender-horned Gazelle (*Gazella leptoceros*) (6.0)
 - Southern White Rhinoceros (*Ceratotherium simum simum*) (0.2)
 - Various birds
- In 2001, 4.2 springbok were added and slender-horned gazelle were removed.

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Bighorn Sheep (*Ovis canadensis*) (1.0)
- Desert Bighorn Sheep (*Ovis canadensis nelsoni*) (4.0)
- Nubian Ibex (*Capra nubiana*) (2.0)
- Transcaspian Urial (*Ovis orientalis arkal*) (3.0)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These are small groups of animals that have been pulled from breeding herds so as to prevent them from breeding. This provides a good holding situation for them. Usually we try to put young males in here around a year of age if possible. If possible we like to move 2 at a time so they have a buddy.

Changes/Accommodations Needed:

- The rocky terrain of this hillside exhibit allows the animals to have many areas to feel comfortable in.
- There is a catchpen area at the bottom of the enclosure for feeding. This allows for better observations and possible trapping opportunities.

Reproductive Management/Breeding History:

- These are all males.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Males only
- Small number of animals
- Species that seem to get along

Group/Exhibit Changes Over Time:

- We have tried different sheep such as Chinese bharal and they were too aggressive and did not get along.
- Originally there were several breeding groups of animals in this exhibit. It is hard to manage breeding groups in this exhibit due to its rocky terrain. Since putting only male goats and sheep in here it is easier to manage.
- In 2000, we had the following groups:
 - European Mouflon (*Ovis aries musimon*) (3.3)
 - Himalayan Tahr (*Hemitragus jemlahicus*) (12.14)
 - Siberian Ibex (*Capra sibirica*) (11.18)



Brent Huffman

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Angolan Roan Antelope (*Hippotragus equinus cottoni*) (9.11)
- Ankole (Watusi) Cattle (*Bos taurus*) (1.1)
- East African Sitatunga (*Tragelaphus spekii spekii*) (2.0)
- Eastern Black Rhinoceros (*Diceros bicornis michaeli*) (0.1)
- Eastern White-bearded Wildebeest (*Connochaetes taurinus albojubatus*) (1.0)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.11)
- Ugandan Kob (*Kobus kob thomasi*) (4.12.1)

Group has been successfully mixed for 9 years (since 2007, current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The male ankole was added as an adult; the female was hand-raised and moved to this enclosure after weaning.
- The black rhinoceros female was moved here as an adult. She can be brought into the boma that is adjacent to this enclosure when necessary.
- The sitatunga were transferred here from two different enclosures as sub-adults.
- The greater kudu are a breeding group. In the past greater kudu had their own exhibit with no other species. They had been tried out in one of our larger field exhibits many years ago and did not do well. They were very timid around the many other species in the field. When the Central Africa exhibit was opened in 2007 these animals were moved from their private enclosure next door into this one. They have done fairly well with this group of animals although they can be pushed away from the feeders by the roan antelope so they definitely have to have plenty of options for feeding areas.
- The wildebeest was brought in as an adult and was very aggressive at first. He chased all of the animals and may have been responsible for some trauma to one of the roan antelope. He has since calmed down and seems to be fitting in fine.
- The kob are a breeding group and most have been born and raised in this exhibit.
- Roan antelope are also a breeding group mostly born and raised in this exhibit.

Changes/Accommodations Needed:

- This 15 acre exhibit has many hills, valleys, trees, a stream, a large pond, dirt and grass and an adjoining boma.
- There are several feeders and drinkers around the enclosure.
- It seems to provide adequate space for all of the animals in this group. This is very important for the kudu especially.

Reproductive Management/Breeding History:

- Adult breeding males are usually rotated every couple of years for the breeding groups.
- Sub-adult males must be immobilized and removed to prevent breeding.
- Females are always on exhibit as here in San Diego we have good weather year round and most of the animals are not brought into a barn or night house.

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Management Challenges:

- Kudu are very shy, timid animals and can be pushed away from feeders by more assertive animals.

Items Contributing to Group's Success:

- Plenty of space! This is the key for any mixed species exhibit.
- Species that don't interact much with each other.

Group/Exhibit Changes Over Time:

- A small group of bachelor male scimitar-horned oryx (5.0) were introduced into this exhibit a few years ago. These were males that we did not want with the breeding herd. They seemed to get along fine until the kudu females began giving birth. Then the oryx males harassed the calves. So they were removed.
 - Angolan Roan Antelope (*Hippotragus equinus cottoni*)
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - East African Sitatunga (*Tragelaphus spekii spekii*)
 - Eastern Black Rhinoceros (*Diceros bicornis michaeli*)
 - Eastern White-bearded Wildebeest (*Connochaetes taurinus albojubatus*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Ugandan Kob (*Kobus kob thomasi*)
 - Scimitar-horned Oryx (*Oryx dammah*)
- A small bachelor group of springbok were added to this enclosure a couple of years ago. There were a couple of problems with them. They tended to fight with each other if there were too many added to the mix. Usually 3 or more is a problem but it also depends on the personalities of the males. Then the other problem was they started mounting and trying to breed the timid kudu calves! Needless to say they were removed.
 - Angolan Roan Antelope (*Hippotragus equinus cottoni*)
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - East African Sitatunga (*Tragelaphus spekii spekii*)
 - Eastern Black Rhinoceros (*Diceros bicornis michaeli*)
 - Eastern White-bearded Wildebeest (*Connochaetes taurinus albojubatus*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Ugandan Kob (*Kobus kob thomasi*)
 - Springbok (*Antidorcas marsupialis*)
- A couple of male Sudan red-fronted gazelle were housed with this group for a time with no problems.
 - Angolan Roan Antelope (*Hippotragus equinus cottoni*)
 - Ankole (Watusi) Cattle (*Bos taurus*)
 - East African Sitatunga (*Tragelaphus spekii spekii*)
 - Eastern Black Rhinoceros (*Diceros bicornis michaeli*)
 - Eastern White-bearded Wildebeest (*Connochaetes taurinus albojubatus*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Ugandan Kob (*Kobus kob thomasi*)
 - Sudan Red-fronted Gazelle (*Eudorcas rufifrons*)
- A couple of young male red river hogs were housed in this exhibit for a short time but they seemed to need better shelter and heat which we were unable to provide in this large field enclosure so they were removed.

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- Angolan Roan Antelope (*Hippotragus equinus cottoni*)
- Ankole (Watusi) Cattle (*Bos taurus*)
- East African Sitatunga (*Tragelaphus spekii spekii*)
- Eastern Black Rhinoceros (*Diceros bicornis michaeli*)
- Eastern White-bearded Wildebeest (*Connochaetes taurinus albojubatus*)
- Greater Kudu (*Tragelaphus strepsiceros*)
- Ugandan Kob (*Kobus kob thomasi*)
- Red River Hog (*Potamochoerus porcus*)

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Bactrian Camel (*Camelus bactrianus*) (1.1)
- Przewalski's Wild Horse (*Equus ferus przewalskii*) (0.12)

Group has been successfully mixed for 5 years (since 2011, current as of 2016).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Two of the horse mares were brought in as young adults and all the rest were born here at the Safari Park.
- The male camel was brought in at about 6 months of age and after a couple of weeks in an adjacent catch-pen he was released into the exhibit. At first the horses were afraid of him then he actually became a constant companion to one of the mares who at the time was about 2 years old.
- There was no stallion in the exhibit when the camel was introduced. The stallion was transferred from another area after a few days. At first the stallion chased the camel around but was not overly aggressive.
- The female camel came in as a 7 year old animal in April of 2014. She was put in a catch-pen adjacent to the exhibit for a couple of days first, to acclimate her to the horses and them to her. When she was released into the exhibit she immediately started following the male camel around the exhibit.

Changes/Accommodations Needed:

- This exhibit is dirt and grass substrate with trees and several feeders.
- The horses are semi-aggressive when they are eating so having several feeders is key.

Reproductive Management/Breeding History:

- We have brought in adult stallions every couple of years for breeding. The mares foal on exhibit and we have not had any issues.
- The male camel is still young (6 years old) and so far he has been very easy to manage. He actually used to "play" with the stallion that was in the exhibit last year. They bit each other and chased each other around.

Management Challenges:

- At this time there are not any real challenges. It is possible there could be problems when we bring in the next Przewalski's horse stallion depending on his temperament. As with all animals, specific personalities are different and keepers must be very observant, especially with species that have aggressive tendencies. Having keepers that are familiar with the animals is important!

Items Contributing to Group's Success:

- Large exhibit with room for animals to get away from each other if necessary
- Plenty of feeders so that they don't have to compete for food (diet is the same for both species)
- Adding the male camel at a young age was probably a good thing.

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Group/Exhibit Changes Over Time:

- The male camel went in in 2011 and the female camel in 2014.
- Horses have been in this exhibit since ~2007 when we moved animals around due to changes in the ride-path for the Africa Tram.
- This enclosure originally housed a breeding herd of Grevy's zebra.
- At one point a small bachelor group of Sudan Barbary sheep (6.0?) was introduced to the Grevy's zebra. We didn't have any problems with these 2 species in the several years they were housed together. They were eventually moved to different enclosures with the ride-path construction in 2006.
 - Barbary Sheep (*Ammotragus lervia*)
 - Grevy's Zebra (*Equus grevyi*)

San Diego Zoo Safari Park, Escondido, CA – Current Exhibit

Current Species:

- Burmese Thamin/Eld's Deer (*Rucervus eldii thamin/Rucervus eldii*) (2.5)
- Greater One-horned Rhino (*Rhinoceros unicornis*) (0.2)
- Indian Hog Deer (*Axis porcinus*) (1.2)
- Javan Banteng (*Bos javanicus*) (1.5)
- Mandarin Sika Deer (*Cervus nippon mandarinus*) (1.0)
- Pere David's Deer (*Elaphurus davidianus*) (2.4)
- Transcaspien Urial (*Ovis orientalis arkal*) (15.31)

Group has been successfully mixed for <1 year (since 2016, current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Most of the older animals in this enclosure were brought in as adults from other enclosures when this exhibit opened in 2007. Over time we have also received animals from other institutions to add to the breeding herds.
- The rhinoceros were moved together from the enclosure adjacent to this one (Asian Plains) in order to prevent them from getting bred. They were very shy to begin with and didn't move around the enclosure much. They posed somewhat of a problem when it was urial birthing season, harassing some of the young sheep.



Brent Huffman

Changes/Accommodations Needed:

- Central Asia is approximately 10 acres with dirt and grass substrate.
- There are hills, trees, a stream, a large wallow, a shelter large enough to accommodate 3 or 4 rhinoceros (if necessary) and a boma that is shared by this exhibit and the next (East Africa).
- There is plenty of room for the animals to feel comfortable.

Reproductive Management/Breeding History:

- All breeding females give birth and raise their young on exhibit.
- New breeding males are generally brought in as adults.

Management Challenges:

- It is a challenge making sure to have enough feeders spread around exhibit for all animals to get enough food. As with all multi-species exhibits making sure everyone gets enough without the more aggressive eaters becoming obese is always a concern.
- Urial have twins and triplets and they can get separated from each other making it big challenge reuniting dams and kids.

Items Contributing to Group's Success:

- Space is key as always!!!

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- Not too many animals in a large space

Group/Exhibit Changes Over Time:

- This exhibit was opened in 2007, and all species except for the rhinoceros were included at that time. Rhinoceros were added in in 2016.
- A large herd of Indian sambar (2.23) were originally part of the group. It was determined at the time that there were too many animals to manage with this additional herd of large deer so they were transferred to another enclosure.
 - Burmese Thamin/Eld's Deer (*Rucervus eldii thamin/Rucervus eldii*) (2.5)
 - Indian Hog Deer (*Axis porcinus*) (1.2)
 - Javan Banteng (*Bos javanicus*) (1.5)
 - Mandarin Sika Deer (*Cervus nippon mandarinus*) (1.0)
 - Pere David's Deer (*Elaphurus davidianus*) (2.4)
 - Sambar Deer (*Rusa unicolor*) (2.23)
 - Transcaspian Urial (*Ovis orientalis arkal*) (15.31)

San Francisco Zoological Gardens, San Francisco, CA – Current Exhibit

Current Species:

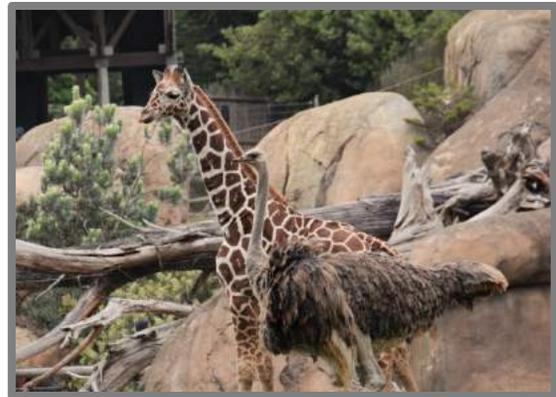
- Grant's Zebra (*Equus quagga boehmi*) (0.3)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.4)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.6)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
- Common Ostrich (*Struthio camelus*) (0.4)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (2.0)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)
- West African Crowned Crane (*Balearica pavonina pavonina*) (0.2)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This exhibit is capable of being sub-divided into 2 large enclosures, while still allowing for all taxa to be shifted to either enclosure. Currently, we have the exhibit divided in half to accommodate breeding of several species (giraffe, greater kudu, and yellow-backed duiker).
- The exhibit has varying heights and sloping terrain, with live cypress trees, grass, leaf litter and sand pits. There are numerous viewing areas and 3 overlooks with browse feeders for giraffe.
- There are 2 large barns attached to the exhibit. The giraffe are brought inside and locked up at night regardless of weather conditions in their own dedicated barn. All other taxa are housed in another barn dedicated for them.
- The marabou storks are left out on exhibit, and only brought into the barn during extreme weather conditions and/or for medical treatments. Ostrich and crowned cranes are brought inside every night. Greater kudu, zebra and yellow-backed duiker are brought inside each night, but then released with access to their exhibit overnight.



Jennifer Doong

Changes/Accommodations Needed:

- Hides and creeps are available for the greater kudu and yellow-backed duiker.
- Logs and tree deadfall are used to keep hoofstock out of pools and to provide safe havens for the cranes and marabou stork nests.

Reproductive Management/Breeding History:

- The male giraffe is exhibited on one side of the exhibit; selected females are shifted out with him for breeding and companionship. The male giraffe is housed at night in a separate bull stall, with visual access to the female herd.
- Pregnant female giraffe are separated into a calving stall at night prior to parturition, with visual access to the other female giraffe overnight.

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- Calving stalls are filled with a natural DG substrate (straw, shavings, and rubber mats are not used).
- Giraffe calves are kept inside for the first 1-3 days, with access to an outdoor corral during the day if they are healthy. The dam and calf are managed in a corral for the first 2-3 weeks before being introduced to the herd and the exhibit. Ostrich and zebra are held off exhibit for the first few days of giraffe calf introductions to the exhibit.



Jennifer Doong

- Greater Kudu are held inside the barn with access to outdoor pens several days prior to calving. A companion female will also be kept inside with the pregnant female. Kudu calves are kept inside for the first 1-3 weeks, pending health and behavior. When kudu calves are introduced into the exhibit, ostrich and zebra are held inside for the first few days, or shifted onto the other side of the exhibit until the calf is 4-6 weeks old.
- Pregnant yellow-backed duiker females are pulled off exhibit prior to calving, and housed in a separate stall and pen. Sometimes, the females are removed from the exhibit and housed in a separate holding facility until the calf is large enough to be reintroduced to the exhibit at several months of age.
- We have not had good success with breeding any of the bird species. We have had nesting and egg-laying with our marabou storks, but predation and interference from wild gulls has proved challenging.

Management Challenges:

- Balancing the differing calving windows and timing of reintroductions with other taxa is challenging.
- Introductions of new individuals are also a challenge, due to the juggling of multiple groups of animals and managing them inside to allow conspecific introductions to occur first.

Items Contributing to Group's Success:

- The ability to split the exhibit in half when needed
- The ability to house animals long-term inside barns with access to outside pens
- The ability to shift giraffe and all other taxa to either side of the exhibit when it is divided; this is attributed to having shifting options inside both barns

Group/Exhibit Changes Over Time:

- We housed 0.2 scimitar-horned oryx when we opened in 2004, in addition to the current list. The oryx were recently shipped out in 2015. While we were successful in managing them with the other taxa, they became aggressive with the greater kudu and zebra species in 2013. We were able to manage them by alternating days and nights on exhibit, but it was not a long term solution. They were placed in a better situation, which allowed us to focus



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on growing the kudu.

- Grant's Zebra (*Equus quagga boehmi*) (0.3)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.4)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.6)
- Scimitar-horned oryx (*Oryx dammah*) (0.2)
- Yellow-backed duiker (*Cephalophus silvicultor*) (1.1)
- Common Ostrich (*Struthio camelus*) (0.4)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (2.0)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)
- West African Crowned Crane (*Balearica pavonina pavonina*) (0.2)

San Francisco Zoological Gardens, San Francisco, CA – Current Exhibit

Current Species:

- Guanaco (*Lama guanicoe*) (1.1)
- Black-necked Swan (*Cygnus melancoryphus*) (0.2)
- Black Swan (*Cygnus atratus*) (0.1)
- Capybara (*Hydrochoerus hydrochaeris*) (1.0)
- Coscoroba Swan (*Coscoroba coscoroba*) (0.2)

Group has been successfully mixed for 6 months (since April 2015, current as of 2015).

Exhibit Size: 5,000-10,000 square feet

General Management Notes:

- All species are on exhibit together daily. The guanaco are brought off exhibit and into a barn every night.

Changes/Accommodations Needed:

- Dead fall is used to create an ungulate-free zone as a retreat area for the capybara.

Reproductive Management/Breeding History:

- The guanaco have been recently added to this exhibit and the male is fairly young; there isn't any reproductive history at this time.

Management Challenges:

- Collection birds competing for food with wild waterfowl is a challenge.

Items Contributing to Group's Success:

- Size of the exhibit
- Barn and holding yard to shift the guanaco
- Dead fall creep for the capybara

Group/Exhibit Changes Over Time:

- Before the guanaco were added a single male Baird's tapir was in this exhibit with the same birds and 0.2 capybara.
 - Baird's tapir (*Tapirus bairdii*) (1.0)
 - Black Necked Swan (*Cygnus melancoryphus*) (0.2)
 - Black Swan (*Cygnus atratus*) (0.1)
 - Capybara (*Hydrochoerus hydrochaeris*) (0.2)
 - Coscoroba Swan (*Coscoroba coscoroba*) (0.2)

Santa Barbara Zoological Gardens, Santa Barbara, CA – Historical Exhibit

Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.1)
- Prevost's Squirrel (*Callosciurus prevostii*) (1.1)
- Spectacled Langur (*Trachypithecus obscurus*) (1.2)

Group was successfully mixed for 3 years (from 2001 to 2004).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We had to shift squirrels in first and out last, otherwise they would come into the primate space and never leave.

Reproductive Management/Breeding History:

- Muntjac were supposed to be breeding and so were the langurs.
- The langurs were the only species to reproduce in this exhibit.

Management Challenges:

- The langurs would get very aggressive toward the squirrels, but never towards the muntjac.
- It was a challenge to keep the muntjac area dry (or at least provide them hay or shavings) while we cleaned holding and hosed the primate and squirrel feces.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The building was getting too old to house primates to current standards.
- The muntjac died, the langurs were replaced with vultures, and the squirrels were relocated.

Group/Exhibit Changes Over Time:

- None

Santa Fe College Teaching Zoo, Gainesville, FL – Current Exhibit

Current Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.2)
- Springbok (*Antidorcas marsupialis*) (1.1)
- Asian Forest Tortoise (*Manouria emys*) (1.5)
- East African Grey Crowned Crane (*Balearica regulorum gibbericeps*) (0.1)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- We had been keeping the muntjac and tortoises together for many (about 20) years. We had an issue with our springbok enclosure and needed to move them out temporarily so we moved them and our single crane in with the muntjac and tortoises.
- Currently we are not experiencing any issues (the male muntjac has since passed away). The remaining muntjac are old and the female springbok has cancer so even though we could move the springbok back out we have chosen not to. The 4 tend to stay together. If one of the species dies they will still have other hoofstock to "herd" with.
- The crane and tortoises have not exhibited any issues.

Changes/Accommodations Needed:

- We have shelters that only the muntjac can get inside and lots of hiding places just in case.
- We had to put a gentle slope on the tortoise wallow so that we would not have leg issues with the springbok.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Once the springbok adjusted into the exhibit there were very few incidents until our male muntjac was on his last legs. He could not see them or hear them coming so when he wouldn't move away from them they would poke or lift him with their horns. We had a total of 2 small puncture wounds.
- One drawback is that everyone eats from all the diets.

Items Contributing to Group's Success:

- Size of enclosure in relationship to the spatial needs of the animals
- Lots of vegetation; plenty of grazing along with bushes and trees
- Long term residents of the zoo

Group/Exhibit Changes Over Time:

- The muntjac and tortoises have been housed together for 20 years.
- Springbok and cranes have been housed together for 12+ years.
- The springbok and cranes have also had leopard tortoises with them.
 - Springbok (*Antidorcas marsupialis*)

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- Grey Crowned Crane (*Balearica regulorum gibbericeps*)
- Leopard Tortoise (*Stigmochelys pardalis*)

Santa Fe College Teaching Zoo, Gainesville, FL – Current Exhibit

Current Species:

- Guanaco (*Lama guanicoe*) (1.0)
- Emu (*Dromaius novaehollandiae*) (0.1)
- Greater (American) Rhea (*Rhea americana*) (0.1)
- Red-footed Tortoise (*Chelonoidis carbonaria*) (1.4)

Group has been successfully mixed for 6 months (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- This emu was just introduced about 6 months ago after being attacked by the male emu. This is temporary.

Changes/Accommodations Needed:

- The tortoises have a corral they can eat their food without the other animals getting to it.

Reproductive Management/Breeding History:

- Nothing is needed for this group since the only breeding going on is with the tortoises.

Management Challenges:

- We have not had any issues.

Items Contributing to Group's Success:

- Size of enclosure in regards to the spatial needs of the animals
- Wooded with some grass
- Single animals

Group/Exhibit Changes Over Time:

- The guanaco and rhea have been together since the guanaco was born (13 years). The rhea is old, and when she was first introduced to the guanaco we had 3 guanaco and 3 rheas.
- The red-footed tortoises were introduced when the guanaco was about 5 years old, and they have now been together for 8 years.

Sedgwick County Zoo, Wichita, KS – Current Exhibit

Current Species:

- Common Warthog (*Phacochoerus africanus*) (1.1)
- Slender-horned Gazelle (*Gazella leptoceros*) (1.2)

Group has been successfully mixed for 16 years (since 1999, current as of 2015).

Exhibit Size: 5,000-10,000 square feet

General Management Notes:

- All individuals were introduced as adults.
- All animals shift together.

Changes/Accommodations Needed:

- The warthogs had a hide that was removed due to digging.

Reproductive Management/Breeding History:

- Only the gazelle are recommended to breed. Species are separated during rearing of young.

Management Challenges:

- Aggression between male gazelle and warthogs is a challenge. This has resulted in the death of gazelle.

Items Contributing to Group's Success:

- Species type
- Separate holding off-exhibit

Group/Exhibit Changes Over Time:

- None

Sedgwick County Zoo, Wichita, KS – Current Exhibit

Current Species:

- Okapi (*Okapia johnstoni*) (2.1)
- Crowned Crane (*Balearica sp.*) (1.1)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)

Group has been successfully mixed for 11 years (since 2004, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults during introductions.

Changes/Accommodations Needed:

- We have separate feeding systems to prevent food-stealing; primarily to keep the okapi from eating the bird diets.

Reproductive Management/Breeding History:

- Birds are separated during calf introductions to the outdoor exhibit.

Management Challenges:

- Food separation for each of the species is a challenge.

Items Contributing to Group's Success:

- Species type
- Size of enclosure
- Animal behavior

Group/Exhibit Changes Over Time:

- None

Sedgwick County Zoo, Wichita, KS – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (1.2)
- Wild Turkey (*Meleagris gallopavo*) (1.2)

Group has been successfully mixed for 20 years (since 1995, current as of 2015).

Exhibit Size: Less than 5,000 square feet

General Management Notes:

- All animals are adults.

Changes/Accommodations Needed:

- We have separate holding off-exhibit for both species.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Species type
- Animal behavior

Group/Exhibit Changes Over Time:

- None

Sedgwick County Zoo, Wichita, KS – Current Exhibit

Current Species:

- Pronghorn (*Antilocapra americana*) (1.2)
- Sandhill Crane (*Grus canadensis*) (1.1)

Group has been successfully mixed for 20 years (since 1995, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were introduced as adults.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Species type
- Animal behavior

Group/Exhibit Changes Over Time:

- None

Sedgwick County Zoo, Wichita, KS – Current Exhibit

Current Species:

- Southern Pudu (*Pudu puda*) (1.2)
- South American Birds (assorted species)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The pudu are in a walk-through exhibit with free-flight birds.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Species type
- Animal behavior

Group/Exhibit Changes Over Time:

- Pudu were once exhibited with giant anteaters. Due to aggression from the male anteater, the pudu were moved to the walk-through exhibit.
 - Southern Pudu (*Pudu puda*)
 - Giant Anteater (*Myrmecophaga tridactyla*)

Sedgwick County Zoo, Wichita, KS – Historical Exhibit

Current Species:

Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)

Common Ostrich (*Struthio camelus*) (1.1)

Kori Bustard (*Ardeotis kori*) (1.1)

Group was successfully mixed for 30 years (from 1974 to 2004).

Exhibit Size: 10,000-20,000 square feet (~22,000 is ½ acre)

General Management Notes:

- All individuals were adults when introduced.

Changes/Accommodations Needed:

- We had separate holding for each species.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- The giraffe were aggressive towards the birds.
- There was aggression from the ostrich towards the giraffe and keepers.
- We had minimal holding options for the ostrich which made them difficult to manage.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- Ostrich were removed from the exhibit in 1995.
- Bustard were removed from the exhibit in 2004.

Sequoia Park Zoo, Eureka, CA – Current Exhibit

Current Species:

- Chacoan Peccary (*Catagonus wagneri*) (5.0)
- Greater (American) Rhea (*Rhea americana*) (2.0)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 20,000-45,000 square feet (½ acre to 1 acre)

General Management Notes:

- The ¾ acre exhibit has several pen areas, where creeps were installed to allow peccaries access, but exclude rhea. However, the rhea can enter if they really try.
- The night house for the peccaries is inaccessible to rhea.
- One of the male rhea chases the peccaries from time to time; no aggression is seen from peccary to rhea.
- 2.0 Chacoan peccaries (approximately 15 years old) were introduced to 3.0 Chacoan peccaries (approximately 1 year old) last year. The 2.0 Chacoan peccaries were introduced to 1.1 greater rhea years ago, and since then our rhea population has changed from 1.1 to 2.3 to 2.0.

Changes/Accommodations Needed:

- We made pens within the ¾ acre for shifting purposes. The exhibit is divided into two, with gates open between them.
- When tensions run high, we separate the species. The pens are within one side of the exhibit, and animals can either cross through them to get to the other side, or pass through a couple open gates.

Reproductive Management/Breeding History:

- The peccaries are not breeding.
- Rhea breeding has contributed to some tension when the male rheas are territorial.

Management Challenges:

- The rhea are aggressive to the peccaries. When they peccaries are backed into a corner they will defend themselves, which can result in injuries.

Items Contributing to Group's Success:

- Size of exhibit
- Circular pattern of pens, so no one gets stuck on one side
- Ability to separate animals

Group/Exhibit Changes Over Time:

- We have had different ratios of peccaries and rhea, but concerns and management are the same as above.

Sequoia Park Zoo, Eureka, CA – Current Exhibit

Current Species:

- Indian Muntjac (*Muntiacus muntjak*) (1.0)
- Red Panda (*Ailurus fulgens*) (2.2)

Group has been successfully mixed for 3 years (since 2012, current as of 2015).

Exhibit Size: Less than 5,000 square feet

General Management Notes:

- We introduced these animals when the muntjac was 6 years old and the pandas were 2 years old.

Changes/Accommodations Needed:

- We have separate night houses and shelters for both species – some can be used by both species and some are intended for only one species.

Reproductive Management/Breeding History:

- The red pandas breed without any issue from the muntjac.

Management Challenges:

- Ensuring that each species consumes its intended diet is a challenge.
- It can be challenging to provide enrichment that is safe for both species, or to only make enrichment accessible for the intended species.

Items Contributing to Group's Success:

- Mellow behavior of both species, nonaggressive
- Occupying different layers of exhibit (ground versus mainly arboreal)
- Similar needs

Group/Exhibit Changes Over Time:

- Red Panda ratios have changed without any issues concerning the muntjac.

Smithsonian National Zoological Park, Washington, DC – Current Exhibit

Current Species:

- Greater Malay Chevrotain (*Tragulus napu*) (1.1)
- Red-ruffed Lemur (*Varecia rubra*) (2.1)
- Rock Hyrax (*Procavia capensis*) (1.2)

Group has been successfully mixed for 1 year (since November 2014, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Chevrotain are the only truly ground-dwelling species in this exhibit, but the hyrax and lemurs will travel on the floor in the chevrotain space. We provide the chevrotain with multiple hides including hollow logs, caves, and nest-boxes.
- The introduction with the lemurs was a long process designed to allow for a very gradual introduction, as the lemurs can be very bold. The hyrax and lemurs both seem to ignore the chevrotain for the most part.

Changes/Accommodations Needed:

- As mentioned above, the chevrotain need hide spots, as well as secluded feeding areas to prevent the lemurs from consuming their diet.
- We have also added plants and fallen logs/driftwoods to provide private areas.
- For introductions, we sectioned off a small corner of the exhibit with hay bales to allow the chevrotain to become accustomed to noises/smells/etc.

Reproductive Management/Breeding History:

- Our chevrotain pair was a breeding pair, but we recently lost the female with a full-term fetus, which was unrelated to the mixed species group.
- There was no issue with the mixed-species to prevent the chevrotain from exhibiting normal breeding behaviors.
- The hyrax is a non-breeding group, while the lemurs have recently been taken off birth control for breeding.

Management Challenges:

- The lemurs can be a bit too curious and try to approach the chevrotain, although we have not had any specific issues with the chevrotain becoming frightened and running into anything.
- We also have the challenge of trying to limit diets to the associated species – lemurs eat everything!

Items Contributing to Group's Success:

- Large size of the exhibit
- Keepers providing plenty of hiding/perching for all species
- Varied use of space by species (lemurs up high, rock hyrax all over, and chevrotain low)

Group/Exhibit Changes Over Time:

- Chevrotain were exhibited in the same exhibit space, but with several other species without any issues. The exhibit had the following species composition:
 - Greater Malay Chevrotain (*Tragulus napu*)
 - Large Tree Shrew (*Tupaia tana*)
 - Lesser Tree Shrew (*Tupaia minor*)
 - Lilac-breasted Roller (*Coracias caudatus*)
 - Prevost's Squirrel (*Callosciurus prevostii*)

Smithsonian National Zoological Park, Washington, DC – Current Exhibit

Current Species:

- Sitatunga (*Tragelaphus spekii*) (1.0)
- Red River Hog (*Potamochoerus porcus*) (1.0)

Group has been successfully mixed for 2 years (since March 2013, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Hogs and sitatunga are exhibited together during the day only, typically from 8:00am-5:30pm. Time together is variable depending on the season. The colder times of the year may restrict the length of time in the exhibit or restrict which species can be out if access to a heated area is required.
- Each species enters/exits the exhibit from their off exhibit holding area or barn through a different gate.



Gil Myers

Changes/Accommodations Needed:

- An elevated “island” was constructed in the center of the exhibit to provide the sitatunga refuge from the hogs if needed. The island is a mound of soil with a combination of large deadfall, natural boulder/rock wall, precut vertical logs anchored in the ground and hot grass.
- A pile of tree limbs weaved together is used to create a natural barrier between the hog and sitatunga barn access points. The majority of our altercations between the male hog and sitatunga occur at the end of the day as they are waiting to be let in for the evening. Their paths constantly cross and they become less tolerant of each other.
- For introductions, visual access was provided through mesh allowing for nose to nose contact for up to a month.

Reproductive Management/Breeding History:

- Hog females are contracepted.
- This exhibit contains male sitatunga only.

Management Challenges:

- Success depends on the tolerance between the hogs and sitatunga (we have worked with three different sitatunga males ranging from 2-4 years of age) when in close proximity.
- Hogs are pushy and never back down to the male sitatunga. Typically, the sitatunga runs away when approached, but on occasion the sitatunga will challenge and attempt contact with horns. The hog often wins, resulting in some minor injuries from biting that require monitoring and/or treatment.

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- Our current 3-year old sitatunga male is curious about the hogs and will occasionally challenge, but only when they approach. Within seconds, he moves away and goes about his own business.
- Altercations have been periodically observed. One such altercation resulted in permanent separation between one female hog and the male sitatunga after the hog was rolled down a slight incline with the horns. As a result, all trust was lost and the hog continuously pursued the sitatunga. Another female hog was given restricted access when her tolerance of the sitatunga allowed the male to demonstrate sexual behaviors to the extreme of mounting for several seconds. The male hog and male sitatunga continue to share the exhibit peacefully.

Items Contributing to Group's Success:

- Size of the exhibit
- Providing areas for species to escape to and limit visual contact
- Disposition (tolerance) of individuals

Group/Exhibit Changes Over Time:

- Different ratios of hogs have been housed with the sitatunga.



Gil Myers

Smithsonian National Zoological Park, Washington, DC – Current Exhibit

Current Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.0)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)

Group has been successfully mixed for 6 months (since March 2015, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Kudu and hornbills are exhibited together during the day only, typically from 8:00am-5:30pm. Time together is variable depending on the season. The colder times of the year may restrict length of time in the exhibit or restrict which species can be outside if access to a heated area is required.
- Each species enters/exits the exhibit from their own off exhibit holding area or barn gate.

Changes/Accommodations Needed:

- For the introduction period, species were in separate yards with visual through bamboo screening for up to a month before placed in the same exhibit.
- Stall access is controlled during exhibit time to prevent the hornbills and kudu from sharing the same small interior space.

Reproductive Management/Breeding History:

- In the spring the hornbill pair is given access to a nest box off exhibit with free choice to the exhibit.
- We are expecting a female kudu in the future for breeding.

Management Challenges:

- There have been no challenges; both species have been calm and tolerant of each other from the start and stay to themselves.

Items Contributing to Group's Success:

- Large size of exhibit
- Natural environment – combination of trees, bushes, overgrown grass and open areas – complements each species' habitat preference
- Staff manages interaction of animals with training and enrichment

Group/Exhibit Changes Over Time:

- None

Smithsonian National Zoological Park, Washington, DC – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (0.4)
- Scimitar-horned Oryx (*Oryx dammah*) (0.2)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (1.1)

Addra gazelle and Ruppell's Griffon vulture have been successfully mixed for over 3 years (since March 2013, current as of 2016). Scimitar-horned oryx have been successfully mixed in for 1 year (since December 2015, current as of 2016).

Exhibit Size: 10,000–20,000 sq ft (~22,000 is ½ acre)



Gil Myers

General Management Notes:

- Gazelle (6-9 years old at the beginning), oryx (2-5 years old), and vulture (5 years old) shift through separate doors to access off exhibit holding/stalls; however, access points are in close proximity (within 6ft) and visible to both species. Gazelle are recalled on a sound cue and vultures are herded inside.
- Initially, gazelle were very cautious with the vultures present and would move away anytime they approached. Over time the two species have built a trust and now they will sun themselves in close proximity.
- Typically, all three species are together from 8am-5:30pm daily, but during cooler temperatures the vultures are kept off exhibit. During times of extreme cold the oryx and gazelle split exhibit time so each can have access to a heated barn. All three species have their own off exhibit space, but can remain within visual contact.
- Vultures are always locked off exhibit overnight. Gazelle are occasionally given free choice to the exhibit overnight after recalling to off exhibit holding. Oryx are given free choice overnight access daily unless the gazelle have access.



Gil Myers

Changes/Accommodations Needed:

- The only exhibit change was providing two feeding structures for the gazelle and oryx and two perching structures for the vulture. We do not place antelope hay on the vulture structures to avoid bringing the species together. Structures are all made of vertical and horizontal natural tree logs or stumps.

Reproductive Management/Breeding History:

- The vultures are not breeding.

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- All breeding has focused on the addra gazelle; the last calves were born in 2012. At the time, the male gazelle was rotated with females during the day only.

Management Challenges:

- We also had 2.0 scimitar-horned oryx (an initial attempt prior to the female oryx's arrival), but the males had to be separated from the vultures and gazelle over time. The male oryx were aggressive toward the vultures from day one and could not share the same space. We had to alternate the gazelle between oryx and vulture during exhibit time.
- Oryx and gazelle exhibited well together until the oryx reached sexual maturity.



Gil Myers

Without female oryx, the male oryx pursued the female gazelle in estrus and often interfered with them shifting off exhibit when recalled at the end of the day. We never observed any aggression to cause strong concern, but they were persistent, and wouldn't give the gazelle a break. Oryx brothers eventually had to be separated permanently (dominant male transferred to another institution). The remaining male worked well with the female gazelle for a period of time, but was eventually denied access to the gazelle. The single male was given access to the exhibit overnight after the gazelle and vulture were shifted to off exhibit space. During this time the oryx shared a section of fenceline with the gazelle and vulture.

- Gazelle and vultures exhibit very well together. The only aggression observed toward the birds was when the vulture were too close to the calves and the dam would charge and chase the vultures away. Once trust was established, the female oryx also mixed very well with the gazelle and vulture. The female oryx never charged the vulture, but during initial introduction, would use their horns to demonstrate their uncertainty. The gazelle are respectful of the oryx size and will move out of the way when approached. All three species will lie very close together.



Janice Sveta

Items Contributing to Group's Success:

- Each species has plenty of space to separate themselves
- Separate feed stations and perching gives species choices
- Disposition of individuals

Group/Exhibit Changes Over Time:

- Various combinations and sex ratios of these 3 species have been exhibited together over the years.
- Originally, a herd of 1.2 addra gazelle (1-2 years old) and 0.2 scimitar-horned oryx (mid-teens) shared the same exhibit. Both species and sexes did very well together.

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- Later, the exhibit changed to 2.0 scimitar-horned oryx (1.5 year olds), 0.4 addra gazelle (3-6 years old) and 1.1 vulture (immature pair). A new 1.0 addra gazelle (7 years old) had arrived for breeding. The sexually mature male gazelle was not exhibited with the male oryx (never attempted), but could be rotated with the female gazelle and pair of vulture without incident.
- Later, a combination of 1.5 addra gazelle (male calf remained with the herd until he was about 6-months old), with 2.0 scimitar-horned oryx and/or 1.1 vulture. The breeding male gazelle was transferred to another institution. Oryx and vulture could not share the same space at any time. The immature male oryx did well with the female adult gazelle at this time. The oryx were curious about the gazelle calves, but never showed aggression. Eventually, the maturing male oryx had to be separated from each other due to increased aggression. One male transferred to another institution. The remaining oryx continued to do well with female gazelle, but eventually had to be removed due to increased sexual behaviors.



Janice Sveda

Staten Island Zoo, Staten Island, NY – Current Exhibit

Current Species:

- Scimitar-horned Oryx (*Oryx dammah*) (2.1)
- Common Ostrich (*Struthio camelus*) (1.1)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

Group has been successfully mixed for 1 year (since 2015, current as of 2016).

Exhibit Size: 5,000-10,000 square feet

General Management Notes:

- Animals were all adults when mixed, except for our calf that was born into the exhibit.
- The species are mixed all year round but the hornbills are placed in heated holding for the winter.
- All animals do fine together.

Changes/Accommodations Needed:

- None



Alex Carr

Reproductive Management/Breeding History:

- Our oryx calf was born in March 2016 and the female is suspected to be pregnant again as of August 2016.
- The hornbills have brooded eggs but not yet produced a viable chick.

Management Challenges:

- None

Items Contributing to Group's Success:

- Exhibit size
- Animals disinterested in each other
- Calm specimens

Group/Exhibit Changes Over Time:

- Previously we had 2 castrated male oryx instead of the 1 intact male with our 1.1 ostrich and 1.1 hornbills.

Staten Island Zoo, Staten Island, NY – Current Exhibit

Current Species:

- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Bruce's Green Pigeon (*Treron waalia*) (2.0)
- Emerald Starling (*Lamprotornis iris*) (1.2)
- Green Singing Finch (*Serinus mozambicus*) (0.0.11)
- Grey Crowned Crane (*Balearica regulorum*) (0.1)
- Kenya Crested Guineafowl (*Guttera pucherani pucherani*) (2.0)
- Red Bishop (*Euplectes orix orix*) (1.0)
- Royal (Golden-Breasted) Starling (*Cosmopsarus regius*) (1.2)
- Speckled Mouse Bird (*Colius striatus*) (1.1)
- Violet Turaco (*Musophaga violacea*) (1.1)
- White-headed Buffalo Weaver (*Dinemellia dinemelli*) (3.0)
- White-throated Kingfisher (*Halcyon smyrnensis*) (1.0)

Group has been successfully mixed for 3 years (since 2013, current as of 2016), with the exception of four bird species added in 2016 (see below).

Exhibit Size: Less than 5,000 square feet

General Management Notes:

- All were introduced as adults.
- The male klipspringer is aggressive with staff, otherwise there are no concerns.
- This is an indoor exhibit with 20 foot ceilings and a glass roof.

Changes/Accommodations Needed:

- There are plenty of kopje rocks in the exhibit.

Reproductive Management/Breeding History:

- The male klipspringer has chronic preputial condition (no breeding), though not recommended by SSP.

Management Challenges:

- No holding is available. Manual capture or darting is required for any specimen in the enclosure.

Items Contributing to Group's Success:

- Calm species
- Private areas

Group/Exhibit Changes Over Time:

- The Bruce's green pigeon, white-throated kingfisher, emerald starling, and red bishop were added in early 2016 without complication.
- Four years ago, 3.0 rock hyrax were also exhibited as well as a buff-crested bustard. The rock hyrax routinely attacked 0.1 klipspringer and bustard at night. Traumatic abscesses developed on the klipspringer from bite wounds. The klipspringer eventually ruptured its Achilles tendon from a bite wound. The klipspringer recovered after 6 months of medical care. The hyrax were

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sent out. The hyrax also attacked the bustard and wounded it severely, also requiring surgical correction.

- Klipspringer (*Oreotragus oreotragus*)
- Buff-crested Bustard (*Eupodotis gindiana*)
- Green Singing Finch (*Serinus mozambicus*)
- Grey-crowned Crane (*Balearica regulorum*)
- Kenya Crested Guinea fowl (*Guttera pucherani pucherani*)
- Rock Hyrax (*Procavia capensis*)
- Royal (Golden-breasted) Starling (*Cosmopsarus regius*)
- Speckled Mouse Bird (*Colius striatus*)
- Violet Turaco (*Musophaga violacea*)
- White-headed Buffalo Weaver (*Dinemellia dinemelli*)

Sunset Zoo, Manhattan, KS – Current Exhibit

Current Species:

- Tufted Deer (*Elaphodus cephalophus*) (1.0)
- Red-crowned Crane (*Grus japonensis*) (1.1)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- Large exhibit size

Group/Exhibit Changes Over Time:

- Before the tufted deer were exhibited with the red crowned cranes we had 1.3 muntjac in this exhibit for 12 years.
 - Muntjac (*Muntiacus sp.*) (1.3)
 - Red Crowned Crane (*Grus japonensis*) (1.1)

Sunset Zoo, Manhattan, KS – Current Exhibit

Current Species:

- Barbados Sheep (*Ovis aries*) (3.0)
- Miniature Zebu (*Bos taurus indicus*) (1.1)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- All were young when introduced.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Items Contributing to Group's Success:

- Domestic farm animals

Group/Exhibit Changes Over Time:

- There were goats, llamas, potbellied pigs, and chicken here at various times.
 - Barbados Sheep (*Ovis aries*)
 - Domesticated Goat (*Capra aegagrus hircus*)
 - Llama (*Lama glama*)
 - Miniature Zebu (*Bos taurus indicus*)
 - Potbellied Pig (*Sus scrofa domesticus*)
 - Chicken (*Gallus gallus domesticus*)

Sunset Zoo, Manhattan, KS – Historical Exhibit

Species:

- Pronghorn (*Antilocapra americana*) (1.1)
- White-tailed Deer (*Odocoileus virginianus*) (0.2)
- Sandhill Crane (*Grus canadensis*) (1.1)
- Wild Turkey (*Meleagris gallopavo*) (0.4)

Group was successfully mixed for 20 years.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Animals were various ages.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This area was going to be used for holding bison.

Group/Exhibit Changes Over Time:

- None

Sunset Zoo, Manhattan, KS – Historical Exhibit

Species:

- Pronghorn (*Antilocapra americana*) (1.1)
- White-tailed Deer (*Odocoileus virginianus*) (0.2)

Group was successfully mixed for 15 years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- There were no major problems with this exhibit.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This area was closed for future renovations and the animals moved to another institution.

Group/Exhibit Changes Over Time:

- None

Tampa's Lowry Park Zoo, Tampa, FL – Current Exhibit

Current Species:

- Bay Duiker (*Cephalophus dorsalis*) (1.2)
- Nyala (*Tragelaphus angasii*) (1.4)
- Marabou Stork (*Leptoptilos crumenifer*) (2.0)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- All animals work well together. All seem to fill different niches that prevent friction.
- All animals are of breeding age except for the marabou storks.

Changes/Accommodations Needed:

- This exhibit has tall grasses that creates “hides” for the duiker, perching for the birds, and a low nesting box for the hornbills.

Reproductive Management/Breeding History:

- All animals are kept together for breeding and calving.

Management Challenges:

- We have very little challenges with this habitat, however, more space would be beneficial.

Items Contributing to Group's Success:

- Animals fulfill different niches
- No sparing bulls
- Great tree canopy and ground vegetation

Group/Exhibit Changes Over Time:

- Lesser kudu were tried, but the kudu and nyala bulls were too aggressive toward each other.
 - Bay Duiker (*Cephalophus dorsalis*)
 - Lesser Kudu (*Tragelaphus imberbis*)
 - Nyala (*Tragelaphus angasii*)
 - Marbou Stork (*Leptoptilos crumenifer*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)

Tampa's Lowry Park Zoo, Tampa, FL – Current Exhibit

Current Species:

- Generic Giraffe (*Giraffa camelopardalis*) (1.0)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.1)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (2.0)
- Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (1.0)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These species work very well together; we have not had any issues.

Changes/Accommodations Needed:

- Shifts for zebra are designed low to the ground to allow access for zebra but not giraffe.

Reproductive Management/Breeding History:

- There has not been any reproduction in this group.

Management Challenges:

- The small habitat can be a challenge.
- Managing giraffe bull sparring is also challenging.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None



Tampa's Lowry Park Zoo

Tampa's Lowry Park Zoo, Tampa, FL – Current Exhibit

Current Species:

Grevy's Zebra (*Equus grevyi*) (1.2)

Southern White Rhinoceros (*Ceratotherium simum simum*) (1.4)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Calving rhinos are separated from the rhino bull and zebra.
- Foaling mares are separated out from the stallion and rhinos if possible.



Tampa's Lowry Park Zoo

Management Challenges:

- Zebra mares will become aggressive toward rhino calves for approximately the first month of the calf's life. Staff needs to keep an eye out to ensure that the dam has her full focus on the calf (mares will sneak in when the dam is not paying attention).

Items Contributing to Group's Success:

- Rhino are big enough that the zebra will not antagonize them.
- The rhino show no interest in the zebra, but will displace them from hay piles.

Group/Exhibit Changes Over Time:

- None

Tampa's Lowry Park Zoo, Tampa, FL – Current Exhibit

Current Species:

- African Bush Elephant (*Loxodonta africana*) (1.5)
- Impala (*Aepyceros melampus*) (1.5)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- All animals are breeding age.

Changes/Accommodations Needed:

- We used to offer access areas for the impala to get where the elephants could not, until we had elephant calves; now they all share the same areas with no issue.

Reproductive Management/Breeding History:

- We have had elephant and impala calves in this exhibit.
- The impala have given birth out in the yard before without issue.

Management Challenges:

- Elephants typically ignore the impala, but yearling calves will try to chance them.

Items Contributing to Group's Success:

- The habitat is a good size and has great grass coverage for grazing.
- The impala are too fast for elephants.

Group/Exhibit Changes Over Time:

- We had Thomson's gazelle, but the bulls were too aggressive with the impala bull.
 - African Bush Elephant (*Loxodonta africana*)
 - Impala (*Aepyceros melampus*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)

Tampa's Lowry Park Zoo, Tampa, FL – Current Exhibit

Current Species:

- Bay Duiker (*Cephalophus dorsalis*) (0.4)
- Okapi (*Okapia johnstoni*) (2.1)
- Marabou Stork (*Leptoptilos crumenifer*) (0.1)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals are breeding age.

Changes/Accommodations Needed:

- We have provided the duiker with a "hiding" area of thick bamboo with a den box that the okapi can't access.

Reproductive Management/Breeding History:

- The okapi are separated for calving.

Management Challenges:

- This is a small habitat and the duiker can become startled and race around.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Tampa's Lowry Park Zoo, Tampa, FL – Current Exhibit

Current Species:

- Malayan Tapir (*Acrocodia indica*) (1.2)
- Visayan Warty Pig (*Sus cebifrons*) (1.1)

Group has been successfully mixed for 1 year (since 2016, current as of 2017).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All animals are breeding age. Tapir adults are of breeding age; calf is 6 months old. Pigs are both 16 years old.

Changes/Accommodations Needed:

- We have provided the pigs with a “safe place” should they want to move away from the tapir.

Reproductive Management/Breeding History:

- The tapir calf was on the ground when we began introductions with the dam and calf. The warty pigs had been with the adult tapir male for 6 months prior to adding the cow and calf.

Management Challenges:

- The tapir can ramp up and run about the habitat. Having safe places for the pigs to get away from tapir that don't also allow access to tapir calf can be challenging.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None.

Tampa's Lowry Park Zoo, Tampa, FL – Historical Exhibit

Species:

Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (1.1)

Muntjac (*Muntiacus sp.*) (1.3)

Nilgai (*Boselaphus tragocamelus*) (1.3.2)

Group was successfully mixed for 2 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- There were no issue with the rhino and nilgai calves.
- The nilgai were gone before any rhino calves were born.

Management Challenges:

- There was no way to secure the nilgai and muntjac in any section of the habitat or barn.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- We needed to house the nilgai and muntjac in an area that allowed more control for management.

Group/Exhibit Changes Over Time:

- None

Toledo Zoo, Toledo, OH – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.1)
- Ankole (Watusi) Cattle (*Bos taurus*) (3.0)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.0)
- Common Warthog (*Phacochoerus africanus*) (0.2)
- Grant's Zebra (*Equus quagga boehmi*) (2.0)
- Greater Kudu (*Tragelaphus strepsiceros*) (2.0)
- Impala (*Aepyceros melampus*) (0.3)
- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.4)
- Common Ostrich (*Struthio camelus*) (1.2)
- Helmeted Guineafowl (*Numida meleagris*) (9.0)

Group has been successfully mixed for 12 years (since 2005, current as of 2017).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- All animals are pulled off exhibit in the winter. Wildebeest are howdied inside for the winter and zebra are housed together in multiple large stalls.
- Between the giraffe and hoofstock barns there is a covered and heated holding with screenings as substrate. Attached is an outside fenced-in yard. This allows hoofstock out of their stalls in the winter. Smaller species are allowed in the area together, others by themselves.
- Giraffe, kudu, ostrich, and guinea fowl are brought in each night.
- It is weather dependent, but usually the animals are out on exhibit March/April through November.



Brent Huffman

Changes/Accommodations Needed:

- The exhibit consists of grass, trees, large logs, grassy moats, and rocks.
- There are areas where animals can get out of each other's view.
- We have some fencing for bird safety zones but they aren't used much.
- Kudu and gazelle used to eat the crane food so feeders were modified.

Reproductive Management/Breeding History:

- The female giraffe are separated out for calving. Most calves are born in the winter so the family group is put out on exhibit together.

Management Challenges:

- Introductions in the spring are challenging. Giraffe and kudu are put out on exhibit first because they can be brought off exhibit. The wildebeest are put out by themselves so they can run

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around and no one will be in their way. Then birds and other hoofstock (except zebra) are put out on exhibit so they become comfortable in the area. The zebra are put out separately.

- We have used MGA feed or halidol for the day they are let out on exhibit.

Items Contributing to Group's Success:

- Space
- Keepers that know the species and individual behaviors

Group/Exhibit Changes Over Time:

- Species and numbers have varied over time since 2005.
- In 2015, this exhibit did not include addra, impala, warthog, or Watusi cattle. Other current species were housed with Thomson's gazelle, cape griffon vultures, East African crowned cranes, Egyptian geese, and a white-headed vulture.
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (2.0)
 - Grant's Zebra (*Equus quagga boehmi*) (2.0)
 - Greater Kudu (*Tragelaphus strepsiceros*) (2.0)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.4)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (1.4)
 - Cape Griffon Vulture (*Gyps coprotheres*) (0.2)
 - Common Ostrich (*Struthio camelus*) (1.2)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*) (3.3)
 - Egyptian Goose (*Alopochen aegyptiaca*) (0.2)
 - Helmeted Guineafowl (*Numida meleagris*) (group of 20)
 - White-headed Vulture (*Trigonoceps occipitalis*) (1.0)
- This exhibit used to house Abyssinian blue-winged geese, sacred ibis, saddle-billed stork, and white storks. Abyssinian blue-winged geese and sacred ibis were removed because the male goose would attack the ibis. The saddle-billed stork did fine in there, but was removed because she needed to go to another institution. White storks were removed because the exhibit was windy and they got a lot of lift, even when their wings were trimmed.
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*)
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Grant's Zebra (*Equus quagga boehmi*)
 - Thomson's Gazelle (*Eudorcas thomsonii*)
 - Abyssinian Blue-winged Goose (*Cyanochen cyanoptera*)
 - Cape Griffon Vulture (*Gyps coprotheres*)
 - Common Ostrich (*Struthio camelus*)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*)
 - Egyptian Goose (*Alopochen aegyptiaca*)
 - Helmeted Guineafowl (*Numida meleagris*)
 - Sacred Ibis (*Threskiornis aethiopicus*)
 - Saddle-billed Stork (*Ephippiorhynchus senegalensis*)
 - White Stork (*Ciconia ciconia*)
 - White-headed Vulture (*Trigonoceps occipitalis*)

Toledo Zoo, Toledo, OH – Historical Exhibit

Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (1.3)
- Giraffe (*Giraffa camelopardalis*) (1.1)
- Common Ostrich (*Struthio camelus*) (1.1)

Group was successfully mixed for 15 years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- This exhibit worked well, but the animals were moved to a larger exhibit.
- Animals were not on exhibit in winter.

Reproductive Management/Breeding History:

- The kudu successfully bred on exhibit.

Management Challenges:

- The exhibit had a sharp hillside by the end of summer due to erosion.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The animals moved into a new, larger exhibit with more species (see Toledo Zoo Current Exhibit).

Group/Exhibit Changes Over Time:

- None

Topeka Zoo, Topeka, KS – Current Exhibit

Current Species:

- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.2)
- Grey Crowned Crane (*Balearica regulorum*) (1.1)

Group has been successfully mixed for 20 years (since Summer 1995, current as of 2015)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- 1.1 giraffe was 2 years old when introduced to the cranes and 0.1 giraffe has been with the cranes since birth.
- The crowned cranes are locked in a separate area when the temperature is below 35°F.

Changes/Accommodations Needed:

- The two species have separate indoor holding areas.

Reproductive Management/Breeding History:

- The cranes have clutched several times and the giraffe have also had offspring. No separation is necessary.

Management Challenges:

- No information provided.

Items Contributing to Group's Success:

- Giraffe are even-tempered
- The size of our yard
- Indoor space

Group/Exhibit Changes Over Time:

- None

Topeka Zoo, Topeka, KS – Historical Exhibit

Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (0.1)
- Hoffman's Two-Toed Sloth (*Choloepus hoffmanni*) (1.1)
- Indian Flying Fox (*Pteropus giganteus*) (0.0.17)
- Tropical Birds (assorted species) (0.0.40)

Group was successfully mixed for 5 years (from May 2008 to February 2013).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The muntjac was in our free flight aviary.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- There were no issues with this group.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit still exists but we no longer house free-ranging hoofstock in the aviary.

Group/Exhibit Changes Over Time:

- None

Toronto Zoo, Toronto, Ontario, Canada – Current Exhibit

Current Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (1.3)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (2.3)
- White-headed Vulture (*Trigonoceps occipitalis*) (1.0)

Group has been successfully mixed for approximately 18 years (since ~1998, current as of 2016).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Animals are only mixed during summer – typically May through October.
- Birds have wings clipped before being released to the paddock, and are caught up for additional clipping as needed during the summer.
- Kudu are brought off exhibit into a barn daily for exhibit cleaning, but the birds remain in the paddock for the season. Kudu are returned to the exhibit overnight as long as overnight temperatures are higher than 10°C.

Changes/Accommodations Needed:

- The hornbills have an area of fenced-off scrub in which to retreat. They are fed here to permit catch-ups for wing-clipping and seasonal moves.
- The topography of the exhibit is quite varied, with several options for the animals to retreat from the three public viewing areas and from other species in the exhibit. There are several large trees in the exhibit surrounded by deadfall to make an ungulate-free zone for the birds.

Reproductive Management/Breeding History:

- Kudu have been housed in a breeding situation for many years. Females are typically held in the barn either on their own or with a companion female for calving, and they and their offspring are kept inside for at least the first two weeks or until the calf is steady on their feet. When the male kudu is separated (typically to avoid breeding with female offspring), he rotates on exhibit overnight.
- The hornbills are a breeding group, but typically breed while in off-exhibit winter quarters, not on exhibit.

Management Challenges:

- There are no management challenges related to hoofstock.
- The birds occasionally jump/fly out if their wings are not clipped in time.

Items Contributing to Group's Success:

- Gentle demeanor of the kudu
- Size of the exhibit, with sufficient creep areas for the birds to retreat from the hoofstock

Group/Exhibit Changes Over Time:

AZA Ungulate TAGs
Mixed-species Manual 2016

- When the exhibit first opened, it housed 1.3 greater kudu as well as 0.3 impala and 1.1 Thomson's gazelle. The gazelle and impala showed some interspecies aggression, and the gazelle were removed after a few weeks of introduction attempts. See Toronto Zoo Unsuccessful Exhibit.
 - Greater Kudu (*Tragelaphus strepsiceros*) (1.3)
 - Impala (*Aepyceros melampus*) (0.3)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (1.1)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)
 - White-headed Vulture (*Trigonoceps occipitalis*)
- The impala remained in the exhibit for over 10 years, but as the individuals aged and died they were not replaced and the species disappeared from the collection. The impala tended to be bolder than the kudu, and sometimes pestered young calves. Otherwise, there were no issues.
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Impala (*Aepyceros melampus*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)
 - White-headed Vulture (*Trigonoceps occipitalis*)
- For one summer, a male Grevy's zebra was rotated through the paddock with the antelope on display during the day and the zebra out overnight with the birds. No incidents were recorded.
 - Grevy's Zebra (*Equus grevyi*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)
 - White-headed Vulture (*Trigonoceps occipitalis*)
- 1.1 ostrich were exhibited here (with kudu, impala, and other ground birds) for one summer without issue, until they were moved to another exhibit.
 - Greater Kudu (*Tragelaphus strepsiceros*)
 - Impala (*Aepyceros melampus*)
 - Common Ostrich (*Struthio camelus*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)
 - White-headed Vulture (*Trigonoceps occipitalis*)

Toronto Zoo, Toronto, Ontario, Canada – Current Exhibit

Current Species:

- Domestic Yak (*Bos grunniens*) (1.8)
- European Mouflon (*Ovis aries musimon*) (6.0)
- Przewalski's Wild Horse (*Equus ferus przewalskii*) (1.8)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This is a drive-through exhibit for our zoo tram.
- Animals were first introduced in the spring of 2013; all animals were adults, except for 1 young yak.
- The animals are only together from about April-October, and for the first two summers each species had a separate holding area they were brought into at night. This last summer (2015) all animals were left in the exhibit together overnight with the mouflon having access to a yard via a creep.

Changes/Accommodations Needed:

- The exhibit can be divided into as many as 4 separate paddocks if needed, and there are numerous hay racks throughout.
- Most of the trees are protected with tree guards.

Reproductive Management/Breeding History:

- Przewalski's horses (1.0 is gelded) and mouflon are non-breeding groups.
- The yak were allowed to breed for one year before the male was castrated. Right before the female yak gave birth the exhibit was divided in half, with Przewalski's horses and mouflon together and yak separate. The animals were not reintroduced for several months.

Management Challenges:

- The Przewalski's horses can sometimes be a problem. During the initial introductions they were very aggressive with the mouflon, chasing them and even cornering and trying to attack them. It took several introduction attempts over the course of about a week before things calmed down (unfortunately the mouflon are flighty and tend to run, which only gets the horses worked up). Every spring when the group is reintroduced there is some chasing, but it usually stops within an hour or so.
- One mouflon male died after showing signs of copper toxicity in 2014 – believed to be the result of mouflon ingesting horse/yak pellets. The mouflon are now separated daily at feeding time to ensure they are only receiving their ewe ration.

Items Contributing to Group's Success:

- Lots of space
- Most of the horses are older animals (over 20 years) and have lived with other species (camels) before.

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Mixed-species Manual 2016

Group/Exhibit Changes Over Time:

- Initially we had 1.9 Przewalski's horses (1.0 is gelded), 1.5 yak, and 7.0 mouflon.

Toronto Zoo, Toronto, Ontario, Canada – Current Exhibit

Current Species:

American Elk (*Cervus canadensis*) (1.2)

Wood Bison (*Bison bison athabasca*) (3.17)

Group has been successfully mixed for 18 years (since 1997, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Bison herd is a female group (ages from newborn to senescence, the oldest was 24 years). Young males live with their mothers until 1.5 years of age, at which point they are moved to a separate bachelor herd. Our current elk are 13 years old (male), and 13 and 21 years (females).
- Both elk and bison live in the exhibit year-round, and are only shifted for medical exams (including an ongoing reproductive study) or chute training.
- The male elk is left with his antlers throughout his rut.
- Feeding is done from a pickup truck.

Changes/Accommodations Needed:

- The exhibit is a large open field, bordering dense forest on several sides (which provide shade during the summer).
- Multiple feeding stations (hayracks) are used to minimize food competition.
- Several smaller yards adjacent to the exhibit can be used to house individuals separately. There is also a tub-and-chute system leading to a restraint chute, which makes sorting individuals easier.

Reproductive Management/Breeding History:

- Both species have successfully bred in this mixed-species exhibit.
- From 1977-1995, the bison herd included a bull for natural breeding. From 1995 to the present, males have been kept in a separate bachelor group, and either introduced only for breeding or (more recently) housed completely separately with breeding occurring via artificial insemination.
- The elk have typically been separated when they are nearing the end of pregnancy to ensure the fawns find their feet without issues from the bison.

Management Challenges:

- The bison typically respect the male elk when he has his antlers, although they (the bison) will push the elk off of feeding locations when he does not have them. After years without incident, the male elk received two gore wounds from the bison in 2015 shortly after dropping his antlers – as if slow to realize that he was no longer as intimidating.
- When the male elk is in rut, shifting/herding the bison can be a challenge.

Items Contributing to Group's Success:

- Size of paddock
- Having multiple feeding locations

AZA Ungulate TAGs
Mixed-species Manual 2016

Group/Exhibit Changes Over Time:

- Pronghorn were housed with the bison in the late 1970s/early 1980s, but did not do well due to respiratory issues. No information pertaining to how the two species (bison + pronghorn) coexisted.
 - Pronghorn (*Antilocapra americana*)
 - Wood Bison (*Bison bison athabasca*)
- The bison and elk herds have both been much larger in the past, with up to ~60 bison and as many as 16 elk. As herd size increases, the bison become more and more pushy with the elk, especially when adult bull bison are involved.

Toronto Zoo, Toronto, Ontario, Canada – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (1.1)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)

Group has been successfully mixed for 18 years (since 1998, current as of 2017).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Marabou storks are on display for the warmer months, generally May-October.
- Grevy's zebra are out 24 hours/day during this time, and go out on days when weather permits during the rest of the year (we watch for ice buildup).

Changes/Accommodations Needed:

- The exhibit is mainly flat, with a raised hill along one side of the back half of the exhibit. There is a long run with two somewhat circular areas at either end (if seen from above, reminiscent to a bone shape).
- Surrounding the entire exhibit is a dry moat blocked off by a strand of hotwire. The storks are able to go under the hotwire at will, therefore being able to move to a safer spot at any time they wish. There are some large trees on the zebra-free side of the hotwire. There is also a shelter on the zebra-free side of the hotwire, on a hill only accessible by the storks.
- The storks are fed twice a day when the zebra are brought into their yards for exhibit cleaning/set-up. Marabous have access to a fenced waterway that is shared between this exhibit and the white rhino exhibit.

Reproductive Management/Breeding History:

- The composition of the group of zebra has changed over the years. Our previous male would be introduced every spring for breeding then moved to another paddock for the rest of the year. Our current male zebra needs company for his wellbeing, so is housed with the females almost all the time, except when females are far along in their pregnancy or have given birth. The groupings of zebra have ranged from 2.3 (1.1 being young kids) to 0.4 (0.2 geriatric).
- The marabous lay eggs in their shelter but have not successfully incubated outdoors. The only eggs successfully raised have been pulled and artificially incubated, followed by hand-rearing the chicks.

Management Challenges:

- There have been no challenges with the hoofstock.
- The male marabou sometimes breaks the female's eggs. If we are trying to breed marabou, we need to be on watch to pull the eggs immediately; this is tougher than when they are housed inside.

Items Contributing to Group's Success:

- Storks are older and laid-back with lots of experience with different zebra
- Exhibit size, lots of room for zebra to run and storks to be out of the way
- Public loves watching the marabou eat while exhibit cleaning is happening

Group/Exhibit Changes Over Time:

- There is a watchmen's fence which splits the waterway in two between the rhino and Grevy's zebra enclosure. The mesh size is large enough that the ducks can swim through and access the Grevy's yard. They spent most of their time on the rhino side but occasionally are seen on the zebra side.
 - Grevy's Zebra (*Equus grevyi*) (1.1)
 - Cape Shelduck (*Tadorna cana*) (1.2)
 - Marabou Stork (*Leptoptilos crumenifer*) (1.1)
- As mentioned before, the composition of zebra has varied wildly, with different zebra being on exhibit at different times depending on whether we are running different groups or a single herd (0.4 being split up to two 0.2 groups due to age related issues).
- We previously had grey crowned cranes in this exhibit. This lasted for several years until one individual was killed by a female zebra. The cranes were more excitable than the storks, and we think that the young female zebra may have begun to chase the crane after the crane began to act out. We have seen a crowned crane be attacked by our group of ground hornbills in the kudu exhibit, after the crane jumped at them and instigated the conflict.
 - Grevy's Zebra (*Equus grevyi*)
 - Grey Crowned Crane (*Balearica regulorum*)
 - Marabou Stork (*Leptoptilos crumenifer*)

Toronto Zoo, Toronto, Ontario, Canada – Current Exhibit

Current Species:

Southern White Rhinoceros (*Ceratotherium simum simum*) (2.2)

Cape Shelduck (*Tadorna cana*) (1.2)

Egyptian Goose (*Alopochen aegyptiaca*) (2.0)

Group has been successfully mixed for 5 years (since 2010, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The birds are put out on exhibit from around May-October, while the weather is warm. Sometimes the Egyptian geese remain out until November as they are more averse to being caught up.
- The geese and ducks are pinioned so no extra clipping is necessary.
- Rhinos are put out in different groupings, mainly 1.2 as a breeding group during the day, and the other 1.0 on exhibit overnight.

Changes/Accommodations Needed:

- The exhibit is somewhat circular with several large trees surrounded by large rocks to prevent the rhinos from gaining too much access to them. This combination creates "islands" throughout the exhibit, areas that the animals can use to create a bit of separation.
- There is a large water-filled moat at the front of the exhibit where the ducks and geese spend most of their time. They do come up onto land to eat, venturing into the middle of the exhibit.
- There is a watchmen's fence which splits the waterway in two between the rhino and Grevy's zebra enclosure. The mesh size is large enough that the ducks can swim through to get away from the geese if they want. They spent most of their time on the rhino side but occasionally are seen on the zebra side. The exhibit slopes upward towards the back of the exhibit.

Reproductive Management/Breeding History:

- Our rhinos go out in various combinations. During the summer months while the birds are outside, we tend to have 1.2 out consistently for breeding, even if the females aren't cycling, as they get along well. Our other male is exhibited on his own overnight as long as temperatures allow. We have not had any calves in years; this group of rhinos has just become sexually mature.
- We do not want to breed our shelducks.

Management Challenges:

- The birds can be somewhat aggressive to each other in close quarters, but tend to leave each other alone given the size of this exhibit. The rhinos do not care about the birds at all.
- Predators that can possibly enter the exhibit are of some concern (summer 2014 we had an explosion of red fox kits, however they showed no interest in our birds).
- Bringing the birds in at the end of the season can be tough, as they are smart enough to know you are trying to catch them up. They will run to the water to evade you. We have tried training them into crates or feeding them progressively closer to the back of the exhibit, with varied success.

Items Contributing to Group's Success:

- Large waterway allows birds space, they are somewhat aggressive species
- Layout of exhibit allows rhino to run, but still have space away from each other
- Having rhino out all the time may deter predators from bothering birds

Group/Exhibit Changes Over Time:

- This exhibit once had 2.0 warthog siblings in with the rhinos (no birds at the time, I believe). The warthogs dug a hole under a large gate, allowing them access to their holding yards. The rhinos would leave them alone for the most part, but would occasionally give chase. I don't believe the warthogs ever felt comfortable in that exhibit, hence the retreat to their yards every day. They would spend most of their time in a grassy moat area where the public couldn't see them, and where the rhinos rarely went. This grouping lasted only a matter of days. See Toronto Zoo Unsuccessful Exhibit.
 - Common Warthog (*Phacochoerus africanus*) (2.0)
 - Southern White Rhinoceros (*Ceratotherium simum*) (2.2)

Toronto Zoo, Toronto, Ontario, Canada – Historical Exhibit

Species:

Aoudad (Barbary Sheep) (*Ammotragus lervia*) (group of 10-20)
European Mouflon (*Ovis aries musimon*) (group of 20)

Group was successfully mixed for approximately 26 years, from ~1986 to 2012.

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- These two species were housed together for several decades, until about 2012 when they were moved (and separated) due to exhibit construction.
- Both species were managed together.
- Barbary sheep were slightly dominant over food, but there were always numerous feeding stations/bowls to minimize competition.
- They were fed free-choice timothy and a low-copper ewe ration to account for the mouflon's copper sensitivity.



Brent Huffman

Reproductive Management/Breeding History:

- Both species bred successfully on an annual basis.
- No hybridization was ever observed.
- Lambs were born in the exhibit and caught up for neonatal processing about 24 hours after birth.

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This area of the zoo was renovated and the exhibit was modified to house snow leopards.

Group/Exhibit Changes Over Time:

- None

Toronto Zoo, Toronto, Ontario, Canada – Historical Exhibit

Species:

Bactrian Camel (*Camelus bactrianus*) (1.3)
Przewalski's Wild Horse (*Equus ferus przewalskii*) (0.4)

Group was successfully mixed for 3 months (Summer 2012).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Animals only lived together for a single summer (approximately 3 months) in the horse exhibit when the camel area was under construction.
- 1.0 camel was a juvenile (about 8-12 months) and the 0.4 horses were all older, about 20 years old.
- The enclosure had two sections, allowing the animals to be separated whenever we needed (e.g., for feeding). Animals were separated for feeding two times a day.



Jenn Martin

Reproductive Management/Breeding History:

- There was no breeding by either species.

Management Challenges:

- During feeding the horses would chase the camels away from the feeders and as a result the animals were separated for feeding (the horses tended to be the instigators in most altercations).
- For the most part the animals didn't really interact, although during the day they were seen grazing near one another without issue.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This was a temporary mix due to construction – once their separate exhibits were completed, both species moved out of this enclosure.

Group/Exhibit Changes Over Time:

- None

Toronto Zoo, Toronto, Ontario, Canada – Historical Exhibit

Species:

- Domestic Yak (*Bos grunniens*) (1.10)
- European Reindeer (*Rangifer tarandus tarandus*) (1.3)
- Sika Deer (*Cervus nippon*) (0.2)

Group was successfully mixed for approximately 10 years (from ~1996 to 2005).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The sika and the yak (including other individuals) had already been displayed together for several years before I worked in the area.
- The reindeer were introduced without incident (including other individuals) seasonally over several years, and eventually remained together year round.
- The reindeer were outreach animals and initially lived with the reindeer herd during the summer months and moved in with the sika and yak in the fall.
- The yak were quietly dominant, followed by the sika deer and then the reindeer. This was always consistent and not challenged.



Brent Huffman

Reproductive Management/Breeding History:

- None of the animals were reproductive during residence together.
- The male European reindeer was castrated.

Management Challenges:

- The only challenge was the sika were shy around people and the other species were not, so separating or shifting just the sika could be difficult.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The sika were phased out of the collection, the yak are part of a new mixed exhibit in a different location, and the reindeer are also now displayed in a different location.

Group/Exhibit Changes Over Time:

- The female yak passed away due to old age, so there was just the male for a period of time. Then one of the sika also died due to old age. There was a period of time (at least a year) where there was only one yak and one sika with the reindeer. The individual reindeer changed now and then but there were usually three females. The castrated male was moved back with the regular reindeer group when the intact male was not in rut.

Toronto Zoo, Toronto, Ontario, Canada – Historical Exhibit

Species:

- Gaur (*Bos gaurus*) (1.3)
- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (2.3)

Group was successfully mixed for 26 years (from 1984 to 2010).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The muntjac had a separate house and hides. There were also cables approximately 3 feet from the perimeter fence that allowed the muntjac to get away from the gaur. There were a few shelters behind the cables for the muntjac.
- The male gaur were housed separately and the females were separated at night.

Reproductive Management/Breeding History:

- The muntjac bred regularly.
- The male gaur were typically housed separately from the females to control breeding.

Management Challenges:

- For the most part these two species stayed out of each other's way. The muntjac were observed laying with gaur on occasion. At some points there was aggression between 1.1 or 1.0 and 1.0, and they would need to be separated.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The muntjac died out and now we only exhibit gaur.

Group/Exhibit Changes Over Time:

- None

Toronto Zoo, Toronto, Ontario, Canada – Historical Exhibit

Species:

- Greater One-Horned Rhinoceros (*Rhinoceros unicornis*) (1.1)
- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (2.4)

Group was successfully mixed for 29 years (from 1982 to 2011).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Rhinos were housed separately from the muntjac at night.
- There were cables (for the rhinos) before the chainlink perimeter fence; there was taller grass behind the cables.
- The exhibit had hides/shelters for the muntjac in the rhino exclusion zone.

Reproductive Management/Breeding History:

- Rhinos were introduced for breeding and separated after breeding; the muntjac stayed away from them.

Management Challenges:

- The muntjac tended to stay on the perimeter of the exhibit, behind the cable fencing. They were not especially visible as the cables were 20 feet away from the perimeter fence at some point and the vegetation was quite dense.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Muntjac were phased out through attrition.

Group/Exhibit Changes Over Time:

- None

Trevor Zoo, Millbrook, NY – Current Exhibit

Current Species:

- Alpaca (*Vicugna pacos*) (2.0)
- Greater (American) Rhea (*Rhea americana*) (1.2)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Rheas were fairly young when introduced to the alpaca.
- We have a holding space for rheas to aid in locking them in for winter storms and/or management purposes.

Changes/Accommodations Needed:

- There is a holding run in the back of the exhibit that connects to one stall of the barn. It is used to separate rheas and alpaca when necessary or for locking in rheas.

Reproductive Management/Breeding History:

- Rheas breed each year but eggs are pulled.
- No breeding with the male alpaca at this time.

Management Challenges:

- Feeding is the most significant challenge as the alpaca really like the rhea food.
- Occasionally the male alpaca will fight for the dominant position of the herd.

Items Contributing to Group's Success:

- Space available
- Howdy, holding area
- Individual personalities

Group/Exhibit Changes Over Time:

- In the past we have had female alpaca and a different set of male rheas, all with relatively the same result in behavior between the two species.
- We've also varied having male and female rheas with different combinations of male and female alpaca, but all resulted in relatively the same reaction/introduction.

Trevor Zoo, Millbrook, NY – Current Exhibit

Current Species:

- Shetland Sheep (*Ovis aries*) (0.3)
- Manchurian Ring-necked Pheasant (*Phasianus colchicus pallasii*) (0.1)
- Turkey Vulture (*Cathartes aura*) (0.0.1)
- Wild Turkey (*Meleagris gallopavo*) (8.5)

Group has been successfully mixed for 1 year (since 2015, current as of 2016).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Turkeys have lived in this exhibit since they were juveniles (ranging from 1-2 years); there have been two groups with different births).
- The Manchurian pheasant has been in the exhibit since her arrival in September 2014.
- The turkey vulture has lived in this exhibit since 1999.
- Sheep were introduced in October 2015.

Changes/Accommodations Needed:

- We have two stalls with plenty of perching for birds and a sheep hut/shed for them to go under for shelter and food.

Reproductive Management/Breeding History:

- We had a male ram that was rotated in for the season and left after breeding season.

Management Challenges:

- Having different areas to separate and/or manage the various groups is a challenge.

Items Contributing to Group's Success:

- Large space
- Nature of species exhibited

Group/Exhibit Changes Over Time:

- We had a male ram for one month in 2015 for the breeding season.
- Previously (7-10 years ago) we had white-tailed deer, turkeys, and turkey vultures on exhibit.
 - White-tailed Deer (*Odocoileus virginianus*)
 - Turkey Vulture (*Cathartes aura*)
 - Wild Turkey (*Meleagris gallopavo*)

Trevor Zoo, Millbrook, NY – Current Exhibit

Current Species:

Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (0.1)

Sika Deer (*Cervus nippon*) (0.1)

White-naped Crane (*Grus vipio*) (1.1)

Group has been successfully mixed for <1 year (since May 2016, current as of 2016).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The current muntjac and sika deer have been together since 2014.
- We have had animals of various ages. The current sika female was born at our institution in 1994. Many other sika have lived in this exhibit over the years, but she is currently our only one.
- The current male muntjac has been with us since 2014. We have had a variety of ages and sex ratios of muntjac over the years.
- All individuals are getting along fine with relatively no interaction with each other.

Changes/Accommodations Needed:

- The muntjac have an insulated and heated stall in the barn. They also have two corral areas with a box to "get away" from other deer, muntjac, or sika.

Reproductive Management/Breeding History:

- Female muntjac are often separated for the early days of calving but are then reintroduced back to the group.

Management Challenges:

- None

Items Contributing to Group's Success:

- Species disposition
- Space of exhibit
- Individual personalities

Group/Exhibit Changes Over Time:

- We've had a variety of numbers and sex ratios of both sika deer and muntjac in this exhibit over the years.

Tulsa Zoo, Tulsa, OK – Current Exhibit

Current Species:

- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.1)
- Springbok (*Antidorcas marsupialis*) (6.0)
- Grey Crowned Crane (*Balearica regulorum*) (2.2)
- White Stork (*Ciconia ciconia*) (2.0)

Group has been successfully mixed for 9 months (since March 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- At the time of introduction all springbok were less than 2 years of age and within 6 months age of one another.
- Springbok and rhinos are usually shifted off exhibit for grain.
- Springbok respond to a cow bell recall.
- White rhinos have a fairly laid-back/even-keeled temperament.

Changes/Accommodations Needed:

- There are plenty of options for animals to get away from one another if necessary.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Until recently our springbok males were mostly cooperative with one another. They arrived as a group of 2.0 and 3.0. The males were initially introduced in smaller yards off exhibit and after some jousting, they seemed to accept one another. The two alpha springbok males from the original groups got tangled up a couple of months after introductions so they were managed separately until the exhibit yards were finished. Once on exhibit the majority of the time, they did well together. About 2 months ago a single male was introduced to the group with little issue.
- Recently we lost one male to a broken rear leg (at one point in time he was the alpha male from the group of 2.0). No noticeable precursor behavior(s) led us to believe there was a problem in the group.

Items Contributing to Group's Success:

- No females
- Plenty of exhibit space
- Generally calm animals

Group/Exhibit Changes Over Time:

- In the past, 1.1 Grant's zebra (plus offspring) were housed in an exhibit in the vicinity of the current exhibit, but the footprint was smaller and a little different overall. They were housed with a breeding group of Grant's gazelle (I believe the maximum number of animals may have been 8-10 individuals). At different points in time the exhibit also included 1.1 grey crowned

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crane, 1.1 marabou storks, and 1.1 Egyptian geese, as well as several guineafowl. See Tulsa Zoo Historical Exhibit.

Tulsa Zoo, Tulsa, OK – Historical Exhibit

Species:

- Grant's Gazelle (*Nanger granti*) (1.4 + offspring)
- Grant's Zebra (*Equus quagga boehmi*) (1.1 + offspring)
- Egyptian Goose (*Alopochen aegyptiaca*) (1.1)
- Guineafowl (*sp.*) (unknown group)
- Grey Crowned Crane (*Balearica regulorum*) (1.1)
- Marabou Stork (*Leptoptilos crumenifer*) (1.1)

Group was successfully mixed for many years.

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- This group was together for many years until the collection began passing due to old age.
- Animals were regularly shifted off exhibit (at least once per week).

Reproductive Management/Breeding History:

- Males were able to breed as permitted.
- Once calves were born, species was kept separate for a while to allow bonding, etc.
- Females were known to give birth either on exhibit or in holding, but seemed to do better if left on exhibit.

Management Challenges:

- Some of the animals were occasionally reluctant to shift off exhibit.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Rhinos were relocated to this general area in November 2014.

Group/Exhibit Changes Over Time:

- None

Turtle Back Zoo, West Orange, NJ – Current Exhibit

Current Species:

- Llama (*Lama glama*) (2.3)
- Black-necked Swan (*Cygnus melancoryphus*) (1.1)
- Capybara (*Hydrochoerus hydrochaeris*) (1.1 or 0.2)
- Greater (American) Rhea (*Rhea americana*) (1.1)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- There is nothing unusual with this group. All animals are fairly tractable.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- There is no reproduction in this exhibit, animals are for exhibit only.
- Swans sometimes nest in a corner of the exhibit but do not rear offspring in this exhibit.

Management Challenges:

- There has been very little negative interaction.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- None

Turtle Back Zoo, West Orange, NJ – Historical Exhibit

Species:

- American Bison (*Bison bison*) (1.2)
- Elk (*Cervus canadensis*) (1.1)

Group was successfully mixed for approximately 10 years.

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Species were shifted separately for feeding grain. Hay was fed free choice in the exhibit in multiple locations.

Reproductive Management/Breeding History:

- Both species bred in this group.
- About a decade ago a female bison died and the elk cow "adopted" the weanling bison calf.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- There are still 1.2 bison in the exhibit. When the elk died from natural causes they were not replaced since the plan is to build a separate elk exhibit.

Group/Exhibit Changes Over Time:

- None

Utah's Hogle Zoo, Salt Lake City, UT – Current Exhibit

Current Species:

Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.2)
Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.1)
Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (0.1)
Common Ostrich (*Struthio camelus*) (2.0)

Group has been successfully mixed for 2 years (since May 2014, current as of 2016).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Rothschild's giraffe were 11 and 29 years when introduced (we used to have a second female who was not introduced to the savanna and to the other animals).
- Hartmann's zebra and nyala were all 1-2 years when introduced.
- Our ostrich were 4, 9, and 20 years old when introduced to the savanna.
- We introduced each species to the savanna separately at first to give them opportunities to get to know the area. The introduction took place over the summer and winter of 2014-2015 (and also included Egyptian geese and helmeted guineafowl – see below for exhibit changes over time).
- We only have one ostrich on the savanna at a time due to their aggression toward each other.
- Our reticulated giraffe 1.0 Riley and 0.1 Kipenzi have been living together on the savanna all summer long without Pogo, who is with her calf, and they have been doing well now that Kipenzi is pregnant. Riley will still chase her and try to hit her with his head when he is agitated but they are doing well and have staked out their own territories for the most part.



Jill VanMilligen

Changes/Accommodations Needed:

- We have burlap on fences/mesh fences as visual aids for nyala that tend to run carelessly.
- A hot grass area is provided for nyala to get away. At first we had it so they could jump over, then later made it so they could duck under but the zebra and ostrich could not.
- Temporary chain-link fence was added when animals were first being introduced to their new savanna exhibit and when learning how to shift in/out through the chutes to/from the barn. Each species was given time on the savanna in the temporary yard until they knew how to shift. Then they were given time on the full savanna with their own kind to explore the exhibit.
- We modified several stalls to have howdy mesh to allow for all but giraffe (separate barn) to interact. We had another permanent "flex yard" which had mesh wall that separates it from the main exhibit. This was also utilized as a howdy.
- We trained zebra and nyala to come into the giraffe barn from the hoofstock barn to allow for protected contact with the giraffe.
- Guineafowl were jumping out of our moated exhibit so we had to trim their wings further.

Reproductive Management/Breeding History:

- 1.0 Riley and 0.1 Kipenzi (reticulated giraffe) have bred three times. Her first calf only lived for 8 months and died of failure to thrive. Her second calf was healthy and was transferred to another facility when old enough. Kipenzi is pregnant now and due in December 2016.
- 1.0 Riley and 0.1 Pogo (giraffe) have bred twice. The first calf did not survive (still born).
- 0.1 Pogo gave birth to 0.1 giraffe, Willow. They have remained separate from 1.0 reticulated giraffe Riley and the rest of the animals on the savanna until she is bigger. They howdy through some mesh and we are hoping to introduce her to the others in September 2016.
- The male is rotated on exhibit for breeding with females. Our females are separated for calving.

Management Challenges:

- One nyala was extremely flighty and couldn't tolerate a curious, persistent zebra, therefore nyala were placed at another institution. The nyala did fine with 0.2 giraffe and 1.0 ostrich on the savanna – see below for exhibit changes over time.
- Ostrich have presented different challenges as far as shifting in/out of the barn through the chutes and coming from one end of the savanna all the way to the barn to shift. Free contact training was the only positive method of working the ostrich to go from place to place. However, after having to force one of the ostrich to get off exhibit into the barn, he lost his shifting courage for over a year.
- One female giraffe was quite nervous and jumpy around ostrich when in the old barn when they were just across the way from their yard. She was even more jumpy when they were in the new exhibit. She just learned to stay away from ostrich.
- 1.0 giraffe Riley and 0.1 Kipenzi had a history of not getting along in the old exhibit – 0.1 running away anytime 1.0 came near. Running and chasing ensued in yards that were not big enough or safe enough to allow, so they were separated to different yards.
- Lack of shelter and heat for animals on the savanna during colder seasons and severe weather makes strategic shifting necessary. We can't just give barn access to all animals due to fighting/confusion that would occur; there is a long chute with access to 2 different barns with different sized doors that species need to be shifted through one at a time.
- There is a train ride attraction for guests that circles the savanna exhibit and completely cuts off the animals' access from the barns to the exhibit. The train ran from 9am-6:15pm during the summer months. The train ride attraction was delayed in its start time after our first season due to needing more time to get the animals on exhibit.
- We currently do public giraffe feedings every day at 11am and 2pm. Some difficulties that we have encountered are that the zebra and ostrich cue into the food being fed out and displace the giraffe at their feeding stations.

Items Contributing to Group's Success:

- The weather in the winter of 2014 and into 2015 was extremely mild for Utah. We had very little snow and very mild temperatures so our introductions went on through a period of time when we expected we wouldn't be able to do much.
- We have a great team of people to work with that supported each other and worked crazy hours to accomplish our goals.
- Having the flex yard attached to the savanna was extremely helpful. We could have animals on exhibit while they were howdying with each other. We could gauge the animals reactions to

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each other before we started our introductions and the animals all got used to seeing other species and how they move and act before having to navigate full introductions.

Group/Exhibit Changes Over Time:

- Until recently we had a second adult female Rothschild's giraffe. However, our 31 year old Daphne (0.1) passed away.
- We had a third male ostrich, but our ostrich Red passed away in spring 2016 due to health difficulties.
- Previously we also had helmeted guineafowl. However, all 24 of our helmeted guineafowl were killed by a mink getting onto the savanna one night. We hope to get more next spring and will make sure to recall train them and bring them in every night to prevent this from happening again. We also had Egyptian geese, which passed away from old age in spring 2016. We have not decided if we will replace them on the exhibit, as it was very hard to feed them without all the other animals eating their food. The Egyptian geese were 12 and 13 years old and the guineafowl were all 1 month old when introduced to the exhibit.
 - Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.2)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.1)
 - Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (0.2)
 - Common Ostrich (*Struthio camelus*) (3.0)
 - Egyptian Goose (*Alopochen aegyptiaca*) (1.1)
 - Helmeted Guineafowl (*Numida meleagris*) (0.0.24)
- Nyala were previously introduced to this exhibit but were placed at other institutions. The nyala were sent to other institutions for 2 reasons. We felt they were never going to work out with our zebra, and due to the breeding recommendation for our zebra we had to also look at space in our barn. All of the animals needed to be separated inside and we only had 8 barn stalls with 3 zebra, 3 ostrich, and 2 nyala; this left no room for zebra offspring and an inability to clean our barns if all the animals had to stay inside due to bad weather.
 - Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.2)
 - Nyala (*Tragelaphus angasii*) (3.0)
 - Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.1)
 - Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (0.2)
 - Common Ostrich (*Struthio camelus*) (3.0)
 - Egyptian Goose (*Alopochen aegyptiaca*) (1.1)
 - Helmeted Guineafowl (*Numida meleagris*) (0.0.24)
- 0.3 giraffe were housed in another single species exhibit. 1.0 was housed at Oregon Zoo for the 2 year construction period but was housed in different compositions with 0.3 for 4 years prior.
- 1.0 and 0.1 Kipenzi (giraffe) didn't get along and had to be separated.
- 3.0 ostrich lived in another single species exhibit. Dynamics changed drastically when they came to the new exhibit. Yellow immediately took dominance from Blue. Red stayed submissive.



Ashely Arimborgo

Virginia Living Museum, Newport News, VA – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (0.4)
- Wild Turkey (*Meleagris gallopavo*) (1.2.1)

Group has been successfully mixed for 25 years (since 1990, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were introduced together as juveniles.

Changes/Accommodations Needed:

- There is cover for the deer.
- There is a roosting areas for turkeys.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Darting deer for blood work is a challenge.
- Destruction of vegetation is a challenge.
- Dead tree removal and general tree work can be challenging.

Items Contributing to Group's Success:

- Deer were imprinted or born in captivity.
- Closing the exhibit to the public when introducing new animals
- Access to the exhibit at both ends

Group/Exhibit Changes Over Time:

- None

Virginia Zoo, Norfolk, VA – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (2.4)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)
- Egyptian Goose (*Alopochen aegyptiaca*) (1.1)

Group has been successfully mixed for 13 years (since 2002, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Overall it is easily managed.
- 1.1 bongo are year old calves.
- The bongo typically leave any nesting birds alone.
- The main management issue is just dealing with a mature bull bongo in the herd of females.

Changes/Accommodations Needed:

- There are a number of mature trees in the exhibit that provide lots of shade, and do well enough for birds to nest.
- The exhibit could use another holding yard to house the male bongo when not breeding. We have had aggression issues with the males over the years.
- The chute is also difficult to use and could use modifications.

Reproductive Management/Breeding History:

- All 3 species have had success breeding almost every year.
- The male bongo is just removed from pregnant females after several months (typical bongo management).
- Females are preferred to give birth indoors but have had calves on exhibit.

Management Challenges:

- There are no challenges at this time.

Items Contributing to Group's Success:

- The species that are housed in this exhibit
- The management of the animals
- The design/structure of the exhibit

Group/Exhibit Changes Over Time:

- Bongo numbers change as births occur and young get shifted out as well as birds.
- The only other species that has been in this exhibit was 1.1 Red-flanked duiker. This species had issues with the holding area, and that is why they are no longer in that exhibit. They did not have issues with the animals in the exhibit.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (2.4)
 - Red-flanked Duiker (*Cephalophus rufilatus*) (1.1)
 - East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)
 - Egyptian Goose (*Alopochen aegyptiaca*) (1.1)

Virginia Zoo, Norfolk, VA – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (2.0)
- Hartmann's Mountain Zebra (*Equus zebra hartmannae*) (1.3)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.0)

Group has been successfully mixed for approximately 2 years (since 2013, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Our male white rhinoceros was born in 1968. He came to the zoo in 1996. He was moved into the current exhibit in 2002.
- The Hartmann's mountain zebra came to the zoo in 2012. The Watusi came to the zoo in 2014.
- Upon my arrival in 2013 the zebra and the rhinoceros were never on exhibit at the same time. After the arrival of the Watusi we introduced them on exhibit to the rhino, then over about 4 months we worked on introductions of all 3 species. All 3 species are currently housed together each day on exhibit.
- Currently no special management is needed.
- Typically zebra are shifted first then the cattle then rhino.
- Overall all animals leave each other alone as long as multiple food stations are present.

Changes/Accommodations Needed:

- We could use a better wallow for the rhino, more furnishings, and a chute.

Reproductive Management/Breeding History:

- We have a zebra foal in the group which the mom is protective over so the initial interactions with the Watusi went well, and they learned quickly to leave her alone. This was the first foal born in this exhibit.
- The reintroduction of the male zebra back has not been that successful based on his reaction to the other zebra, so on exhibit for the day it could be either 1.2 zebra or 0.3 zebra. The rhino and Watusi don't seem to recognize the difference.
- Breeding with the zebra does occur on exhibit without any effect on the other species.

Management Challenges:

- After the birth of our Hartmann's calf we experienced herd changes with the dominance hierarchy between them. The male became very aggressive toward the other female (not the one that just had the foal). At this point we can have the male with the foal and mother but cannot house the male with the other female. They are rotated each day as to who is on exhibit.
- The main challenge is just the age of the rhino, who is 47 this year and slow moving. This can slow down the process of shifting off for the night.

Items Contributing to Group's Success:

- The male rhino is older and not as active.
- The Watusi were introduced when still young so they grew up with this group.
- Making sure that food is available through the exhibit

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- The size/structure of the yard
- The length of time they are together each day
- The personalities of the animals

Group/Exhibit Changes Over Time:

- There used to be 2.1 southern white rhinoceros in this exhibit. At that time they had Grant's zebra and no Watusi cattle.
 - Grant's Zebra (*Equus quagga boehmi*) (1.2)
 - Southern White Rhinoceros (*Ceratotherium simum simum*) (2.1)

Virginia Zoo, Norfolk, VA – Current Exhibit

Current Species:

- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (2.2)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
- Common Ostrich (*Struthio camelus*) (1.1)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- This exhibit works out really well together. We don't have any issues between animals at all.
- Our male giraffe came to us in 2002 and the current adult female arrived in 2003. The newest giraffe female came this year (2015) and was introduced to all the animals after a 1 month quarantine period. The female duiker came in 2013 and the male came in 2014. The male ostrich was living in where the current exhibit opened so he was moved into the new exhibit in 2002. The current female came in 2012.
- The duiker and the hornbills are the only ones that are not shifted off exhibit at night.
- The male duiker is fairly skittish still, but the female we are able to hand inject, etc.
- Currently the second male giraffe is a 2 month old calf, so there are no issues with that yet.
- Introductions all occurred over a two week process without issues.
- All animals are pulled for the season if needed based on temperature regulations, so we have off exhibit holding.
- During the summer, duiker and hornbills basically stay on exhibit but do have holding if they want to enter (but typically don't).
- Giraffe do participate in a public BTS feedings at ground level.

Changes/Accommodations Needed:

- There were some "creeps" added for the duiker and hornbills on both sides of the exhibit that involve a rock "wall" and some fencing that they can get over, but the giraffe and ostrich can't. There is a similar area with a nest box for the hornbills as well.

Reproductive Management/Breeding History:

- Animals are basically free to breed at any time.
- The giraffe are a successful breeding group.
- Births for the giraffe do occur inside, while the hope would be to pull the duiker off as well.
- The current adult female giraffe we have has had 3 calves. She recently just had a male calf which is why it is 2.2. Our other female is young and was moved here for breeding.
- The duiker had a still born last year from a previous male. We have seen them breed but have not had a calf yet. The males DOB is 4/7/13 so he is still young.
- The hornbills produced an egg last year but have not had successful offspring yet.
- The ostrich breed and lay eggs a lot but we pull the eggs.

Management Challenges:

- Overall things work well.

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- The only challenges we have has been shifting the duiker and the hornbills into holding successfully. They have access and their food is inside the holding areas, but we have not been able to lock them in regularly. This becomes more of an issue when we have a new giraffe calf.

Items Contributing to Group's Success:

- The “creeps” for the smaller animals
- The species that are in the exhibit
- The size/structure of the exhibit
- The fact that we shift them on/off exhibit every day and night

Group/Exhibit Changes Over Time:

- 1.1 East African crowned cranes used to be housed in this exhibit. The hornbills showed a lot of aggression toward them and they were moved into another mixed exhibit. See Virginia Zoo Unsuccessful Exhibit.
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (2.2)
 - Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
 - Common Ostrich (*Struthio camelus*) (1.1)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)
- Grant's gazelles used to be housed in this exhibit. The last male died in 2014 and we have not replaced that species in that exhibit yet.
 - Grant's Gazelle (*Nanger granti*)
 - Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
 - Yellow-backed Duiker (*Cephalophus silvicultor*)
 - Common Ostrich (*Struthio camelus*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)

Virginia Zoo, Norfolk, VA – Current Exhibit

Current Species:

- Blue Duiker (*Philantomba monticola*) (2.1)
- Crested Screamer (*Chauna torquata*) (2.2)
- Demoiselle Crane (*Grus virgo*) (1.1)

Group has been successfully mixed for 1 year (since 2014, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- These animals basically stay out year round.
- Screamers and duiker do have sheds that act as holding capes when needed, that they have learned to "call their own" and enter every night if needed.
- The most recent duiker calf was born on exhibit without any issues, and the screamer chicks were on exhibit by day 3.

Changes/Accommodations Needed:

- None, other than we have a lot of bamboo that grows in the exhibit that helps with the duiker and their cover.

Reproductive Management/Breeding History:

- Screamers have had chicks, which luckily they like to build their nest in the shed that they have.
- Duiker have given birth and breed on exhibit.

Management Challenges:

- Most of the challenges come from the native wildlife.

Items Contributing to Group's Success:

- The amount of bamboo present
- Having separate holding spaces/entrances

Group/Exhibit Changes Over Time:

- Composition only changes based on the number of births.

White Oak Conservation Center, Yulee, FL – Current Exhibit

Current Species:

- Giant Eland (*Taurotragus derbianus*) (3.0)
- Lesser Kudu (*Tragelaphus imberbis*) (6.0)
- Nile Lechwe (*Kobus megaceros*) (3.0)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 3 acres-8 acres

General Management Notes:

- The ungulates in this enclosure are managed as bachelor groups for several of the species that are being managed here currently.
- Age of introduction varies, with some males pulled from breeding herds at the onset of sexual maturity to prevent aggression from the breeding male, and others moved in after spending time as the breeding male in the corresponding herd.

Changes/Accommodations Needed:

- There are several shelters provided within the enclosure and a corral system that can be utilized by the different groups.
- Feeding locations are spread out to prevent the monopolization of resources.

Reproductive Management/Breeding History:

- There is no breeding in this group.

Management Challenges:

- There is a minimal amount of intraspecific aggression within this exhibit.

Items Contributing to Group's Success:

- Large enclosure
- Multiple feeding locations
- Multiple shelters

Group/Exhibit Changes Over Time:

- This enclosure has been used as a bachelor holding pen since 2000 and has maintained several different species of bachelors with varying numbers since then. In addition to the current species there has also been addra gazelle, as well as breeding pairs of wattled crane, and stanley crane.
 - Addra (Dama) Gazelle (*Nanger dama*)
 - Giant Eland (*Taurotragus derbianus*)
 - Lesser Kudu (*Tragelaphus imberbis*)
 - Nile Lechwe (*Kobus megaceros*)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*)
 - Southern Ground Hornbill (*Bucorvus leadbeateri*)
 - Wattled Crane (*Bugeranus carunculatus*)

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- From 1994-2000 this enclosure maintained several different breeding groups, including bontebok (7.12) over that span, as well as (6.0) Grevy's zebra and 2.0 Javan banteng
 - Bontebok (*Damaliscus pygargus*) (7.12)
 - Grevy's Zebra (*Equus grevyi*) (6.0)
 - Javan Banteng (*Bos javanicus*) (2.0)

White Oak Conservation Center, Yulee, FL – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (6.0)
- Javan Banteng (*Bos javanicus*) (1.0)
- Nile Lechwe (*Kobus megaceros*) (2.0)
- Roan Antelope (*Hippotragus equinus*) (8.0)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: Larger than 8 acres

General Management Notes:

- This enclosure is used to hold males that have been pulled from breeding herds. The animals range from immature males to fully mature males.
- The composition of this exhibit is fluid, with animals routinely being moved through the exhibit for breeding and holding purposes.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- There is no breeding in this group.

Management Challenges:

- There is a low level of intraspecific aggression within this exhibit.

Items Contributing to Group's Success:

- Large size
- Multiple areas for individuals to get away from aggression

Group/Exhibit Changes Over Time:

- This exhibit has been used to house multiple combinations of mixed species. These have included single sex groups of both genders and breeding pairs of cranes. Dwarf forest buffalo (0.3) were held from 1992-2004 with the population dying out over that time span. Bontebok (6.0) were held from 1992-2002 with the population reducing over time to zero. Kafue Flats lechwe were held in a bachelor setting; the population ranged from 1.0 to 6.0. Sand gazelle (3.0) were held from 1992- 2000 with the population reducing to zero. From 1992-1996 we had (0.3.1) West African crowned cranes and 1996-2002 had (3.0) wattled cranes.
 - Bontebok (*Damaliscus pygargus*) (6.0)
 - Dwarf Forest Buffalo (*Syncerus caffer nanus*) (0.3)
 - Kafue Flats Lechwe (*Kobus leche kafuensis*) (1.0-6.0)
 - Sand Gazelle (*Gazella subgutturosa*) (3.0)
 - Wattled Crane (*Bucconas carunculatus*) (3.0)
 - West African Crowned Crane (*Balearica pavonina pavonina*) (0.3.1)
- From 2004-2006 we had 5.0 giant eland and 4.0 Grevy's zebra as part of the enclosure along with 7.0 Nile lechwe and 7.0 roan antelope.

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- Giant Eland (*Taurotragus derbianus*) (5.0)
- Grevy's Zebra (*Equus grevyi*) (4.0)
- Nile Lechwe (*Kobus megaceros*) (7.0)
- Roan Antelope (*Hippotragus equinus*) (7.0)

White Oak Conservation Center, Yulee, FL – Current Exhibit

Current Species:

- Nile Lechwe (*Kobus megaceros*) (0.20)
- Wattled Crane (*Bugeranus carunculatus*) (1.0)

No information was provided about how long this group has been successfully mixed.

Exhibit Size: 3 acres-8 acres

General Management Notes:

- No information provided.

Changes/Accommodations Needed:

- A creep feeder is provided for the wattled crane.

Reproductive Management/Breeding History:

- There is no breeding in this group.

Management Challenges:

- The wattled crane has a history of eating the grain provided for the lechwe.
- The crane is also difficult to separate and catch up for veterinary care.

Items Contributing to Group's Success:

- No information provided.

Group/Exhibit Changes Over Time:

- Historically the enclosure has been maintained as a breeding herd of lechwe and a breeding pair of wattled cranes.

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (0.2)

Giant Eland (*Taurotragus derbianus*) (1.12)

Wattled Crane (*Bugeranus carunculatus*) (2.0)

Group was successfully mixed for 10 years (from 2002 to 2012).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Giant eland were managed as a single male breeding herd.

Reproductive Management/Breeding History:

- Males were rotated out to prevent inbreeding.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The enclosure is no longer mixed and is now being utilized by a breeding herd of lesser kudu.

Group/Exhibit Changes Over Time:

- 1996-2002: The enclosure held 1.1 Abyssinian ground hornbill, 1.2 East African crowned crane, 8.30 eastern bongo, 2.2 Stanley cranes, 1.2 wattled cranes. The different crane species did not cohabitate, and all species were held in breeding situations.

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (8.30)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (2.2)

OR

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (8.30)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
- East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.2)

OR

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (8.30)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
- Wattled Crane (*Bugeranus carunculatus*) (1.2)

- 1992-1996: The enclosure held 1.1 Abyssinian ground hornbill, 14.21 nyala and 2.1.2 Stanley cranes.

- Nyala (*Tragelaphus angasii*) (14.21)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (2.1.2)

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- 1981-1990: The enclosure held 4.8 barasingha and 1.1 Sarus crane. Both populations were breeding and reproducing.
 - Barasingha (*Rucervus duvaucelii*) (4.8)
 - Sarus crane (*Grus antigone*) (1.1)

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

- Bontebok (*Damaliscus pygargus*) (2.6)
- Grevy's Zebra (*Equus grevyi*) (0.1)
- Wattled Crane (*Bugeranus carunculatus*) (2.0)

Group was successfully mixed for 3 years (from 1997 to 2000).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Bontebok herd was held in a breeding situation.

Reproductive Management/Breeding History:

- Males were rotated to prevent inbreeding.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit was combined with an adjacent enclosure in 2000 (see White Oak Historical Exhibit) and presently holds the breeding herd of Grevy's zebra.

Group/Exhibit Changes Over Time:

- 1996-1997: This exhibit held 2.6 bontebok, 1.9 Grevy's zebra, 3.14 Javan banteng and 2.0 wattled crane.
 - Bontebok (*Damaliscus pygargus*) (2.6)
 - Grevy's Zebra (*Equus grevyi*) (1.9)
 - Javan Banteng (*Bos javanicus*) (3.14)
 - Wattled Crane (*Bugeranus carunculatus*)(2.0)
- 1995-1996: This exhibit housed 3.17 Javan banteng and 0.18 scimitar-horned oryx.
 - Javan Banteng (*Bos javanicus*) (3.17)
 - Scimitar-horned Oryx (*Oryx dammah*) (0.18)
- 1994-1995: We exhibited 3.12 bontebok, 1.1 East African crowned crane, 2.19 scimitar-horned oryx, and 4.0 West African crowned crane.
 - Bontebok (*Damaliscus pygargus*) (3.12)
 - Scimitar-horned Oryx (*Oryx dammah*) (2.19)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)
 - West African Crowned Crane (*Balearica pavonina pavonina*) (4.0)
- 1993-1994: We housed 4.12 bontebok and 1.5 Grevy's zebra in this exhibit.
 - Bontebok (*Damaliscus pygargus*) (4.12)
 - Grevy's Zebra (*Equus grevyi*) (1.5)

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

- Bontebok (*Damaliscus pygargus*) (2.9)
- Grevy's Zebra (*Equus grevyi*) (0.9)
- Wattled Crane (*Bugeranus carunculatus*) (3.0)

Group was successfully mixed for 4 years (from 1996 to 2000).

Exhibit Size: Larger than 8 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- No information provided.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit was combined with an adjacent exhibit (see White Oak Historical Exhibit) to form a single exhibit that now contains the breeding Grevy's zebra herd.

Group/Exhibit Changes Over Time:

- None

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

- Roan Antelope (*Hippotragus equinus*) (1.12 + offspring)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group was successfully mixed for 18 years (from 1993 to 2011).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Breeding males were rotated to prevent inbreeding.
- Male calves were pulled out prior to sexual maturity.

Management Challenges:

- There was some intraspecific aggression between members of the herd.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The roan antelope are still exhibited in this space, however, only as a single species group.

Group/Exhibit Changes Over Time:

- This exhibit at one time also housed wattled cranes (1.1)
 - Roan Antelope (*Hippotragus equinus*) (1.12 + offspring)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)
 - Wattled Crane (*Bufo carunculatus*) (1.1)
- 1995-1999: 0.2 eastern bongo and 1.1 West African crowned crane were also housed in this exhibit.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)(0.2)
 - Roan Antelope (*Hippotragus equinus*) (1.12 + offspring)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)
 - West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)
- 1993-1995 1.1 East African Crowned Crane were exhibited with roan and Stanley cranes.
 - Roan Antelope (*Hippotragus equinus*)(1.12 + offspring)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.10 + offspring)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1 + offspring)

Group was successfully mixed for 6 years (from 2005 to 2011).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Males were rotated to prevent inbreeding, and young males were pulled prior to sexual maturity to prevent aggression.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The exhibit is currently an unmixed hoofstock exhibit.

Group/Exhibit Changes Over Time:

- 2003-2005: This exhibit housed Abyssinian ground hornbill (1.1 + offspring), addra gazelle (5.0), eastern bongo (1.2) and wattled crane (1.1).
 - Addra (Dama) Gazelle (*Nanger dama*) (5.0)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1 + offspring)
 - Wattled Crane (*Bugeranus carunculatus*) (1.1)
- 2001-2003: Abyssinian ground hornbill (1.1 + offspring), bontebok (0.3), giant eland (0.4), and wattled crane (0.1) were housed in this exhibit.
 - Bontebok (*Damaliscus pygargus*) (0.3)
 - Giant Eland (*Taurotragus derbianus*) (0.4)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1 + offspring)
 - Wattled Crane (*Bugeranus carunculatus*) (0.1)
- 1999-2001: Abyssinian ground hornbill (1.1), bontebok (0.4) were mixed in this space.
 - Bontebok (*Damaliscus pygargus*) (0.4)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1)
- 1996-1999: Abyssinian ground hornbill (1.1 + offspring) were mixed with giant eland (1.5).
 - Giant Eland (*Taurotragus derbianus*) (1.5)
 - Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.1 + offspring)
- 1995-1996: Giant eland (2.5), sand gazelle (1.10), and wattled crane (1.0) were mixed in this enclosure.
 - Giant Eland (*Taurotragus derbianus*) (2.5)
 - Slender-horned Gazelle (*Gazella leptoceros*) (1.10)
 - Wattled Crane (*Bugeranus carunculatus*) (1.0)

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- 1994-1995: Sand gazelle (1.16) were housed with Abyssinian ground hornbill (1.1).
 - Slender-horned Gazelle (*Gazella leptoceros*) (1.16)
 - Abyssinian Gound Hornbill (*Bucorvus abyssinicus*) (1.1)

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.9 + offspring)
- West African Crowned Crane (*Balearica pavonina pavonina*) (1.1)

Group was successfully mixed for 9 years (from 2002 to 2011).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Males were rotated to prevent inbreeding.
- Offspring were moved according to needs; males were pulled before sexual maturity.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit is no longer mixed species, and only contains a breeding herd of addra.

Group/Exhibit Changes Over Time:

- 1995-2002: A single male breeding group of sand gazelle (~1.8 + offspring) and Stanley cranes (1.3) were exhibited together.
 - Sand Gazelle (*Gazella subgutturosa*) (1.8 + offspring)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.3)
- 1993-1995: Giant eland (1.3) were mixed with wattled crane (1.1 + offspring).
 - Giant Eland (*Taurotragus derbianus*) (1.3)
 - Wattled Crane (*Bugeranus carunculatus*) (1.1 + offspring)

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.8 + offspring)
Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group was successfully mixed for 6 years (from 2005 to 2011).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This was a breeding group of individuals. Some female offspring were kept, allowing the size of the herd to grow.

Reproductive Management/Breeding History:

- Males were rotated to prevent inbreeding, with male calves pulled to prevent inbreeding and aggression.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This exhibit maintains the bongo herd, but no longer has birds mixed. The current herd contains 3.14 bongo.

Group/Exhibit Changes Over Time:

- 1992-2005: East African crowned cranes (1.1 + offspring) were also housed in this exhibit.
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.8 + offspring)
 - Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)
 - East African Crowned Crane (*Balearica regulorum gibbericeps*)

White Oak Conservation Center, Yulee, FL – Historical Exhibit

Species:

- Nyala (*Anthropoides angasii*) (1.7 + offspring)
- Blue (Stanley) Crane (*Anthropoides paradiseus*) (1.1)

Group was successfully mixed for 14 years (from 1985 to 1999).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- Males were rotated out to prevent inbreeding, with younger males pulled before sexual maturity. Some females were left with the herd, allowing the herd to grow.

Management Challenges:

- No information provided.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- This enclosure was combined with an adjacent enclosure and currently holds a breeding giant eland herd.

Group/Exhibit Changes Over Time:

- None

Wildlife Safari, Winston, OR – Current Exhibit

Current Species:

- Ankole (Watusi) Cattle (*Bos taurus*) (~5.5)
- Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (~3.3.1)
- Common Eland (*Taurotragus oryx*) (~6.10)
- Gemsbok (*Oryx gazella*) (~1.2)
- Giraffe (*Giraffa camelopardalis*) (~4.0 & 1.2)
- Plains Zebra (*Equus quagga*) (~4.8)
- Scimitar-horned Oryx (*Oryx dammah*) (~2.3)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.1)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Introductions work best during estrus.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- No rotations, breeding and calving occur on exhibit.
- Calves are watched closely for 2-3 days due to zebra aggression.

Management Challenges:

- Zebra aggression during calving and introductions.

Items Contributing to Group's Success:

- Exhibit size
- Large herds
- Natural exhibiting

Group/Exhibit Changes Over Time:

- Bongo, Addax, and waterbuck have been mixed in this exhibit as well. Health issues were bigger issues with these species in our climate. Waterbuck had aggression with smaller herd size; we will be trying a larger herd introduction in the future.
 - Addax (*Addax nasomaculatus*)
 - Ankole (Watusi) Cattle (*Bos taurus*) (~5.5)
 - Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (~3.3.1)
 - Common Eland (*Taurotragus oryx*) (~6.10)
 - Common Waterbuck (*Kobus ellipsiprymnus*)
 - Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*)
 - Gemsbok (*Oryx gazella*) (~1.2)
 - Giraffe (*Giraffa camelopardalis*) (~4.0 & 1.2)
 - Plains Zebra (*Equus quagga*) (~4.8)

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- Scimitar-horned Oryx (*Oryx dammah*) (~2.3)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (1.1)

Wildlife Safari, Winston, OR – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (~10.7.18)
- Aoudad (Barbary Sheep) (*Ammotragus lervia*) (~4.5)
- Guanaco (*Lama guanicoe*) (~1.4)
- Llama (*Lama glama*) (group of 5)
- Roosevelt Elk (*Cervus canadensis roosevelti*) (~4.10)
- Greater (American) Rhea (*Rhea americana*) (2.1)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Breeding occurs on exhibit.
- Bison are very protective of the herd.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- There is no rotation in this group – calving occurs on exhibit without any issues.

Management Challenges:

- Isolating single bison can be challenging.
- Llamas have not worked well with bison.

Items Contributing to Group's Success:

- Exhibit size
- Natural herds

Group/Exhibit Changes Over Time:

- Llamas, guanaco and rhea have been new additions over the past few years.

Wildlife Safari, Winston, OR – Current Exhibit

Current Species:

- Blackbuck (*Antilope cervicapra*) (~5.10)
- Fallow Deer (*Dama dama*) (~6.21)
- Nilgai (*Boselaphus tragocamelus*) (~1.4)
- Sika Deer (*Cervus nippon*) (~5.25)
- Yak (*Bos grunniens*) (~3.8)
- Emu (*Dromaius novaehollandiae*) (~4.3)
- Greater (American) Rhea (*Rhea americana*) (~6.6.15)
- White-naped Crane (*Grus vipio*) (~1.1)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Introductions occur at all times of the year.
- Yak can get aggressive in larger herds.

Changes/Accommodations Needed:

- No information provided.

Reproductive Management/Breeding History:

- Everything occurs on exhibit.

Management Challenges:

- Larger yak herds result in aggression.

Items Contributing to Group's Success:

- Natural herds
- Exhibit size

Group/Exhibit Changes Over Time:

- None

The Wilds, Cumberland, OH – Current Exhibit

Current Species:

- Banteng (*Bos javanicus*) (2.6)
- Scimitar-horned Oryx (*Oryx dammah*) (1.13)
- Common Ostrich (*Struthio camelus*) (1.3)

Group has been successfully mixed for 6 months (current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- We have successfully managed a herd of banteng since 1999. This species has been in several different pastures and been with several different species over this time period. This is subject to change yearly or seasonally depending on breeding recommendations and individual animals' personalities.
- Banteng are managed as a small herd with one breeder bull and five adult cows (1.5). Calves are born in the pasture over the summer. We had 1.1 calves born in 2015.
- Ostrich have been managed at The Wilds since 2011. They have been in several different pastures with a variety of other species including antelopes, giraffe, cervids, and large bovids with no problems.
- Our ostrich group consists of 0.1 older bird that has been here three years, joined recently by 1.2 younger birds. They mixed well with no problems, and seem to get along with all other species well.
- Scimitar-horned oryx have been managed since 1991 and have been with multiple species, including other antelope, rhino, deer, zebra and giraffe without many complications.
- Our current scimitar-horned oryx herd has 0.10 adults in this pasture. All but one individual was born on site with 1.3 calves born in the pasture in 2015. This species mixes well with all other species in this pasture and is used as a filler species here.

Changes/Accommodations Needed:

- Our banteng bulls are aggressive towards species that are taller than they are, such as giraffe and camels. If either of those species need to move through this pasture for any reason the banteng bull must be shifted to a catch yard adjacent to the pasture so they cannot interact. This is also the case when bison or other large bovid species need to go through the pasture housing banteng.
- Banteng utilize both shade structures and watering holes that they can submerge themselves in.
- Given the option the banteng will use foliage for cover and hiding places.
- Banteng do well in any type of topography including hills and water.
- Ostrich use shallow water areas during warmer temperatures. They do well in an open environment with natural substrates.
- Scimitar-horned oryx will utilize shade structures in their pasture. They are rarely observed by the watering hole. They prefer taller grasses for hiding places as well as calving areas. Scimitar-horned oryx calves will stay hidden for up to 3 weeks after birth.

Reproductive Management/Breeding History:

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- For calving, the banteng prefer an isolated location. In this pasture they will go down a hill to get out of sight.
- Banteng males are rotated on and off exhibit in the pasture based on breeding plans, typically starting in August and ending in November.
- The ostrich male and females stay together in the pasture throughout the season. We do not let them incubate their eggs, as we are not actively breeding them at this time.
- Scimitar-horned oryx males are rotated on exhibit in pasture to breed with the females based on breeding recommendations. This happens starting in mid-August and ending in November when species come out of pasture for the season.

Management Challenges:

- In the past we have had challenges with certain scimitar-horned oryx males that do not get along with other species. It has only been with select individuals, not every male; it depends on the individual personalities.

Items Contributing to Group's Success:

- Having varied species diversity helps coexistence (34 acres)
- Ample amount of space compared to individual animal counts
- Favorable herd size and sex ratio per species

Group/Exhibit Changes Over Time:

- We have managed a large variety of mixed species in this pasture because of its close proximity to medical facilities and winter housing. If there is a species that needs to be more closely monitored this is a good area for them because of the limited hiding areas. Typically it is best to have species that tend to get along with many other species because this is a smaller area than some of our other pastures. The smaller size of this pasture also limits the number of herds with large numbers of individuals that can be managed in this area.

The Wilds, Cumberland, OH – Current Exhibit

Current Species:

- Grevy's Zebra (*Equus grevyi*) (1.7)
- Père David's Deer (*Elaphurus davidianus*) (27.29)
- Sichuan Takin (*Budorcas taxicolor tibetana*) (21.19)

Group has been successfully mixed for multiple years (current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The Grevy's zebra herd started with two adult females coming from one institution and three adult females from another. It took a few years for the group to bond, but there were no major conflicts in those first years.
- The Père David's deer herd ranges in age from older individuals (mid- to upper-teens) to new fawns being born every year, with a majority of the herd being born at our facilities. They get along with other species, including other cervids. Males tend to only fight with each other during their seasonal rut, which is between June and July, otherwise the herd gets along together fine. This species has two pastures available to them (Pasture B and Pasture D) because of their ability to swim the lake that separates the two pastures.
- Our Sichuan takin herd started out with a breeding group of mainly adults and sub-adults that mixed together very well. They mix well with most other species and do not normally start conflicts, however, if other species infringe on their food or offspring they will be defensively aggressive.

Changes/Accommodations Needed:

- This is a long, narrow pasture with a ridge down the middle and bodies of water on the sides.
- There are two shelters and three rock piles.
- Père David's deer and Sichuan takin utilize the water access, especially in warmer weather months.
- The Grevy's zebra prefer high, dry ground near the shade shelters.
- There is not much foliage, but the varied terrain provides hiding areas and blind spots for isolation.

Reproductive Management/Breeding History:

- The Grevy's zebra male is rotated in pasture for breeding starting in April through November. With our management, the Grevy's zebra herd will only have one or two offspring every other year.
- The Père David's and takin herds are both managed with multiple males. Both species exhibit seasonal breeding, and will have multiple offspring born to the herds in pasture every season.
- During the Sichuan takin reproductive seasons, which is the end of June to the beginning of August, males will fight for dominance and breeding rights. Serious injuries are possible, and animals may need to be removed from the group for medical attention or to prevent further fighting.

Management Challenges:

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- Challenges faced with these species are potential injuries occurring during intra-specific competition during rut for both Père David's deer Sichuan takin.
- Sichuan takin are not typically aggressive towards other species, but will react aggressively if surprised or threatened. Due to their size and strength, serious injuries can result.

Items Contributing to Group's Success:

- Ample amount of space for all species to separate if needed (143 acres)
- Père David's deer and takin are both in pasture year round and have no long term separation

Group/Exhibit Changes Over Time:

- The species composition in this pasture has minimally varied – the exception being Bactrian camels which seem to get along with the current species.
 - Bactrian Camel (*Camelus bactrianus*)
 - Grevy's Zebra (*Equus grevyi*)
 - Père David's Deer (*Elaphurus davidianus*)
 - Sichuan Takin (*Budorcas taxicolor tibetana*)
- Père David's deer have been at the Wilds since 1995 and have always been in this pasture.
- The Grevy's zebra have been at The Wilds since 2005 and have rotated between Pasture A and Pasture B because of male's proximity to other equid males.
- The takin were introduced to the pastures in 2008.
- The herd sizes have constantly grown since the beginning but seem to do better with a lower male to female ratio for all species.

The Wilds, Cumberland, OH – Current Exhibit

Current Species:

Generic and Masai Giraffe (*Giraffa camelopardalis/Giraffa camelopardalis tippelskirchi*) (3.2)
Père David's Deer (*Elaphurus davidianus*) (27.29)
Przewalski's Wild Horse (*Equus ferus przewalskii*) (1.8)
Sichuan Takin (*Budorcas taxicolor tibetana*) (21.19)

Group has been successfully mixed for 10 years (since 2005, current as of 2015).

Exhibit Size: Larger than 8 acres

General Management Notes:

- Przewalski's wild horses were put into this pasture around 2004 to try and limit their grazing potential due to weight and laminitis issues that occurred in Pasture C from a nearly unlimited amount of grazing. The move seemed to work; we have not had any laminitis cases; this pasture has more tree cover than open grazing spots.
- Giraffe are moved into this pasture around June 1st and removed mid-September. All is determined by weather.
- Père David's deer and Sichuan takin herds will both cross the lake and use this pasture as well as the one described above. See The Wilds Current Exhibit for notes on the management of deer and takin.

Changes/Accommodations Needed:

- This pasture has the most available browse for the giraffe.

Reproductive Management/Breeding History:

- The male Przewalski's horses are rotated into pasture every other year for breeding based on recommendations. Females will have their foals in pasture in the spring and summer.
- Male giraffe are only put out with the herd at specific times of the year in order to time potential births to an appropriate season.

Management Challenges:

- Occasionally a male Przewalski's wild horse will challenge a giraffe for food; this depends on the specific individual and does not occur with every male placed in the pasture. However, if this does occur the male horse will be separated and removed from the pasture.

Items Contributing to Group's Success:

- Lots of space (78 acres)
- Varied habitats – there is tree cover and foliage for hides. There is also a good amount of shore line with the water so species do not have to frequent the same area as others if they do not want.

Group/Exhibit Changes Over Time:

- Giraffe were managed here up to 2015.
- Bactrian deer used to be in this pasture but due to the extensive cover and their use of it they were not easily accessible for daily management and veterinary treatments.

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- Bactrian Deer (*Cervus elaphus bactrianus*)
- Generic and Masai Giraffe (*Giraffa camelopardalis/Giraffa camelopardalis tippelskirchi*)
- Przewalski's Wild Horse (*Equus ferus przewalskii*)

The Wilds, Cumberland, OH – Current Exhibit

Current Species:

- Bactrian Camel (*Camelus bactrianus*) (1.5)
- Greater One-horned Rhinoceros (*Rhinoceros unicornis*) (1.2)
- Indochinese Sika (*Cervus nippon pseudaxis*) (5.0)
- Persian Onager (*Equus hemionus onager*) (0.15)

The rhinos, onagers, and camels in this group have been successfully mixed for 16 years (since 2000, current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- We introduce adult female Bactrian camels throughout the year with no problems; male offspring are removed from the group at 2 years of age. This herd stays out in pasture year round.
- Our Indian rhino herd started with one male and two females. Herd size may vary with calves. The rhinos go out to pasture in April and come back around the end of October.
- Males have been introduced to the Indochinese sika bachelor group at one year of age when they can no longer live with related females. This herd stays out year round.
- Persian onagers stay out year round and have foals in pasture.

Changes/Accommodations Needed:

- Bactrian camels share the area well with the species in this pasture. There is a multitude of places for them to inhabit, however they seem to prefer road sides and open flat areas.
- This pasture is best for the Indian rhinos because of multiple water access and large areas of woody vegetation for hiding and separation from each other. This is also the farthest pasture away from the southern white rhinos, so there is no visual access between the species.
- The bachelor group of sika is managed in this pasture because of the distance from the female herd. This species also prefers the woody vegetation for hides and to rub antlers.
- Onagers can pester other animals so they get along well in this pasture because of the size difference between them and the Bactrian camels and Indian rhinos.

Reproductive Management/Breeding History:

- Bactrian camels are always together and breed seasonally. We pull the camels into an adjacent pasture when a calf is born because of the Persian onagers. We have found that younger onagers (1 to 3 year olds) will pester and pick on camel calves. After the camel calf is 4 to 5 months old we will return the camel group back to pasture with the onagers.
- The Indian rhino male and females stay out in pasture together from April until late October. We have had times were females come to the Wilds and have never been out in our large areas before. We will usually introduce the inexperienced animals to the area first before the male goes out. This gives them a few days to roam around and explore the place before the male is introduced. We expect the male rhino to run them around for a brief period following the introduction. This behavior does not typically last long or cause any damage.
- Persian onager males are put in pasture based on breeding recommendations, and can stay out with their foals.

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Management Challenges:

- Sika males will still be aggressive towards each other in rut season, even though there are no females around.
- Some Persian onager males go around and pester other animals in the pasture when all of their females are bred. This has been an issue with some males, but not all.

Items Contributing to Group's Success:

- All types of species use different habitats within the pasture. Bactrian camels like the roads and small flats along them. Persian onagers like the open grass areas and sometimes the roads. Sika like thick cover. The Indian rhinos like pond edges, muddy bogs, and woody cover.
- There is ample space for the species to get away from each other (101 acres).
- Two species are herd animals (camels and onagers) and two are more solitary (Indian rhino and male sika).

Group/Exhibit Changes Over Time:

- Rhino, onager, and camel have always been in this pasture, but the number of individual animals per species has changed throughout the years. Numerous other species have been managed in this area including:
 - American Bison (*Bison bison*)
 - Bactrian Camel (*Camelus bactrianus*)
 - Banteng (*Bos javanicus*)
 - Greater One-horned Rhinoceros (*Rhinoceros unicornis*)
 - Indochinese Sika (*Cervus nippon pseudaxis*)
 - Père David's Deer (*Elaphurus davidianus*)
 - Persian Onager (*Equus hemionus onager*)
 - Przewalski's Wild Horse (*Equus ferus przewalskii*)



Amy Johnson

The Wilds, Cumberland, OH – Current Exhibit

Current Species:

- American Bison (*Bison bison*) (1.13)
- Common Eland (*Taurotragus oryx*) (0.3)
- Fringe-eared Oryx (*Oryx beisa callotis*) (0.4)
- Sable Antelope (*Hippotragus niger*) (1.8)
- Southern White Rhinoceros (*Ceratotherium simum simum*) (2.8)

Group has been successfully mixed for 6 months (current as of 2016).

Exhibit Size: Larger than 8 acres

General Management Notes:

- The white rhinoceros and the African antelope species have been in this pasture and coexisted for years.

Changes/Accommodations Needed:

- There are multiple shade structures in this pasture because of lack of natural shade.
- There is a large water area with extended shorelines.
- Also in this pasture are many rock piles for hides, along with many rolling hills that shorten lines of sight for animals.

Reproductive Management/Breeding History:

- This pasture houses a variety of African antelope species that get along well when there is no breeding male present.
- Some species need to be separated into different pastures during breeding seasons when the males are introduced. This happens starting in August until the end of the November when they are moved to winter housing.

Management Challenges:

- Some individual antelope males do not get along with other species so their herd will be separated out of this pasture when the males are present for breeding.
- In the past we have had negative interactions between male Grevy's zebra and the southern white rhinoceros, so we no longer have zebra and rhinos in the same pasture.
- Occasionally species such as the American bison and the white rhinoceros want to occupy the same areas of the pasture. When that happens, animal management usually uses food to relocate one of the species to a different area with a visual barrier.
- We managed southern white rhinoceros and giraffe together with no problems for over 20 years, however, we've had aggressive interactions in recent years between these species. Because of these negative interactions we no longer manage these two species in the same pasture area.

Items Contributing to Group's Success:

- This is the largest pasture so the amount of space makes this mix successful (166 acres).
- Topographic options such as hills, rocks, and barriers are used to create visual barriers if there is a conflict.

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- There are several easy options to remove animals from the pasture if there are conflicts. These options include three catch yards, two other pastures, and the rhinoceros and giraffe facilities that all border the pasture.

Group/Exhibit Changes Over Time:

- In the past, because of its location and vast size, we have used this as an area for male bachelor herds such as bison and Bactrian deer. Due to change in management strategy we no longer manage separate bachelor herds; instead we use multi-male herds for these species.
- From 1997 until the present there has been a wide variety of species that have been in and out of this pasture. The species that have been constant since the beginning are the common eland and southern white rhinoceros. Other species such as the sable antelope, fringe-eared oryx, and the scimitar-horned oryx alternate in this pasture depending on breeding with males and when they have offspring.
- We previously housed southern white rhinos and Grevy's zebra together in this pasture; however, because of negative interactions from the stallion to the rhinos we no longer keep these species in the same pasture.
 - Common Eland (*Taurotragus oryx*)
 - Grevy's Zebra (*Equus grevyi*)
 - Southern White Rhinoceros (*Ceratotherium simum simum*)
- For kept giraffe and rhinos together successfully for over 20 years. Recent bouts of aggression resulted in the separation of these species.
 - Common Eland (*Taurotragus oryx*)
 - Giraffe (*Giraffa camelopardalis*)
 - Southern White Rhinoceros (*Ceratotherium simum simum*)



Brent Huffman

Woodland Park Zoo, Seattle, WA – Current Exhibit

Current Species:

- Fringe-eared Oryx (*Oryx beisa callotis*) (2.0)
- Grant's Gazelle (*Nanger granti*) (1.4)
- Plains Zebra (*Equus quagga*) (1.2)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.2)
- Common Ostrich (*Struthio camelus*) (1.1)
- Egyptian Goose (*Alopochen aegyptiaca*) (0.4)
- Helmeted Guineafowl (*Numida meleagris*) (2.0)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Zebra, oryx, gazelle, and giraffe have been in the same exhibit since 1980. Ostrich were introduced in 2007.
- Male zebra was castrated, but prior to that he would frequently displace all the other animals.
- Male ostrich also displaced giraffe and had to be managed separately at certain times.
- The exhibit includes two low shelters for gazelle and one taller shelter for zebra and oryx.
- New species or individuals are introduced first to the gazelle, then to oryx, giraffe, ostrich and finally to the zebra.

Changes/Accommodations Needed:

- Gazelle have access to the barn through a creep door that excludes the bigger species.
- Zebra and oryx shift through the same door when coming into the barn and are frequently left with access to each other while inside.
- Giraffe have a separate barn, as do the ostrich.

Reproductive Management/Breeding History:

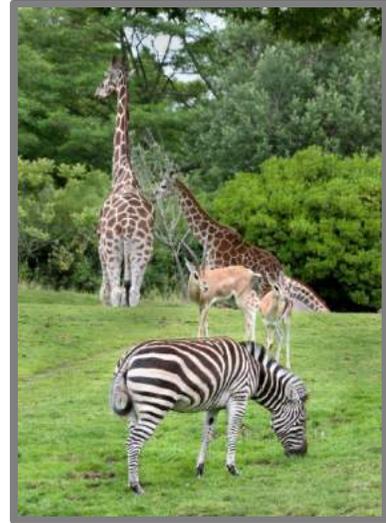
- Zebra tend to be aggressive to new animals on the exhibit, even giraffe. When we were breeding Grant's gazelle many years ago dams and calves were kept in an enclosure away from the zebra for two months.

Management Challenges:

- Aggression from zebra to all the other animals is a challenge, although it usually subsides.
- Ostrich displacing new giraffe is also challenging.

Items Contributing to Group's Success:

- Compatibility of the species
- Gradual introductions of new species and individuals
- Size of the exhibit



Dennis Dow



Dennis Dow

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Group/Exhibit Changes Over Time:

- None

Zoo Atlanta, Atlanta, GA – Current Exhibit

Current Species:

- Lesser Kudu (*Tragelaphus imberbis*) (2.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (4.0)
- Plains Zebra (*Equus quagga*) (0.2)
- Common Ostrich (*Struthio camelus*) (0.2)

Group has been successfully mixed for 3 years (since December 12th, 2012, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The lesser kudu were young when they arrived at Zoo Atlanta (both boys were approximately 6 months old). We introduced them slowly to each animal on exhibit, giving them an escape back into their stall if they needed. Once we locked them on exhibit after the introductions, we gave them access to a small holding pen that they had access to through a tunnel. Eventually, once everything looked calm and normal, we locked them out of that pen as well.
- While in quarantine, Watson appeared to be the more 'spastic' of the two kudu and tried to jump through a small window to escape the quarantine keeper; he got a gash on his head because of that. But as time has gone on, Watson has proved to be the more calm and easily-trained one. He enjoys scratches and head-rubs, while his brother Sherlock doesn't want anything to do with us.

Changes/Accommodations Needed:

- Slow introductions with escapes to holding pens or the inside barn were necessary for the kudu introductions.
- We also had more logs over a small area that they could jump into to get away from giraffe and possibly zebra.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Watson is very 'interested' in the zebra girls. He hasn't tried to mount them, but he does enjoy rubbing his horns and head on their back-ends, which occasionally results in a kick to the head (not hard enough to do damage).

Items Contributing to Group's Success:

- The calmness of the lesser kudu
- The fact that there is no reproduction in this exhibit
- Good yard space

Group/Exhibit Changes Over Time:

- None

Zoo Boise, Boise, ID – Current Exhibit

Current Species:

- Greater Malay Chevrotain (*Tragulus napu*) (1.0)
- Aldabra Tortoise (*Aldabrachelys gigantea*) (0.1)

Group has been successfully mixed for 1+ years (current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The Aldabra tortoise is 63 years old; the chevrotain is 11 years old.
- They are housed together year round in an indoor exhibit and have access to an outdoor exhibit in warmer months.
- The chevrotain is always locked in at night as the outside exhibit is open top (we have raccoon, mink, and fox in the area).
- When we first introduced the 2, the tortoise destroyed the chevrotain's den area, and the chevrotain defecated in the tortoise's hay.
- We separated them at feeding time to ensure they were each getting their appropriate diet. We no longer separate them, but do feed them at the same time so that they don't eat each other's food.

Changes/Accommodations Needed:

- The chevrotain's den was rebuilt so that it would accommodate the tortoise if she tried to go in it. We have not had any issues with the tortoise destroying the den since then.

Reproductive Management/Breeding History:

- None

Management Challenges:

- Besides the initial hiccups that happen with any introductions, we have had no issues.

Items Contributing to Group's Success:

- They are both solitary animals and pretty much keep to themselves.
- We feed at the same time to minimize one animal not getting enough to eat.
- They both have areas of the exhibit that they prefer to hang out in.

Group/Exhibit Changes Over Time:

- None

Zoo Boise, Boise, ID – Current Exhibit

Current Species:

- Anglo-Nubian Goat (*Capra aegagrus hircus*) (0.3)
- La Mancha Goat (*Capra aegagrus hircus*) (0.4)
- Llama (*Lama glama*) (1.0)
- Oberhasli-Brienz Goat (*Capra aegagrus hircus*) (1.2)
- Shropshire Sheep (*Ovis aries*) (1.4)
- Toggenburg Goat (*Capra aegagrus hircus*) (1.2)

Group has been successfully mixed for 5+ years (current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All goats and sheep are domesticated species.
- Most of these goats, sheep, and llama have lived together for 4+ years.
- They are housed in our "Zoo Farm" exhibit that is one large yard, barn at the back of yard, and 2 outside covered areas.
- They live together year round and get along fine.

Changes/Accommodations Needed:

- We do have to try and separate the llama from the rest of the herd so he can have his special diet. Most of the goats and sheep will enter in to the barn and we can close them in. Often one goat will not join the group in the barn, but she can be harnessed and tied to a fixed spot while the llama eats (the goat is given a treat at the same time).

Reproductive Management/Breeding History:

- All of our original female goats and sheep (with exception of 1) came in pregnant and we currently house them and their offspring.

Management Challenges:

- We have no challenges, other than the feeding of the llama as mentioned above.

Items Contributing to Group's Success:

- Diets are all similar.
- Plenty of space for all animals to be able to get away from the group if they need to
- Easy to manage in general

Group/Exhibit Changes Over Time:

- None

Zoo Boise, Boise, ID – Historical Exhibit

Species:

- Llama (*Lama glama*) (4.0)
- Sika Deer (*Cervus nippon*) (0.1)

Group was successfully mixed for ≤4 years (from sometime after 2007 to 2011).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- We had a single, old female sika deer that we needed to house, but did not want to house alone. We were not interested in continuing to include sika deer in our collection so we chose to house her with 4 llamas.
- The sika deer kept to herself, but definitely ruled the yard.

Reproductive Management/Breeding History:

- None

Management Challenges:

- None

Reasons Exhibit No Longer Exists/Houses Ungulates:

- The sika deer passed away due to old age, and llamas were placed with our goats and sheep in our new “Zoo Farm” (see Zoo Boise Current Exhibit).

Group/Exhibit Changes Over Time:

- None

Zoo de Granby, Granby, Québec, Canada – Current Exhibit

Current Species:

Grant's Zebra (*Equus quagga boehmi*) (0.2)

Southern White Rhinoceros (*Ceratotherium simum simum*) (1.1)

East African Grey Crowned Crane (*Balearica regulorum gibbericeps*) (1.1)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The management of this mixed species exhibit has been relatively simple since 2007. Our 3 species all live together in summer.
- The 1.1 rhinos spend 23 hours a day in the habitat and one hour indoors during cleaning for their first meal. To give them the opportunity to protect themselves against the weather, they have free inside access to their pen during the night. They are calm and friendly with the keepers and also with their “roommates”. They are cooperative in the training sessions.
- Our male rhino is 12 years old and he arrived at Granby with his brother before reaching sexual maturity. We didn't have any problem introducing them with the 2 other species. The female is 36 years old. She was switched for one of our males a few years ago, after it became difficult to keep the males together when they achieved maturity. Rhinoceros have their winter quarters adjacent to their habitat so when the weather is too cold (we have a weather scale for them), we just keep them inside.
- Hay is given outside at different times for our rhino and zebra.
- Zebra are transferred to the rhino's habitat at the beginning of May where they'll stay until mid-November. They return to the savannah sector for the winter. We shift them easily with a hydraulic trailer. In the spring, we don't always shift the same 0.2 zebra on this exhibit; it depends on the hierarchy in the herd (newborn, etc.). Sometimes the zebra will communicate with the other zebra that are in the savannah sector, especially after their recent transfer in the spring, but we have never had problems introducing zebra.
- Cranes stay outside all summer long. They have access to a rhino-free zone if they wish, where their feeder is installed. The male is aggressive towards keepers during cleaning. Their feathers are cut at the beginning of season, near the middle of May and a second time at the end of August to maintain them in the habitat. In winter, they are kept in a pen adjacent to the rhino's pen.
- Like the cranes, zebra have a large rhino-free zone. They can visit that area when they want. The zebra are sent inside at night for their security. We fear that they could enter in the rhinoceros pens and that the rhino may attack them in a small space without an escape option.

Changes/Accommodations Needed:

- The zebra and cranes have access to a few “rhino-free” areas; there are a lot of hiding places too (trees, rock, bushes).
- The topography is mostly regular and the substrate is natural. We have different water sources, and we can throw hay easily from the outskirts of the habitat.

Reproductive Management/Breeding History:

- There has not been any breeding in this habitat; the facility was not designed to breed rhino, which is why we chose to get a post-reproductive female.
- We tried to breed the cranes, but the eggs were infertile. The cranes have a place specially designed for them around the pond; we will be looking into crane insemination next year.

Management Challenges:

- The only challenge we have had in this group was managing the two male rhino after they reached sexual maturity and became aggressive toward each other. Before the switch there was a time when we couldn't keep the two males together anymore, and so they were managed separately and alternated time on the exhibit.

Items Contributing to Group's Success:

- A security zone
- Ratio and group composition
- Good management

Group/Exhibit Changes Over Time:

- At the beginning when the habitat was first opened we had 2.0 rhinoceros that were both 4 years old. The males became aggressive once they reached maturity, just as we had predicted, and we exchanged one of the males for a post-reproductive female; this exhibit has been problem-free ever since.

Zoo de Granby, Granby, Québec, Canada – Current Exhibit

Current Species:

Domestic Yak (*Bos grunniens*) (1.3.3)

Himalayan Tahr (*Hemitragus jemlahicus*) (1.5)

Group has been successfully mixed for 12 years (since 2003, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Our Himalayan mixed exhibit stays the same all year round without any management required.
- In the morning, the yak are transferred indoors for their feeding and to allow the keepers to clean the habitat. The tahr spend all their time in the habitat and have free access to an indoor holding where their feed is distributed. The yak cannot access the tahr holding because the doors aren't big enough. During the evening, the keepers open the doors that lead to the yak holding, which gives them free indoor access and also access to their second feeding area.
- The tahr sometimes enter the yak holding, but without any negative consequences.
- Hay may be distributed at various times, not causing any aggression between the two species.



Zoo de Granby

Changes/Accommodations Needed:

- The habitat is quite large for the cohabitation of both species.
- The tahr have easier access to one area of the park that represents a pseudo-mountain, and they can also take refuge indoors.
- There is some variation in the topography and the mountain creates hiding places.

Reproductive Management/Breeding History:

- Our yak reproduce each year, births often occur early in the morning. This causes no problems.
- In the past, we have also had tahr births within the mixed group without any problems. The Himalayan tahr are nervous and will flee if we enter their comfort zone. They have this same attitude towards the yak.
- Reproduction happens on its own. The young yak usually leave the group when they are around two years old. When our reproductive male passed on, we easily acquired a second reproductive male that was quickly introduced to the females.

Management Challenges:

- We have had aggressions between tahr, but nothing serious.
- The young yak sometimes enter the tahr holding to steal some of their feed.
- Our installations make it difficult for us to capture the group of tahr.

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Items Contributing to Group's Success:

- Selection and species ratio
- Size and habitat topography

Group/Exhibit Changes Over Time:

- We bred tahr in the past, but had to stop because of an inbreeding problem and have not been able to find a new reproductive male.

Zoo de Granby, Granby, Québec, Canada – Current Exhibit

Current Species:

- Common Eland (*Taurotragus oryx*) (1.2)
- Grant's Zebra (*Equus quagga boehmi*) (0.4)
- Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (1.3)
- Thomson's Gazelle (*Eudorcas thomsonii*) (3.0)
- Common Ostrich (*Struthio camelus*) (0.3)
- Marabou Stork (*Leptoptilos crumenifer*) (2.1)

Group has been successfully mixed for 8 years (since 2007, current as of 2015).

Exhibit Size: 3 acres-8 acres

General Management Notes:

- Introductions to the exhibit went in the following order: giraffe first, then common eland (previous species), then 0.2 zebra and ostrich, followed by 1.3 zebra, then the marabou storks, and finally the gazelle.
- In summer, all the species live outside together. In the colder seasons, only the zebra and the ostrich can be exhibited outside, depending on our weather scale. For the others (giraffe, eland, gazelle and marabous), they are all separated physically in their large winter pens.
- Animal welfare is a priority for this institution. For this reason, we leave as many species as possible outside at night to minimize their time on a concrete floor. This means that gazelle, marabou storks, and ostrich spend 23 hours a day on exhibit. The giraffe, eland, and zebra also spend the night outside, but in a separate pen; this minimizes the pressure on the vegetation of the habitat and continues to promote normal behavior, like foraging during the day.
- All the species of the savannah are called inside in the morning for exhibit maintenance and training. The animals know the shifting order and generally follow the procedure without issue.
- When we need to add a new species or individuals to the group we use the following procedure (the procedure is flexible, depending on the animals' behaviors):
 - Inside pen, visual contact with their species group
 - Inside pen, direct contact with their species group
 - Outside isolation + inside access with their species group + visual on the savannah
 - Exhibit access with their species group.
 - Exhibit access with their species group and a gradual cohabitation with the other species: birds, gazelle, giraffe, eland, and zebra
- Some of the species have their own territory or preferred location in the exhibit (e.g. the marabou near a natural pond).
- Giraffe reproduce well in this group; they are calm and friendly with the other species.
- The eland are becoming older and therefore are relatively calm as well. However, sometimes at the alfalfa rack the male pushes the giraffe away so he can pick the alfalfa off the ground. We reduced this problem by adding an automatic feeder further in the savannah.



Zoo de Granby

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- The zebra have more energy; they use the whole exhibit space and tend to run after the gazelle when they look nervous.
- Marabous are curious but they don't bother the other species.
- Ostrich are sometimes nervous and tend to join the run when started by the other species.

Changes/Accommodations Needed:

- Our savannah is large and green. We try to keep grass in the exhibit to keep the exhibit looking nice and to promote natural behaviors.
- The exhibit also contains live and dead trees, rocks, ponds, and natural plants that provide hides to our species.
- The size of this habitat and topography helps to give different territories and resting spots.

Reproductive Management/Breeding History:

- We have been very successful breeding giraffe. At night, we keep only the female in estrus with the male, separating them from the other females. When possible, we try to time calving during the winter so the calves are ready to go on exhibit in the spring. If calving occurs in the spring or summer then the calf and dam have to stay inside or in the outside pen, which is not desirable for the public. We never introduce the young to the others species before it is 5-6 months old.

Management Challenges:

- Presently, everything is going well. Before the departure of the male zebra, he would occasionally chase the gazelle or infants of other species.
- In the beginning, it was not easy to manage the gazelle because we didn't have a big group and they were very nervous. With time, we increased our knowledge, and at the same time the gazelle became less nervous. We hope to increase the size of the gazelle herd in the future.

Items Contributing to Group's Success:

- Our large space and facility (installations)
- Sex ratio and group composition

Group/Exhibit Changes Over Time:

- Our past group composition was: 1.2.2 giraffe, 1.1.1 common eland, 1.3 zebra, 0.4 ostrich, 5.0 gazelle, and 2.2 marabou storks. It's difficult to define a specific group at a specific time because the composition changes with births, mortalities, acquisitions and dispositions. However, since the construction of this habitat, the overall composition in general has mostly remained constant.
 - Common Eland (*Taurotragus oryx*) (1.1.1)
 - Grant's Zebra (*Equus quagga boehmi*) (1.3)
 - Rothschild's Giraffe (*Giraffa camelopardalis rothschildi*) (1.2.2)
 - Thomson's Gazelle (*Eudorcas thomsonii*) (5.0)
 - Common Ostrich (*Struthio camelus*) (0.4)
 - Marabou Stork (*Leptoptilos crumenifer*) (2.2)

Zoo de Granby, Granby, Québec, Canada – Historical Exhibit

Species:

- Llama (*Lama glama*) (1.3)
- Capybara (*Hydrochoerus hydrochaeris*) (1.1)
- Greater (American) Rhea (*Rhea americana*) (1.2)

Group was successfully mixed for 10-12 years (from the 1990s to approximately 2003).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All three species lived together without any problems during spring, summer and fall.
- The llama would stay year-round in the habitat while the other two species were transferred to their winter quarters.
- The rheas were aggressive towards the keepers, but not with the other animals.

Reproductive Management/Breeding History:

- The capybaras had a cabin and a water basin where they could go to seek refuge.
- Shortly before giving birth, the female capybara was isolated in winter quarters.
- The llama and rheas both reproduced easily, without management.

Management Challenges:

- The rhea were aggressive towards the keepers.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- Modifications were made to the exhibit. We still have capybaras and llama, but they are not housed together because of convenient locations.
- Rheas were removed from the collection plan; for the time being we have emu and ostrich instead.

Group/Exhibit Changes Over Time:

- None; it was almost always the same animal proportion in this habitat.

Zoo de Granby, Granby, Québec, Canada – Historical Exhibit

Species:

- Reeves's (Chinese) Muntjac (*Muntiacus reevesi*) (1.0)
- Red Panda (*Ailurus fulgens*) (1.1)

Group was successfully mixed for approximately 4-5 years (from ~1999 to 2003).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The two species were separated for the night and during meals, but would be together throughout the day.
- The pandas spent their day higher up in trees and on branches and when they came down the muntjac would be on the lookout, but didn't show any signs of stress.
- The pandas were fed up on higher platforms and the muntjac at ground level.
- During winter, the muntjac was transferred to his winter quarter.

Reproductive Management/Breeding History:

- There was no reproduction in this exhibit.

Management Challenges:

- None; these species were well-tempered.

Reasons Exhibit No Longer Exists/Houses Ungulates:

- A new female panda arrived and she was aggressive towards the muntjac. It was decided to remove the muntjac from the animal collection plan. Following our pandas' housing modernization, mixed species housing was excluded.

Group/Exhibit Changes Over Time:

- None

Zoo Miami, Miami, FL – Current Exhibit

Current Species:

- Grant's Gazelle (*Nanger granti*) (1.3.3)
- Grant's Zebra (*Equus quagga boehmi*) (1.2)
- Reticulated/Rothschild's Giraffe Hybrid (*Giraffa Camelopardalis reticulata/rothschildi*) (2.3.2)
- Common Ostrich (*Struthio camelus*) (1.1)
- Vulturine Guineafowl (*Acryllium vulturinum*) (0.0.4)

Group has been successfully mixed for 10+ years (current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- The giraffe shift in every night and back out each morning.
- There are two yards so the zebra rotate on and off exhibit on a random basis.
- We usually will put giraffe calves out on exhibit after a few days but give them a few hours with just the dam to orient to the new exhibit. We then will slowly start adding the rest of the herd. Once the herd is established we introduce the rest of the animals slowly based on individual disposition.
- With the gazelle calves we usually wait a few days and then give the herd access to the exhibit (the door restricts other species from entering holding). After a few days of access to the exhibit we lock everyone out.

Changes/Accommodations Needed:

- The Grant's gazelle holding is blocked off to keep the giraffe and zebra out, but still allow for the gazelle to come and go.

Reproductive Management/Breeding History:

- The groups remain together throughout the year except when trying to introduce a new calf to the exhibit.

Management Challenges:

- We have rarely seen any interspecies aggression; however, we have a male Grant's gazelle with a fractured mandible (most likely from a zebra kick).

Items Contributing to Group's Success:

- Exhibit size
- Second yard allows us to move animals off for introductions/calving
- Giraffe feeding station gives giraffe something to focus on

Group/Exhibit Changes Over Time:

- The gazelle are newer to the exhibit but the group has been managed the same way for a while.

Zoo Miami, Miami, FL – Current Exhibit

Current Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.1.1)
- Greater Kudu (*Tragelaphus strepsiceros*) (1.4)
- Spur-thighed Tortoise (*Testudo graeca*)

Group has been successfully mixed for 2 years (since 2013, current as of 2015).

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- These animals were introduced as adults.

Changes/Accommodations Needed:

- None

Reproductive Management/Breeding History:

- Both ungulate species breed regularly. The groups remain together unless introducing a calf to the exhibit yard.

Management Challenges:

- None

Items Contributing to Group's Success:

- Exhibit Size

Group/Exhibit Changes Over Time:

- None

Zoo New England, Boston, MA & Stoneham, MA – Current Exhibit

Current Species:

Blue (White-bearded) Wildebeest (*Connochaetes taurinus*) (1.3)

Grant's Zebra (*Equus quagga boehmi*) (2.0)

Red-necked Ostrich (*Struthio camelus camelus*) (1.1)

Group has been successfully mixed for ~23 years (since ~1992, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- This group of animals is displayed and managed at Franklin Park Zoo's Serengeti exhibit, located at the northern end of the zoo.
- All species are accessed to the exhibit throughout the year. Each has proven hardy enough to display throughout New England winters and are only restricted from exhibit access during times of icy condition.
- The zebra are secured inside barn stalls at night. The ostrich and wildebeest are given stall access and free choice to remain outdoors overnight. In the case of the female wildebeest, this is because this group has never tamed down enough to safely secure indoors. Males have been able to be captured inside without exhibiting excessive stress. The current male is quite tractable and has responded to some operant conditioning.
- An additional 1.2 Grant's zebra are managed as a breeding pair, but the stallion has proven intolerant of being displayed adjacent to an exhibit that contains 0.2 warthogs mixed with 1.2 African crested porcupines. This has required this pair to be restricted to an off-exhibit holding area adjacent to the zebra holding barn.
- Timothy hay is provided on exhibit as the main source of dietary forage, but in addition the exhibit offers plentiful natural grass for grazing. An automatic fill waterer is concealed from view by means of an artificial rock and offers the only source of drinking water for all species.
- The male wildebeest has shown tendencies to chase the ostrich and has since been restricted to going on exhibit only when the ostrich are kept in their holding area. The zebra males associate well with both the female and male wildebeest.
- In the past, this exhibit also contained ibex mixed with the above mentioned species. In the past, it also served as a display for bongo given that a large portion is covered by mature oak trees and was known as Bongo Congo. The bongo proved unsuccessful for display in this area since it is situated along a very busy city street and the animals were sensitive to the noise and activities of the public outside the zoo's perimeter fenceline.
- This exhibit offers very close public access (4 ft. post and rail setback from exhibit perimeter fenceline) and allows for close observation. Each species has a designated off-exhibit holding yard directly adjacent to the main exhibit. Animals are visible from the public viewing area and this fenceline also effectively serves for soft introductions (howdying) for introducing new individuals.

Changes/Accommodations Needed:

- Truck access gates are installed at 2 locations to allow for an F250 pickup truck to be used during intra- and interspecies introductions. These access points also allow for landscaping equipment (e.g., backhoe, skid steerer, dump truck, etc.) to be brought into this space.

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- Some flooding of portions of the exhibit has happened. Difficulties in locating storm sewers from old zoo drawings has hindered being able to fully and effectively eliminate this condition.
- A lack of barn access within a reasonable distance to this exhibit has proven the main limitation to being able to add additional species. An example would be that an approximately 500 foot transfer chute needed to be constructed to be able to transit the 0.2 warthogs from their holding barn to the exhibit. Limitations in capital funding has not allowed for any newer construction other than using circa 1930 holding structures.

Reproductive Management/Breeding History:

- The male wildebeest is kept separated from the female other than for selected breeding with particular females.
- Pairing for mating is accomplished in off-exhibit holding areas.
- Gender groups are rotated during times when the sexes are separated to prevent breeding. The breeding pair of zebra currently are restricted to being held in an off-exhibit holding area for the reasons previously stated.
- Ostrich are paired from display and breeding continuously.

Management Challenges:

- Challenges have included configuring a stable Grant's zebra grouping. Aside from problems described in displaying the breeding pair of zebra we have experienced problems trying to maintain male offspring long term in with the adult stallion. We also experienced incompatibility challenges from the adult female to a juvenile female who we tried to introduce to the pair to configure a harem grouping. This attempt at forming such a social group failed.
- The female wildebeest group has never acclimated to being in close proximity to staff and react very negatively to being confined in closed spaces. This has required giving these animals access to indoor holding during the winter, but this has at times caused exclusions of subordinate individuals from the holding.
- Minor cases of interspecific incompatibility have developed, mostly during initial introductions of new animals to the exhibit space.

Items Contributing to Group's Success:

- Grouping reflects natural interspecific associations as African plains animals.
- Exhibit space offers ample room (>1 acre) to allow for successful inter- and intraspecific socialization.
- Continual close management observation is helpful to detect and address social anomalies either inter- or intraspecific in nature. A large off-exhibit holding area allows for temporary or longer term separations when necessary.

Group/Exhibit Changes Over Time:

- None

Zoo New England, Boston, MA & Stoneham, MA – Current Exhibit

Current Species:

Grevy's Zebra (*Equus grevyi*) (1.4)

Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.1)

Group has been successfully mixed for ~10 years (since the early 2000s, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Few intraspecific conflicts have occurred. When they have, it has most often been the result of young male Grevy's zebra harassing the giraffe. There have been times when some animals need to be restricted from being put on exhibit with giraffe due to persistent antagonism.
- Giraffe have high temperature restrictions (female accessed only at temperatures above 65 F/ male only exhibited at 70 F or higher). The Grevy's zebra offer much greater seasonal exhibition (restricted at temperatures below freezing with icy conditions or low wind chills).
- Both species are accessed to the exhibit through separate transfer chutes and are housed in separate barns.
- Capacity for giraffe is limited to 3 stalls and allows for only managing the adult male, female and a calf before needing to transfer the calf to another facility in preparation for following births. The Grevy's zebra barn contains 6 separate stalls.

Changes/Accommodations Needed:

- The exhibit vegetation is sparse and requires greater supplementation of forage. Natural shade has been provided by mature American beech trees, but those trees have been blighted by three-line bores and are dying out. A 20 foot tall, triangular-shaped shade cloth structure provides supplemental shade. Plans are to enlarge this structure to provide shade for a greater portion of the day especially in light of losing the previously mentioned trees.
- No special configuration is needed to mix these 2 species on this exhibit. As mentioned earlier some need to supplement shade has been addressed and will be increased going into the future.
- The exhibit presents as a very level topography throughout. A natural wetlands drainage area exists at the southern end of the exhibit which was open to both species in the past, but since has been restricted by electrical hot wire to prevent giraffe possibly become entrapped by the soft bottom soil.

Reproductive Management/Breeding History:

- The Masai giraffe pair has received breeding recommendations through every Breeding and Transfer plan since the pair was established in the early 2000s. The bull is briefly separated from the cow and neonate calf for the first several weeks post-birth. The giraffe are reintroduced within weeks of the calf's birth and displayed on exhibit soon after.
- The Grevy's stallion is kept separate from the females other than times we conduct selective pairing for breeding. Foals are maintained with dams for several weeks before being introduced to the rest of the female herd and subsequently to the exhibit.
- Neonates of both species are introduced to the exhibit within a month of birth. Most births are planned for spring or summer. Neonates of both species are allowed to acclimate to the exhibit for several days before the other species are reintroduced the exhibit.

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Management Challenges:

- Currently the low mean kinship ranking of the male Grevy's zebra has limited our ability to maintain a breeding group and have sufficient room to manage an adult multi-male.
- Low carrying capacity due to the limited stall space in the giraffe barn has hindered an ability to have a larger giraffe herd.
- Zoo New England has started a giraffe feeding encounter for the public, but the limited number of animals and the fact that the adult male has proven the only giraffe willing to consistently participate in the public feeding has limited the success of this program. A greater carrying capacity of giraffe would enhance this program and our ability to support the SSP program.

Items Contributing to Group's Success:

- Exhibit size
- These 2 species seem to cohabitate well together.
- Individual temperaments of most specimens seem to compliment this mix. Some younger individual Grevy's zebra have presented challenges with being displayed with the giraffe, but most of this activity is likely due to these animals being playful rather than aggressive.

Group/Exhibit Changes Over Time:

- None

Zoo New England, Boston, MA & Stoneham, MA – Current Exhibit

Current Species:

- Pygmy Hippopotamus (*Choeropsis liberiensis*) (1.1)
- Hartlaub's Duck (*Pteronetta hartlaubii*) (1.1)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (1.1)

Group has been successfully mixed for ~15 years (since the early 2000s, current as of 2015).

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- This exhibit is one of 19 exhibits in Franklin Park Zoo's Tropical Forest building.
- The pygmy hippopotamus collection is represented by a 22 year old female and a 3 year old male. Although this is a planned pairing for breeding the male has yet to reach sufficient size for a safe introduction. Therefore these 2 animals have yet to be displayed together on exhibit or housed together in holding.
- 1.1 vultures have been housed in this exhibit for >10 years. Over the past 2 years, these 2 specimens have been housed outdoors in the summer months in another part of Franklin Park Zoo as replacements for ground hornbill specimens that had died.
- This exhibit also contains 1.1 Hartlaub's ducks which were introduced approximately 3 years ago. These birds mainly inhabit the exhibit pool and to date have had no negative interactions with either the hippopotamus or vultures.

Changes/Accommodations Needed:

- It is primarily a gunite constructed display that includes a raised soil substrate area that leads to a ~5,000 gallon pool. Steps were sculpted into the gunite side of the pool to allow easier access both in and out of the pool for the hippopotamus.
- 1.1 vultures are provided an elevated perching platform located near the back portion of the exhibit. Large rocks were eventually used to thwart attempts by the hippopotamus to climb up underneath this platform.
- Vegetation for the exhibit is mainly arranged in outside planters that border the exhibit via naturalistic gunite planters. No vegetation is directly planted within the exhibit nor would any likely survive.
- Exhibit topography is flat except for an elevated portion, which is where the vulture platform is located.

Reproductive Management/Breeding History:

- Although this is meant to be a breeding pair of vulture, no successful egg laying has ever occurred.
- As mentioned earlier the male hippopotamus is still too young to be introduced to the female. Plans are to make for such an introduction in the near future. Most likely the pair will be separated if a calf is produced. Currently each hippopotamus is rotated to the exhibit every other day for display.

Management Challenges:

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- Hippopotamus in the past have spent time in a recessed alcove that hides the holding door and are then out of sight of the visitors. A secondary barrier was installed to help prevent animals lying in this area.

Items Contributing to Group's Success:

- Effective separation of the vulture nesting platform from where the hippopotamus primary display space exists.
- Adequate dryland/water ratio for the hippopotamus
- Natural lighting through the roof material of the Tropical Forest

Group/Exhibit Changes Over Time:

- None

Zoo New England, Boston, MA & Stoneham, MA – Current Exhibit

Current Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.3)
- Red River Hog (*Potamochoerus porcus*) (1.2)

Group has been successfully mixed for 6 months (since summer of 2015, current as of 2015).

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Bongo are housed in the primary barn directly attached to this exhibit. The red river hogs are housed in an adjacent barn and transferred to and from the exhibit through a chute.
- Both species are relatively cold intolerant. The bongos are given access on days in which the temperature reaches at least 40 F. On such days they are given free choice access to the barn.
- The female bongo group has consisted of 2 breeding cows and, for an interim period of time, their calves until those specimens receive transfer recommendations.
- The red river hogs are all siblings so no breeding will be attempted. Desire to form a breeding group may be attempted in the future through contacting the SSP Coordinator.

Changes/Accommodations Needed:

- Both species are housed in separate barns at night. The male bongo has never been accessed to the exhibit with the red river hogs. Initial introduction of the female bongo to the red river hogs did result in brief challenge displays from the male hog and an aggressive contact was made by one female bongo (flipped male hog with horns).
- No other negative interactions have ever been noted since that incident. Concerns have existed that the male bongo may prove to be more territorial than the female with the presence of the red river hogs so no plans have developed to introduce him.
- The male bongo is kept separate from the female in an adjacent "bull yard" and accessed to selected females only for breeding. A downed mulberry tree provides a "run around" for introduction of new animals or when the male is first reintroduced to the female group. The connection of the bull yard to the main exhibit incorporates two separate slide gates at opposite ends of a common fence and provides additional "run around" options for introductions.
- The exhibit topography is flat and open and provides very good views of all animals. Mature trees are located towards the back third of the exhibit and prove to be the preferred spot for the bongo to lie and, until modifying the guest viewing area to be closer, proved challenging for guests to see the bongo.
- The red river hogs were introduced to the exhibit to add species variety to such a large open exhibit.

Reproductive Management/Breeding History:

- The bongo breeding program has been quite successful at Franklin Park Zoo for many years. This species was originally managed in the Tropical Forest building. As mentioned earlier the male is separated from the females other than for breeding. All bongo births to date have been successful in producing viable offspring.

Management Challenges:

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- The exhibit is large and the back treed portion encourages the bongo to lay at the farthest point from viewing area for the public. The red river hogs have added a dynamic quality that was lacking since they tend to be active and explore the exhibit throughout the day.

Items Contributing to Group's Success:

- Exhibit size provides more than adequate space for mixing these species. Plans are to consider identifying one more species to manage in this space.
- Barn access is directly connected for both species.
- Mature trees provide ample shade over two-thirds of the exhibit space, and public viewing is configured to allow comfortable self-separation from guests when preferred.

Group/Exhibit Changes Over Time:

- None

Zoo New England, Boston, MA & Stoneham, MA – Current Exhibit

Current Species:

- Common Warthog (*Phacochoerus africanus*) (0.2)
- African Crested Porcupine (*Hystrix cristata*) (1.2)

Group has been successfully mixed for 6 months (since summer of 2015, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Franklin Park Zoo's warthog/crested porcupine exhibit is one of the newest displays at the zoo. This exhibit was constructed in 2013 and originally only housed 0.2 warthogs. A decision was made to follow the European model of mixing African crested porcupines as a way to add diversity to the exhibit and to also provide a species that has lower temperature tolerances than the warthogs to provide a longer exhibiting season for this display. Through initial conversation with the AZA Warthog SSP Coordinator, it was suggested that this species mix had not to date been accomplished within AZA facilities.
- The warthog specimens were acquired through SSP recommendation from Honolulu and were 1 year old when introduced to the exhibit.
- This exhibit had not been incorporated into the 2013 fiscal year budget planning which resulted in limited funding being available for its construction. Given this financial limitation it was necessary to utilize a pre-existing hoofstock barn which is located a significant distant away from the exhibit. This fact has resulted in the need to incorporate an approximately 500 foot transfer chute to be constructed to transit the warthogs to and from the exhibit. Funds were sufficient to construct a dedicated building for housing the porcupines directly connected to the exhibit.
- The 2 female porcupine specimens range from 13 to 15 years of age. An 8.5 year old male was acquired this year to attempt breeding with the females.

Changes/Accommodations Needed:

- A heated concrete pad (encased electric heating coil) and an accompanying 3-sided shelter was installed to provide a supplemental heat source for the warthogs.
- Thought was given on how to exclude the warthogs from entering the porcupine holding and also how to give the porcupines a safe area to escape aggressive behavior from the warthogs. To accomplish this goal, a line of cedar poles, measuring 5 feet above ground (2 feet below ground embedded in a concrete grade beam) and separated on average by 9 inches between each pole, were installed across the width of the exhibit. This array has worked effectively to allow the porcupines access throughout all of the exhibit, but has prevented the warthogs from entering a portion of the exhibit directly in front of the porcupine holding.
- Several large logs have been placed in the exhibit as run-arounds.
- As with most warthog exhibits the vegetation is very sparse due to their nature of heavy grazing and rooting in the soil. To date, basically every area of the exhibit has been excavated by the warthogs. The topography of this exhibit is for the most part flat except for a slight grade near the back portion. The entire perimeter is secured with a buried, 3 foot chain-link dig barrier angled at 45 degrees.

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- This exhibit annexed a portion of the Serengeti exhibit which houses the wildebeest, Grant's zebra and red-necked ostrich. Other than the chain-link perimeter fence used to cordon off this exhibit the visual effect basically allows for immersion of this display with the main exhibit.

Reproductive Management/Breeding History:

- In acquiring the 2 female warthogs it was agreed with the SSP Coordinator that Zoo New England would manage these 2 animals for several years and get accustomed to their husbandry needs before advancing our management to a breeding group. Zoo New England will likely pursue such an arrangement in the next 2 years.
- In regards to the African crested porcupine, the 2 females were originally accessioned as a breeding pair. Due to difficulty in determining gender in this species through general visual exam, it wasn't until a DNA analysis was conducted last year that it was determined these specimens were likely both female.
- In response, a male specimen was acquired through the Breeding and Transfer planning process and Zoo New England is currently attempting to breed this species. The male will be separated from the females if it is suspected that either is pregnant. Zoo New England is fortunate to have the AZA African Crested Porcupine SSP Coordinator working as a staff member which allows for direct expertise in managing the species.

Management Challenges:

- Upon the initial introduction of the porcupines to the warthogs, as had been expected, the warthogs made several aggressive charges. Also as expected the porcupines had no trouble standing their ground and rebuffing each advance. Several times the warthogs received quills in their snouts or face, but no serious injuries were experienced, and the quills were able to be removed by keepers by calling the affected animal off exhibit into the transfer chute and target training close to the mesh.
- The bollard system for restricting the warthogs from entering the space near the porcupine holding has been effective so far.
- The only other challenge has been aggressive displays by the adult male Grant's zebra in reaction to the warthogs and porcupines being on display. This activity has included this animal kicking and biting at the exhibit fence. This activity has unfortunately resulted in an inability to access the breeding pair of Grant's zebra on the main exhibit. Plans are to look into deaccessioning these animals and maintaining only a bachelor herd of zebra formulated from 2 present male offspring.

Items Contributing to Group's Success:

- An effective barrier system by use of bollards to provide the porcupines a safe, isolated space from the warthogs
- The fact that African crested porcupines have one of the best defensive mechanisms (quills) and assertive natures allows for them to rebuff any aggressive advances by the warthogs. A true test of this situation may be made once a male warthog is introduced to this mix.
- The fact that the warthogs are very trainable has benefited us in being able to teach them how to transfer such a long distance to and from the holding barn and also for basic husbandry such as the situation described earlier in helping with quill removal.

Group/Exhibit Changes Over Time:

- The group used to consist of only 0.2 porcupines.

ZooAmerica North American Wildlife Park, Hershey, PA – Current Exhibit

Current Species:

- White-tailed Deer (*Odocoileus virginianus*) (1.2)
- Wild Turkey (*Meleagris gallopavo*) (1.4)

Group has been successfully mixed for 37 years (since 1978, current as of 2015).

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- In the fall during rutting season the male buck is fenced away from the doe in an adjoining portion of the exhibit. The rest of the year all species use the entire exhibit.
- Turkey are introduced when they are young adults.

Changes/Accommodations Needed:

- We have a place to separate the buck when he is in rut.

Reproductive Management/Breeding History:

- The male deer is vasectomized.

Management Challenges:

- A male buck in rut can be challenging, and we have had some turkey that chased and picked at the deer.
- Our turkey are flighted so they will need to have feathers trimmed on one side after each molt.

Items Contributing to Group's Success:

- Generally non-aggressive species
- Traditionally are found in the same areas in the wild
- Ability to separate if the need arises

Group/Exhibit Changes Over Time:

- The exhibit composition once included up to four does in the larger exhibit (14,000 sq ft; reduced in 1990s to current size to build a bear exhibit).

ZooAmerica North American Wildlife Park, Hershey, PA – Current Exhibit

Current Species:

- Pronghorn (*Antilocapra americana*) (1.2)
- Sandhill Crane (*Grus canadensis*) (0.0.2)

Group has been successfully mixed for 4 years (since 2011, current as of 2015).

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Pronghorn were introduced at over 6 months of age and the cranes were introduced as adults.

Changes/Accommodations Needed:

- We have the ability to bring animals into a covered area for extreme weather.
- We also have special fencing that allows the cranes to get away from the pronghorn.

Reproductive Management/Breeding History:

- We have not yet had any breeding to this mixed exhibit.

Management Challenges:

- Cranes are difficult to work around (peck at staff).
- Male pronghorn is quite pushy during breeding season.

Items Contributing to Group's Success:

- Locally found together in the wild
- Utilize different parts of the exhibit
- Ability for cranes to get away from pronghorn – lots of flexibility

Group/Exhibit Changes Over Time:

- We are continuing to add additional female pronghorn to the group.
- At one point we had bison and elk together in this area but at the time we did not have enough flexibility to successfully house the two larger species together.
 - American Bison (*Bison bison*)
 - American Elk (*Cervus canadensis*)
- At one point we also exhibited bison and turkey vultures together with an area for the vultures to get away, but we had a bison that began to stomp on them, so we built a small permanent exhibit in the center of the exhibit that now houses the vultures.
 - American Bison (*Bison bison*)
 - Turkey Vulture (*Cathartes aura*)

LINKS TO UNSUCCESSFUL MIXED-SPECIES EXHIBIT SUMMARIES BY INSTITUTION

Adventure Aquarium
Bergen County Zoological Park
Birmingham Zoo
Blank Park Zoo
Brevard Zoo
Caldwell Zoo
Cameron Park Zoo
Cape May County Park Zoo
Cheyenne Mountain Zoo
Chicago Zoological Society – Brookfield Zoo
Cleveland Metroparks Zoo
Connecticut’s Beardsley Zoo
Dallas Zoo
Denver Zoological Gardens
Detroit Zoo
Disney’s Animal Kingdom Lodge
Gladys Porter Zoo
Jackson Zoological Park
Jacksonville Zoo and Gardens
Kansas City Zoo
Lincoln Park Zoo
Los Angeles Zoo and Botanical Garden
Milwaukee County Zoological Gardens
Oklahoma City Zoological Park
Point Defiance Zoo & Aquarium
Rosamond Gifford Zoo at Burnet Park
Sacramento Zoo
Saint Louis Zoo
San Diego Zoo
San Diego Zoo Safari Park
Santa Barbara Zoological Gardens
Toronto Zoo
Virginia Zoo
The Wilds

TABLE OF UNSUCCESSFUL MIXED-SPECIES GROUPS

Please review this table with caution and be sure to reference specific profiles for each unsuccessful group (see links). Several mixes were deemed unsuccessful based on individual animal temperaments or specific exhibit limitations, rather than incompatibility of species. For each exhibit, the table only includes the species that were specifically noted as being responsible for the group's failure. Exhibits with no interspecies issues have been omitted from the table, but can be found in the next section (Unsuccessful Mixed-Species Exhibit Summaries by Institution).

The best way to use this table is to search for a specific ungulate species in the left-hand column and then find which species (both ungulate and non-ungulate) it has been unsuccessfully mixed with by looking in the corresponding middle column; in the right hand column is a list of all institutions that have reported each mix as unsuccessful. All institution names have been linked to the corresponding exhibit templates that are provided in this manual; you can click on the institution link to read more about the mixed-species exhibit, its management, and why the exhibit was deemed unsuccessful.

Next to several institution names, you will find an asterisk (*). These asterisks mean that the subspecies for one or both of the species in the mix was provided for that specific institution.

Ungulate Species	Species Mixes (Unsuccessful)	Institutions
Addax (<i>Addax nasomaculatus</i>)	Bontebok (<i>Damaliscus pygargus</i>)	Dallas Zoo
Alpaca (<i>Vicugna pacos</i>)	Capybara (<i>Hydrochoerus hydrochaeris</i>)	Milwaukee County Zoo
Anoa, Lowland (<i>Bubalus depressicornis</i>)	Otter, Asian Small-clawed (<i>Amblonyx cinereus</i>)	Point Defiance Zoo
Antelope, Royal (<i>Neotragus pygmaeus</i>)	Duiker, Blue (<i>Philantomba monticola</i>) Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Brookfield Zoo Los Angeles Zoo
Antelope, Sable (<i>Hippotragus niger</i>)	Gazelle, Grant's (<i>Nanger granti</i>)	Lincoln Park Zoo
Ass, African Wild (<i>Equus africanus</i>)	Gazelle, Addra (Dama) (<i>Nanger dama</i>)	Dallas Zoo*
Babirusa, North Sulawesi (<i>Babyrousa celebensis</i>)	Crane, Sarus (<i>Grus antigone</i>) Gibbon, White-handed (<i>Hylobates lar</i>)	Los Angeles Zoo Toronto Zoo
Banteng (<i>Bos javanicus</i>)	Bharal (<i>Pseudois nayaur</i>)	The Wilds
Bharal (<i>Pseudois nayaur</i>)	Banteng (<i>Bos javanicus</i>) Deer, Sika (<i>Cervus nippon</i>) Oryx, East African (Beisa) (<i>Oryx beisa</i>)	The Wilds The Wilds* The Wilds*
Bison, American (<i>Bison bison</i>)	Elk, American (<i>Cervus canadensis</i>) Peccary, Collared (<i>Pecari tajacu</i>) Pronghorn (<i>Antilocapra americana</i>) Crane, Sandhill (<i>Grus canadensis</i>) Rhea, Greater (American) (<i>Rhea americana</i>)	Caldwell Zoo Detroit Zoo Oklahoma City Zoo Connecticut's Beardsley Zoo Cape May County Park Zoo

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Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)	Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>) Hog, Red River (<i>Potamochoerus porcus</i>)	Caldwell Zoo Sacramento Zoo
Bontebok (<i>Damaliscus pygargus</i>)	Addax (<i>Addax nasomaculatus</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Giraffe (<i>Giraffa camelopardalis</i>)	Dallas Zoo Cleveland Metroparks Zoo Gladys Porter Zoo*
Buffalo, Cape (<i>Syncerus caffer</i>)	Mandrill (<i>Mandrillus sphinx</i>)	San Diego Zoo Safari Park*
Camel, Bactrian (<i>Camelus bactrianus</i>)	Takin (<i>Budorcas taxicolor</i>)	Detroit Zoo
Cattle, Domestic (<i>Bos taurus</i>)	Elk, American (<i>Cervus canadensis</i>)	Caldwell Zoo*
Deer, Red Brocket (<i>Mazama temama</i>)	Guanaco (<i>Lama guanicoe</i>)	Bergen County Zoological Park
Deer, Sambar (<i>Rusa unicolor</i>)	Ibex, Nubian (<i>Capra nubiana</i>)	San Diego Zoo Safari Park*
Deer, Sika (<i>Cervus nippon</i>)	Bharal (<i>Pseudois nayaur</i>)	The Wilds*
Deer, Tufted (<i>Elaphodus cephalophus</i>)	Serow, Japanese (<i>Capricornis crispus</i>)	Los Angeles Zoo
Deer, White-tailed (<i>Odocoileus virginianus</i>)	Elk, American (<i>Cervus canadensis</i>)	Caldwell Zoo
Duiker, Blue (<i>Philantomba monticola</i>)	Antelope, Royal (<i>Neotragus pygmaeus</i>) Monkey, Vervet (<i>Chlorocebus pygerythrus</i>)	Brookfield Zoo Rosamond Gifford Zoo
Duiker, Red-flanked (<i>Cephalophus rufilatus</i>)	Antelope, Royal (<i>Neotragus pygmaeus</i>)	Los Angeles Zoo
Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>) Gazelle, Soemmerring's (<i>Gazella soemmerringii</i>) Okapi (<i>Okapia johnstoni</i>) Sitatunga (<i>Tragelaphus spekii</i>)	Caldwell Zoo San Diego Zoo Safari Park* Dallas Zoo Sacramento Zoo
Duiker, Zebra (<i>Cephalophus zebra</i>)	Talapoin, Angolan (<i>Miopithecus talapoin</i>)	Los Angeles Zoo
Eland, Common (<i>Taurotragus oryx</i>)	Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Ostrich, Common (<i>Struthio camelus</i>)	San Diego Zoo Safari Park Kansas City Zoo Kansas City Zoo Detroit Zoo Blank Park Zoo
Eland, Giant (<i>Taurotragus derbianus</i>)	Ostrich, Common (<i>Struthio camelus</i>)	Los Angeles Zoo
Elk, American (<i>Cervus canadensis</i>)	Bison, American (<i>Bison bison</i>) Cattle, Domestic (<i>Bos taurus</i>) Deer, White-tailed (<i>Odocoileus virginianus</i>) Crane, Sandhill (<i>Grus canadensis</i>)	Caldwell Zoo Caldwell Zoo* Caldwell Zoo Bergen County Zoological Park; Caldwell Zoo

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Elk, American (<i>Cervus canadensis</i>)	Turkey, Wild (<i>Meleagris gallopavo</i>) Waterfowl (assorted species)	Caldwell Zoo* Caldwell Zoo
Gazelle, Addra (Dama) (<i>Nanger dama</i>)	Ass, African Wild (<i>Equus africanus</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>)	Dallas Zoo* Dallas Zoo
Gazelle, Grant's (<i>Nanger granti</i>)	Antelope, Sable (<i>Hippotragus niger</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)	Lincoln Park Zoo Lincoln Park Zoo Oklahoma City Zoo
Gazelle, Slender-horned (<i>Gazella leptoceros</i>)	Bontebok (<i>Damaliscus pygargus</i>) Gazelle, Addra (Dama) (<i>Nanger dama</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Zebra, Plains (<i>Equus quagga</i>)	Cleveland Metroparks Zoo Dallas Zoo Dallas Zoo Kansas City Zoo Kansas City Zoo
Gazelle, Soemmerring's (<i>Gazella soemmerringii</i>)	Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)	San Diego Zoo Safari Park*
Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Impala (<i>Aepyceros melampus</i>) Zebra, Plains (<i>Equus quagga</i>)	Dallas Zoo Toronto Zoo Cleveland Metroparks Zoo*; Dallas Zoo
Giraffe (<i>Giraffa camelopardalis</i>)	Bontebok (<i>Damaliscus pygargus</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Rhinoceros, White (<i>Ceratotherium simum</i>) Zebra, Grevy's (<i>Equus grevyi</i>) Zebra, Plains (<i>Equus quagga</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ostrich, Common (<i>Struthio camelus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Stork, Saddle-billed (<i>Ephippiorhynchus senegalensis</i>) Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>) Vulture, Griffon (<i>Gyps fulvus</i>) Vulture, Lappet-faced (<i>Torgos tracheliotos</i>)	Gladys Porter Zoo* Birmingham Zoo* Cheyenne Mountain Zoo Brevard Zoo* Cameron Park Zoo* Brookfield Zoo* Cheyenne Mountain Zoo Cleveland Metroparks Zoo* Cheyenne Mountain Zoo Jacksonville Zoo and Gardens* Cheyenne Mountain Zoo; Santa Barbara Zoo Oklahoma City Zoo Oklahoma City Zoo
Goral, Chinese (<i>Naemorhedus griseus</i>)	Crane, Hooded (<i>Grus monacha</i>)	Saint Louis Zoo
Guanaco (<i>Lama guanicoe</i>)	Deer, Red Brocket (<i>Mazama temama</i>) Peccary, Collared (<i>Pecari tajacu</i>) Capybara (<i>Hydrochoerus hydrochaeris</i>) Rhea, Greater (American) (<i>Rhea americana</i>)	Bergen County Zoological Park Detroit Zoo Bergen County Zoological Park Bergen County Zoological Park

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Hippopotamus, Common (<i>Hippopotamus amphibius</i>)	Bustard, White-bellied (<i>Eupodotis senegalensis</i>) Crane, Crowned (<i>Balearica sp.</i>) Duck (assorted species) Swamphen, Purple (<i>Porphyrio sp.</i>)	Adventure Aquarium Adventure Aquarium Adventure Aquarium Adventure Aquarium
Hog, Red River (<i>Potamochoerus porcus</i>)	Bongo, Eastern (Mountain) (<i>Tragelaphus eurycerus isaaci</i>)	Sacramento Zoo
Ibex, Nubian (<i>Capra nubiana</i>)	Deer, Sambar (<i>Rusa unicolor</i>) Klipspringer (<i>Oreotragus oreotragus</i>)	San Diego Zoo Safari Park* Dallas Zoo
Impala (<i>Aepyceros melampus</i>)	Gazelle, Thomson's (<i>Eudorcas thomsonii</i>)	Toronto Zoo
Klipspringer (<i>Oreotragus oreotragus</i>)	Ibex, Nubian (<i>Capra nubiana</i>) Colobus, Angolan Black and White (<i>Colobus angolensis</i>)	Dallas Zoo Denver Zoological Gardens
Kudu, Greater (<i>Tragelaphus strepsiceros</i>)	Eland, Common (<i>Taurotragus oryx</i>) Giraffe (<i>Giraffa camelopardalis</i>) Zebra, Grevy's (<i>Equus grevyi</i>)	San Diego Zoo Safari Park Birmingham Zoo* Cameron Park Zoo
Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Giraffe (<i>Giraffa camelopardalis</i>) Oryx, Scimitar-horned (<i>Oryx dammah</i>) Waterbuck, Common (<i>Kobus ellipsiprymnus</i>) Zebra, Plains (<i>Equus quagga</i>) Hornbill, Southern Ground (<i>Bucorvus leadbeateri</i>) Ostrich, Common (<i>Struthio camelus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>) Tortoise, Sulcata (African Spurred) (<i>Centrochelys sulcata</i>)	Kansas City Zoo Kansas City Zoo Cheyenne Mountain Zoo Kansas City Zoo Kansas City Zoo Kansas City Zoo Cheyenne Mountain Zoo Saint Louis Zoo Cheyenne Mountain Zoo Cheyenne Mountain Zoo
Moose (<i>Alces alces</i>)	Crane, Sandhill (<i>Grus canadensis</i>) Turkey, Wild (<i>Meleagris gallopavo</i>)	Cheyenne Mountain Zoo Cheyenne Mountain Zoo*
Oryx, East African (Beisa) (<i>Oryx beisa</i>)	Bharal (<i>Pseudois nayaur</i>)	The Wilds*
Oryx, Scimitar-horned (<i>Oryx dammah</i>)	Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Kansas City Zoo
Okapi (<i>Okapia johnstoni</i>)	Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)	Dallas Zoo
Peccary, Collared (<i>Pecari tajacu</i>)	Bison, American (<i>Bison bison</i>) Guanaco (<i>Lama guanicoe</i>)	Detroit Zoo Detroit Zoo
Pronghorn (<i>Antilocapra americana</i>)	Bison, American (<i>Bison bison</i>)	Oklahoma City Zoo
Serow, Japanese (<i>Capricornis crispus</i>)	Deer, Tufted (<i>Elaphodus cephalophus</i>)	Los Angeles Zoo

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Sheep, Wild (<i>Ovis orientalis</i>)	Crane, Wattled (<i>Bucconyx carunculatus</i>) Hornbill, Abyssinian Ground (<i>Bucorvus abyssinicus</i>)	Saint Louis Zoo* Saint Louis Zoo*
Sitatunga (<i>Tragelaphus spekii</i>)	Duiker, Yellow-backed (<i>Cephalophus silvicultor</i>)	Sacramento Zoo
Takin (<i>Budorcas taxicolor</i>)	Camel, Bactrian (<i>Camelus bactrianus</i>)	Detroit Zoo
Tapir, South American (<i>Tapirus terrestris</i>)	Capybara (<i>Hydrochoerus hydrochaeris</i>) Rhea, Greater (American) (<i>Rhea americana</i>)	Lincoln Park Zoo Detroit Zoo
Warthog, Common (<i>Phacochoerus africanus</i>)	Porcupine, African Crested (<i>Hystrix cristata</i>) Ostrich, Common (<i>Struthio camelus</i>)	Detroit Zoo Oklahoma City Zoo*
Waterbuck, Common (<i>Kobus ellipsiprymnus</i>)	Eland, Common (<i>Taurotragus oryx</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>)	Kansas City Zoo Kansas City Zoo
Zebra, Grevy's (<i>Equus grevyi</i>)	Eland, Common (<i>Taurotragus oryx</i>) Gazelle, Grant's (<i>Nanger granti</i>) Giraffe (<i>Giraffa camelopardalis</i>) Kudu, Greater (<i>Tragelaphus strepsiceros</i>) Crane, Crowned (<i>Balearica sp.</i>) Ostrich, Common (<i>Struthio camelus</i>) Stork, Marabou (<i>Leptoptilos crumenifer</i>)	Detroit Zoo Lincoln Park Zoo Cameron Park Zoo* Cameron Park Zoo Cameron Park Zoo Jackson Zoological Park, Sacramento Zoo Cameron Park Zoo
Zebra, Plains (<i>Equus quagga</i>)	Gazelle, Slender-horned (<i>Gazella leptoceros</i>) Gazelle, Thomson's (<i>Eudorcas thomsonii</i>) Giraffe (<i>Giraffa camelopardalis</i>) Kudu, Lesser (<i>Tragelaphus imberbis</i>) Goose, Spur-winged (<i>Plectropterus gambensis</i>)	Kansas City Zoo Cleveland Metroparks Zoo*; Dallas Zoo Brookfield Zoo* Kansas City Zoo Dallas Zoo

Adventure Aquarium, Camden, NJ – Unsuccessful Exhibit

Species:

Common Hippopotamus (*Hippopotamus amphibius*)
Cape Porcupine (*Hystrix africaeaustralis*)
African Cichlids (assorted species)
Abdim's Stork (*Ciconia abdimii*)
Cattle Egret (*Bubulcus ibis*)
Crowned Crane (*Balearica sp.*)
Duck (assorted species)
Hamerkop (*Scopus umbretta*)
Purple Swamphen (*Porphyrio sp.*)
Taveta Golden Weaver (*Ploceus castaneiceps*)
White-bellied Bustard (*Eupodotis senegalensis*)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- See Adventure Aquarium Current Exhibit.

Reproductive Management/Breeding History:

- See Adventure Aquarium Current Exhibit.

Items Contributing to Group's Failure:

- The hippos would occasionally go after any species of birds that would tend to spend too much time on the ground, near the water's edge or fell in the pool. When we identified a problem with a specific species they would be moved out of the exhibit. This included: crowned crane, white bellied bustards and purple swamphens (they would not move away from the hippos on land), and any species of duck (at first ducks would actively avoid the hippos, but over time they would eventually become desensitized to the hippos and stop moving away from them in the water).

Bergen County Zoological Park, River Edge, NJ – Unsuccessful Exhibit

Species:

- American Bison (*Bison bison*) (1.2)
- American Elk (*Cervus canadensis nelsoni*) (1.2)
- Sandhill Crane (*Grus canadensis*) (1.2)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- When the cranes were exhibited with our bison and elk problems developed between the female elk and cranes. A separate area was created within the larger exhibit to maintain the cranes separately (with chain-link and electric fencing, open-top). However, the cranes would escape from smaller area and be chased by the elk. Ultimately, the cranes were no longer exhibited here.
- See Bergen County Zoo Current Exhibit.

Reproductive Management/Breeding History:

- None

Items Contributing to Group's Failure:

- This mixed group ultimately failed because of elk aggression towards the cranes. We are unsure if this was due to individual elk personalities, but we have never tried this mix again.

Bergen County Zoological Park, River Edge, NJ – Unsuccessful Exhibit

Species:

- Guanaco (*Lama guanicoe*) (0.2)
- Red Brocket Deer (*Mazama americana*) (2.2)
- Capybara (*Hydrochoerus hydrochaeris*) (2.0)
- Greater (American) Rhea (*Rhea americana*) (1.2)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- We have maintained this mixed-species exhibit for many years with successful breeding by all species, but our current 0.2 guanacos are now in a separate exhibit. They did not settle in well with any of the other species and would continually run into fencing, escape and pace. These animals did not do well when they were able to see any other species (even those that didn't actually share the exhibit with them) and have been moved to another area where they have very limited visual contact with any other animals.
- See Bergen County Zoo Current Exhibit.

Reproductive Management/Breeding History:

- None

Items Contributing to Group's Failure:

- Current 0.2 guanaco's inability to be housed with or in sight of any other animals

Birmingham Zoo, Birmingham, AL – Unsuccessful Exhibit

Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (1.1)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.2)
- Common Ostrich (*Struthio camelus*) (0.2)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The first attempted introduction between the male kudu and male giraffe was unsuccessful and led to aggression between the two. Both animals were left with injuries, mostly minor. No further attempts at introductions were made due to animals' safety issues.

Reproductive Management/Breeding History:

- No breeding occurred within this group.

Items Contributing to Group's Failure:

- Aggression between the male kudu and male giraffe
- Both were very young and new to the area
- Young males attempting to establish dominance of area

Blank Park Zoo, Des Moines, IA – Unsuccessful Exhibit

Species:

- Common Eland (*Taurotragus oryx*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.2)
- Grey Crowned Crane (*Balearica regulorum*) (1.1)
- Guineafowl (*sp.*) (0.0.7)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The eland were contained within the exhibit by hotwire and the smaller birds were free to move in and out of the hotwire to get away from the eland when necessary.
- See Blank Park Zoo Current Exhibit.

Reproductive Management/Breeding History:

- No breeding occurred in this group.

Items Contributing to Group's Failure:

- These particular ostrich were never comfortable being around the eland – the eland were aggressive towards the ostrich.
- The exhibit was too small and had too many corners to be successful with this group of animals. We tried for about 1 month before the ostrich were removed.

Brevard Zoo, Melbourne, FL – Unsuccessful Exhibit

Species:

Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (2.0)
Southern White Rhinoceros (*Ceratotherium simum simum*) (2.0)

Exhibit Size: 3 acres-8 acres

General Management Notes:

- There were many visual barriers in the exhibit.
- The rhinos chased the giraffe and the two species were separated in less than one hour. There were many visual barriers.

Reproductive Management/Breeding History:

- No breeding occurred in this exhibit.

Items Contributing to Group's Failure:

- Young rhinos, around 2 years old
- Would need a very long introduction/acclimation time

Caldwell Zoo, Tyler, TX – Unsuccessful Exhibit

Species:

Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.1)
Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were mature.
- The male duiker would only attack the male bongo and not the female.
- See Caldwell Zoo Current Exhibit.

Reproductive Management/Breeding History:

- The female duiker is on contraception and the bongo are a breeding pair, but there was no breeding behavior at the time of introductions.

Items Contributing to Group's Failure:

- The male duiker would charge and strike the male bongo with his horns. He would only attack when the male bongo was not watching him. He would strike and run away.
- Individual behavior was likely the problem because I have heard of others mixing them without problems.

Caldwell Zoo, Tyler, TX – Unsuccessful Exhibit

Species:

American Bison (*Bison bison*)
Elk (*Cervus canadensis*)
Texas Longhorn Cattle (*Bos taurus*)
White-tailed Deer (*Odocoileus virginianus*)
Eastern Turkey (*Meleagris gallopavo silvestris*)
Sandhill Crane (*Grus canadensis*)
Waterfowl (assorted species)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- See Caldwell Zoo Current Exhibit.

Reproductive Management/Breeding History:

- See Caldwell Zoo Current Exhibit.

Items Contributing to Group's Failure:

- Elk were removed because they were very aggressive towards the waterfowl and other species. This exhibit still exists with other species listed above. See Caldwell Zoo Current Exhibit.

Cameron Park Zoo, Waco, TX – Unsuccessful Exhibit

Species:

Greater Kudu (*Tragelaphus strepsiceros*)
Grevy's Zebra (*Equus grevyi*)
Masai Giraffe (*Giraffa camelopardalis tippelskirchi*)
Reticulated Giraffe (*Giraffa camelopardalis reticulata*)
Crowned Crane (*Balearica sp.*)
Marabou Stork (*Leptoptilos crumenifer*)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- See Cameron Park Zoo Current Exhibit.
- These species were exhibited together from 1992-1997.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- The Grevy's zebra wreaked havoc and caused several euthanasia of offspring.

**Cape May County Park Zoo,
Cape May Court House, NJ – Unsuccessful Exhibit**

Species:

- American Bison (*Bison bison*) (2.2)
- Elk (*Cervus sp.*) (0.1)
- Greater (American) Rhea (*Rhea americana*) (1.1)

Exhibit Size: 3 acres-8 acres

General Management Notes:

- See Cape May County Zoo Current Exhibit.

Reproductive Management/Breeding History:

- See Cape May County Zoo Current Exhibit.

Items Contributing to Group's Failure:

- This grouping worked okay for about 2 years until our previous bison bull killed one of the rhea.

Cheyenne Mountain Zoo, Colorado Springs, CO – Unsuccessful Exhibit

Species:

- Generic Giraffe (*Giraffa camelopardalis*) (large group)
- Lesser Kudu (*Tragelaphus imberbis*) (4.0)
- Marabou Stork (*Leptoptilos crumenifer*) (1.0)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)
- Sulcata (African Spurred) Tortoise (*Centrochelys sulcata*) (1.0)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- See Cheyenne Mountain Zoo Current Exhibit.
- Animals were introduced in 2003.
- The tortoise was not purposely put in the yard with the giraffe – he escaped from his enclosure in July 2011 & was seriously injured by the giraffe stomping on him (he is a large tortoise). Happily, he did survive his injuries.

Reproductive Management/Breeding History:

- Giraffe breeding took place in a side yard. Calving occurred indoors.

Items Contributing to Group's Failure:

- There was not enough space for the kudu to feel comfortable.
- Hornbills were too curious and they would get under the giraffes' feet.
- The marabou stork spent too much time out of bird safe areas walking around among the giraffe.

Cheyenne Mountain Zoo, Colorado Springs, CO – Unsuccessful Exhibit

Species:

- Moose (*Alces alces*) (1.0)
- Rio Grande Turkey (*Meleagris gallopavo intermedia*) (various groups)
- Sandhill Crane (*Grus canadensis*) (1.0)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The sandhill crane was introduced to the moose exhibit in July 2008 and killed by the moose in December 2008.
- Our moose also stomped on Rio Grande turkeys that entered the exhibit a few times (not killing them but injuring them). The turkeys were wild; we did not manage them.

Reproductive Management/Breeding History:

- We only had a single bull moose and a single crane.

Items Contributing to Group's Failure:

- Bull moose temperament, especially during rut
- Bird species that want to occupy the same yard areas as the moose
- Not sufficient protected/moose-proof bird areas in the exhibit

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Unsuccessful Exhibit

Species:

Blue Duiker (*Philantomba monticola*) (0.1)
Royal Antelope (*Neotragus pygmaeus*) (0.1)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- We unsuccessfully attempted to introduce an older female blue duiker to the royal antelope. The duiker chased the royal antelope so these introductions were discontinued.
- See Brookfield Zoo Current Exhibit for additional details about this exhibit.

Reproductive Management/Breeding History:

- None

Items Contributing to Group's Failure:

- The duiker chased the royal antelope.

Chicago Zoological Society – Brookfield Zoo, Brookfield, IL – Unsuccessful Exhibit

Species:

- Grant's Zebra (*Equus quagga boehmi*) (3.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.5)
- Topi (*Damaliscus korrigum jimela*) (1.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The order of introduction to the new yard was giraffe, topi, zebra over a 3 week period in 1995.
- All species learned shifting easily and had their own assigned gates. Occasionally the topi would try to shift inside with the giraffe.
- The yard area had a deadfall area as a giraffe restricted zone which the topi used frequently.
- The yard area had 1 side with a water moat that 1 zebra entered twice. This yard could not be used as a winter yard for zebra because they could exit the yard by walking over the frozen water moat.
- The mixed exhibit was used for 2 summers only.

Reproductive Management/Breeding History:

- Female giraffe with calves were reintroduced to the mixed group when calves were 4-6 weeks old.
- Zebra were geldings.

Items Contributing to Group's Failure:

- Aggression from zebra towards giraffe, resulting in bite wounds to giraffe
- The yard has 2 fairly narrow peninsular areas that created areas the giraffe could be cornered into by zebra.

Cleveland Metroparks Zoo, Cleveland, OH – Unsuccessful Exhibit

Species:

- Grant's Zebra (*Equus quagga boehmi*) (0.3)
- Thomson's Gazelle (*Eudorcas thomsonii*) (1.1)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 2 adult zebra, 1 sub-adult zebra and 2 adult Thomson's gazelle are housed in this exhibit. 0.1 Thomson's gazelle was hand-reared).
- 0.3 zebra were housed for months with 0.1 gazelle without incident, then 0.1 gazelle was found injured on exhibit so it was decided to keep her separate.
- The 1.0 gazelle was only introduced to 0.1 zebra and there was immediate aggression, so it was decided to manage the 2 species separately.
- See Cleveland Metroparks Zoo Current Exhibit.

Reproductive Management/Breeding History:

- Since the introductions did not work, the 2 species were managed separately.

Items Contributing to Group's Failure:

- Demeanor of the 1.0 Thomson's gazelle
- Demeanor of 0.1 zebra
- Shyness of 0.1 Thomson's gazelle

Cleveland Metroparks Zoo, Cleveland, OH – Unsuccessful Exhibit

Species:

Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.3)
Common Ostrich (*Struthio camelus*) (0.2)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 0.2 ostrich were from an ostrich farm and were only a few years old; they were partial to staff.
- See Cleveland Metroparks Zoo Current Exhibit.

Reproductive Management/Breeding History:

- 1.0 giraffe was rotated on exhibit due to planned pregnancies.

Items Contributing to Group's Failure:

- 0.2 ostrich were young and not familiar with other animals.
- The area made it difficult to control the introduction. We tried to introduce the species on exhibit first but the ostrich tried jumping out of the pool. Then we tried the introduction in an area next to the giraffe exhibit, but the ostrich panicked anytime the giraffe passed them.
- These particular 0.2 ostrich were very flighty.

Cleveland Metroparks Zoo, Cleveland, OH – Unsuccessful Exhibit

Species:

- Bontebok (*Damaliscus pygargus*) (1.1)
- Slender-horned Gazelle (*Gazella leptoceros*) (1.4)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- These animals were brought off exhibit every night.
- The 1.0 bontebok would chase 1.0 slender-horned gazelle at various times throughout the day.

Reproductive Management/Breeding History:

- Both species were kept in breeding groups. The females were brought in for calving and kept inside for a few weeks.

Items Contributing to Group's Failure:

- There was not enough space in the exhibit.
- There were not enough hiding areas for the gazelle to get away from bontebok.
- 1.0 bontebok was very dominant; it may have helped if there were more female bontebok on exhibit.

Connecticut's Beardsley Zoo, Bridgeport, CT – Unsuccessful Exhibit

Species:

- American Bison (*Bison bison*) (1.1)
- White-tailed Deer (*Odocoileus virginianus*) (0.2)
- Sandhill Crane (*Grus canadensis*)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- This group was exhibited with limited success.
- See Connecticut's Beardsley Zoo Current Exhibit.

Reproductive Management/Breeding History:

- This was a nonbreeding group.

Items Contributing to Group's Failure:

- The decision was made to pull the cranes from the exhibit due to fear of being killed by the bison.

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

- Okapi (*Okapia johnstoni*) (0.1)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.2)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 1.2 yellow-backed duikers were aged 19 and above. Okapi was breeding age.
- Okapi shifted onto the exhibit first. Yellow-backed duiker shifted as a group.
- The subordinate 0.1 yellow-backed duiker was difficult to shift and would move separately from the other 1.1.
- The subordinate yellow-backed duiker would hide in rockwork while on exhibit, presumably to avoid other duiker.
- The okapi and duiker rarely interacted. The okapi avoided contact and appeared to fear close proximity to the others (would run if the duiker approached).
- See Dallas Zoo Historical Exhibit.

Reproductive Management/Breeding History:

- 1.0 duiker was vasectomized.
- No breeding occurred on exhibit as the okapi was pulled off for breeding introductions.

Items Contributing to Group's Failure:

- The 2 female duiker did not do well together. They do not group together in nature and appeared to need more space or separate enclosures.
- The exhibit is long and narrow with no "run around." Animals are easily cornered.

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Nubian Ibex (*Capra nubiana*) (2.3)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced.
- We had a breeding pair of klipspringer, but a non-breeding group of Nubian ibex (males were vasectomized).
- Klipspringer chased the ibex frequently, and ibex had difficulty with the moat on exhibit when being chased.
- This group was together for less than a week in 2007.
- The biggest challenge was managing the aggression from the klipspringer towards the Nubian ibex. They chased the ibex relentlessly and the ibex would run away from the klipspringer panicked. One ibex broke its leg and was euthanized; a second ibex injured its leg which required treatment for several months. After these injuries, these animals were no longer exhibited together.
- See Dallas Zoo Current Exhibit.

Reproductive Management/Breeding History:

- Not applicable; this group was together for less than a week.

Items Contributing to Group's Failure:

- The extreme aggression of the klipspringer towards the Nubian ibex
- The inability of the ibex to safely maneuver the exhibit's rock-work in a panicked state

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

Addax (*Addax nasomaculatus*) (0.7)
Bontebok (*Damaliscus pygargus*) (1.0)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- We tried introducing a male bontebok to 0.7 addax on exhibit in 2001. The male bontebok constantly chased the addax, and was no longer put on exhibit with the addax.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Items Contributing to Group's Failure:

- The male bontebok constantly chasing the addax

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

- Addra (Dama) Gazelle (*Nanger dama*) (1.0)
- Somali Wild Ass (*Equus africanus somaliensis*) (0.2)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- After introductions to the gemsbok in 2014, the Somali wild ass were introduced to a single male addra gazelle. They were very interested in him, and he would hold his ground when they approached him.
- The Somali wild ass ended up kicking him in the head, knocking one of his horns off but causing him no other apparent harm. No further introductions of addra and Somali wild ass were attempted.
- See Dallas Zoo Current Exhibit.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Items Contributing to Group's Failure:

- Aggression from the Somali wild ass to the addra.

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

Addra (Dama) Gazelle (*Nanger dama*) (1.0)
Slender-horned Gazelle (*Gazella leptoceros*) (1.0)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- In 2004, we exhibited a male addra and male slender-horned gazelle together. There was aggression between the males, so the male addra was left off exhibit and the male slender-horned gazelle was exhibited with the female addra, scimitar-horned oryx, and female slender-horned gazelle.
- See Dallas Zoo Current Exhibit.

Reproductive Management/Breeding History:

- This was a non-reproductive group.

Items Contributing to Group's Failure:

- Aggression between the male addra and male slender-horned gazelle

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (1.3)
- Impala (*Aepyceros melampus*) (1.9)
- Slender-horned Gazelle (*Gazella leptoceros*) (0.2)
- Thomson's Gazelle (*Eudorcas thomsonii*) (1.0)
- Lappet-faced Vulture (*Torgos tracheliotos*) (1.1)
- Marabou Stork (*Leptoptilos crumeniferus*) (1.0)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- We tried to introduce 0.2 slender-horned gazelle to the already existing group of kudu, impala, Thomson's gazelle, vulture, stork, and hornbill. The introduction lasted only 2 days and they were only introduced to the bird species and the Thomson's gazelle. 0.2 slender-horned gazelle chased the Thomson's gazelle nonstop, and when they got him cornered they would try to horn him.
- See Dallas Zoo Current Exhibit.

Reproductive Management/Breeding History:

- Not applicable; introductions only lasted for two days.

Items Contributing to Group's Failure:

- The slender-horned gazelle nonstop chasing of the Thomson's gazelle

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

African Bush Elephant (*Loxodonta africana*) (≤0.3)
Impala (*Aepyceros melampus*) (various groups)
Plains Zebra (*Equus quagga*) (3.0)
Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (various groups)
Thomson's Gazelle (*Eudorcas thomsonii*) (1.0)
Common Ostrich (*Struthio camelus*) (0.4)
Helmeted Guineafowl (*Numida meleagris*) (1.9)
Vulturine Guineafowl (*Acryllium vulturinum*) (5.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Thomson's gazelle were moved from another mixed species exhibit in the zoo and introduced sequentially to impala, ostrich, guinea fowl, giraffe, and elephant with success.
- The zebra were aggressive towards the Thomson's gazelle, and he was removed from the exhibit.
- Introduction was started in late spring.
- See Dallas Zoo Current Exhibit.

Reproductive Management/Breeding History:

- We were not able to maintain late pregnancy impala on exhibit with zebra due to injury to calves.
- We separated zebra and elephants from giraffe calves.
- The bull giraffe was kept separate from females until desired breeding, but allowed on exhibit with castrated males.
- We rotated the impala bull with female impala to control breeding.
- We had castrated non-breeding giraffe and impala males, and zebra.

Items Contributing to Group's Failure:

- Solitary Thomson's gazelle who isolated himself and became a target
- Zebra had established comfort level in exhibit.
- Heat and limited shade affected Thomson's gazelle.

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

African Bush Elephant (*Loxodonta africana*) (≤ 0.3)
Impala (*Aepyceros melampus*) (various groups)
Plains Zebra (*Equus quagga*) (3.0)
Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (various groups)
Common Ostrich (*Struthio camelus*) (0.4)
Helmeted Guineafowl (*Numida meleagris*) (1.9)
Spur-winged Goose (*Plectropterus gambensis*) (2.0)
Vulturine Guineafowl (*Acryllium vulturinum*) (5.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Spur-winged geese were introduced sequentially to impala, ostrich, guineafowl, giraffe, zebra, and elephants.
- Zebra kept geese contained to the pool and would not let them venture out onto land.
- Geese were kept on exhibit 24 hours a day, so they did explore the exhibit overnight.
- Geese never ventured into adjacent elephant exhibit as hoped.
- Both geese had some recurrent lameness issues that ultimately resulted in moving them to a bird area for winter housing.
- See Dallas Zoo Current Exhibit.

Reproductive Management/Breeding History:

- We were not able to maintain late pregnancy impala on exhibit with zebra due to injury to calves.
- We separated zebra and elephants from giraffe calves.
- The bull giraffe was kept separate from females until desired breeding, but allowed on exhibit with castrated males.
- We rotated the impala bull with female impala to control breeding.
- We had castrated non-breeding giraffe and impala males, and zebra.

Items Contributing to Group's Failure:

- Zebra had established comfort level and motivation to harass geese.
- Geese had lameness issues.
- Cold weather

Dallas Zoo, Dallas, TX – Unsuccessful Exhibit

Species:

African Bush Elephant (*Loxodonta africana*) (≤0.3)
Impala (*Aepyceros melampus*) (1.8)
Plains Zebra (*Equus quagga*) (3.0)
Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (various groups)
Common Ostrich (*Struthio camelus*) (0.4)
Helmeted Guineafowl (*Numida meleagris*) (1.8)
Kenya Crested Guineafowl (*Guttera pucherani*) (2.2)
Vulturine Guineafowl (*Acryllium vulturinum*) (5.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Kenyan crested guineafowl were young and hand-reared. They were introduced first to other guineafowl species, then impala, ostrich, giraffe, and zebra
- We had no interspecies problems.
- Introductions were conducted in spring and summer.
- Crested guineafowl did not use much of exhibit and stayed out of view of visitors.
- See Dallas Zoo Current Exhibit.

Reproductive Management/Breeding History:

- We were not able to maintain late pregnancy impala on exhibit with zebra due to injury to calves.
- We separated zebra and elephants from giraffe calves.
- The bull giraffe was kept separate from females until desired breeding, but allowed on exhibit with castrated males.
- We rotated the impala bull with female impala to control breeding.
- We had castrated non-breeding giraffe and impala males, and zebra.

Items Contributing to Group's Failure:

- Heat and lack of shade
- Inexperience and hand-rearing of crested guineafowl.
- Large open exhibit too intimidating for crested guineafowl

Denver Zoological Gardens, Denver, CO – Unsuccessful Exhibit

Species:

Klipspringer (*Oreotragus oreotragus*) (1.1)

Angolan Black and White Colobus (*Colobus angolensis*) (1.3)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- The colobus did not get along with the klipspringer, and eventually the species had to be separated permanently.

Reproductive Management/Breeding History:

- The klipspringer had a separate barn for birthing.

Items Contributing to Group's Failure:

- Colobus hurting klipspringer

Detroit Zoo, Royal Oak, MI – Unsuccessful Exhibit

Species:

- Common Warthog (*Phacochoerus africanus*) (0.2)
- African Crested Porcupine (*Hystrix cristata*) (1.1)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Animals were introduced as adults.
- They were housed together on exhibit and separated when inside. They were fed separately inside.
- We housed them together for less than 2 weeks then discontinued housing them together after one of the warthogs was quilled by the porcupines for the third time.

Reproductive Management/Breeding History:

- Neither group was a breeding group.

Items Contributing to Group's Failure:

- Curious nature of warthog led to repeated quilling

Detroit Zoo, Royal Oak, MI – Unsuccessful Exhibit

Species:

- Bactrian Camel (*Camelus bactrianus*) (2.2)
- Takin (*Budorcas taxicolor*) (2.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- 2.0 takin were introduced to camels when the takin were approximately 1 year old, 1.1 camels were also approximately 1 year old and 1.1 camels were adults. Introductions began in March, and animals were housed together on exhibit periodically over a couple of years.
- The camels were always housed in a group of 1.2, with the males rotating.
- They were separated for weeks to months at a time due to camel/takin aggression, which was initiated by both species and increased as the takin aged.
- Epoxy caps were applied to the takin's horns to reduce injury potential once the takin became more aggressive than the camels. They were together on exhibit only and separated overnight and when in the building/holding yards, except during initial introductions when one of the takin broke a gate and got into a holding yard with the adult male camel, resulting in injury to the takin. We eventually discontinued housing camels/takin together due to aggression.
- See Detroit Zoo Current Exhibit.

Reproductive Management/Breeding History:

- 1.1 camels were a breeding pair. A calf was born during one of the periods in which the camels and takin were separated due to aggression, and we did not attempt to introduce the takin to the calf. The takin were very aggressive toward the calf through mesh.

Items Contributing to Group's Failure:

- Aggressive nature of takin

Detroit Zoo, Royal Oak, MI – Unsuccessful Exhibit

Species:

Common Eland (*Taurotragus oryx*) (1.1)
Grevy's Zebra (*Equus grevyi*) (1.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- Zebra was 2 years old, 1.1 eland were 5 and 6, respectively.
- 1.0 zebra was intact and 1.0 eland was vasectomized.
- Introductions occurred in late spring and the group was determined to be unsuccessful after one introduction attempt. The zebra chased the female eland heavily until she eventually became exhausted and required veterinary treatment.
- See Detroit Zoo Current Exhibit.

Reproductive Management/Breeding History:

- There was no prior breeding history with any individual. 1.1 eland were not a breeding pair.

Items Contributing to Group's Failure:

- 1.0 zebra was intact and chased 0.1 eland until staff determined introduction was unsafe for the eland.

Detroit Zoo, Royal Oak, MI – Unsuccessful Exhibit

Species:

American Bison (*Bison bison*) (1.2)
Collared Peccary (Javelina) (*Pecari tajacu*) (6.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- The male bison was 1 year old and the females were 1 and 8 years at the time of introduction. Peccary were in their late teens.
- The peccary had a small protected area on exhibit surrounded by vertical posts that the bison could not enter, and the gate to the holding building was modified to allow peccary to enter while excluding bison.
- Multiple areas of deadfall in the exhibit provided "hiding" opportunities for the peccary.
- For exhibit servicing, peccary and bison were locked in separate (adjacent) stalls in the holding building.

Reproductive Management/Breeding History:

- Neither group was a breeding group; all male animals were castrated.

Items Contributing to Group's Failure:

- Bison were aggressive to peccary.
- Exhibit was relatively open so peccary seemed to feel vulnerable moving around in it.
- Holding building had only one entrance so peccary often had to pass bison to enter

Detroit Zoo, Royal Oak, MI – Unsuccessful Exhibit

Species:

- Guanaco (*Lama guanicoe*) (6.6)
- Collared Peccary (Javelina) (*Pecari tajacu*) (5.0)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- All animals were geriatric (or nearly) at time of introductions.
- Species were separated overnight.
- We tried to house these species together over a period of several months, but peccary chased the guanaco and the guanaco never became comfortable with the peccary.
- Peccary often divided up and chased the guanaco as a group, approaching from many angles. Guanaco were always on alert and moved whenever the peccary moved to maintain the greatest distance possible. Several of the guanaco had arthritis/mobility issues that created an additional challenge.

Reproductive Management/Breeding History:

- Neither group was a breeding group; all male animals were castrated.

Items Contributing to Group's Failure:

- Peccary were aggressive toward guanaco.
- Guanaco were extremely flighty in the presence of peccary.
- Several guanaco had arthritis and mobility issues that were affected by the peccary.

Detroit Zoo, Royal Oak, MI – Unsuccessful Exhibit

Species:

South American Tapir (*Tapirus terrestris*)
Greater (American) Rhea (*Rhea americana*)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- No additional information was provided about this mix. See Detroit Zoo Current Exhibit.

Reproductive Management/Breeding History:

- Tapir were not a breeding group.

Items Contributing to Group's Failure:

- Mixing tapir with rheas did not work since the female tapir was aggressive toward and injured a rhea.

Disney's Animal Kingdom Lodge, Orlando, FL – Unsuccessful Exhibit

Species:

- Common Waterbuck (*Kobus ellipsiprymnus*) (1.3)
- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (3.2)
- Reticulated/Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*) (4.0)
- Thomson's Gazelle (*Eudorcas thomsonii*) (3.0)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (0.3)
- Marabou Stork (*Leptoptilos crumenifer*) (3.3)
- Ruppell's (Griffon) Vulture (*Gyps rueppellii*) (2.2)

Exhibit Size: Larger than 8 acres

General Management Notes:

- There were issues when we tried housing a bachelor herd of 3.0 Thomson's gazelle. These were just issues within the group and didn't pose an issue with other species on the savanna.

Reproductive Management/Breeding History:

- This was a bachelor group of Thomson's gazelle (non-breeding).

Items Contributing to Group's Failure:

- Bachelor group of Thomson's gazelle did not work once breeding age

Gladys Porter Zoo, Brownsville, TX – Unsuccessful Exhibit

Species:

- Bontebok (*Damaliscus pygargus*) (1.1)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (3.5 or 1.5)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Bontebok were introduced to the giraffe when they were adults.
- Each species had its own entrance into the barn and each had their own feed stations.
- The housing for each species was in separate areas of the barn and both were brought into the barn nightly.
- We never had any concerns with either species entering the others' holding.
- See Gladys Porter Zoo Current Exhibit.

Reproductive Management/Breeding History:

- There was breeding in the giraffe herd. The giraffe calved on exhibit with the bontebok also on display.
- The bontebok never calved, although the male did try and breed.
- We had to rotate the male bontebok and the infant giraffe on display as we were concerned about aggression towards the calf from the male bontebok.

Items Contributing to Group's Failure:

- The male bontebok was aggressive and sparred with giraffe.
- We were also concerned the male bontebok would injure calves or that he would be injured when challenging the male giraffe.

Jackson Zoological Park, Jackson, MS – Unsuccessful Exhibit

Species:

- Grevy's Zebra (*Equus grevyi*) (1.2)
- Klipspringer (*Oreotragus oreotragus*) (1.1)
- Common Ostrich (*Struthio camelus*) (1.2)
- Spur-winged Goose (*Plectropterus gambensis*) (2.0)
- Wattled Crane (*Bufo carunculatus*) (1.0)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- See Jackson Zoo Current Exhibit.

Reproductive Management/Breeding History:

- The male Grevy's zebra became aggressive during breeding.

Items Contributing to Group's Failure:

- This exhibit still exists, but the ostrich had to be removed due to increased aggression from the zebra stallion.

Jacksonville Zoo and Gardens, Jacksonville, FL – Unsuccessful Exhibit

Species:

- Greater Kudu (*Tragelaphus strepsiceros*) (0.3)
- Klipspringer (*Oreotragus oreotragus*) (0.2)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (3.8)
- Leopard Tortoise (*Stigmochelys pardalis*) (1.0)
- Saddle-billed Stork (*Ephippiorhynchus senegalensis*) (1.1)
- Wattled Crane (*Bugeranus carunculatus*) (0.1)
- White-backed Vulture (*Gyps africanus*) (1.1)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- See Jacksonville Zoo and Gardens Historical Exhibit.
- The vultures spent most of the time on a large rock in the middle of the exhibit.
- The crane and storks could go behind hot wire to get away from the giraffe.

Reproductive Management/Breeding History:

- 3.8 giraffe were part of a breeding group with 4 giraffe under the age of 2 years old.

Items Contributing to Group's Failure:

- The young giraffe were very active and would run around much more than the older ones; they ended up stepping on one of the storks and killing it.

Kansas City Zoo, Kansas City, MO – Unsuccessful Exhibit

Species:

- Common Eland (*Taurotragus oryx*) (5.1)
- Common Waterbuck (*Kobus ellipsiprymnus*) (1.2)
- Lesser Kudu (*Tragelaphus imberbis*) (1.7)
- Plains Zebra (*Equus quagga*) (1.3)
- Scimitar-horned Oryx (*Oryx dammah*) (1.9)
- Slender-horned Gazelle (*Gazella leptoceros*) (1.4)

Exhibit Size: Larger than 8 acres

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- The oryx, slender-horned gazelle, and eland bred.
- The oryx bull and specific females came off exhibit for breeding.

Items Contributing to Group's Failure:

- The eland bull and waterbuck bull fought. The waterbuck chased the eland into a fence and killed him.
- The lesser kudu male chased other animals.
- The zebra chased slender-horned calves into the fence.

Lincoln Park Zoo, Chicago, IL – Unsuccessful Exhibit

Species:

Grant's Gazelle (*Nanger granti*) (1.3)

Grevy's Zebra (*Equus grevyi*) (1.2)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The gazelle were introduced to an exhibit that housed the zebra.
- An introduction of the gazelle to the female zebra was attempted, but resulted in significant chasing of gazelle.
- Introductions were attempted twice with similar results and were never attempted again.

Reproductive Management/Breeding History:

- These individuals were not housed together long enough for breeding to occur.

Items Contributing to Group's Failure:

- Zebra's pursuit of the gazelle
- Exhibit size
- Exhibit complexity – visual and physical barriers to break up the exhibit and provide some distance between the groups

Lincoln Park Zoo, Chicago, IL – Unsuccessful Exhibit

Species:

Grant's Gazelle (*Nanger granti*) (1.3)
Sable Antelope (*Hippotragus niger*) (1.3)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The gazelle were introduced to an exhibit that housed the sable antelope.
- The gazelle were introduced to the full sable herd but the gazelle never settled down; there was a fear that the gazelle could injure themselves from running around the enclosure and trying to avoid the sable.

Reproductive Management/Breeding History:

- These individuals were not housed together long enough for breeding to occur.

Items Contributing to Group's Failure:

- Exhibit size
- Exhibit complexity and lack of visual and physical barriers in the exhibit

Lincoln Park Zoo, Chicago, IL – Unsuccessful Exhibit

Species:

- South American Tapir (*Tapirus terrestris*) (1.2)
- Capybara (*Hydrochoerus hydrochaeris*) (2.3 + offspring)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- These two species were housed in the same enclosure with land space divided by post wall that the capybara could move through, but tapirs were excluded from passing through.
- Both species shared a water source.
- There was aggression between the tapir and capybara when all individuals were in the same section of the exhibit or were in the pool area.

Reproductive Management/Breeding History:

- The capybara bred during this time and produced several offspring. The offspring were kept with the nursing female, separate from the tapir, until they were weaned.

Items Contributing to Group's Failure:

- Exhibit size
- Exhibit complexity

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Unsuccessful Exhibit

Species:

- Reeves's Muntjac (*Muntiacus reevesi*) (1.0)
- Francois's Langur (*Trachypithecus francoisi*) (2.1)
- Lady Amherst's Pheasant (*Chrysolophus amherstiae*) (1.1)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- See Los Angeles Zoo Current Exhibit.

Reproductive Management/Breeding History:

- See Los Angeles Zoo Current Exhibit.

Items Contributing to Group's Failure:

- The pheasants were removed from the enclosure within a few months of the exhibit opening due to the langurs harassing the pheasant.
- The young male langurs started going after the pheasants and pulling out their feathers.
- Also prior to this, eggs would hatch and the langurs would kill them.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Unsuccessful Exhibit

Species:

- Red-flanked Duiker (*Cephalophus rufilatus*) (0.1)
- Royal Antelope (*Neotragus pygmaeus*) (1.1)
- Superb Starling (*Lamprotornis superbus*) (1.1)
- White-crested Turaco (*Tauraco leucolophus*) (1.1)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- See Los Angeles Zoo Historical Exhibit.
- All animals were adults when introduced.
- The royal antelope had heated hide boxes.
- The red-flanked duiker was the last individual introduced to the group.

Reproductive Management/Breeding History:

- The turacos and royals were reproductive.

Items Contributing to Group's Failure:

- The red-flanked duiker harassed the royal antelope and was taken out of the exhibit after two days of attempts. The other three species remained successfully mixed for one summer.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Unsuccessful Exhibit

Species:

Japanese Serow (*Capricornis crispus*) (1.1)
Tufted Deer (*Elaphodus cephalopus*) (0.1)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All individuals were adults.
- The tufted deer were bought into the exhibit several weeks before releasing the serow.
- We made a "safe zone" for the deer.

Reproductive Management/Breeding History:

- The serow were reproductive.

Items Contributing to Group's Failure:

- The serow were too aggressive.
- The serow were able to get into the "safe zone" that was created for the tufted deer.
- The female serow chased the deer and the deer attempted to jump out and got caught in the fence. She sustained a compound fracture and was euthanized.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Unsuccessful Exhibit

Species:

- Giant Eland (*Taurotragus derbianus*) (1.2)
- Common Ostrich (*Struthio camelus*) (1.0)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- All animals were adults.

Reproductive Management/Breeding History:

- The eland were reproductive.

Items Contributing to Group's Failure:

- The eland gored the ostrich, but did not kill him.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Unsuccessful Exhibit

Species:

North Sulawesi Babirusa (*Babyrousa celebensis*) (1.1)
Sarus Crane (*Grus antigone*) (0.0.1)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The sarus crane was an adult and the babirusa were 2-3 years old.
- The babirusa pair was kept together and brought in at night.
- The crane was kept on exhibit with access to holding.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- The babirusa attacked the crane and inflicted severe bite wounds on the neck of the crane.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Unsuccessful Exhibit

Species:

- Zebra Duiker (*Cephalophus zebra*) (1.2)
- Angolan Talapoin (*Miopithecus talapoin*) (5.4)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Individuals in this group were of mixed ages.

Reproductive Management/Breeding History:

- The duiker were reproductive.

Items Contributing to Group's Failure:

- All went well in this exhibit until the five male talapoins attacked the male duiker.

Los Angeles Zoo and Botanical Garden, Los Angeles, CA – Unsuccessful Exhibit

Species:

Bezoar Ibex (*Capra aegagrus aegagrus*) (2.4)

Armenian Mouflon (*Ovis orientalis gmelini*) (1.2)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The Armenian mouflon/red sheep were adults and the ibex were adults and juveniles when introduced.
- The sheep were housed in the exhibit prior to the ibex.
- There weren't any issues between the animals during the short period of time they were together (less than two weeks in 1980 or 1981).

Reproductive Management/Breeding History:

- There was no reproduction during the two weeks when these species were mixed.

Items Contributing to Group's Failure:

- The exhibit was a rock mountain with a dry moat. Additional sight barriers were placed on top of the wall. The ibex were wild caught in New Mexico and were "wild". They were released onto exhibit and were seen on top of the wall next to the sight barrier but they would always jump back into the exhibit. The idea was that given time they would get used to exhibit and not want to go anywhere. At some point part of the sight barrier came down and the ibex all jumped out. Some were recaptured but some escaped into Griffith Park and existed for years, even reproducing.

Milwaukee County Zoological Gardens, Milwaukee, WI – Unsuccessful Exhibit

Species:

Alpaca (*Vicugna pacos*)
Baird's Tapir (*Tapirus bairdii*)
Capybara (*Hydrochoerus hydrochaeris*)
Greater (American) Rhea (*Rhea americana*)
Red-footed Tortoise (*Chelonoidis carbonaria*)
Yellow-footed Tortoise (*Chelonoidis denticulata*)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- See Milwaukee County Zoo Current Exhibit.

Reproductive Management/Breeding History:

- See Milwaukee County Zoo Current Exhibit.

Items Contributing to Group's Failure:

- Capybara fatally injured alpaca crias and were removed.

Oklahoma City Zoological Park, Oklahoma City, OK – Unsuccessful Exhibit

Species:

- American Bison (*Bison bison*) (0.3)
- Pronghorn (*Antilocapra americana*) (unknown group)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- We unloaded 2 of 3 hand-reared male pronghorn before they could kill each other. Not having females did not make a difference in aggression once they matured.
- We mixed the 3rd hand-reared male pronghorn with bison, whom he promptly tried to mount and was gored but lived.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- This was not a good mix. The pronghorn continuously fought with the bison and ultimately we had to move the pronghorn out.

**Oklahoma City Zoological Park,
Oklahoma City, OK – Unsuccessful Exhibit**

Species:

Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*)
Griffon Vulture (*Gyps fulvus*)

OR

Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*)
Lappet-faced Vulture (*Torgos tracheliotos*)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- See Oklahoma City Zoo Current Exhibit.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- Vultures got stomped by giraffe.

**Oklahoma City Zoological Park,
Oklahoma City, OK – Unsuccessful Exhibit**

Species:

Reticulated Giraffe and Rothschild's Giraffe (*Giraffa camelopardalis reticulata/rothschildi*)
Common Warthog (*Phacochoerus africanus*)
Blue-necked (Somali) Ostrich (*Struthio camelus molybdophanes*)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- See Oklahoma City Zoo Current Exhibit.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- Warthog killed an ostrich.

Oklahoma City Zoological Park, Oklahoma City, OK – Unsuccessful Exhibit

Species:

Grant's Gazelle (*Nanger granti*)
Abyssinian Ground Hornbill (*Bucorvus abyssinicus*)
East African Crowned Crane (*Balaerica regulorum gibbericeps*)
Egyptian Goose (*Alopochen aegyptiaca*)
Guineafowl (*Numididae sp.*)

Exhibit Size: No information provided.

General Management Notes:

- See Oklahoma City Zoo Current Exhibit.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- We used to have African ground hornbills with the breeding group of gazelle, the cranes, and the geese and guineas. However, the hornbills would kill baby gazelle, baby guineas and even killed a crowned crane. We do not mix them anymore because they are too aggressive to other species.

Point Defiance Zoo & Aquarium, Tacoma, WA – Unsuccessful Exhibit

Species:

- Lowland Anoa (*Bubalus depressicornis*) (1.0)
- Asian Small-clawed Otter (*Amblonyx cinereus*) (1.1)

Exhibit Size: See Current Exhibits for Point Defiance Zoo.

General Management Notes:

- See Current Exhibits for Point Defiance Zoo.

Reproductive Management/Breeding History:

- Otters could breed at any time.

Items Contributing to Group's Failure:

- We tried to introduce our male anoa to the otters and all he wanted to do was stomp on them. I don't believe this is a male anoa issue necessarily, but perhaps an individual problem.
- The otters can successfully be housed with our female anoa (see Current Exhibits for Point Defiance Zoo).

Point Defiance Zoo & Aquarium, Tacoma, WA – Unsuccessful Exhibit

Species:

Hoofstock (*sp.*)
Indian Crested Porcupine (*Hystrix indica*)

Exhibit Size: See Current Exhibits for Point Defiance Zoo.

General Management Notes:

- See Current Exhibits for Point Defiance Zoo.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- We tried Indian crested porcupines with some of our hoofstock, and that did not work out well.

Rosamond Gifford Zoo at Burnet Park, Syracuse, NY – Unsuccessful Exhibit

Species:

Blue Duiker (*Philantomba monticola*)
Vervet Monkey (*Chlorocebus pygerythrus*)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Vervets were too aggressive towards the duiker.

Reproductive Management/Breeding History:

- We housed non-breeding groups of both species.

Items Contributing to Group's Failure:

- The vervets were too aggressive towards the duiker.

Sacramento Zoo, Sacramento, CA – Unsuccessful Exhibit

Species:

Sitatunga (*Tragelaphus spekii*) (1.0)

Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- The 2 year old male sitatunga was introduced to the yard that previously housed 1.1 yellow-backed duiker.
- The yellow-backed duiker had access to a barn via creep doors.
- The sitatunga had access to a barn and holding pen via a shift door.
- The exhibit was serviced with the duiker present and sitatunga in holding.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- The male sitatunga was aggressive towards the duiker – he was interested in chasing, sparring, and trying to access the duiker's food and barn space.

Sacramento Zoo, Sacramento, CA – Unsuccessful Exhibit

Species:

- Eastern (Mountain) Bongo (*Tragelaphus eurycerus isaaci*) (1.2)
- Red River Hog (*Potamochoerus porcus*) (1.3)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- See Sacramento Zoo Historical Exhibit.
- The breeding group of bongo included a young male and female (both about 2 years old at the time of introductions) and an older female (about 16 years old).
- The older female had been housed with the 1.1 red river hog adult breeding pair for many years.
- Both young bongo were from previous facilities with no exposure to other species/never before in mixed species situation.
- 1.1 red river hogs had previously been housed with 1.2 bongo in this exhibit (0.1 bongo of the current group).
- River hogs had a litter of 0.2 after introductions to the 2 young bongo were completed.

Reproductive Management/Breeding History:

- The breeding group of 1.2 bongo were kept in the large yard with pen access; they were shifted inside during exhibit servicing.
- The breeding pair of 1.1 river hogs were closed in a separate yard at night.
- The two species were housed in a separate yard and barn when the piglets were born for 1 month before introductions to the bongo in the big yard.

Items Contributing to Group's Failure:

- The piglets were actively aggressive towards the bongo.
- The young bongo had no previous experience in a mixed species exhibit and were very reactive to hog aggression.

Sacramento Zoo, Sacramento, CA – Unsuccessful Exhibit

Species:

Grevy's Zebra (*Equus grevyi*) (0.3)
Common Ostrich (*Struthio camelus*) (1.2)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- See Sacramento Zoo Historical Exhibit.
- We have housed Grevy's with ostrich in this yard for many years.
- Our ostrich group was down to 0.1 due to age related deaths and then we acquired 1.1 hatchling ostrich and raised them in the zebra yard with the remaining 0.1 adult ostrich and 0.3 Grevy's.
- 1.0 ostrich became extremely aggressive at sexual maturity towards staff and all other animals.

Reproductive Management/Breeding History:

- None

Items Contributing to Group's Failure:

- The hand-reared male ostrich was aggressive – he killed a female ostrich and attacked a female zebra (the injuries led to her death).

Saint Louis Zoo, St. Louis, MO – Unsuccessful Exhibit

Species:

Chinese Goral (*Naemorhedus griseus*) (1.1)
Hooded Crane (*Grus monacha*) (1.0)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- All animals were adults when introduced.
- The goral showed aggression towards the crane immediately.

Reproductive Management/Breeding History:

- None

Items Contributing to Group's Failure:

- Aggression from the goral towards the crane.

Saint Louis Zoo, St. Louis, MO – Unsuccessful Exhibit

Species:

- Lesser Kudu (*Tragelaphus imberbis*) (1.0)
- Reticulated Giraffe (*Giraffa camelopardalis reticulata*) (1.3)
- Common Ostrich (*Struthio camelus*) (1.1)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- See Saint Louis Zoo Historical Exhibit.
- All animals were adults at the time of the introductions.

Reproductive Management/Breeding History:

- Female giraffe were separated for calving.

Items Contributing to Group's Failure:

- In two separate instances we had a male lesser kudu that shared a habitat with the giraffe and ostrich for quite some time before there were any issues (See Saint Louis Zoo Historical Exhibit). Both times there was an altercation between an ostrich and the lesser kudu male. We do not know which animal initiated the altercation.

Saint Louis Zoo, St. Louis, MO – Unsuccessful Exhibit

Species:

- Transcaspiian Urial (*Ovis orientalis vignei*) (1.3)
- Abyssinian Ground Hornbill (*Bucorvus abyssinicus*) (1.0)
- Wattled Crane (*Bugeranus carunculatus*) (1.0)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- Both of these were accidental introductions; the birds jumped/flew into the urial habitat.
- All animals were adults.
- All urial were immediately aggressive towards the birds.

Reproductive Management/Breeding History:

- None

Items Contributing to Group's Failure:

- Aggression from the urial towards the birds.

San Diego Zoo, San Diego, CA – Unsuccessful Exhibit

Species:

- Bharal (*Pseudois nayaur*) (2.0)
- Sichuan Takin (*Budorcas taxicolor tibetana*) (1.4)

Exhibit Size: Less than 5,000 sq ft

General Management Notes:

- Animals were held in one large pen.
- Bharal started within a smaller pen within the main exhibit for 3 days before introduction.

Reproductive Management/Breeding History:

- This was a breeding group of takin.

Items Contributing to Group's Failure:

- Bharal jumped out.

San Diego Zoo Safari Park, Escondido, CA – Unsuccessful Exhibit

Species:

Congo Buffalo (*Syncerus caffer nanus*)
Mandrill (*Mandrillus sphinx*)

Exhibit Size: 1 acre-3 acres

General Management Notes:

- They immediately attacked one another and would not stop until one (mandrill) was sent to the hospital.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- We were not able to visually acclimate the animals.
- The mandrill male was very aggressive.
- The male Congo buffalo would not back away from the mandrill male.

San Diego Zoo Safari Park, Escondido, CA – Unsuccessful Exhibit

Species:

Common Eland (*Taurotragus oryx*)
Greater Kudu (*Tragelaphus strepsiceros*)

Exhibit Size: Larger than 8 acres

General Management Notes:

- We had an adult male eland and a young kudu bull with breeding female kudu and eland.
- Eland and kudu hybridized.

Reproductive Management/Breeding History:

- See above.

Items Contributing to Group's Failure:

- We needed adult males of both species that were dominant.

San Diego Zoo Safari Park, Escondido, CA – Unsuccessful Exhibit

Species:

Malayan Sambar Deer (*Rusa unicolor equina*) (2.0)
Nubian Ibex (*Capra nubiana*) (8.19)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- The Nubian ibex breeding herd occupies two 100' x 120' pens that are connected by a large 10' gate.
- In January 2012, 2 Malayan sambar males were transferred from the breeding herd to this enclosure. They were removed from this enclosure in 2014 after being suspected of predation of Nubian ibex kids.

Reproductive Management/Breeding History:

- Adult males for breeding are rotated every couple of years.
- The entire herd lives together year-round.
- Females give birth and raise their young in these pens.

Items Contributing to Group's Failure:

- Predation by Malayan sambar

San Diego Zoo Safari Park, Escondido, CA – Unsuccessful Exhibit

Species:

Nubian Soemmerring's Gazelle (*Nanger soemmerringii soemmerringii*) (breeding group)
Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)

Exhibit Size: 10,000-20,000 sq ft (~22,000 is ½ acre)

General Management Notes:

- No information provided.

Reproductive Management/Breeding History:

- The Soemmerring's gazelle were a breeding group with the females giving birth on exhibit.
- The yellow-backed duiker were suspected of predation and removed from the enclosure.

Items Contributing to Group's Failure:

- Predation of gazelle calves by yellow-backed duiker

Santa Barbara Zoological Gardens, Santa Barbara, CA – Unsuccessful Exhibit

Species:

Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (1.2)
Sulcata (African Spurred) Tortoise (*Centrochelys sulcata*) (3.3)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- Male giraffe would walk over and stand on the tortoises like they were rocks.

Reproductive Management/Breeding History:

- Giraffe herd was breeding.
- Tortoises were not breeding.

Items Contributing to Group's Failure:

- The giraffe breeding bull was pushy towards everything in the exhibit while breeding.
- The tortoises would burrow into the ground and we were concerned about our giraffe calves running around the yard and collapsing the den and getting a leg stuck. We kept pulling the tortoises from their dens and this was stressful for them; this also meant they were out in the open more than normal, perfect for our male giraffe to pester.

Toronto Zoo, Toronto, Ontario, Canada – Unsuccessful Exhibit

Species:

- Sulawesi Babirusa (*Babyrousa celebensis*) (1.0)
- White-handed Gibbon (*Hylobates lar*) (1.1)

Exhibit Size: 5,000-10,000 sq ft

General Management Notes:

- This is an indoor exhibit with climbing structures for the gibbons and a variety of live plants (including a large *Ficus benjamina* tree).
- There is natural substrate, and a pool/moat is along one side.
- Gibbons are a pair of older gibbons, late 30s at the time; babirusa was 4 years old.
- “Babirusa-proof” islands were created at the base of the gibbon climbing structures to protect some of the existing vegetation prior to the introduction. The two species had separate off-exhibit holding areas.
- 1.0 gibbon would swipe at babirusa from above, and on one occasion, scratched or bit him. It was a minor cut but it bled a lot, causing visitors to panic. The babirusa was also stressed by the incident, running away as the gibbon chased him around the exhibit. After that they were separated. They had lived together for a few months, with mostly curiosity from the male gibbon.

Reproductive Management/Breeding History:

- Gibbons are older non-reproductive animals, and the babirusa was a lone male.

Items Contributing to Group’s Failure:

- Gibbons lived alone for many years
- There was not space for babirusa away from climbing structure
- Gibbon antagonistic behavior toward babirusa

Toronto Zoo, Toronto, Ontario, Canada – Unsuccessful Exhibit

Species:

Common Warthog (*Phacochoerus africanus*) (2.0)

Southern White Rhinoceros (*Ceratotherium simum*) (2.2)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- Rhinos and warthogs shifted onto exhibit from two separate runways from the same building.
- Introductions only lasted a few days, as warthogs kept digging under the gate to get back into their yards and began trying to break the chain link gate.
- See Toronto Zoo Current Exhibit.

Reproductive Management/Breeding History:

- There was no reproductive activity with either group at this time. Rhinos were exhibited in different combinations, but one male was always kept separate from the others because he was aggressive; the other male rhino was geriatric.

Items Contributing to Group's Failure:

- Exhibit was not right for warthogs, too many places to hide or misbehave
- Runway into exhibit for warthogs was not secure enough, they would dig into it and stay there
- Not enough interest in this grouping to go forward with necessary upgrades to the exhibit

Toronto Zoo, Toronto, Ontario, Canada – Unsuccessful Exhibit

Species:

Greater Kudu (*Tragelaphus strepsiceros*) (1.3)
Impala (*Aepyceros melampus*) (0.3)
Thomson's Gazelle (*Eudorcas thomsonii*) (1.1)
Southern Ground Hornbill (*Bucorvus leadbeateri*)
White-headed Vulture (*Trigonoceps occipitalis*)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- When the exhibit first opened, it housed 1.3 greater kudu as well as 0.3 impala and 1.1 Thomson's gazelle. The gazelle and impala showed some interspecies aggression, and the gazelle were removed after a few weeks of introduction attempts.
- See Toronto Zoo Current Exhibit.

Reproductive Management/Breeding History:

- See Toronto Zoo Current Exhibit.

Items Contributing to Group's Failure:

- The gazelle and impala showed some interspecies aggression, and the gazelle were removed after a few weeks of introduction attempts.
- No issues were reported between other species in this exhibit.

Virginia Zoo, Norfolk, VA – Unsuccessful Exhibit

Species:

- Masai Giraffe (*Giraffa camelopardalis tippelskirchi*) (2.2)
- Yellow-backed Duiker (*Cephalophus silvicultor*) (1.1)
- Common Ostrich (*Struthio camelus*) (1.1)
- East African Crowned Crane (*Balaerica regulorum gibbericeps*) (1.1)
- Southern Ground Hornbill (*Bucorvus leadbeateri*) (1.1)

Exhibit Size: 20,000-45,000 sq ft (½ acre to 1 acre)

General Management Notes:

- See Virginia Zoo Current Exhibit.
- 1.1 crowned cranes used to be housed in this exhibit. The southern ground hornbill showed a lot of aggression toward them and they were moved into another mixed exhibit.

Reproductive Management/Breeding History:

- No information provided.

Items Contributing to Group's Failure:

- Aggression from hornbills to crowned cranes

The Wilds, Columbus, OH – Unsuccessful Exhibit

Species:

- Banteng (*Bos javanicus*) (1.4)
- Bharal (*Pseudois nayaur*) (3.0)
- Fringe-eared Oryx (*Oryx beisa callotis*) (0.5)
- Indochinese Sika (*Cervus nippon pseudaxis*) (0.15)

Exhibit Size: Larger than 8 acres

General Management Notes:

- We had three bharal males under the age of 4 that were only in the pasture for one season.

Reproductive Management/Breeding History:

- We never had female bharal in this group.

Items Contributing to Group's Failure:

- Male bharal tend to start fights they can't finish with larger species; this was possibly due to the lack of females of their own species to occupy their time and attention.

The Wilds, Columbus, OH – Unsuccessful Exhibit

Species:

- Banteng (*Bos javanicus*) (1.4)
- Chinese Goral (*Naemorhedus griseus*) (6.0)
- Fringe-eared Oryx (*Oryx beisa callotis*) (0.5)
- Indochinese Sika (*Cervus nippon pseudaxis*) (0.15)

Exhibit Size: Larger than 8 acres

General Management Notes:

- There were six Chinese goral males that were between 3-9 years of age.

Reproductive Management/Breeding History:

- This was an attempt to manage Chinese goral as a bachelor group in a large area.

Items Contributing to Group's Failure:

- Chinese goral males are too solitary to be in a space with other males of their own species.
- One individual Chinese goral was the main aggressor, but we were concerned that if he was removed another would fill his position.
- This pasture did not provide enough space and hides to get away from one another when there was a conflict. Because of their size and crafty nature, we did not attempt to manage Chinese goral in a larger space.

APPENDIX I. SURVEY METHODS

Surveys were collected using SurveyMonkey® from August 2015 to November 2015, with additional edits submitted through March 2017. Individuals from all AZA institutions were asked to answer a set of survey questions for the three categories of mixed-species exhibits (current successful, previous/historic successful, and unsuccessful). The survey questions are shown below. After surveys were collected, data were summarized by institution, and all mixed-species exhibit combinations were inserted into a series of four tables (three for successful mixed-species exhibits and one for unsuccessful mixed-species exhibits).

Current Mixed-species Exhibit Questions:

1. Exhibit Size
2. Species and Sex Ratio
3. Notes about the management of the mixed species group in this exhibit (Example: ages when introduced, shifting, season, details about animals themselves)
4. Are there any specific exhibit changes or accommodations needed for this group? (Example: hides, separating species, substrate, furnishings, topography)
5. Describe any reproductive management or breeding history with this group (Example: male rotated on exhibit for breeding, females separated for calving)
6. How long has this group successfully been mixed (include dates if possible)?
7. What are the specific challenges that you experience with managing this group?
8. What three things (in your opinion) contribute to the success of this particular group?
9. Was the species composition in this exhibit/enclosure ever structured differently in the past? If so, please describe the species composition, the period of time over which that group was housed in this exhibit/enclosure, and any specific notes about behavior and management for each successfully managed species composition throughout time.

Previous/Historic Mixed-species Exhibit Questions:

1. Exhibit Size
2. Species and Sex Ratio
3. Notes about the management of the mixed species group in this exhibit (Example: ages when introduced, shifting, season, details about animals themselves)
4. Are there any specific exhibit changes or accommodations needed for this group? (Example: hides, separating species, substrate, furnishings, topography)
5. Describe any reproductive management or breeding history with this group (Example: male rotated on exhibit for breeding, females separated for calving)
6. How long was this group successfully mixed (include dates if possible)?
7. What were the specific challenges that you experiences with managing this group?
8. Why does this exhibit/enclosure no longer exist (or no longer house ungulates) at your institution?

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9. Was the species composition in this exhibit/enclosure ever structured differently from the group described above? If so, please describe the species composition, the period of time over which that group was housed in this exhibit/enclosure, and any specific notes about behavior and management for each successfully managed species composition throughout time.

Unsuccessful Mixed-species Exhibit Questions:

1. Exhibit Size
2. Species and Sex Ratio
3. Notes about the management of the individual animals in the unsuccessful group (Example: ages when introduced, shifting, season, details about animals themselves)
4. Describe any reproductive management or breeding history with this group before it was broken up (Example: male rotated on exhibit for breeding, females separated for calving)
5. What three things (in your opinion) contributed to the breaking apart (or failure) of this mixed-species group?