

AZA Ciconiiformes/Phoenicopteriformes Taxon Advisory Group
Regional Collection Plan

2008



**ASSOCIATION
OF ZOOS &
AQUARIUMS**

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TABLE OF CONTENTS

	PAGE
Introduction, Mission and Goals	4
TAG Structure	5
TAG Administration	10
Guidelines, TAG Definition, Space Analysis	10
Selection Criteria, Management Categories	12
Management Criteria	13
Decision Tree Definition and Trees	15
SSP and PMP Programs	17
Species Recommended for DERP Management	24
Species Recommended for Phase Out	28
Species Recommendations Update Table	29
Three-year Action Plan	40
TAG Endorsed Conservation and Research Projects	41
 APPENDICES	
Programs Review Table (status and history)	Appendix A
Target Species Population Analysis and Recommendations	Appendix B
Species by Species Conservation Status & Recommendations	Appendix C
Space Survey Results	Appendix D

INTRODUCTION

The Regional Collection Plan is a required element for all Association of Zoos and Aquariums Taxon Advisory Groups (TAG) and is essential for managing zoo/aquarium populations. Conservation and zoo/aquarium based management issues were taken into account for all species recommendations. A decision tree format was used to make decisions on all species. Through responsible management of our zoo/aquarium populations, involvement in local and international conservation programs the Ciconiiformes/Phoenicopteriformes Taxon Advisory Group hopes to increase awareness about the issues facing many species in these Orders.

This is the second edition of the Ciconiiformes/Phoenicopteriformes TAG Regional Collection Plan. This TAG's highest level of species management is the Species Survival Plan. All of the recommended species were sent through the decision tree and management criteria and only the Waldrapp ibis or northern bald ibis fits the SSP criteria.

There are groups of birds that need group management and those are designated as PMPs. Some colonial species such as scarlet ibis, Waldrapp ibis, southern bald ibis, spoonbills and flamingos require a group management style program that should still monitor demographic and genetic status of the population. The program managers should work with the PMC to suit the needs of the populations.

There are some colonial species whose reproductive strategy requires a baseline (minimum) number in the flock in order to be reproductively successful. It will be important for the holders of these species to participate in the goal of establishing balanced sex ratios and maintaining appropriate numbers at breeding facilities. The TAG is sensitive that zoos still need specimens for display and will work with holders to meet their needs. The priority species are: southern bald ibis and lesser flamingo.

The Waldrapp ibis meets the criteria for SSP. Additional founders should be obtained and the population consolidated to a few zoos to meet the basic colonial requirements (3 to 5 pairs).

History

Prior to the development of formal regional collection plans, AZA bird managers formed taxa interest groups to discuss husbandry issues. In 1986, a workshop on the "Conservation and Captive Breeding of Storks" was held on St. Catherine's Island. The participants brought together information and expertise on storks from both the wild and captive setting. From this meeting, the Stork Interest Group (SIG) was established to help maintain interest in storks and form an international network of individuals interested in the conservation of storks and their habitats. The American Regional Stork Advisory Group (NARSAG) evolved from this meeting and was one of the early avian taxon groups to become active in North American zoos. An AZA workshop for flamingos was held in 1990, and along with the development of studbooks, this helped to begin the focus on improving flamingo husbandry practices. The stork and flamingo groups eventually evolved into the current organized taxon advisory group which expanded its scope to all wading birds. The Ciconiiformes TAG assisted the Flamingo Specialist Group with organizing the Second International Flamingo Workshop, in the fall of 1998. Participants developed a Conservation Assessment and Management Plan. The TAG held a husbandry workshop for flamingos in June 1999. Flamingo Husbandry Guidelines were published in 2005 as a joint effort with EAZA's Phoenicopteriformes/Ciconiiformes EEP and in cooperation with the Wild Waterfowl Trust. In the mid 1990's a global Conservation Assessment and Management Plan was developed for storks, ibises and spoonbills. Global planning for herons began at the same time.

Before this TAG formed, there were several groups monitoring zoo/aquarium Ciconiiformes and Phoenicopteriformes populations in North America. AZA's Heron, Ibis and Hammerhead Advisory Group developed a Regional Collection Plan for the smaller Ciconiiformes in 1994. Similarly, AZA's Stork Advisory Group developed informal recommendations around the same time. In 1996, a survey of wading bird spaces was conducted and a TAG regional collection plan meeting was held at the 1997 AZA Regional Workshop. During this meeting, recommendations were made for most wading bird taxa. Subsequently, an e-mail listserv was developed and there has been considerable discussion of priorities through this venue and among the steering committee. In addition, we have exchanged plans with the EAZA Phoenicopteriformes/Ciconiiformes EEP as well as the ARAZPA Non-Passerine TAG.

In April 1998, a small working group based at the Wildlife Conservation Society/Bronx Zoo convened for a day to continue the process, and to make telephone calls and inquiries to people and places to clarify recommendations. A draft Regional Collection Plan and Three-Year Action Plan was then distributed for review to active members of the AZA Ciconiiformes TAG via e-mail and surface mail. Revisions were incorporated and a final document was produced and submitted to WCMC in 2000. WCMC reviewed the plan

and failed to approve it. WCMC approved the Regional Collection Plan in June 2001. Also in 2001 the Ciconiiformes TAG formed a new steering committee and adjusted to fit the WCMC changes for taxon advisory groups. A steering committee listserv was established for discussing business outside AZA meetings. A studbook keepers and population managers listserv was also created to facilitate communication and information specific to species targeted in the regional collection plan. In 2004 the Ciconiiformes TAG steering committee reviewed and updated the existing regional collection plan and three year action plan. In 2005 and 2006, at AZA meetings and by email, the regional collection plan was updated. In 2007 the regional collection plan was thoroughly reviewed and revised to comply with the WCMC collection planning guidelines. Additionally, the Order Phoenicopteriformes was officially added to the TAG's name to appropriately identify all taxa covered by the TAG.

MISSION STATEMENT

The mission of the Ciconiiformes/Phoenicopteriformes Taxon Advisory Group is to coordinate management of wading birds in the North America region zoo and aquarium collections, as well as participate in and support relevant conservation efforts globally.

GOALS OF THE CICONIIFORMES/PHOENICOPTERIFORMES TAXON ADVISORY GROUP

- Identify and coordinate the use of space in zoos/aquariums for species in the Orders Ciconiiformes and Phoenicopteriformes.
- Develop and disseminate husbandry and exhibition information for all species currently within the scope of the TAG and any species under consideration by the TAG.
- Many birds in these taxa are colonial nesters. This strategy introduces challenges for sustained management, as extra-pair copulation has been widely documented, in both wild and zoo/aquarium flocks. This TAG will work closely with the AZA Small Population Management Advisory Group and Population Management Center to improve population management of species where parentage is uncertain.
- Encourage mixed species flocks to maximize spaces available for colonial species and exhibits that represent wetlands conservation messages.
- Manage large charismatic Ciconids as focal species and not as exhibit enhancement with hoof stock. Essentially this display strategy precludes reproduction of the birds. The development of husbandry and breeding techniques are critical for the establishment of self-sustaining captive populations with minimal reliance on wild-caught specimens to sustain our populations.
- Develop relationships with the scientific community to identify research needs.
- Cooperate with other national and international conservation organizations to identify common in-situ/ex-situ conservation goals.
- Recruit advisors, program managers, and species champions.

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Program Liaisons have been established for both managed and DERP programs (flamingo, stork, ibis, spoonbill, hamerkop/heron/egret). Bitterns do not have a liaison at this time as only one bittern, the least bittern, is designated as a DERP/REHAB and is rarely seen in collections. The primary purpose of a program liaison is to help the steering committee accomplish the goals of the Ciconiiformes/Phoenicopteriformes TAG. Liaisons recruit population managers, species champions and are sources of expert opinion. Program liaison positions are open to steering committee members only.

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AZA CICONIIFORMES/PHOENICOPTERIFORMES TAG ADMINISTRATION

Steering Committee Structure and Procedures:

- Steering Committee membership: up to 15 voting members and the Chair; elected offices include: Vice-Chair and Secretary. All advisory positions serve in a non-voting capacity.
- Steering Committee elections to be held every three years.
- Responsibilities of Steering Committee Member:
 - 1) Dedicate sufficient time to carry out TAG duties.
 - 2) Respond and contribute to TAG business two-thirds of the time.
 - 3) Be prepared to chair TAG subcommittees and specialist groups.
 - 4) Review and vote on submission of RCP to WCMC.
 - 5) Review and vote on TAG policies/guidelines.
 - 6) Review and vote on Studbook Keeper, PMP, SSP Coordinator applications.
 - 7) Have Internet and e-mail access.
- Voting procedure: Two-thirds approval by the Steering Committee is required for a majority.
- The Vice Chair and Secretary offices are elected every three years and attend meetings.
- The Vice Chair oversees Program Liaisons who are responsible for managed populations and DERP's.
- The Secretary is responsible for conducting elections.
- The Secretary is responsible for taking and keeping meeting minutes.
- The Secretary maintains and updates the Institutional Representative list and moderates the Ciconiiformes/Phoenicopteriformes TAG Listserv in collaboration with the AZA Office.

POLICIES AND GUIDELINES

The Ciconiiformes/Phoenicopteriformes TAG encourages all participating institutions and facilities to abide by the following:

- The TAG encourages all institutions to cooperate fully with the Species Survival Plan and various Population Management Plan recommendations.
- The sex of birds should be identified to aid in the management of all species.
- Microchip identification and leg bands are recommended for species covered by the TAG to aid in long-term identification of individuals.
- Individuals or institutions interested in conducting research on species in these Orders are encouraged to seek TAG guidance.
- Institutions interested in acquiring birds should follow the AZA acquisition policy. The TAG welcomes the opportunity to offer consultation for species selection and availability.
- All institutions should refer to the AZA disposition policy when surplus birds need to be placed.
- Cooperation among institutions holding small numbers of colonial species or single-sex groups are encouraged to help establish breeding colonies for certain species or to provide individuals to create appropriate flock sizes.
- Displays dedicated to the exhibition and education of wading bird species are encouraged. For native species, when possible, non-releasable rehabilitation birds should be utilized.
- Wading birds (flamingos, storks, ibises, spoonbills, herons, egrets, hamerkop) are recommended to be managed in pairs or colonies appropriate to the species' biology to encourage breeding and other natural behaviors.
- When appropriate, the TAG encourages institutions to develop mixed avian flocks to maximize the spaces available for managing colonial species and exhibits that present wetlands conservation messages.
- Reconsider housing non-flighted wading bird species with hoof stock as exhibit enhancements; this essentially precludes reproduction of the birds.
- Promote wetlands conservation in education programs since habitat loss is the leading threat to wading birds.

Ciconiiformes/Phoenicopteriformes TAG Statement on Flight Restriction

Flight restriction has been used by zoo/aquarium bird managers for decades, primarily as a method to allow the display of birds in open spaces while precluding the birds from using flight to depart these spaces. Flight restriction can be accomplished using a variety of methods and can be temporary or permanent. The techniques applicable to flamingos, storks, ibis, spoonbills, herons and egrets might include feather clipping, feather vane trimming, brailing, pinioning, tenotomy or tendonectomy, patagiectomy, or functional ankylosis. Each method has its advantages and disadvantages. Some are permanent and need only be done once in a bird's life, others are temporary and require regular handling of the birds with the associated risks involved in that handling.

Whereas flight restriction potentially increases the number of exhibit spaces available to display long-legged waders, it may also affect the reproductive potential of a flock. The impact of flight restriction on fertility seems to be variable amongst captive waders. Flight restriction may impair the mechanical act of copulation for most long-legged birds.

As with many aspects of animal management, there are differing opinions on the most appropriate strategies for avian exhibition. In the case of flight restriction, the benefits and costs of the various strategies to the birds and the institutions should be carefully weighed before proceeding with any particular course of action.

TAG Recommendations:

- 1) The Ciconiiformes/Phoenicopteriformes TAG recognizes the use of flight restriction in birds is complex and generates many strong and varied opinions. The TAG suggests each AZA zoo or aquarium devote significant time and energy to thinking through and documenting its own institutional guidelines on if /how flight restriction is employed.
- 2) The TAG respects institutional decisions about the use of flight restriction while recognizing the potential impact some of these decisions could have on successfully managing TAG populations (see #4 below).
- 3) The TAG does not recommend the pinioning of birds greater than a few days of age.
- 4) The TAG recognizes that several species under its management are known to have significant challenges to successful reproduction when flight restricted. In particular it is recommended that, storks in general not be permanently flight restricted, but especially male saddle-billed, lesser adjutant, marabou and jabiru. Waldrapp ibis and southern bald ibis due to their program status and minimal numbers should not be permanently flight restricted.
- 5) The TAG encourages all AZA institutions to support scientific research into the welfare implications of flight restriction and creatively work towards methods and technologies for minimizing its use and impacts.

TAG DEFINITION

The Ciconiiformes/Phoenicopteriformes Taxon Advisory Group oversees all long-legged wading birds with the exception of cranes. This includes flamingos, storks, ibises, spoonbills, egrets, herons and hamerkop. The TAG's mission is to promote conservation through propagation, education and research in cooperation with the relevant international specialist groups and TAGs in other regions. The taxa included in the TAG are all species recognized by Handbook of the Birds of the World Volume 1 (1992) in the Orders Ciconiiformes and Phoenicopteriformes. There are 113 recognized species in five families in Ciconiiformes and six species (sometimes considered five) in one family in Phoenicopteriformes. All of the species covered in this TAG are listed in the Species List and Conservation Status section of this Regional Collection Plan.

SPACE ANALYSIS

A space survey was conducted in 2007 and distributed to 232 AZA accredited and related facilities, 188 responses were received which provided the TAG with an 81% response rate. Of the 44 institutions that did not respond it was determined that 17 of those facilities did not have Ciconiiformes and/or Phoenicopteriformes in their collections currently which brings the response rate of institutions with Ciconiiformes and/or Phoenicopteriformes in their collections to 88%. The TAG feels that the space survey gives an accurate picture of the space available currently and over the next three years. Population Management/Studbook data and International Species Information System (ISIS) information were also used to determine space availability in combination with the space survey. See Appendix C p.72.

Analysis of existing and projected management space was complicated by the fact that many wading bird species are managed in colonies. Additionally, groups of these species compete for the same management space. Flamingos are not really interchangeable with the other long-legged waders. Space is not limiting for flamingos, as young can easily be absorbed into existing groups. The Flamingo Husbandry Guidelines recommends a minimum flock size of at least 20. However, flocks of 30 or more appear to have better reproduction potential. Larger birds (taller than one meter), for example marabou storks, are often pinioned and housed in open yards, sometimes with mammals, although housing in aviaries is generally preferable. These species may compete for space with large non-wading bird species such as cranes, bustards, ratites or vultures. Smaller birds tend to be housed in aviaries. Wading birds tend to spend most of their time in or near water and need more aquatic space. Terrestrial species need less water in their spaces. Colonial species should be housed in groups, and may sometimes be mixed with other bird species. Non-colonial species are less gregarious and tend to need more private space.

SELECTION CRITERIA (SC)

The primary criteria that were applied to all species for consideration in the Regional Collection Plan (RCP) were the existence or absence of the species in the North America population.

Several other criteria were also used to evaluate taxa for management within the Ciconiiformes/Phoenicopteriformes TAG. These criteria cannot be ranked due to species variability and differences between conservation programs. The following list was created to assist with species selection. A species that exists within the North America zoo/aquarium region population must exhibit at least three of the selection criteria (SC) to be considered in the RCP process. A new species that is being considered for addition to the North America zoo/aquarium region population should also exhibit at least three of the following SC.

- 1) **Conservation connection:** A conservation need must be identified through sources such as the Endangered Species Act (ESA), IUCN, Birdlife International, and other related documents. The species currently or has the potential for, collaborative conservation projects endorsed by the range countries.
- 2) **Research:** The population has the potential to act as a salvage population/genetic reservoir or provide valuable information that would be useful to maintaining stable wild populations. The salvage population and genetic reservoirs must be in conjunction with an established conservation project with defined goals and objectives. Husbandry research that benefits a current zoo/aquarium population may also apply to this category. Husbandry research must be clearly defined with goals, expected outcomes and what the potential benefits will be, i.e. related species, specific population, specific questions such as nutrition, etc.

- 3) **Flagship potential:** This species can help generate attention and support for a habitat, region, or ecosystem.
- 4) **Education:** The species can become part of an education program if it has one or more of the following characteristics: 1) leads to direct conservation action by our public, 2) exhibits taxonomic uniqueness, 3) has a biologically interesting breeding or survival strategy, 4) a native species from a rehabilitation program that is non-releasable and fits into a habitat theme exhibit, i.e. native wading birds for wetlands exhibits.
- 5) **Demonstrated interest by zoos and others:** An organized conservation effort has demonstrated interest in working with the zoo community to recover or conduct research on a species. Species that have a small nucleus of zoos interested in developing husbandry expertise should receive consideration if there is a species champion and interest is high.
- 6) **Exhibit value:** Visitor appeal of the species.

MANAGEMENT CATEGORIES

Once it is determined that a species should be included in the RCP, a decision will need to be made about what type of management program would not only benefit the species but support TAG goals. The following management categories will be applied to the appropriate species:

- 1) **Species Survival Plan (SSP) Population:** Studbook required, intense management to maintain a determined percentage of genetic diversity for years, make breeding recommendations and create a master plan, program managed by coordinator and elected management group.
- 2) **Population Management Plan (PMP) Population:** Studbook required, moderate management to maintain population, institutional compliance encouraged, breeding and transfer recommendations communicated through a Population Management Plan, program managed by a PMP Manager, institutional input through TAG IRs, non-member participation through AZA and institutional Acquisition/Disposition policies.
- 3) **Display, Education, and Research Population / Rehabilitation (DERP/REHAB):** No studbook required, long-term genetic demographic management not required. Native North American birds desirable for exhibit purposes. This category is intended for species that are available but offer a specific conservation message and/or are needed to develop husbandry methods. The main targets for this category are native wading birds in particular wood stork, herons and egrets. The numbers vary at any given time. Breeding is generally not recommended as these species may compete for space with program species. Replace with program species when possible. A majority of these species will be available in small numbers and some are rarely available. If a particular population actually reaches 10 or more birds in a three-year period, it will be addressed in the next Regional Collection Plan. This category is intended to acquire birds primarily through rehabilitation centers however, wild collection may be recommended.
- 4) **Display, Education, and Research Population (DERP):** No studbook required, long-term genetic demographic management not required. TAG may identify a species champion who may track species through registries.
- 5) **Phase-In Population:** Not currently in AZA institutions but the TAG plans or hopes to initiate a program. The taxa will then be reassigned to another management category.
- 6) **Phase-Out Population:** Not viewed as a managed program. Currently in AZA institutions but should be phased out through a breeding moratorium: Phase-out process should be monitored in some manner.
- 7) **Not Recommended:** Not currently in AZA institutions and the TAG recommends the taxon NOT be brought into an AZA program.

MANAGEMENT CRITERIA (MC)

The following table was used to determine the level of management required for recommended species:

Management Assessment Criteria for Recommended Taxa

CRITERIA	SSP	PMP	No Management
Availability within AZA	LOW	MODERATE	EXTREMES
Availability outside AZA	LOW	MODERATE	EXTREMES
Extinction Risk without Management (in Zoos & Aquariums)	ENDANGERED/THREATENED	VULNERABLE	EXTREMES
Extinction Risk with Management (in Zoos & Aquariums)	DECREASES	DECREASES/STABLE	STABLE
Demand within AZA	HIGH	MODERATE	LOW
Institutional Commitment	HIGH	MODERATE	LOW
Ease of Breeding	LOW/MODERATE	HIGH	EXTREMES
Extinction Risk (Wild)	ENDANGERED/THREATENED	VULNERABLE	LEAST CONCERN
Acquisition Cost (Outside AZA)	HIGH	MODERATE	LOW
Program Operating Costs	HIGH	MODERATE	LOW
International Program	YES	NO	NO
Link to Conservation of Wild Population	DIRECT	INDIRECT OR NONE	NONE
North American Governmental Conservation Program	YES	NO	NO

CHARACTERISTICS OF DIFFERENT LEVELS OF POPULATION MANAGEMENT			
CHARACTERISTICS	SSP	PMP	No Management
Participation	FULL/MANDATORY	VOLUNTARY	NA
Memorandum of Participation	NO	NO	NA
Compliance	MANDATORY	VOLUNTARY	NA
AZA Conflict Resolution Process	YES	NO	NA
Non-member Participation	TO BE DETERMINED	PER PARTICIPANT A/D POLICY	PER PARTICIPANT A/D POLICY
Animal-by-Animal Recommendations	YES	PER PROGRAM DECISION	NO
Steering Committee	OPTIONAL	NO	NA
AZA Population Management Center Assistance	YES	YES	NO
SPMAG Assistance	YES	YES	MAYBE
AZA Regional Studbook	YES	YES	NO

DECISION TREE

A decision tree approach was used to help categorize species covered by the TAG. The capacity and space availability in North American institutions were determined through data from the 2007 Ciconiiformes/Phoenicopteriformes space survey, studbooks and ISIS data. Target population sizes for managed programs were determined at a meeting with the AZA Population Management Center population biologists in June 2007. The space available for a particular species or taxa was a determining factor for the sustainability of that population. Once a species was determined to be in North American populations the sustainability of the population was determined using the criteria below. The species then proceeded through the decision tree to determine if it was a recommended or not recommended species. The management criterion was applied to all recommended species to determine the level of management.

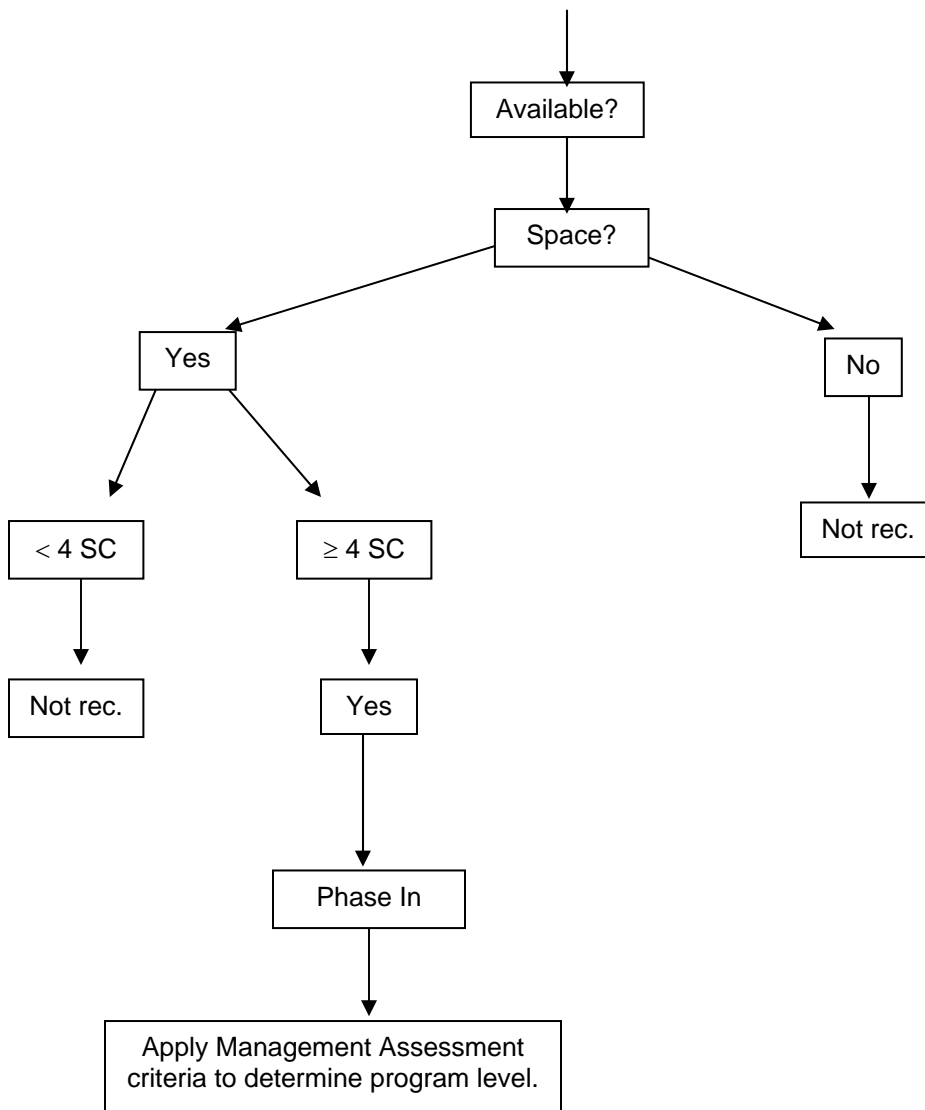
- 1) **Sustainable population:** A nucleus of founders is available to provide potential genetic diversity. Husbandry expertise exists for this species and is successful. This is defined as

consistent hatches and surviving offspring by a variety of unrelated pairs (more than five). Space is currently available to house the number of birds needed to maintain a stable population.

- 2) **Potentially Sustainable population:** There exists a nucleus of potential founders. There is either existing or past husbandry expertise with this species; or a related species with husbandry expertise established exists to model program after. Additional founders may be necessary and sources for these birds must be available (i.e. other zoo regions, private sector, wild importation). Space is either currently available or will be available over the next three years to develop a viable population.
- 3) **No Sustainable population:** There are not enough founders to construct a viable population and/or there has been no success with husbandry efforts. The results from the space survey and ISIS data may show that there currently is not space available to achieve a viable population.

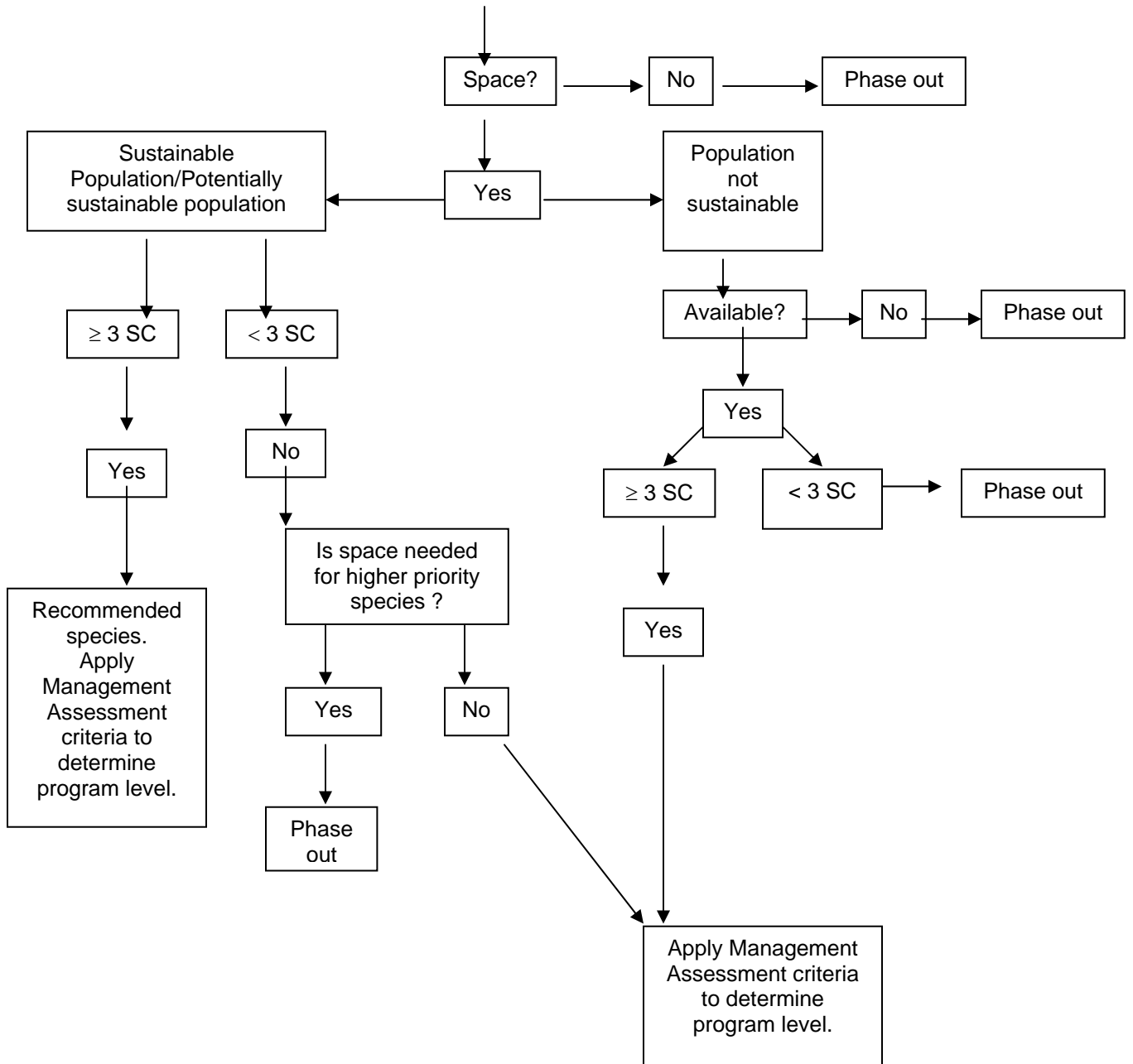
DECISION TREE

Species/Taxa Not Currently Held in North American Collections



DECISION TREE

Species/Taxa Currently Held in North American Collections



TAXONOMIC REFERENCES

Taxonomy primarily follows that used in J. del Hoyo et al. (1992, Handbook of the Birds of the World, Vol. 1, Lynx Edicions, Barcelona).

SOURCES FOR ASSESSMENT OF WILD POPULATIONS

2001 IUCN Red List Categories and Criteria version 3.1.

Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland.
Threatened Birds of the World. BirdLife International 2000.

Lynx Edicions and BirdLife International, Barcelona and Cambridge , UK.

SUMMARY OF MANAGED PROGRAMS (SSP & PMP)

A summary list of all taxa recommended for management by the AZA Ciconiiformes/Phoenicopteriformes TAG. See also Program Review Table, Appendix A and Population Analysis, Appendix B.
Program taxa are assigned a liaison from the steering committee to oversee program activities.

THESE PROGRAMS ARE CONSIDERED AS MANAGED AND INSTITUTIONS ARE ENCOURAGED TO FOLLOW THE RECOMMENDATIONS OF THE POPULATION MANAGER. IF NO MANAGER EXISTS THE BREEDING RECOMMENDATION FOR SPECIES IN THIS SITUATION IS: ONE CLUTCH PER YEAR UNTIL A MANAGER CAN BE FOUND. ONCE A MANAGER IS IN PLACE REFER TO BREEDING RECOMMENDATIONS.

Program Liaisons:

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TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	CONSERVATION	HUSBANDRY NOTES	Manager
Boat-billed heron <i>Cochlearius cochlearius</i>	Management Level: PMP Target population size: 175 Objectives: 1) Develop husbandry guidelines 2) increase space 3) Of the five subspecies, the TAG will focus on <i>C. c. ridgwayi</i> 4) Work with EAZA region to determine their needs.	Large range and population in tropical areas of southern Mexico, Central America, western Caribbean islands and northern South America. Population trends and designations of frequent sightings indicate the species is not in decline. IUCN Red List evaluation = Least Concern. Potential threats: Destruction of wetlands. Very little is known of this nocturnal and secretive heron. Unique heron, potential education component to promote tropical wetlands conservation.	Mixes with other bird species, although can be territorial. Primarily nocturnal in habits. Recommended to keep full-winged in aviary. Not cold tolerant below 32° F wind chill. Only heron with management program. High degree of taxonomic uniqueness. Nests colonially, but prefers to nest in the absence of other wading birds. Nests are made from sticks and soft vegetation high in trees over water. Habitat: tropical lowlands near water. Generally quiet slow moving rivers, ponds, cenotes, and swamps. Diet: aquatic vertebrates and invertebrates.	Robin Lentz, Bird Supervisor Jacksonville Zoo and Gardens 370 Zoo Parkway Jacksonville, FL 32218-5799 Phone: (904) 757-4463 e-mail: lentzr@jaxzoo.org
Hamerkop <i>Scopus umbretta</i>	Management Level: PMP Target population size: 100 Objectives: Establish self-sustaining, viable population. Recruit more individuals through importation (can bring in 2 per year for 10 years). Females needed. Develop husbandry guidelines.	Large range and population in tropical areas of Madagascar and Africa generally south of the Sahara. Population trends indicate the species is not in decline. IUCN Red List evaluation = Least Concern. Potential threats: excessive use of pesticides in its wetland habitat. Hunted and traded in traditional medicine markets. Sole representative of the family <i>Scopidae</i> . Unique species that attracts attention.	Tropical species mixes well with other bird species. Doesn't seem to compete for space with other wading birds. Recommended for aviaries. Cold tolerant to 20° F wind chill if given shelter. Solitary nester in pairs, may come together in small groups outside the breeding season. The nest is a huge bulky structure of sticks and other vegetation high in a tree or rock ledge with eggs being laid and chicks raised in a cavity inside this structure. Habitat: Forests to semi-desert as long as water is available. Diet: aquatic invertebrates, vertebrates and amphibians.	John Azua, Curator of Birds Denver Zoological Gardens 2300 Steele Street Denver, CO 80205-4899 Phone: (303) 376-4800 e-mail: jazua@denverzoo.org
Abdim's stork <i>Ciconia abdimii</i>	Management Level: PMP Target population size: 120 Objectives: Reproduction decreased population declining, need to start breeding again to sustain population. Develop husbandry guidelines. Recruit more founders. Make recommendations to keep multiple pairs.	Large range throughout east Africa, Ethiopia and South Africa. Global population large with indications the species is not in decline. IUCN Red List evaluation = Least Concern. Potential threats include habitat loss by development and agricultural activities (farming, poisoning of primary food, locust, and overgrazing), hunted for trade in medicine markets. Occurs around Lake Kundi an Important Bird Area in Sudan.	Small stork, colonial, mixes well with a variety of species. Will reproduce flighted or flight restricted. Habitat: open grassland, areas of cultivation and woodland. Diet: primarily insectivorous (locust, grasshopper, cricket, caterpillar). Somewhat cold tolerant to 32°F wind chill.	Valerie Nichols, Keeper Disney's Animal Kingdom PO Box 10000 Lake Buena Vista, FL 32830 Phone: (407) 939-6382 e-mail: valerie.d.nichols@disney.com
European white stork <i>Ciconia ciconia</i>	Management Level: PMP Target population size: 100 Objectives: create self-sustaining, viable population, and to improve husbandry. 71% of population pedigree known. 50% unknown ancestry will be excluded from genetic management. Projections indicate that genetic goals (90% gene diversity for 100 years) will not be met. However, by increasing effective population size and importing new founders from Europe, projections indicate gene diversity can be maintained within 10% of the current level for 100 years with a target population size of 100.	Large range, breeds throughout western and eastern Europe and winters in tropical Africa. Global populations large with indications the species is not in decline. However, localized populations have declined and some have been boosted by zoo raised birds. IUCN Red List evaluation = Near Threatened. Potential threats include altering wetlands (draining, preventing floods with dams, embankments, pumping stations), development, industrialization. In Africa, collisions with power lines, poisoning from pesticides and hunting.	Winter hardy, charismatic storks that can be managed in open yards. Will nest colonially if nests can be about 10 ft. apart. Nests are bulky made of sticks and generally built above ground. Habitat: open areas such as grasslands, flooded pastures, shallow marshes near scattered trees for roosting. Diet: Opportunistic, small mammals, large insects, reptiles, fish and small birds.	Tom Schneider, Curator of Birds Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: tschneider@detroitzoo.org

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	CONSERVATION	HUSBANDRY NOTES	Manager
Saddle-billed stork <i>Ephippiorhynchus senegalensis</i>	Management Level: PMP Target population size: 85 – 100 Objectives: Update husbandry guidelines and identify additional space. Need to indicate specific management guidelines for this species (nest size, height, no flight restriction). With better husbandry we hope to increase numbers. Move all males currently full-winged into paired situations and in facilities that can devote to breeding and send permanent flight restricted males to zoos for display purposes. Investigate how many males that are pinioned have had nests with eggs. Continue to aggressively pursue techniques that might result in pinioned males breeding.	Large range south of the Sahara through tropical Africa to South Africa. Population large with indications the species is not in decline. IUCN Red List evaluation = Least Concern. CITES Appendix III Ghana. Potential threats: vulnerable to disturbance and habitat alteration, pesticide overuse and agriculture practices.	Highly charismatic stork. Not recommended to set up for breeding in open exhibits. Males that are flight restricted have never produced fertile eggs. May be a good candidate for Artificial Insemination or alternative reproduction “assists” (i.e. clipping the full wing of pinioned males, training, etc.). Can be aggressive to other birds in the same enclosure. Solitary nesters and may come together in family groups outside the breeding season. Nests are large bulky stick platforms build high in isolated trees near or over water. Cold sensitive, tolerates temperatures to 32° F wind chill. Habitat: Extensive wetlands such as freshwater marshes, flooded plains, lake shores and ponds. Diet: primarily fish, but also amphibians, crustaceans, reptiles, small mammals, birds and insects.	Jocelyn Womack, Senior Keeper Dallas Zoo and Dallas Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 948-0575 email: jockjfitz@aol.com
Marabou <i>Leptoptilos crumeniferus</i>	Management Level: PMP Target population size: 150 Objectives: Focus on husbandry. Males kill females. With better husbandry we hope to develop a self-sustaining population.	Large range and population in sub-Saharan Africa with indications the species is not in decline. IUCN Red List evaluation = Least Concern. Potential threats: hunting and trading at trading at traditional medicine markets.	Most numerous of the giant storks. Not cold tolerant below 32° F. Can be very aggressive and are often used in African Plains exhibits which are generally not suitable for breeding, however this stork has produced in mixed species exhibits with hoof stock as long as safe areas are provided. Can breed in pairs or colonies. Has reproduced when flight restricted. Nests are bulky made with sticks usually above ground, but has nested on the ground in zoos. Habitat: savannas, swamps, riverbanks, lake shores. Diet: primarily carrion, but also live fish, birds, herps and small mammals.	Paul Schutz, Zoological Manager Disney’s Animal Kingdom PO Box 10000 Lake Buena Vista, FL 32830 Phone: (407) 939-6382 e-mail: paul.j.schutz@disney.com
Yellow-billed stork <i>Mycteria ibis</i>	Management Level: PMP Target population size: 80 Objectives: Promote among region zoos. Develop husbandry guidelines. Recruit more founders and increase number of spaces. Grow population.	Large range and population in sub-Saharan Africa with indications the species is not in decline. IUCN Red List evaluation = Least Concern. Potential threats: destruction of wetlands.	Mixes well with other bird species. Nests colonially in small groups of up to 20 pairs. Nests are constructed from sticks usually in trees. Some zoos have kept multiple pairs together. San Diego WAP has bred wing-clipped and pinioned individuals. May hybridize with other <i>Mycteria</i> . Not cold tolerant below 32° F. Habitat: variety of wetland types. Diet: small aquatic vertebrates and sometimes small mammals and birds.	Andrea Worrall, Animal Care Manager San Diego Zoo’s Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: AWorrall@sandiegozoo.org

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	CONSERVATION	HUSBANDRY NOTES	Manager
Painted stork <i>Mycteria leucocephala</i>	Management Level: PMP Target population size: 50 Objectives: 1) Determine population size 2) Develop husbandry requirements. 3) promote among zoos and develop husbandry guidelines.	One of the most abundant of the Asian storks however population considered in decline. Current population estimates = 25,000 individuals total in south and southeast Asia. IUCN Red List evaluation = Near Threatened. Threats: hunting, drainage and pollution of wetland habitat, hunting, egg and nestling collection. Fortunately this species occurs in a number of protected areas. Conservation measures: monitor colonies, ensure protection of breeding areas, encourage protection of habitat, conduct local awareness campaigns.	Colonial and mixes with other bird species. Mixes well with other bird species. Nests colonially in small groups of up to 20 pairs. Nests are constructed from sticks usually in trees. May hybridize with other <i>Mycteria</i> . Not cold tolerant below 32°F. Habitat: variety of wetland types. Diet: small aquatic vertebrates and sometimes small mammals and birds.	Debbie Gungle, Lead Bird Keeper San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: dgungle@sandiegozoo.org
Milky stork <i>Mycteria cinerea</i>	Management Level: PMP Target population size: 50 Objectives: 1) Develop management plan 2) participate in import from Singapore Zoo. Increase numbers and genetic diversity. Recruit at least 20 birds from outside region. Develop husbandry guidelines.	Rapid population decline Current population estimates = fewer than 5,000 individuals total in south and southeast Asia. The species' stronghold is Sumatra. IUCN Red List evaluation = Vulnerable. Considered endangered in Viet Nam and Malaysia. Threats: loss of habitat, human disturbance, hunting and trade. Conservation measures: CITES Appendix I listing, several breeding colonies are located in globally important protected wetland areas throughout range, local awareness campaigns, captive breeding/release programs.	Endangered Asian stork. Colonial. Recommended for aviaries only at this time. Good candidate for <i>in situ</i> work. See Bird Life International for <i>in situ</i> conservation programs. May hybridize with other <i>Mycteria</i> . Not cold tolerant below 32° F. Habitat: coastal areas, mangroves, freshwater marshes, swamps and rice fields. Diet: small aquatic vertebrates and sometimes small mammals and birds.	Andrea Worrall, Animal Care Manager San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: AWorrall@sandiegozoo.org
Waldrapp ibis or northern bald ibis <i>Geronticus eremita</i>	Management Level: SSP Target population size: 150 Objectives: encourage population growth in AZA region, need additional holding institutions. Recruit additional founders from Europe. Identify zoos that can hold a colony of at least 8. Consolidate small colonies or increase numbers. Identify <i>in situ</i> program for TAG to support. WCS/Bronx Zoo and Philadelphia Zoo provide support to field programs with Bird Life International and a program utilizing captive raised birds to establish a migratory population in Europe. WCS investigating recorded vocalizations as a means to improve zoo-based breeding programs. Develop husbandry guidelines. Encourage TAG veterinary advisors to work on skin lesion issues with this species.	Extremely small declining population within its range. Most numbers occurring in Morocco. Estimated population size approximately 200. IUCN Red List evaluation = critically endangered. Threats: historically, declines perhaps due to natural causes. More recent declines attributed to changes in farming practices on feeding grounds, illegal building and disturbance at breeding sites, hunting and over grazing. Conservation measures: CITES Appendix I listing. Development of international advisory group, species action plan developed in 2006, captive breeding programs for release, local awareness campaigns, establishment of Important Bird Areas within the species' range.	Cold tolerant above 20°F wind chill, cliff-dwelling ibis species fills exhibit niche. Colonial, constructs bulky stick nests on cliffs or rocky outcropping. Mixes well with other bird species. Flight restriction not recommended. Doesn't breed in colonies fewer than 6 or 8 individuals. Habitat: semi-arid sparsely vegetated regions, cultivated areas and pastureland in north Africa, Jordan, Saudi Arabia and Turkey. Formerly occurred in western Europe and Mediterranean regions. Diet: terrestrial invertebrates.	Mark Hofling, Supervisor/Ornithology WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100 e-mail: mhofling@aol.com

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	CONSERVATION	HUSBANDRY NOTES	Manager
Southern bald ibis <i>Geronticus clavus</i>	Management Level: PMP Target population size: 100* Objectives: Recruit more founders. Increase numbers through importation and breeding. *Target population size may depend upon decreasing scarlet ibis numbers. Develop husbandry guidelines.	Small population restricted to areas in southeast Africa (South Africa, Swaziland and Lesotho) believed to be declining. IUCN Red List evaluation = Vulnerable. CITES Appendix II. Threats: human interference with breeding colonies, habitat loss (mining, farming, construction), pesticide contamination, collisions with electric power lines. Conservation Measures: CITES Appendix II listing. Full legal protection in South Africa and protection in various nature preserves in other parts of range. Bird guards installed on electric power lines. Conduct surveys to assess populations, protect larger breeding colonies and feeding areas.	Good for southern climate zoos/aquariums or with indoor enclosures. Colonial, no fewer than four pairs per colony. Constructs bulky stick nests on cliffs or rocky outcroppings. Observed using electric power line poles for roosting and nesting. Mixes well with other bird species. Flight restriction not recommended. Works in mixed avian exhibits. Not as cold tolerant as Waldrapp. Habitat: areas of high rainfall: grasslands, lightly wooded areas and arid country. Diet: terrestrial invertebrates and small vertebrates.	Mark Hofling, Supervisor/Ornithology WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100 e-mail: mhofling@aol.com
Scarlet ibis <i>Eudocimus ruber</i>	Management Level: PMP Target population size: 600 Objectives: manage reproduction to assure long term demographic and genetic viability. Develop husbandry guidelines.	Large range and population occurring from tropical lowlands in northern South America. Occurs occasionally in southern Central America and selected islands in the Caribbean. Population trends indicate the species is not in decline. IUCN Red List evaluation = Least Concern. CITES Appendix II. Populations fluctuate locally. Some area populations have declined. Potential threats: alteration of wetland habitat, hunting and pesticides. Conservation measures: CITES Appendix II listed.	Popular in mixed bird exhibits. Recommended for aviaries. Colonial nester, uses sticks to build untidy nests in trees, especially mangroves in coastal areas. Can be assertive during the nesting season with similar species. Cold tolerant to 20°F wind chill. Habitat: mangrove swamps, tidal flats, estuaries, sewage treatment plants. Freshwater marshes and flooded fields. Diet: mainly crustaceans. Also small fish and aquatic invertebrates.	Brigitte Thompson, Mammal Keeper I Sonora Desert North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: brigitte.thompson@nczoo.org
African spoonbill <i>Platalea alba</i>	Management Level: PMP Target population size: 140 Objectives: Meeting with PMC to develop management plan. Develop husbandry guidelines. Need self sustaining population. Currently good diversity but not much reproduction.	Large range and population in sub-Saharan Africa with indications the species is not in decline. IUCN Red List evaluation = Least Concern. Potential threats: destruction of wetlands. In Madagascar breeding colonies have been disrupted and even destroyed at several lakes.	Mixes well with other bird species. Recommended to keep full-winged but has reproduced when flight restricted. Nests colonially with other wading bird species or conspecifics in small groups of up to 20 pairs. Nests are a mixture of sticks and soft vegetation situated over water in submerged trees, bushes or on the ground on islands or rocky ledges. Cold tolerant above 20°F wind chill. Habitat: Primarily freshwater lakes, ponds, sewage plants, rivers. Diet: aquatic vertebrates and invertebrates.	Bonnie Van Dam, Associate Curator/Birds Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: bvandam@detroitzoo.org

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	CONSERVATION	HUSBANDRY NOTES	Manager
<p>Roseate spoonbill <i>Platalea (Ajaja) ajaja</i></p>	<p>Management Level: PMP Target population size: 500 Objectives: Meet with PMC to develop master plan. Develop husbandry guidelines.</p>	<p>Large range and population occurring from southeast United States, south through tropical lowland Mexico, Central America to central South America and selected islands in the Caribbean. Population trends indicate the species is not in decline. IUCN Red List evaluation = Least Concern. US Fish and Wildlife Service = Migratory Bird Treaty Act.</p> <p>Potential threats: In the United States the population bottlenecked in the 1940's due to feather collecting. The population rebounded but appears to be declining due to pesticide use and habitat alteration. Throughout range habitat changes, pollution and pesticides.</p>	<p>Only New World spoonbill. Mixes well with a variety of birds. Recommended for aviaries. Colonial nester, uses sticks to build untidy nests in trees or bushes and on islands on the ground in coastal areas. Cold tolerant to 20° F wind chill if given shelter.</p> <p>Habitat: coastal wetland habitats such as mangrove swamps, tidal flats, lagoons, salt marshes. Also, rice fields and freshwater marshes.</p> <p>Diet: primarily aquatic invertebrates and vertebrates. Occasionally aquatic vegetation.</p>	<p>Laurie McGivern, Supervisor Houston Zoo, Inc. 1513 N MacGregor Drive Houston, TX 77030-1603 Phone: (713) 533-6801 e-mail: LDMCG@aol.com</p>
<p>Caribbean flamingo <i>Phoenicopterus ruber ruber</i></p>	<p>Management Level: PMP Target population size: 1610 Objectives: 1) update studbook 2) update information and add to husbandry guidelines for this species 3) Sex unsexed birds.</p>	<p>Limited range and restricted breeding populations occurring in coastal areas in Yucatan, Mexico, northern South America and limited islands in the Caribbean (mainly Cuba and Bonaire). Small population in Galapagos Islands. Population trends indicate the population is declining. IUCN Red List evaluation = Least Concern. Considered endangered in Mexico. CITES Appendix II. US Fish and Wildlife Service Migratory Bird Treaty Act.</p> <p>Potential threats: Caribbean flamingo breeding colonies are limited to 4 main colonies in Mexico, Cuba, Bahamas and Netherlands Antilles. Human disturbance at the nest site, hurricanes, droughts and habitat alterations (salt production).</p> <p>Conservation measure: CITES Appendix II listed, Caribbean flamingo region management group formed in 2007, monitoring populations in Caribbean region, chick production and nesting activities. Local awareness campaigns. AZA institutions provide support to <i>in situ</i> conservation and research programs in Mexico, Cuba and Bahamas. Dallas Zoo and WCS assisting with banding and local population assessments in Mexico and Bahamas. See TAG endorsed projects.</p>	<p>Popular exhibit. Can be housed in open exhibits. Large numbers can be maintained in relatively small space. Should be kept in flocks no fewer than 20. Reliable breeding is more likely to occur with flocks of 30+ birds. Will hybridize with other <i>Phoenicopterus</i> species. All individuals should have unique coded leg bands for visual identification from a distance and microchip for easy identification.</p> <p>Mixes well with small to medium waterbirds/waterfowl. Cold tolerant to 20° F wind chill.</p>	<p>Peter Shannon, Curator of Birds Albuquerque Biological Park 903 10th Street SW Albuquerque, NM 87102-4029 Phone: (505) 248-8500 e-mail: pshannon@cabq.gov</p>

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	CONSERVATION	HUSBANDRY NOTES	Manager
Greater flamingo <i>Phoenicopterus ruber roseus</i>	Management Level: PMP Target population size: 600 Objectives: 1) consolidate small flocks 2) update information and add to husbandry guidelines for this species 3) Sex unsexed birds.	Large range and population occurring in north, west, east and south Africa, Mediterranean, Middle East to India. Population trends indicate the species is not in decline. IUCN Red List evaluation = Least Concern. CITES Appendix II. Potential Threats: trapping, hunting, wetlands habitat alterations. Conservation measures: CITES Appendix II listed.	Can be housed in open exhibits. Sometimes mixed with lesser flamingos. Founder population in the hundreds. Should be kept in flocks no fewer than 20. Reliable breeding is more likely to occur with flocks of 30+ birds. Will hybridize with other <i>Phoenicopterus</i> species. All individuals should have unique coded leg bands for visual identification at a distance and a microchip for easy identification. Mixes well with small to medium waterbirds/waterfowl. Cold tolerant to 20° F wind chill.	Tom Schneider, Curator of Birds Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: tschneider@detroitzoo.org
Chilean flamingo <i>Phoenicopterus chilensis</i>	Management Level: PMP Target population size: 1750 Objectives: 1) most productive of the 3 species in AZA region, maintain list of zoos wanting this flamingo and establish enough for new flocks 2) update information and add to husbandry guidelines for this species. 3) sex unsexed individuals in the population and make recommendations for moving birds around 4) encourage zoos with small colonies to increase numbers 5) gather information from zoos that have consistent breeding.	Population considered to be declining throughout its range in Peru, Bolivia, Argentina, Chile, Paraguay, Uruguay and Brazil. IUCN Red List evaluation = Near Threatened. CITES Appendix II. Threats: egg collecting, hunting, disturbance at nest sites and habitat destruction. Conservation measures: CITES Appendix II listing, Survey populations during the breeding season to determine population trends. Control egg collecting. See TAG endorsed <i>in situ</i> projects.	Should be kept in single species flock with no fewer than 20 individuals. Reliable breeding is more likely to occur with flocks of 30+ birds. Will hybridize with other <i>Phoenicopterus</i> species. Try to keep even sex ratio. More cold tolerant than other flamingos in this region. Consider heated shelter below 20° F wind chill. All individuals should have unique coded leg bands for visual identification from a distance and a microchip for easy identification. Mixes well with small waterbirds / waterfowl.	Amanda Hall, Keeper Scovill Zoo 71 S. Country Club Road Decatur, IL 62521-4470 Phone: (217) 421-7435 e-mail: ahall@decparcs.com
Lesser flamingo <i>Phoeniconaias minor</i>	Management Level: PMP Target population size: 542 Objectives: 1) update information and add to husbandry guidelines for this species gather information from zoos who are breeding them 2) sex all unknown sex birds 3) Distribute individuals to create even sex ratio flocks 4) increase numbers of small flocks 5) Identify zoos that will develop breeding programs.	The most numerous of all species of flamingos with an extensive range south of the Sahara in Africa, Arabian Peninsula to Pakistan and India. However, lesser flamingo populations appear to be declining. IUCN Red List evaluation = Near Threatened. CITES Appendix II. Threats: Three main breeding sites exist only in Africa and all are facing threats. Habitat alterations, in particular the most important breeding site at Lake Natron in Tanzania. A large scale soda ash extraction plant is proposed. Hydro-electric plants, disturbance of the food sources these flamingos require (brine shrimp and blue-green algae). Conservation measures: CITES Appendix II listing, construction of artificial nest islands in South Africa at Kamfers Dam; Kimberley, South Africa where the species is breeding. Flamingo Specialist Group and wildlife agencies in Africa developing awareness campaigns.	Demand for this species exceeds reproduction. Importations may be considered. Maintain in single species flocks no fewer than 20 of even sex ratio. Breeding is more likely with flocks of 30+ birds. Sometimes kept with greater flamingos. Individuals should have unique coded leg bands for visual identification from a distance and a microchip for easy identification. Cold tolerant to 32° F wind chill. International Species Action Plan completed next review 10 years.	Laurie Conrad, Asst. Curator Birds Sea World San Diego 500 Sea World Drive San Diego, CA 92109-7904 Phone: (619) 222-6363 e-mail: laurie.conrad@SeaWorld.com

SPECIES RECOMMENDED AS DISPLAY/ EDUCATION/RESEARCH POPULATIONS (DERP) ARE CONSIDERED UNMANAGED POPULATIONS. HOWEVER, THE TAG WANTS TO EMPHASIZE THE IMPORTANCE OF THE SPECIES LISTED UNDER THIS CATEGORY AND THE POTENTIAL FOR THEM TO BECOME MANAGED PROGRAMS IN THE FUTURE. CONTACT THE SPECIES CHAMPION OR THE TAXA LIAISON FOR GUIDENCE.

A species champion is defined as an individual affiliated with the TAG who is interested in the species and agrees to assist in efforts to promote viability of the population. Species champions monitor the AZA population by examining the numbers, sex ratio, age, institutional holdings and other aspects of population management once or twice per year. They actively track institutional wants and needs, make recommendations for pairing or forming larger groups by calling and lobbying holding institutions. Promote the species by recruiting more spaces. The species champion will work on specific elements of the AZA Standardized Guidelines and TAG husbandry guidelines for the species. A species champion may also be involved in any conservation work regarding the species. A species champion may or may not be a studbook keeper, PMP Manager or SSP coordinator. If a program manager is present for a species (SSP, PMP or studbook keeper) they are automatically the species champion. As with the managed population programs, taxa liaisons have been assigned to assist and/or recruit species champions.

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	HUSBANDRY NOTES	RECOMMENDATIONS	SPECIES CHAMPION
Great blue heron <i>Ardea herodias</i>	Management Level: DERP DISPLAY/EDUCATION/REHAB Role: Conservation awareness of native wading birds and wetlands habitats.	Handsome native species. Probably never before bred in zoos. Hardy, cold tolerant to 20° F wind chill. Can be exhibited with other native wading birds and waterfowl.	Serve as flagship species for wetlands education. Develop husbandry guidelines.	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Madagascar pond heron <i>Ardeola idae</i>	Management Level: DERP EDUCATION/RESEARCH Role: Conservation awareness of Madagascar wildlife and habitats.	Unique and limited to specific Madagascar exhibits. Not cold tolerant below 32° F wind chill.	Several years ago St. Louis Zoo was coordinating field research. Possibly smaller population numbers in the wild than originally thought. Develop husbandry guidelines.	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Javan pond heron <i>Ardeola speciosa</i>	Management Level: DERP DISPLAY/EDUCATION Role: Native to Thailand, Indochina, and Indonesia. There are no other small Asian waders that can be consider for exhibit, this species will not be taking away space from other programs.	Little known of nesting habits. Solitary or in mixed wading bird colonies. Clutch size 3. Primary habitats include freshwater swamps, ponds, lakes and flooded areas such as rice fields. Can be housed in mixed aquatic bird exhibits. Probably similar to cattle egret. Cold tolerant to 32° F wind chill.	Nine potential founders exist in the AZA region between Miami Metrozoo and San Diego Zoo. Current region population is 55 (52 held at Miami Metrozoo, plus the threatened Malagasy pond heron). Miami Metrozoo indicated they can continue to expand to about 50 birds before space concerns. Develop husbandry guidelines.	Jim Dunster, Curator of Birds Miami Metrozoo 12400 SW 152 nd St/One Zoo Blvd Miami, FL 33177-1402 Phone: (305) 251-0400 e-mail: jdun@miamidade.gov

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	HUSBANDRY NOTES	RECOMMENDATIONS	SPECIES CHAMPION
Little blue heron <i>Egretta caerulea</i>	Management Level: DERP EDUCATION/REHAB Role: Conservation awareness of native wading birds and wetlands habitats.	Does well in mixed aviaries. Good candidate for indoor aviaries Does not compete well with assertive species. Not cold tolerant below 32° F wind chill.	Develop husbandry guidelines. Recruit additional founders.	Sara Hallager, Biologist Smithsonian National Zoological Park 3001 Connecticut Ave NW Washington, D.C. 20008-2537 Phone: (202) 633-4440 e-mail: hallagers@si.edu
Goliath heron <i>Ardea goliath</i>	Management Level: DERP DISPLAY/EDUCATION Role: Conservation awareness of African wading birds and wetlands habitats	Can be aggressive. Large solitary nester. Not good in close mixed exhibits. Breeds with flight restriction and have bred in hoof stock areas. Not cold tolerant below 32° F wind chill. Impressive size.	Very small population. Recruit additional founders. Zoos interested in importing. Form a consortium. Develop husbandry guidelines.	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Snowy egret <i>Egretta thula</i>	Management Level: DERP EDUCATION/DISPLAY Role: Conservation awareness of native wading birds and wetlands habitats.	Popular egret. Works in mixed aviaries, but tends to be delicate and does not compete well with assertive species. Reclusive. Not cold tolerant below 32° F wind chill. Good candidate for indoor aviaries.	Recruit additional founders to the population. Develop husbandry guidelines.	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Oriental white stork <i>Ciconia boyciana</i>	Management Level: DERP DISPLAY/EDUCATION Role: Education conservation connection to wild population.	Aggressive, doesn't mix well in groups as European white stork. Should not be flight restricted or mixed with hoof stock. May not be as cold tolerant as European white stork. Has international studbook. Reproduces well in Japan's zoos.	Contact release program managers to determine if additional breeding spaces are needed. If so, identify AZA facilities interested and begin financial commitment. After 3 years will examine space availability and determine how many individuals to bring into the region. Develop husbandry guidelines.	Tom Schneider, Curator Birds Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: tschneider@detroitzoo.org
Storm's stork <i>Ciconia stormi</i>	Management Level: DERP EDUCATION/RESEARCH Role: Conservation. Classified as indeterminate, however most ornithologists consider it to be endangered and the rarest stork in the world. Wild population estimated to be 300. Range: Borneo, Sumatra, Malaysia.	Not cold hardy below 32°F wind chill. Solitary nester. Recommended for aviaries only.	Develop husbandry guidelines. Exchange birds with zoos in Asia to establish unrelated group in North America region. Consider elevating to PMP or SSP. May be a candidate for release program in the future.	Michael Mace, Curator Birds San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org
Lesser adjutant stork <i>Leptoptilos javanicus</i>	Management Level: DERP EDUCATION/RESEARCH Role: Conservation awareness of endangered greater adjutant, other Asian storks and wetlands habitats.	Similar to marabou. Colonial, but needs more space in AZA region. Not cold tolerant below 32° F wind chill. Maintain full-winged. Does best in aviary. Does not mix with other bird species, but has been exhibited successfully with goliath herons at Bronx Zoo.	In-situ support in Cambodia. WCS sponsors nest site monitoring and developed pictorial guide for locals to determine ages. Additional bloodlines may be available in Europe in both public and private collections. WCS interested in starting international population registry. Develop husbandry guidelines. Continue behavioral research.	Chris Sheppard, Curator Ornithology WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100 e-mail: csheppard@wcs.org

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	HUSBANDRY NOTES	RECOMMENDATIONS	SPECIES CHAMPION
Shoebill <i>Balaeniceps rex</i>	Management Level: DERP EDUCATION/RESEARCH Role: Research. Conservation awareness of wild population and African wetlands habitats. Possible flagship species.	Unique species with special needs. Pelican-like feeding habits. First described in 1850. First documented hatch in a zoo, Parc Paradisio in Belgium, hatch date 19 July 2008. Exhibit single pairs. Mixes well with other species. Significant financial and husbandry commitment required. Several institutions have imported individuals in 2006 and 2007. Not cold tolerant below 32° F wind chill.	Establish husbandry guidelines. Research: Hormonal analysis study at San Diego WAP being considered. Stabilize population and reconsider for PMP if founders available.	Michael Mace, Curator Birds San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org
Wood stork <i>Mycteria americana</i>	Management Level: DERP EDUCATION/RESEARCH/ REHAB Role: Conservation connection to wild population and preserving wetlands habitats.	Wetland themed exhibits recommended. Few in collections. Mostly non-releasable rehab. Several institutions interested in developing wetlands exhibits around this stork. Few available. Mixes with ibis, spoonbill, flamingos, herons, egrets and waterfowl. Compatible in groups. Only stork native to North America. Cold tolerant to 20°F wind chill.	Endangered in U.S. where it is at northern range limits. Numbers good in southern range. Jacksonville Zoo and Disney's Animal Kingdom coordinate a project for school classes to learn about storks by following the movements of radio tagged individuals. USFWS Recovery Plan. Develop husbandry guidelines.	Donna Bear-Hull, Curator Birds Jacksonville Zoo and Gardens 370 Zoo Parkway Jacksonville, FL 32218-5799 Phone: (904) 757-4463 e-mail: bear-hull@djaxzoo.org
White ibis <i>Eudocimus albus</i>	Management Level: DERP RESEARCH/REHAB Role: A native species. If successful models for colonial management are developed, and efficient, it may be desirable to develop PMP level oversight with congeneric scarlet ibis. Wetlands themed exhibit.	Will hybridize with scarlet ibis. Mixes with other NA wading bird species. Maybe somewhat assertive in mixed aviaries during nesting season. Cold tolerant to 20° F wind chill.	Manage reproduction to prevent over population. Assure long term demographic and genetic viability. Develop husbandry guidelines.	Ken Reininger, General Curator North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org
Sacred ibis <i>Threskiornis aethiopicus</i>	Management Level: DERP DISPLAY/EDUCATION Role: Education/Display Manage as generic population rather than at subspecies level unless it is possible to acquire Madagascar or Aldabra subspecies.	They are numerous in AZA region. Also in EAZA region. African themed exhibits. Colonial, mixes well with other birds. Cold tolerant to 20° F wind chill.	Manage reproduction to prevent over population. Assure long term demographic and genetic viability. Develop husbandry guidelines.	Ken Reininger, General Curator North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org

TAXA	POPULATION MANAGEMENT RECOMMENDATIONS	HUSBANDRY NOTES	RECOMMENDATIONS	SPECIES CHAMPION
Straw-necked ibis <i>Threskiornis spinicollis</i>	Management Level: DERP DISPLAY/EDUCATION Role: Recommended for Australian themed exhibits. Representative wading bird in that region.	More terrestrial than other ibises. Breeding season August to December. Cold tolerant to 32° F wind chill.	Develop husbandry guidelines.	Ken Reininger, General Curator North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org
White-faced ibis <i>Plegadis chihi</i>	Management Level: DERP EDUCATION/REHAB Role: Native to North America. Education for wetlands habitat conservation.	Clutch size 2-7, length of incubation 21-22 days, days to fledged 28+. Diet: aquatic invertebrates. Probably similar to white ibis in temperament. Can be housed in mixed aquatic bird exhibits. Cold tolerant to 20° F wind chill.	Develop husbandry guidelines.	Ken Reininger, General Curator North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org
Puna ibis <i>Plegadis ridgwayi</i>	Management Level: DERP DISPLAY/EDUCATION/RESEARCH Role: Native to high altitude zones in Peru, Chile and possibly northwestern Argentina. Vulnerable to habitat loss and over-harvesting of eggs.	Habitat is marsh and pastureland. Nests in reeds around marshes. Diet: aquatic invertebrates, amphibians. Social. Can be housed in mixed aquatic bird exhibits. Cold tolerant to 20° F wind chill.	Develop husbandry guidelines. Further research into their biology and conservation may be beneficial. Hematology and biochemistry values reported in an article in the <i>Journal of Wildlife Diseases</i> 2004.	Joe Barkowski, Curator of Birds Sedgwick County Zoo 5555 W. Zoo Boulevard Wichita, KS 67212-1698 Phone: (316) 660-9453 e-mail:jcbksi@aol.com
Hadada ibis <i>Bostrychia hagedash</i>	Management Level: DERP DISPLAY/EDUCATION Role: Native to most of Africa south of the Sahara. Not present in the desert southwest regions of Africa. Classified CITES III in Ghana.	Social outside the breeding season. Generally solitary nesters. Clutch size 2-6, incubation may begin before clutch is complete. Nesting and chick rearing last 2 – 3 months. Diet: aquatic vertebrates and invertebrates. May scavenge for carrion. Can be housed in mixed aquatic bird exhibits. Cold tolerant to 20° F wind chill.	Develop husbandry guidelines.	McCall Lowe, Keeper San Francisco Zoological Gardens 1 Zoo Road San Francisco, CA 94132-1098 Phone: (415) 753-7080 e-mail:McCall.Lowe@sfbzoo.org
Madagascar crested ibis <i>Lophotibis cristata</i>	Management Level: DERP DISPLAY/EDUCATION Role: Native to Madagascar. Classified as near-threatened to vulnerable. Forest habitat decreasing and is hunted for food.	Has successfully reproduced at San Diego WAP and Zoo. Clutch size 2-3. Nests high in forest canopy, 20+ feet. Solitary nester. Diet: terrestrial vertebrates and invertebrates. More often seen in pairs than groups or alone. Not cold tolerant below 32° F wind chill.	Develop husbandry guidelines. Acquire additional individuals from EAZA region.	Michael Mace, Curator Birds San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org

Species Recommended for Phase-in: None at this time

Species Recommended for Phase-Out:

These species are not recommended for breeding and should be replaced with recommended species.

TAXA	TAXA
White-faced heron <i>Egretta novaehollandiae</i>	Jabiru <i>Jabiru mycteria</i>
Indian pond heron <i>Ardeola grayii</i>	Black-headed ibis <i>Threskiornis melanacephalus</i>

Species Recommendations Update Table

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/ SPECIES CHAMPION
Whistling heron <i>Syrigma sibilatrix</i>	DERP	NOT RECOMMENDED	N/A	N/A
Great blue heron <i>Ardea herodias</i>	DERP	DERP/DISPLAY- EDUCATION-REHAB	N/A	Chris Brown, Curator Birds Species Champion Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Goliath heron <i>Ardea goliath</i>	DERP	DERP/DISPLAY-EDUCATION	N/A	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Great white egret <i>Egretta alba</i>	DERP	DERP/REHAB	N/A	N/A
Reddish egret <i>Egretta rufescens</i>	DERP	DERP/REHAB	N/A	N/A
Tricolored heron <i>Egretta tricolor</i>	DERP	DERP/REHAB	N/A	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/SPECIES CHAMPION
White-faced heron <i>Egretta novaehollandiae</i>	DERP	Phase-out Replace with recommended species	N/A	N/A
Little blue heron <i>Egretta caerulea</i>	DERP	DERP/EDUCATION-REHAB	N/A	Sara Hallager, Biologist Species Champion Smithsonian National Zoological Park 3001 Connecticut Ave NW Washington, D.C. 20008-2537 Phone: (202) 633-4440 e-mail: hallagers@si.edu
Snowy egret <i>Egretta thula</i>	DERP	DERP/EDUCATION-DISPLAY	N/A	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Cattle egret <i>Bubulcus ibis</i>	DERP	DERP/REHAB	N/A	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Indian pond heron <i>Ardeola grayii</i>	DERP	Phase-out Replace with recommended species	N/A	N/A
Javan pond heron <i>Ardeola speciosa</i>	N/A	DERP/DISPLAY-EDUCATION	N/A	Jim Dunster, Curator of Birds Species Champion Miami Metrozoo 12400 SW 152 nd St/One Zoo Blvd Miami, FL 33177-1402 Phone: (305) 251-0400 e-mail: jdun@miamidade.gov
Madagascar pond heron <i>Ardeola idae</i>	DERP	NOT RECOMMENDED	YES	N/A

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/ SPECIES CHAMPION
Green-backed heron <i>Butorides striatus</i>	DERP	NOT RECOMMENDED	N/A	N/A
Yellow-crowned night heron <i>Nycticorax violaceus</i>	DERP	DERP/REHAB	N/A	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Black-crowned night heron <i>Nycticorax nycticorax</i>	DERP	DERP/REHAB	N/A	Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
Boat-billed heron <i>Cochlearius cochlearius</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Robin Lentz, Bird Supervisor PMP Mgr & Studbook Keeper Jacksonville Zoo and Gardens 370 Zoo Parkway Jacksonville, FL 32218-5799 Phone: (904) 757-4463 e-mail: lentzr@jaxzoo.org
Bare-throated tiger-heron <i>Tigrisoma mexicanum</i>	DERP	NOT RECOMMENDED	N/A	N/A
Fasciated tiger-heron <i>Tigrisoma fasciatum</i>	DERP	NOT RECOMMENDED	N/A	N/A
Rufescent tiger-heron <i>Tigrisoma lineatum</i>	DERP	NOT RECOMMENDED	N/A	N/A
New Guinea tiger-heron <i>Zonerodius heliosylus</i>	DERP	NOT RECOMMENDED	N/A	N/A
White-crested tiger-heron <i>Tigriornis leucolophus</i>	DERP	NOT RECOMMENDED	N/A	N/A

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/SPECIES CHAMPION
Least bittern <i>Lxobrychus exilis</i>	NOT RECOMMENDED	DERP/REHAB	N/A	N/A
North American bittern <i>Botaurus lentiginosus</i>	DERP	DERP/REHAB	N/A	N/A
Hamerkop <i>Scopus umbretta</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	NO	N/A
Wood stork <i>Mycteria Americana</i>	DERP	DERP/EDUCATION-RESEARCH-REHAB	YES	Donna Bear-Hull, Curator Birds Species Champion Jacksonville Zoo and Gardens 370 Zoo Parkway Jacksonville, FL 32218-5799 Phone: (904) 757-4463 e-mail: bear-hulld@JaxZoo.org
Milky stork <i>Mycteria cinerea</i>	DERP	REGIONAL STUDBOOK PMP	N/A	Andrea Worrall, Animal Care Manager PMP Mgr & Studbook Keeper San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: AWorrall@sandiegozoo.org
Yellow-billed stork <i>Mycteria ibis</i>	DERP	REGIONAL STUDBOOK PMP	N/A	Andrea Worrall, Animal Care Manager PMP Mgr & Studbook Keeper San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: AWorrall@sandiegozoo.org
Painted stork <i>Mycteria leucocephala</i>	DERP	REGIONAL STUDBOOK PMP	N/A	Debbie Gungle, Lead Bird Keeper PMP Mgr & Studbook Keeper San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: dgungle@sandiegozoo.org

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/ SPECIES CHAMPION
Asian openbill stork <i>Anastomus oscifans</i>	DERP	NOT RECOMMENDED	N/A	N/A
African openbill stork <i>Anastomus lamelligerus</i>	DERP	DERP/DISPLAY	N/A	N/A
Black stork <i>Ciconia nigra</i>	DERP	NOT RECOMMENDED	N/A	N/A
Abdim's stork <i>Ciconia abdimii</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Valerie Nichols, Keeper PMP Mgr & Studbook Keeper Disney's Animal Kingdom PO Box 10000 Lake Buena Vista, FL 32830 Phone: (407) 939-6382, e-mail: valerie.d.nichols@disney.com
Woolly-necked stork <i>Ciconia episcopus</i>	DERP	DERP/DISPLAY	N/A	N/A
Storm's stork <i>Ciconia stormi</i>	NOT RECOMMENDED	DERP/EDUCATION- RESEARCH	N/A	Michael Mace, Curator Birds Species Champion San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org
Maguari stork <i>Ciconia maguari</i>	DERP	DERP/DISPLAY Recommended for South American themed exhibits	N/A	N/A
European white stork <i>Ciconia ciconia</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	NO	N/A

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/ SPECIES CHAMPION
Oriental white stork <i>Ciconia boyciana</i>	DERP	DERP/DISPLAY-EDUCATION	N/A	Tom Schneider, Curator of Birds Species Champion Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: tschneider@detroitzoo.org
Black-necked stork <i>Ephippiorhynchus asiaticus</i>	DERP	NOT RECOMMENDED	N/A	N/A
Saddle-billed stork <i>Ephippiorhynchus senegalensis</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Jocelyn Womack, Senior Keeper PMP Mgr & Studbook Keeper Dallas Zoo and Dallas Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 948-0575 email: jocjakfitz@aol.com
Jabiru <i>Jabiru mycteria</i>	DERP	Phase-out Replace with recommended species	YES	N/A
Lesser adjutant stork <i>Leptoptilos javanicus</i>	DERP	DERP/EDUCATION-RESEARCH	N/A	Chris Sheppard, Curator Ornithology Species Champion WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100 e-mail: csheppard@wcs.org
Greater adjutant stork <i>Leptoptilos dubius</i>	DERP	NOT RECOMMENDED	N/A	N/A

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/ SPECIES CHAMPION
Marabou <i>Leptoptilos crumeniferus</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Paul Schutz, Zoological Manager PMP Mgr & Studbook Keeper Disney's Animal Kingdom PO Box 10000 Lake Buena Vista, FL 32830 Phone: (407) 939-6382, e-mail: paul.j.schutz@disney.com
Shoebill <i>Balaeniceps rex</i>	DERP	DERP/EDUCATION- RESEARCH	NO	N/A
White ibis <i>Eudocimus albus</i>	DERP	DERP/RESEARCH-REHAB	N/A	Ken Reininger, General Curator Species Champion North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Species Champion Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/ SPECIES CHAMPION
Sacred ibis <i>Threskiornis aethiopicus</i>	REGIONAL STUDBOOK PMP	DERP/DISPLAY-EDUCATION	N/A	Ken Reininger, General Curator Species Champion North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Species Champion Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org
Black-headed ibis <i>Threskiornis melanacephalus</i>	DERP	Phase-out Replace with recommended species	N/A	N/A
Straw-necked ibis <i>Threskiornis spinicollis</i>	DERP	DERP/DISPLAY-EDUCATION	N/A	Ken Reininger, General Curator Species Champion North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Species Champion Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/SPECIES CHAMPION
Waldrapp ibis or northern bald ibis <i>Geronticus eremita</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK SSP	YES	Mark Hofling Supervisor/Ornithology SSP Mgr & Studbook Keeper WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100, e-mail: mhofling@aol.com
Southern bald ibis <i>Geronticus clavus</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Mark Hofling Supervisor/Ornithology PMP Mgr & Studbook Keeper WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100, e-mail: mhofling@aol.com
Black-faced ibis <i>Theristicus melanopsis</i>	DERP	NOT RECOMMENDED	N/A	N/A
Hadada ibis <i>Bostrychia hagedash</i>	DERP	DERP/DISPLAY-EDUCATION	N/A	McCall Lowe, Keeper Species Champion San Francisco Zoological Gardens 1 Zoo Road San Francisco, CA 94132-1098 Phone: (415) 753-7080 e-mail: McCall.Lowe@sfoo.org
Buff-necked ibis <i>Theristicus caudatus</i>	DERP	NOT RECOMMENDED	N/A	N/A
Scarlet ibis <i>Eudocimus ruber</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Brigitte Thompson, Mammal Keeper I Sonora Desert PMP Mgr & Studbook Keeper North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: brigitte.thompson@nczoo.org

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/ SPECIES CHAMPION
Glossy ibis <i>Plegadis falcinellus</i>	DERP	DERP/REHAB	N/A	N/A
White-faced ibis <i>Plegadis chihi</i>	DERP	DERP/EDUCATION-REHAB	N/A	Ken Reininger, General Curator Species Champion North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: ken.reininger@nczoo.org AND Lee Schoen, Curator of Birds Species Champion Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org
Puna ibis <i>Plegadis ridgwayi</i>	DERP	DERP/DISPLAY- EDUCATION-RESEARCH	N/A	Joe Barkowski, Curator of Birds Species Champion Sedgwick County Zoo 5555 W. Zoo Boulevard Wichita, KS 67212-1698 Phone: (316) 660-9453 e-mail: jcbksi@aol.com
Madagascar crested ibis <i>Lophotibis cristata</i>	NOT RECOMMENDED	DERP/DISPLAY-EDUCATION	N/A	Michael Mace, Curator Birds Species Champion San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org

TAXA	PREVIOUS PROGRAM STATUS	CURRENT RECOMMENDATION	PROGRAM LEADER CHANGE?	NEW PROGRAM LEADER/SPECIES CHAMPION
African spoonbill <i>Platalea alba</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Bonnie VanDam, Associate Curator/Birds PMP Mgr & Studbook Keeper Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: bvandam@detroitzoo.org
Eurasian spoonbill <i>Platalea leucorodia</i>	DERP	NOT RECOMMENDED	N/A	N/A
Roseate spoonbill <i>Platalea (Ajaia) ajaja</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Laurie McGivern, Supervisor PMP Mgr & Studbook Keeper Houston Zoo, Inc. 1513 N MacGregor Drive Houston, TX 77030-1603 Phone: (713) 533-6801 e-mail: LDMCG@aol.com
Caribbean flamingo <i>Phoenicopterus ruber ruber</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	NO	N/A
Greater flamingo <i>Phoenicopterus ruber roseus</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Tom Schneider, Curator of Birds PMP Mgr & Studbook Keeper Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: tschneider@detroitzoo.org
Chilean flamingo <i>Phoenicopterus chilensis</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	YES	Amanda Hall, Keeper PMP Mgr & Studbook Keeper Scovill Zoo 71 S. Country Club Road Decatur, IL 62521-4470 Phone: (217) 421-7435 e-mail: ahall@decparcs.com
Lesser flamingo <i>Phoeniconaias minor</i>	REGIONAL STUDBOOK PMP	REGIONAL STUDBOOK PMP	NO	N/A

AZA Ciconiiformes/Phoenicopteriformes Advisory Group 2008-11 Three Year Action Plan

Short Term Goals

1. Finish inserting photos into Flamingo Husbandry Guidelines (Sue Maher) 2009
2. Re-distribute Flamingo Husbandry Guidelines through the Ciconiiformes/Phoenicopteriformes TAG listserv (C. Brown) 2009
3. Update management plans at a minimum every three years. Some programs will require more frequent updates to accomplish a variety of population management criteria. The TAG sees proper program management as being more than simply publishing a plan. It includes, but may not be limited to, timely follow up to insure recommendations are being followed. (program managers and program liaisons) 2009
4. Recruit education advisor, PR advisor, fill program manager vacancies, and recruit species champions. (Steering Committee) 2009
5. Develop Ciconiiformes/Phoenicopteriformes international zoo action plans with international counterparts. (C. Brown) On going
6. Complete AZA Animal Care Manuals for storks and flamingos (Peter Shannon and Sherry Branch; Jocelyn Womack and Paul Schutz). 2008-09 The Flamingo Animal Care Manual was completed in 2008 and is in final stages of required committee peer review. The Stork Animal Care Manual is beginning with a workshop at the AZA Mid-year meeting in Oklahoma City in March 2009.
7. Develop, and promote within AZA zoos, techniques for managing and exhibiting mixed species flocks to maximize use of space. Essentially husbandry guidelines (Program Managers and Species Champions) On going
8. Develop management model for colonial wading birds. (Steering Committee/PMC) 2009
9. Report results of the African bird trade meeting. (Ken Reininger)

Ciconiiformes/Phoenicopteriformes TAG Endorsed Conservation and Research Projects

1. Hialeah Racetrack/AZA Caribbean flamingo colony management and egg collecting consortium (Sherry Branch, Sea World Orlando coordinator)
2. Caribbean flamingo Conservation and Research in Yucatan, Mexico (Chris Brown, Dallas Zoo in collaboration with local NGO Ninos Y Crias)
3. Census and feeding ecology of Caribbean flamingos in the Bahamas (Nancy Clum, Bronx Zoo)
4. Lesser adjutant stork ecology in Cambodia, develop field guide to assist locals with determining the age of young storks (Chris Sheppard, Bronx Zoo)
5. Conservation work for Waldrapp ibis in Ethiopia (Mark Hofling, Bronx Zoo)
6. Starting a migratory flock of Waldrapp ibis in Europe facilitated through the Konrad Lorenz Institute in Austria (Mark Hofling, Bronx Zoo and Aliza Baltz, Philadelphia Zoo)
7. Wood stork satellite tagging and monitoring of colonies. (Donna Bear-Hull, Jacksonville Zoo)
8. Khinganski Nature Reserve of Muraviovka Park in Russia to preserve Oriental white stork breeding habitat (Carol Hesch, Memphis Zoo)
9. Investigate skin lesions of Waldrapp ibis and other species of ibis in zoos/aquariums. Disney's Animal Kingdom and Zoo New England veterinary staff (Drs. Terry Norton, Douglas Whiteside, Alan Pessier veterinary advisors)
10. Andean and Puna Flamingo Action Plan. (Felicity Arengo, Associate Director, American Museum of Natural History and Coordinator/Western Hemisphere IUCN-SSC Wetlands Flamingo Specialists Group)
11. Andean, Puna and Chilean flamingo conservation and research project in Bolivia (Felicity Arengo, Associate Director, American Museum of Natural History and Coordinator/Western Hemisphere IUCN-SSC Wetlands Flamingo Specialists Group in collaboration with local NGO Biota)
12. Artificial nest island construction and monitoring of breeding population of near threatened lesser flamingos at Kamfers Dam; Kimberley, South Africa. (Mark D. Anderson, Specialist Nature Conservation Scientist, Dept. of Tourism, Kimberley, South Africa)

Appendices

Program Review Table

TAG Name: Ciconiiformes/Phoenicopteriformes TAG
TAG Chair: Chris Brown, Dallas Zoo
Chair Start Date: 1/1/2000
Program Start Date: 12/31/95

SSP Name	First	Last	Institution	SSP Date	SSP deadline	SSP deadline notes	Program Start	Coord Start Date
Ibis, Waldrapp	Mark	Hofling	Bronx Zoo	4/18/08	4/18/11		4/14/08	4/14/08

PMP Name	First	Last	Institution	PMP Date	PMP deadline	PMP deadline notes	Program Start	Manager Start Date
Flamingo, Caribbean	Peter	Shannon	Albuquerque Biological Park			6 mos after Sbk	6/15/92	6/22/07
Flamingo, Chilean	Amanda	Hall	Scovill Zoo			6 mos after Sbk	4/8/96	2/27/07
Flamingo, Greater	Tom	Schneider	Detroit Zoological Park		1/1/09	Sbk 6/23/08	6/15/92	5/13/04
Flamingo, Lesser	Laurie	Conrad (see Burch)	SeaWorld San Diego	6/28/06	6/28/09		4/8/96	8/31/00
Heron, Boat-billed	Robin	Lentz	Jacksonville Zoo and Gardens	9/21/06		6 mos after Sbk	1/13/93	10/13/07
Ibis, Scarlet	Brigitte	Thompson	North Carolina Zoological Park			6 mos after Sbk	4/9/91	6/22/07
Spoonbill, African	Bonnie	Van Dam	Detroit Zoological Park			Next deadline after Sbk	12/14/94	10/31/01
Spoonbill, Roseate	Laurie	McGivern	Houston Zoo, Inc.	9/10/08	9/10/11		8/18/95	1/9/01
Stork, Abdim's (White Bellied)	Valerie	Nichols	Disney's Animal Kingdom			6 mos after Sbk	4/28/93	4/17/07
Stork, Hamerkop	John	Azua	Denver Zoological Gardens	3/26/07	3/26/10		12/31/94	6/8/99
Stork, Marabou	Paul	Schutz	Disney's Animal Kingdom			6 mos after Sbk	4/8/96	5/7/06
Stork, Milky	Andrea	Worrall	San Diego Zoo's Wild Animal Park	7/20/08	7/20/11	Draft	4/6/07	1/28/08
Stork, Painted	Debbie	Gungle	San Diego Zoo's Wild Animal Park	10/27/06	10/27/09		2/28/03	2/28/03
Stork, Saddle-Billed	Jocelyn	Womack	Dallas Zoo	7/2/08	7/2/11		1/31/01	1/31/01
Stork, European white	Tom	Schneider	Detroit Zoological Park	2/6/07	2/6/10		4/23/91	12/31/95
Stork, Yellow-billed	Andrea	Worrall	San Diego Zoo's Wild Animal Park	12/28/05		6 mos after Sbk	6/1/05	10/13/07

Studbook Name	First	Last	Institution	Studbook Date	Sbk deadline	Sbk deadline notes	Program Start	Sbk Keeper Start Date	PM I Course	PM I Deadline
Flamingo, Caribbean	Peter	Shannon	Albuquerque Biological Park	1/1/96		12 mos after PM1	6/15/92	6/22/07	not taken	6/22/09
Flamingo, Chilean	Amanda	Hall	Scovill Zoo		1/1/09	12 mos after PM1	4/8/96	2/27/07	2007	
Flamingo, Greater	Tom	Schneider	Detroit Zoological Park	6/23/08	6/23/11		6/15/92	5/13/04	Grand-fathered	
Flamingo, Lesser	Laurie	Conrad (nee Burch)	SeaWorld San Diego	5/25/07	5/25/10		4/8/96	8/31/00	2001	
Heron, Boat-billed	Robin	Lentz	Jacksonville Zoo and Gardens	10/1/96	2/28/09	12 mos after PM1	1/13/93	10/13/07	2008	
Ibis, Scarlet	Brigitte	Thompson	North Carolina Zoological Park	12/31/94	1/1/09	Extended from 7/1/2008	4/9/91	6/22/07	2006	
Ibis, Waldrapp	Mark	Hofling	Bronx Zoo	5/23/07	5/23/10		6/6/89	9/1/00	2002	
Spoonbill, African	Bonnie	Van Dam	Detroit Zoological Park	10/31/94	1/1/09		12/14/94	10/31/01	2007	
Spoonbill, Roseate	Laurie	McGivern	Houston Zoo, Inc.	7/11/07	7/11/10		8/18/95	1/9/01	2002	
Stork, Abdim's (White Bellied)	Valerie	Nichols	Disney's Animal Kingdom	3/31/03	1/1/09	12 mos after PM1	4/28/93	4/17/07	2007	
Stork, Hamerkop	John	Azua	Denver Zoological Gardens	2/22/07	2/22/10		12/31/94	6/8/99	1997	
Stork, Marabou	Paul	Schutz	Disney's Animal Kingdom	10/8/08	10/8/11		4/8/96	5/7/06	2007	
Stork, Milky	Andrea	Worrall	San Diego Zoo's Wild Animal Park			12 mos after PM1	4/6/07	1/28/08	not taken	1/28/10
Stork, Painted	Debbie	Gungle	San Diego Zoo's Wild Animal Park	6/30/06	6/30/09		2/28/03	2/28/03	2000	
Stork, Saddle-billed	Jocelyn	Womack	Dallas Zoo	5/6/08	5/6/11		1/31/01	1/31/01	2002	
Stork, White	Tom	Schneider	Detroit Zoological Park	1/24/07	1/24/10		4/23/91	12/31/95	Grand-fathered	
Stork, Yellow-billed	Andrea	Worrall	San Diego Zoo's Wild Animal Park	3/1/06		12 mos after PM1	6/1/05	10/13/07	not taken	10/13/09

Management Recommendations
for the
Ciconiiformes & Phoenicopteriformes
Taxon Advisory Group

SPMAG/PMC ADVISORS

Sarah Long, AZA Population Management Center
Louise Bier, AZA Population Management Center
Kristine Schad, AZA Population Management Center

8 June 2007

This report was prepared with assistance from the

PMC

Population Management Center

Lincoln Park
Zoo

ASSOCIATION
OF ZOOS &
AQUARIUMS

Table of Contents

Executive Summary	48
Definitions and Explanations of Tables	49

Common Name	Latin Name	
STORKS		
European white stork	<i>Ciconia ciconia</i>	50
Painted stork	<i>Mycteria leucocephala</i>	51
Yellow-billed stork	<i>Ephippiorhynchus senegalensis</i>	52
Abdim's stork	<i>Mycteria/Ciconia abdimii</i>	53
Marabou Stork	<i>Leptoptilos crumeniferus</i>	54
Milky Stork	<i>Mycteria cinerea</i>	55
Saddlebill stork	<i>Ephippiorhynchus senegalensis</i>	56
HAMERKOP		
Hamerkop	<i>Scopus umbretta</i>	57
IBISES		
Northern Bald Ibis	<i>Geronticus eremita</i>	58
Southern Bald Ibis	<i>Geronticus calvus</i>	59
Scarlet ibis	<i>Eudocimus ruber</i>	60
SPOONBILLS		
African spoonbill	<i>Platalea alba</i>	61
Roseate Spoonbill	<i>Platalea ajaja</i>	62
HERONS		
Boat-billed Heron	<i>Cochlearius cochlearius</i>	63
FLAMINGOS		
Lesser flamingo	<i>Phoeniconaias minor</i>	64
Greater flamingo	<i>Phoenicopterus ruber roseus</i>	65
Chilean flamingo	<i>Phoenicopterus chilensis</i>	66
Caribbean flamingo	<i>Phoenicopterus ruber ruber</i>	67

Acknowledgments

This report details the results of a meeting held at the Lincoln Park Zoo in Chicago, Illinois on 6 – 8 June 2007. In attendance were:

AZA Population Management Center, Lincoln Park Zoo:

Sarah Long, Senior Population Biologist
Louise Bier, Associate Population Biologist
Kristine Schad, Studbook Analyst

Steering Committee:

Chris Brown, Dallas Zoo
Sue Maher, Disney's Animal Kingdom
Sherry Branch, SeaWorld Orlando
Michael Mace, San Diego Wild Animal Park
Lee Schoen, Audubon Zoo
Ken Reininger, North Carolina Zoo

Studbook Keepers:

Paul Schutz (marabou stork), Disney's Animal Kingdom
Amanda Hall (Chilean flamingo), Scovill Zoo
Mark Hofling (Northern bald ibis), Bronx Zoo
Laurie Conrad (lesser flamingo), SeaWorld San Diego
Tom Schneider (European white stork), Detroit Zoo, by phone

Report and Analyses prepared by:
Sarah Long & Louise Bier

**This report was prepared and distributed by the Population Management Center.
pmc@lpzoo.org**

Executive Summary

Objective: To assist the Ciconiiformes & Phoenicopteriformes Taxon Advisory Group with the evaluation of target population sizes in the current draft of the TAG's Regional Collection Plan (2007 – 2009).

Methods: This is the first evaluation of target sizes for this TAG by the Population Management Center. To evaluate potential management strategies for species that are current or proposed Population Management Plan species (PMPs) or Species Survival Plans® (SSPs), demographic and genetic analyses were conducted using the most current available studbook data and the Goal Setting screen of Population Management 2000 software (PM2000 Version 1.212). Genetic analyses were limited to the AZA population unless otherwise noted. The current population size for each species was obtained from the population studbook or ISIS data as noted, for AZA institutions only unless otherwise stated. In additional modeling scenarios, adjustments to other demographic parameters such growth rate were made based on studbook data of similar species and the expertise of meeting attendants.

Where noted, the number of founders that could reasonably be obtained was added into the projections to determine its impact on the maintenance of gene diversity. A potential founder is considered to be any animal that is unrelated to individuals in the current population, and may be obtained from other populations or from the wild. Although the importation of founders is considered in some of the management strategies evaluated, every effort should be made to create self-sustaining populations not reliant on imports. Frequent importations should not be viewed as an alternative strategy to responsible population management for the maintenance of gene diversity over time.

Management Goals: For each species, several different strategies were tested to evaluate population sizes relative to genetic and demographic sustainability over the next 100 years. The first strategy listed in the table for each species is a baseline strategy, demonstrating the projected status of the population assuming no changes to current management or population parameters and using either the population's current size or the estimated 5-year (2011) holding capacity from the TAG's 2006 space survey. Other strategies tested include changes to population parameters, including growth rate and effective size, or the recruitment or acquisition of potential founders.

The genetic goal for all populations was the maintenance of 90% gene diversity for 100 years into the future or, if starting gene diversity was unknown or already lower than 90%, long-term management goals are assumed to be the loss of no more than 10% gene diversity relative to the starting gene diversity. When gene diversity falls below approximately 90% of the gene diversity in the founding population, it is expected that reproduction will be increasingly compromised by, among other factors, lower hatch weights, and greater hatchling mortality.

The target size analyses within this document are based primarily on genetic projections, with the assumption that husbandry and cooperation will be adequate for the populations to grow to the target sizes tested.

General recommendations for non-colonial and colonial species: In general, species that are important to AZA zoos should have current and accurate studbook data in order to facilitate genetic and demographic management. A studbook is relevant even for colonial species in order to monitor population size and demographic health through data such as births, deaths, sex ratio, and age structure. Genetic management is also possible for colonial species, whether parentage can be monitored or not. If parentage can be consistently tracked, specific pairs could be allowed to breed or discouraged from breeding (through egg-removal) using MateRx recommendations which rate the genetic desirability of every potential pair in a colony. If parentage cannot be consistently tracked, strategies for the genetic management of groups may include tracking group lineages and recommending genetically desirable breeding and transfers among groups rather than individuals (e.g., prioritizing breeding for under-represented colonies). Examples of management strategies to avoid inbreeding and increase gene diversity include separating/transferring offspring during the breeding season or periodically rotating all males (or females) from one colony to another. Program leaders for colonial and non-colonial species alike should contact the Population Management Center for master planning customized to the specialized needs of their populations.

Definitions and Explanation of Tables

Demography & Genetics

Number of holding institutions	N_0	Estimated future holding capacity	T	λ	GD_0	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
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Number of institutions

This is the number of AZA institutions currently holding specimens of a given species, unless otherwise specified.

N_0 – Current population size

This is the current number of birds estimated to be living in participating institutions, according to the most current studbook.

Estimated future holding capacity

This is the future (5-year) population size compiled from the 2006 TAG space surveys sent to institutions.

T – Generation time

This represents the average age at reproduction (from first reproduction through to last reproduction), in years.

λ - Potential population growth rate ($\lambda = 1.0$, 0% growth)

This represents the annual rate of increase of the population, as determined by demographic analysis of historic studbook data within the date range of modern management, or comparison with a similar species.

GD_0 – Estimated current gene diversity of population (%)

Gene diversity was calculated by genetic analysis of true or analytical studbook data. When studbook data was insufficient, a benchmark gene diversity (90%) was used as a starting point to measure loss of GD over time. The proportional gene diversity (as a proportion of the source population) is the probability that two alleles from the same locus sampled at random from the population will not be identical by descent.

N_e/N – Ratio of effective population size to actual population size.

This ratio represents the approximate proportion of the population that is breeding, calculated from the number of living animals with living offspring in the population.

% Known – Percentage of pedigree known (before and after assumptions and exclusions).

This is the proportion of the pedigree of living specimens descended from known or wild-caught ancestors. If pedigree assumptions were made or if unknown pedigree animals were excluded from the genetic analyses, the percentage known before and after these assumptions/exclusions is noted.

The following table is an example of different projection strategies used for each population to evaluate whether the current population will be able to meet the standard AZA program goal of 90% gene diversity for at least 100 years.

Projection strategy	% GD at 100 years	Years to 90% GD	Years to 10% GD loss	Tested Target Population Size
A. Baseline				
<i>Strategy A evaluates the genetic status of the population in 100 years under current conditions (historic average annual growth rate, current GD, current N_e/N). This strategy assumes that no founders will be imported. The tested target population size was the number set as the maximum allowable population size on the PM2000 Goals Screen, and was generally the current population size or the estimated 2009 holding capacity from the TAG's space survey.</i>				
B. Increase lambda or N_e/N				
C. Increase target population size tested				
<i>Additional strategies evaluate the genetic status of the population in 100 years with an improvement to population parameters (average annual growth rate, N_e/N) or an increase in the tested target size (set to either the estimated 2009 holding capacity from the TAG's space survey or some larger population size).</i>				
D. Import reasonable # founders				
<i>Other additional strategies evaluate the genetic status of the population based on previous improvements with the addition of a realistic number of founders, based on meeting attendees' expertise, with imports scheduled as described.</i>				

European White Stork *Ciconia ciconia*

Proposed program status: PMP

Conservation status: IUCN = Near Threatened

Projections for this population were based on an analytical version of the European White Stork North American Regional Studbook (current to 1 January 2007, from studbook keeper Tom Schneider, Detroit Zoo). Assumptions used were developed by the PMC for the 2006 master plan. Genetic data exports for the living population were based on the AZA population. Demographic exports were based on North American data from 1 January 1980 – 12 November 2006.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	Projected λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
33	83	65	100	13.7	1.02	94.15	22	1	0.21	48.5/ 95.4

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	75.68	18	83
B. Increase N_e/N to 0.3	80.86	27	83
C. Increase N_e/N to 0.3, increase target size	82.59	30	100
D. Increase N_e/N to 0.3, add founders (10 founders in year 1)	82.02	37	83
E. Increase N_e/N to 0.3, increase target size, add founders (10 founders in year 1)	83.93	43	100
F. Increase N_e/N to 0.3, increase target size, add founders (2 every 10 years for 50 years)	85.07	54	100

Given estimated population parameters and the population size suggested by the TAG space survey, projections indicate that genetic goals (90% GD for 100 years) will not be met. However, by increasing effective population size and importing new founders from Europe, projections indicate gene diversity can be maintained within 10% of the current level for 100 years with a target population size of 100.

Painted Stork

Mycteria leucocephala

Proposed program status: PMP

Conservation status: IUCN = Near Threatened

Projections for this population were based on the Painted Stork North American Regional Studbook (current to 1 April 2006, from studbook keeper Debbie Gungle, San Diego Wild Animal Park). Two unknown pedigreed birds were excluded as per the 2006 master plan developed by the PMC. Genetic data exports for the living population were based on the AZA population. Demographic exports were based on North American data from 1 January 1992 – 15 June 2006.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	Projected λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
5	32	30	50	10.7	1.06	92.48	11	0	0.22	92.9/100

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	46.14	2	32
B. Increase target size	59	3	50
C. Increase target size	66.12	3	70
D. Increase effective size to 0.3, increase target size	72.4	5	70
E. Increase effective size to 0.3, add founders (6 founders in year 1), increase target size	73.86	12	70
F. Increase effective size to 0.3, add founders (10 founders in year 1), increase target size	74.58	16	70

Given estimated population parameters and the population size suggested by the TAG space survey, projections indicate that genetic goals (90% GD over 100 years) will not be met. However, increasing the target size (Strategy C) improves the genetic outlook for the population. Additional founders may be available and would benefit the population; with additional founders and improved breeding, the population could maintain almost 75% gene diversity for 100 years (Strategy F).

Yellow-billed Stork

Mycteria ibis

Proposed program status: PMP

Conservation status: IUCN = Least Concern

Projections for this population were based on the Yellow-billed Stork North American Regional studbook (data current to 3 January 2006 from former studbook keeper David Heckard, San Diego Wild Animal Park; studbook keeper). Current PMP coordinator is Andrea Worrall, San Diego WAP. Genetic data exports for the living population were based on the AZA population. Demographic exports were based on North American data from 1 January 1986 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	Projected λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
10	42	n/a	80	13.5	1.045	91.72	12	10	0.19	100/ n/a

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	56.52	2	42
B. Increase target size	70.26	3	80
C. Increase effective size, increase target size	77.56	6	80
D. Increase effective size, recruit existing potential founders (10 founders in year 1), increase target size	79.82	23	80
E. Increase effective size, add founders (10 founders every 10 years, for 20 years), increase target size	81.58	37	80
F. Increase effective size, add founders (10 founders every 10 years, for 20 years), increase target size	83.89	43	100

Given estimated population parameters and the population size suggested by the TAG space survey (Strategy B) projections indicate that genetic goals (90% GD over 100 years) will not be met. However, there are ten potential founders currently in the population. By recruiting these existing potential founders and increasing the proportion of birds breeding (Strategy D), projections indicate 80% gene diversity could be maintained for 100 years.

Abdim's Stork *Mycteria abdimii*

Proposed program status: PMP

Conservation status: IUCN = Least Concern

Projections for this population were based on the Abdim's Stork North American Regional Studbook (current to 31 December 2004 from former studbook keeper Sue Maher, Disney's Animal Kingdom; current studbook keeper Valerie Nichols, Disney's Animal Kingdom). However, ISIS data (current through 31 December 2006) shows a population size much smaller than that from the 2004 studbook (ISIS data, N=79; studbook data, N=112). The population size in PM2000 analyses was changed to 80 specimens to reflect the current ISIS data; gene diversity was assumed to remain approximately at the level of the 2004 population. Pedigree assumptions used were developed by the PMC for the 2004 master plan (never finalized, unpublished). Genetic data exports were based on the living population as of 30 November 2004. Demographic exports were based on North American data from 1 January 1980 to 30 November 2004.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
19*	80*	n/a	120	11.4	1.09	87.94**	11**	2**	0.29	14.2/ 96

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

* Estimated based on ISIS data (current through 31 December 2006).

** Estimated based on 2004 genetic analyses.

Projection strategy	% GD at 100 years	Years to 90% GD	Years to 10% GD loss	Tested target population size
A. Baseline	72.5	n/a	70	80
B. Increase target size	77.22	n/a	100	120
C. Add founders (10 founders in year 1), increase target size	80.8	n/a	130	120

Current gene diversity for this population is only an estimate based on gene diversity in the population as of 2004, and is estimated to be less than 90%. Given estimated population parameters and the target population size suggested by the TAG space survey (Strategy B), projections indicate that less than 10% GD loss over 100 years can be maintained.

Although this species appears to be starting at a lower level of gene diversity than other stork populations, this is due mainly to unknowingness in the historic pedigree and conservative assumptions about the founder base. Actual founder contributions are likely to have been higher than that estimated by pedigree assumptions developed for inbreeding avoidance. A decent founder base, along with high historic growth rates, and high effective size of this population indicate that this species is well-suited to be managed as a genetically and demographically healthy PMP.

Marabou Stork

Leptoptilos crumeniferus

Proposed program status: PMP

Conservation status: IUCN = Least Concern

Projections for this population were based on the Marabou Stork North American Regional Studbook (current to 5 March 2005, updated through 30 April 2007, from studbook keeper Paul Schutz, Disney's Animal Kingdom). Genetic data exports for the living population were based on the AZA population, with 19 unknown-pedigreed birds excluded from the genetic analyses. Demographic exports were based on North American data from 1 January 1990 – present. Because of this species' long life span and short history, exported demographic data may not accurately reflect true biological parameters.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N _e /N	% Pedigree known before/after exclusions
36	96	77	150	15*	1.02	94.15	16	39	0.14	57.3/ 94.15

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

* Generation length is an estimate to account for poor demographic data; based on life span and comparison with other species.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	72.94	16	96
B. Increase N _e /N to 0.2	78.82	24	96
C. Recruit ½ existing potential founders (20 founders in year 1), increase N _e /N to 0.2	80.49	36	96
D. Recruit ½ existing potential founders (20 founders in year 1), increase N _e /N to 0.2, increase target size	85.6	55	150
E. Recruit ½ existing potential founders (20 founders in year 1), increase N _e /N to 0.3, increase target size, increase lambda to 1.03	89	85	150

Given estimated population parameters and the current population size (Strategy A), projections indicate that genetic goals (90% GD over 100 years) will not be met. However, because of the potential to increase the effective size, growth rate, and number of founders (by recruiting as many as possible of the 39 existing potential founders), projections indicate the population could maintain 89% gene diversity for 100 years with a population size of 150 (Strategy E).

Milky Stork *Mycteria cinerea*

Proposed program status: PMP

Conservation status: IUCN = Vulnerable;
CITES Appendix I
(endangered in Viet Nam and Malaysia)

Projections for this population were based on the Milky Stork North American Regional studbook (current to 17 March 2005, from studbook keeper John Hollingshead, San Diego Zoo). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on North American data from 1 January 1989 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
3	31	n/a	50	10*	1.07	81.11	5	3	0.29	62.5/ n/a

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

* Estimate based on other stork species.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Add founders (20 founders in year 1), increase target size	65.07	n/a	50
B. Add founders (10 founders every 10 years, for 20 years), increase target size	66.39	n/a	50

At this time, the TAG is investigating importing founders as a strategy to improve the outlook for this population. Importing 20 founders will provide a good genetic base for the population to be managed into the future. The timing of the importations has little effect on gene diversity. If this species is important to AZA zoos, the PMP should focus on maintaining a proper studbook, researching unknown pedigrees, and facilitating genetic and demographic management in order to maximize the genetic potential of imported founders, and to maintain a long-term viable population.

Saddle-billed Stork

Ephippiorhynchus senegalensis

Proposed program status: PMP

Conservation status: IUCN = Least Concern;
CITES Appendix III Ghana

Projections for this population were based on the Saddlebill Stork North American Regional studbook (current to 31 March 2007, partially updated through 30 April 2007, from studbook keeper Jocelyn Womack, Dallas Zoo). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the White Stork North American Regional Studbook data from 1 January 1994 – present.

Because of this species' long life span and short history, exported demographic data may not accurately reflect true biological parameters; demographic data from similar species was used in the projections.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known
33	66	65	85 – 100	14*	1.02*	92.34	10	34**	0.11	100

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

* Values estimated from European White Stork data.

**At least 11 flight-restricted males who are highly unlikely to breed are included in these potential founders

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	54.73	3	65
B. Increase N_e/N to 0.2	69.58	8	65
C. Recruit existing founders (10 founders in year 1), increase N_e/N to 0.2	71.05	15	65
D. Recruit existing founders (10 founders in year 1), increase N_e/N to 0.2, increase target size	75.88	19	85
E. Recruit existing founders (10 founders in year 1), increase N_e/N to 0.2, increase target size	78.12	21	100
F. Recruit existing founders (10 founders in year 1), increase N_e/N to 0.3, increase target size	81.83	22	150

Given estimated population parameters and the current population size (strategy A), projections indicate that genetic goals (90% GD over 100 years) will not be met. However, increasing effective population size, recruiting existing potential founders, and increasing target size (strategies D, E, and F) improves gene diversity retention so that no more than a 10% loss of GD occurs over 100 years.

Hamerkop *Scopus umbretta*

Proposed program status: PMP

Conservation status: IUCN = Least Concern

Projections for this population were based on the Hamerkop North American Regional studbook (current to 17 October 2006, from studbook keeper John Azua, Denver Zoo). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1980 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
41	83	78	100	6.4	1.03	93.38	18	2	0.42	92/ 97.4

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	73.26	14	78
B. Increase target size	77.13	17	100
C. Increase target size	79.34	19	120
D. Add founders (10 founders in year 1), increase target size	80.79	30	120
E. Add founders (2 founders every 10 years, for 100 years), increase target size	87.62	31	120

Given estimated population parameters and the current population size (strategy A), projections indicate that genetic goals (90% GD over 100 years) will not be met. Increasing the target size somewhat improves projections of gene diversity (strategies B and C). A one-time import of founders appears to have little effect on gene diversity but with good genetic management, this strategy could help the population more than these deterministic projections indicate (strategy D).

Northern Bald Ibis *Geronticus eremita*

Proposed program status: SSP

Conservation status: IUCN= Critically Endangered;
CITES Appendix I

Projections for this population were based on the Northern Bald Ibis North American Regional studbook (current to 1 January 2007, from studbook keeper Mark Hofling, Wildlife Conservation Society). Assumptions used were developed by the PMC for the 2003 master plan (“clans” overlay). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1964 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
18	120	n/a	150	8*	1.01	90**	6**	0	0.38	0/95

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG’s space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

* Value obtained from data pre-2003, when population was experiencing consistent breeding.

** Gene diversity value is a benchmark value and does not reflect true gene diversity retention; assumptions made were to avoid inbreeding.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	78.31	n/a	120
B. Increase target size	80.39	n/a	150
C. Add founders (10 founders in year 5), increase target size	83.26	n/a	150

If the target size is increased to 150 (strategy B), projections indicate a 10% loss of gene diversity over 100 years; importation of founders further improves projections of gene diversity. Upgrading this population to a SSP[®] may be warranted in order to facilitate cooperation among institutions and consolidate birds into colonies of at least six in order to increase breeding.

Southern Bald Ibis *Geronticus calvus*

Proposed program status: PMP

Conservation status: IUCN = Vulnerable;
CITES Appendix II

Projections for this population were based on the Southern Bald Ibis North American Regional Studbook (current to 1 March 2007, from studbook keeper Mark Hofling, Wildlife Conservation Society). Assumptions were developed by the PMC at the RCP analysis meeting and incorporated into an analytical studbook (xxsbibis4). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1995 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
4	25	n/a	100*	8**	1.02	80.64	5	0	0.37	76/88

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

* Value reflects spaces created by possible recommendation to decline sacred ibis population.

** Estimated value based on Waldrapp ibis data.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	39.98	n/a	25
B. Increase target size	57.54	n/a	75
C. Increase target size	58.51	n/a	100
D. Increase target size	59.52	n/a	150
E. Add founders (2 founders every 10 years for 100 years, starting year 5), increase target size	84.87	n/a	100

Given estimated population parameters, genetic goals cannot be met at any target population size (Strategies A, B, C, and D). Additional founders in addition to an increased target size (Strategy E) would be necessary to help this population be genetically and demographically viable; founders may be available from other regions.

Scarlet Ibis

Eudocimus ruber

Proposed program status: PMP

**Conservation status: IUCN = Least Concern;
CITES Appendix II
USFWS = Migratory Bird Treaty Act**

Projections for the scarlet ibis population were based on an ISIS download (current to 31 December 2006, validated by Kristine Schad, Studbook Analyst, Population Management Center). New studbook keeper Brigitte Thompson, North Carolina Zoo. Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1979 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
72	537	n/a	600	8.2*	1.00	90**	4	1	0.2*	1.0/n/a

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

* Estimate based on other ibis species.

** 90% gene diversity chosen as a benchmark value for projections; actual gene diversity is unknown.

Projection strategy	% GD at 100 years	Years to 10% loss GD	Tested target population size
A. Baseline A benchmark GD of 90% was used for projections	84.97	200	537

Data is insufficient for genetic analyses due to unknown pedigree and unknown origins, and a reliable estimate of gene diversity cannot be made. But using a benchmark value of gene diversity, projections indicate gene diversity can be maintained within 10% of the current level for 200 years at the current population size (N=537). For this population, assuming that a relatively large founder base of wild birds has contributed to the breeding colonies and that the colonies are successfully breeding, target size is driven by exhibit needs rather than genetic or demographic needs.

African Spoonbill

Platalea alba

Proposed program status: PMP

Conservation status: IUCN = Least Concern

Projections for this population were based on the African Spoonbill North American Regional Studbook (current to 3 March 2005, from studbook keeper Bonnie Van Dam, Detroit Zoo). Genetic data exports for the living population were based on the AZA population. All animals with unknown pedigrees were excluded from genetic analyses. Demographic exports were based on the North American data from 1 January 1988 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
16	66	49	140	11.6	1.02	93.93	15	20	0.24	73.4/100

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	70.4	11	66
B. Increase target size	76.74	12	100
C. Recruit existing founders (20 founders in year 1), increase target size	79.52	31	100
D. Recruit existing founders (20 founders in year 1), increase target size	83.11	38	140

Given estimated population parameters, genetic goals (90% GD for 100 years) cannot be met at any target population size. However, if existing potential founders are recruited, in addition to increasing the target population size (Strategy D), projections indicate gene diversity can be maintained within 10% of the current level for 100 years.

Roseate Spoonbill

Platalea ajaja

Proposed program status: PMP

Conservation status: IUCN = Least Concern;
USFWS = Migratory Bird Treaty Act

Projections for this population were based on the Roseate Spoonbill North American Regional Studbook (current to 1 February 2007, from studbook keeper Laurie McGivern, Dallas Zoo). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1973 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
58	421	n/a	500	9.6	1.0	97.28	47	32	0.24	35.4/ n/a

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size	Minimum population size to meet goals
A. Baseline	> 90	> 100	421	281

Given estimated population parameters, projections indicate that genetic goals (90% GD for 100 years) can be met with a minimum population size of 281 specimens (Strategy A). For this population, target size is driven primarily by exhibit needs, rather than genetic or demographic needs.

Boatbilled Heron

Cochlearius cochlearius

Proposed program status: PMP

Conservation status: IUCN = Least Concern

Projections for this population were based on the Boatbilled Heron North American Regional Studbook (current to 31 December 2006, from studbook keeper Alan Rost, Jacksonville Zoo). Current studbook keeper is Robin Lentz, Jacksonville Zoo. Assumptions used were developed by the PMC for a 2006 master plan meeting. Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1988 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	# Founders	# Potential Founders	N_e/N	% Pedigree known before/after exclusions
29	121	102	175	6.1	1.02	96.84	29	6	0.31	66.4/ 92.8

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size
A. Baseline	73.72	26	102
B. Increase target size	80.7	31	175

Given estimated population parameters, genetic goals cannot be met at any target population size. Projections of genetic diversity are improved by increasing target size; with a target size of 175, projections indicate 80% gene diversity can be maintained for 100 years (Strategy B).

Lesser Flamingo *Phoeniconaias minor*

Proposed program status: PMP

Conservation status: IUCN = Near Threatened;
CITES Appendix II

Projections for this population were based on the Lesser Flamingo North American Regional Studbook (current to 1 January 2007, from studbook keeper Laurie Conrad, SeaWorld San Diego). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1980 – present. However, demographic data is insufficient for the calculation of vital rates; estimates used are based on those in the 2006 PMP.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	N_e/N	# Founders	# Potential Founders	% Pedigree known before/after exclusions
17	542	n/a	542	12	1.00	97.05	0.06	35	466	91.9/ n/a

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size	Minimum population size to meet goals
A. Baseline	85.18	57	542	Not possible
B. Increase effective size to 0.2	90	> 100	542	278

Given estimated population parameters, including the low effective population size, projections indicate 85% gene diversity can be maintained for 100 years (Strategy A). If the PMP can achieve a greater proportion of animals breeding and improve the effective size, projections indicate that 90% gene diversity can be maintained for 100 years with a population size of 278 specimens. For this population, target size is driven mainly by exhibit needs, rather than genetic needs.

Greater Flamingo

Phoenicopterus ruber roseus

Proposed program status: PMP

Conservation status: IUCN = Least Concern;
CITES Appendix II

Projections for this population were based on the Greater Flamingo North American Regional Studbook (current to 1 January 2005, from studbook keeper Tom Schneider, Detroit Zoo). Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1989 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	N_e/N	# Founders	# Potential Founders	% Pedigree known before/after exclusions
11	408	n/a	600	16.8	1.01	99.13	0.27	110	106	82.4/ n/a

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size	Minimum population size to meet goals
A. Baseline	> 90	> 100	408	115

Given estimated population parameters, projections indicate that 90% gene diversity can be maintained for 100 years with a population size of just 115 specimens, due to the large number of founders (Strategy A). For this population, target size is driven mainly by exhibit needs, rather than genetic or demographic needs.

Chilean Flamingo

Phoenicopterus chilensis

Proposed program status: PMP

Conservation status: IUCN = Near Threatened;
CITES Appendix II

Projections for the Chilean flamingo population were based on an ISIS download (current to 31 December 2006, validated by Kristine Schad, Studbook Analyst, Population Management Center). Current studbook keeper is Amanda Hall, Scovill Zoo. Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the North American data from 1 January 1979 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	N_e/N	# Founders	# Potential Founders	% Pedigree known before/after exclusions
58	1605	706	1750	29.6	1.005	99.28	0.24	197	370	21.4/ 100

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at x years	Years to 90% GD	Tested target population size	Minimum population size to meet goals
A. Baseline (90% GD for 100 years)	> 90	> 100	1605	72
B. Increase goal (90% GD for 200 years)	> 90	> 200	1605	144

Given estimated population parameters, projections indicate that 90% gene diversity can be maintained for 100 years with a population size of just 72 specimens (Strategy A). In fact, 90% gene diversity can be maintained for 200 years with a population of only 144 specimens. For this population, target size is driven by exhibit needs, rather than genetic or demographic needs.

Caribbean Flamingo

Phoenicopterus ruber ruber

Proposed program status: PMP

**Conservation status: IUCN = Least Concern
(endangered in Mexico); CITES Appendix II;
USFWS= Migratory Bird Treaty Act**

Projections for the Caribbean flamingo population were based on an ISIS download (current to 31 December 2006, validated by Kristine Schad, Studbook Analyst, Population Management Center). Current studbook keeper is Peter Shannon, Albuquerque Biological Park. Genetic data exports for the living population were based on the AZA population. Demographic exports were based on the AZA data from 1 January 1975 – present.

Demography & Genetics

Number of holding institutions	N	N (after exclusions)	Estimated future holding capacity	T	λ	GD (%)	N_e/N	# Founders	# Potential Founders	% Pedigree known before/after exclusions
54	1553	n/a	1610	19.9	1.02	98.39	0.16	69	171	5.7/ n/a

N – Current population size

Estimated 5 year holding capacity was obtained from the Ciconiiformes & Phoenicopteriformes TAG's space survey

T – Generation time (years)

λ - Potential population growth rate based on historic data for this species ($\lambda = 1.0$, 0% growth)

GD – Estimated current gene diversity of population

N_e/N – Ratio of effective population size to actual population size.

% Known – proportion of descendant population with known pedigree.

Projection strategy	% GD at 100 years	Years to 90% GD	Tested target population size	Minimum population size to meet goals
A. Baseline (90% GD for 100 years)	> 90	> 100	1553	189
B. Increase goal (90% GD for 200 years)	> 90	> 200	1553	377

Given estimated population parameters, projections indicate that 90% gene diversity can be maintained for 100 years with a population size of just 189 specimens (Strategy A). In fact, 90% gene diversity can be maintained for 200 years with a population of only 377 specimens. For this population, target size is driven by exhibit needs, rather than genetic or demographic needs.

SPECIES BY SPECIES CONSERVATION STATUS AND TAG RECOMMENDATIONS

APPENDIX C

Species are listed in taxonomic order. Columns for taxon and name are self-explanatory.

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
ARDEIDAE whistling heron <i>Syrigma sibilatrix</i>	Bolivia to SE Brazil and NE Argentina; E Columbia, Venezuela	NGT; locally common but distribution patchy	NOT RECOMMENDED
capped heron <i>Pilherodius pileatus</i>	basins of Amazon and Orinoco; from E Panama through Guianas to E Brazil and S through E Ecuador to S Bolivia and Paraguay	NGT; poorly known to scarce; uncommon in Brazil and Columbia	NOT RECOMMENDED
grey heron <i>Ardea cinerea</i>	Japan to N Burma and S to Java; most of Palearctic, thinly through Africa, India and Sri Lanka; Madagascar; Banc d'Arguin and Mauritania	NGT; common and expanding to N & S	NOT RECOMMENDED
great blue heron <i>Ardea herodias</i>	most of N&C America; S Florida through W Indies to islands off Venezuela; Galapagos	NGT; populations stable in NA; probably extinct Jamaica; common in Mexico	DERP/REHAB Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
cocoi heron <i>Ardea cocoi</i>	Most of S America excluding Andes from E Panama S through Chile & Argentina	NGT; widespread in lowland S America; common but not abundant in Argentina; scarce or absent along arid Pacific coast of Ecuador to Chile	NOT RECOMMENDED
white-necked heron <i>Ardea pacifica</i>	Australia and Tasmania	NGT; common in Australia; scarce but probably regular in S New Guinea; benefited from deforestation to create pastures and construction of reservoirs	NOT RECOMMENDED
black-headed heron <i>Ardea melanocephala</i>	Africa S of Sahara from Senegal to Ethiopia and S to South Africa	NGT; widespread and common but with patchy distribution; commonest of large herons in Africa	NOT RECOMMENDED

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
Madagascar heron <i>Ardea humbloti</i>	endemic to Madagascar	INSUFFICIENTLY KNOWN; local and little known although still frequent along N & W coasts; probably never abundant; recent reports suggest possible breeding in Comoro Is.	NOT RECOMMENDED
white-bellied heron <i>Ardea insignis</i>	southern foothills of Himalayas from Nepal to NE India and Burma	CRITICALLY ENDANGERED; not recorded in Nepal this century; rare in NE India; habitat destruction large-scale and devastating throughout Burma	NOT RECOMMENDED
great-billed heron <i>Ardea sumatrana</i>	Burma, Thailand and S Viet Nam to Indonesia, Philippines and New Guinea; N Australia	NGT; currently considered near-threatened; widespread but at low densities; reportedly widespread in Malay Peninsula	NOT RECOMMENDED
Goliath heron <i>Ardea goliath</i>	Africa S of Sahara, S Iraq and S Iran with non-breeders along Red Sea; scattered on Indian Subcontinent from Pakistan to Bangladesh and S into Sri Lanka	NGT; requires monitoring in South Africa; CITES II in Ghana; nesting probably ceased in S Iraq; probably also extirpated from Iran and Indian Subcontinent	DERP Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
purple heron <i>Ardea purpurea</i>	W Palearctic including N Africa, E to Kazakhstan and Iran; S of Sahara, Cape Verde Islands; Madagascar; S & E Asia, Indonesia, Philippines	NGT; widespread and locally common in Africa, common in Madagascar; tendency towards expansion in C Europe since 1940; declining in France and Spain; uncommon and local in Japan; common in China; threatened in Thailand although abundant in places	NOT RECOMMENDED
great white egret <i>Egretta alba</i>	C Europe to SE Asia; Japan Korea S through Indonesia to Australia; N C & S America to C Argentina	NGT; abundant in N America; still threatened in W Palearctic though expanding to W and has recently bred in Italy and Netherlands; habitat destruction main threat	DERP/REHAB
reddish egret <i>Egretta rufescens</i>	S USA and E Mexico through West Indies to N Columbia and N Venezuela; W Mexico	NGT; uncommon to rare in USA; uncommon in Mexico except in NW Baja California; white morph now only in Bahamas	DERP/REHAB
pied heron <i>Egretta picata</i>	N Australia and S Sulawesi; New Guinea, Moluccas and Tanimbar Is.	NGT; locally common or even abundant along lowlands of N Australia; habitat threatened by invasion of <i>Mimosa</i> and other plants, expansion of feral buffalo; has benefited from construction of artificial water bodies	NOT RECOMMENDED

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
slaty egret <i>Egretta vinaceigula</i>	Okavango Delta, N Botswana, NE Namibia through NW Zimbabwe to NE Zambia	INDERTERMINATE – uncommon within restricted probably relict range; fairly frequent in Okavango Delta; decrease in numbers due to human control of flooding	NOT RECOMMENDED
black heron <i>Egretta ardesiaca</i>	Africa S of Sahara except Congo Basin and arid area around Kalahari; Madagascar	NGT – generally scarce though locally abundant e.g. by Lake Victoria; in Madagascar marked decline in last 30 years due to human interference	NOT RECOMMENDED
tricolored heron <i>Egretta tricolor</i>	S & E USA to C America, W Indies, Columbia and N Venezuela to Trinidad to NE Brazil; Ecuador and extreme N Peru	NGT – in USA common on Gulf and E coasts; uncommon to fairly common in Honduras; one of commonest herons on coast of Surinam; uncommon to fairly common on N & W coasts of Columbia; rare inland; populations expanding	DERP/REHAB Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
intermediate egret <i>Egretta intermedia</i>	Africa S of Sahara; SE Asia and W Indonesia to Japan; E Indonesia to New Guinea and Australia	NGT – in Africa, common and widespread; pollution and disturbance of colonies in Japan causing marked declines; more shy and sensitive to disturbance than other egrets	NOT RECOMMENDED
white-faced heron <i>Egretta novaehollandiae</i>	New Zealand, Australia, S New Guinea, New Caledonia and S Indonesia	NGT – commonest heron in Australia; in Australia and New Zealand, has benefited from clearing of woodlands, conversion of land for agriculture and extensive irrigation	PHASE OUT
little blue heron <i>Egretta caerulea</i>	N America from Ma to FL to E Mexico and W Indies; Gulf of California through C America in N half of South America S to Peru, Bolivia and S Brazil	NGT – populations stable throughout range	DERP/REHAB Sara Hallager, Biologist Smithsonian National Zoological Park 3001 Connecticut Ave NW Washington, D.C. 20008-2537 Phone: (202) 633-4440 e-mail: hallagers@si.edu

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
snowy egret <i>Egretta thula</i>	W USA , Baja California; N C and S America from NE USA through Caribbean to NE Argentina; NW Mexico to S Chili	NGT – populations stable to expanding	DERP/REHAB Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
little egret <i>Egretta garzetta</i>	Palearctic from France, Spain and NW Africa to Korea and Japan; islands of SE Asia and SW Pacific through N & E Australia and New Zealand; Africa S of Sahara	NGT – CITES III in Ghana; other populations stable to expanding; common to locally very common over most of range	NOT RECOMMENDED
Chinese egret <i>Egretta eulophotes</i>	Korea, E China; non-breeders range from Japan to Sumatra and E to Philippines	ENDANGERED – total pop est. 1000 pairs; threatened by transformation of habitat and egg collecting	NOT RECOMMENDED
eastern reef-egret <i>Egretta sacra</i>	coastal SE Asia to Japan, Indonesia, Philippines, SW & S Pacific, Australia, New Zealand; New Caledonia, Loyalty Is.	NGT – relatively common, abundant in many islands of SW Pacific; population decline in New Zealand due to habitat transformation	NOT RECOMMENDED
cattle egret <i>Bubulcus ibis</i>	Africa and Madagascar; SW Europe to Caspian Sea; N, C & S America from Canada to Guianas and N Chile; also NE Argentina and scattered parts of Brazil; Seychelles; S & E Asia to Australia and New Zealand	NGT – CITES III in Ghana; has undergone enormous expansion since 1900; has colonized all continents except Antarctica	DERP/REHAB Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
squacco heron <i>Ardeola ralliodes</i>	SW & C Europe eastwards to Aral Sea and SE Iran; Africa N & S of Sahara, Madagascar	NGT – common to expanding populations although has shown marked fluctuations; more numerous S of equator; common in Madagascar	NOT RECOMMENDED
Indian pond heron <i>Ardeola grayii</i>	N Persian Gulf E through Indian subcontinent and Sri Lanka to Burma; Laccadives & Maldives, Andamans and Nicobars	NGT – abundant throughout India; common in Nepal to 1500 m; common in Burma	PHASE OUT

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
Chinese pond-heron <i>Ardeola bacchus</i>	China W to Assam, N Burma and Andaman Is; Japan; Malay Peninsula, Indochina, Borneo, Sumatra, Ryukyur Is	NGT – one of commonest herons in E China; declining in Borneo; large quantities of eggs and birds taken for food in China, nevertheless range is expanding	NOT RECOMMENDED
Javan pond-heron <i>Ardeola speciosa</i>	C Thailand, S Indochina; W & C Indonesia	NGT – fairly common to very common; populations increasing Philippines	DERP Jim Dunster, Curator of Birds Miami Metrozoo 12400 SW 152 nd St/One Zoo Blvd Miami, FL 33177-1402 Phone: (305) 251-0400 e-mail: jdun@miamidade.gov
Madagascar pond-heron <i>Ardeola idae</i>	Madagascar and Aldabra; migrates to C & E Africa	NGT – currently considered near-threatened; declined dramatically in last 50 years; decline thought to be due to competition with <i>A. ralloides</i>	NOT RECOMMENDED
rufous-bellied heron <i>Ardeola rufiventris</i>	Uganda and Kenya S to Natal and W to Angola, N Namibia and N Botswana	NGT – local and generally scarce or rare; strongholds in floodplains of W & N Zaire and Okavango Delta in Botswana	NOT RECOMMENDED
green-backed heron <i>Butorides striatus</i>	W C S USA and E Canada to Panama; Caribbean; most of South America except Andes; Africa S of Sahara; Madagascar; Indian subcontinent to E China to N Viet Nam and N Burma; South Pacific Islands; NW to NE Australia	NGT – generally common to locally abundant in mostly cosmopolitan range; difficult to census accurately; several studies have shown adversely affected by human disturbance and pesticides; taken for food in some areas	NOT RECOMMENDED
agami heron <i>Agamia agami</i>	E Mexico through C America and N South America to E Bolivia and N & C Brazil	NGT – currently considered near-threatened; status hard to determine , rarely comes into open areas and is difficult to see; said to be one of commonest herons on oxbow lakes in SE Peru	NOT RECOMMENDED

FAMILY Common Name Scientific Name	Distribution	Conservation Status*	TAG Recommendations
yellow-crowned night heron <i>Nycticorax violaceus</i>	C & E USA, E Mexico through Honduras to Columbia to NE and E Brazil; Baja California to El Salvador, W Indies; Panama to Peru; Galapagos Is.	NGT – common in USA; populations stable to expanding; successfully reintroduced to Bermuda	DERP/REHAB Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
black-crowned night heron <i>Nycticorax nycticorax</i>	N C and S America from S Canada to N Chile and N Argentina to Tierra de Fuego; C & S Europe east to C and S Asia, N to Japan and S to Timor; Africa and Madagascar; Falkland Islands	NGT – common to locally abundant throughout most of range; very wide range makes overall population estimate very difficult	DERP/REHAB Chris Brown, Curator Birds Dallas Zoo and Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 670-6839 e-mail: chris.brown@dallascityhall.com
rufous night-heron <i>Nycticorax caledonicus</i>	Philippines, E Borneo; Australia N to Java and New Guinea; Bismarck Archipelago to Solomon Is.; Palau and Carline Is.; New Caledonia	NGT – in Australia, widespread and common; locally common in New Guinea; very rare on Java; quite common New Caledonia	NOT RECOMMENDED
white-backed night-heron <i>Nycticorax leuconotus</i>	scattered populations in Africa S of Sahara, from Senegal to N Angola and through Zaire to Tanzania; S from Zambia and N Botswana to E South Africa	NGT – widespread; generally rare to uncommon although frequent in some areas; shy and rarely seen due to nocturnal & solitary habits; few data available and real status difficult to assess; range contraction in South Africa due to cutting down of waterside trees and silting up of clear pools used for foraging	NOT RECOMMENDED
white-eared night-heron <i>Gorsachius magnificus</i>	E and S China	ENDANGERED – rare and local with very few recent reports; records suggest decline due to deforestation of habitat; extensive research and surveys recommended to evaluate status and establish conservation priorities	NOT RECOMMENDED
Japanese night-heron <i>Gorsachius goisagi</i>	S Japan; Ryukyu Is., Volcano Is., and SE China to Philippines	VULNERABLE – uncommon to rare and very local throughout Japan; suitable habitat now scarce; not uncommon on Miyake-jima to S of Tokyo; none recorded in Asian Waterfowl Census, Jan 1990	NOT RECOMMENDED

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
Malayan night-heron <i>Gorsachius melanolophus</i>	SW India to S China, S through Indochina to Philippines; Sri Lanka, Malay Peninsula and Greater Sundas	NGT – considered near-threatened; regarded as generally rare; difficult to census due to impenetrable habitat and nocturnal habits; fairly frequent in China; uncommon and local in Japan and Philippines; at risk in Thailand	NOT RECOMMENDED
boat-billed heron <i>Cochlearius cochlearius</i>	W, C & S Mexico and Belize S to W Honduras and El Salvador, Costa Rica, S through Panama to Guianas and Amazonia S to NE Argentina	NGT – widespread, generally found in all suitable habitats; local in Columbia; no details available on real status and population sizes	PMP Robin Lentz, Bird Supervisor Jacksonville Zoo and Gardens 370 Zoo Parkway Jacksonville, FL 32218-5799 Phone: (904) 757-4463 e-mail: lentzr@jaxzoo.org
bare-throated tiger-heron <i>Tigrisoma mexicanum</i>	coastal W and E Mexico through C America to NW Columbia	NGT – no information available on overall status and population size; widespread and fairly common Honduras; common in Belize, Guatemala, Nicaragua, Costa Rica; legally protected in Brazil	NOT RECOMMENDED
fasciated tiger-heron <i>Tigrisoma fasciatum</i>	Costa Rica E to Venezuela and S to SE Brazil to N Argentina	NGT – considered near-threatened but no information on overall status and population sizes; rare and patchy in Columbia; perhaps extinct in SE Brazil due to deforestation	NOT RECOMMENDED
rufescent tiger-heron <i>Tigrisoma lineatum</i>	SE Mexico to W Ecuador and E through Amazonia to E Brazil, S to N Argentina	NGT - no information available on overall status and population size; said to be common breeder, Nicaragua; thinly spread over Columbia; uncommon in Peru	NOT RECOMMENDED
New Guinea tiger-heron <i>Zonerodius heliosylus</i>	restricted to New Guinea and some larger islands adjacent to W coast including Salawati; Aru Is.	NGT – considered near-threatened; presumably very rare and localized	NOT RECOMMENDED
white-crested tiger-heron <i>Tigriornis leucolophus</i>	equatorial rain forest belt of W Africa from Sierra Leone E to Cameroon, Gabon, Zaire and Central African Republic	NGT – generally uncommon to rare; very difficult to see; little information available on status population sizes and general biology; has disappeared from some localities in E Zaire due to habitat destruction	NOT RECOMMENDED
zigzag heron <i>Zebrius undulatus</i>	basins of Orinoco, Negro and Amazon: E Columbia through Venezuela to Gianas and NC Brazil, extending SW to E Peru and NE Bolivia	NGT – poorly known; until recently considered threatened; now classed INSUFFICIENTLY KNOWN; least known member of heron family; uncontrolled hunting may be a problem, e.g. Venezuela	NOT RECOMMENDED

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
stripe-backed bittern <i>Ixobrychus involucris</i>	N Columbia through N Venezuela, Trinidad and Guyana to Surinam; S Bolivia and S Brazil to C Argentina and C Chile	NGT – generally scarce though appears common in places; very difficult to see, due to size, skulking habits and habitat	NOT RECOMMENDED
least bittern <i>Ixobrychus exilis</i>	SE Canada and E USA W to Baja California; C America and Caribbean; NW Mexico S through Panama through Guianas to SE Brazil and Paraguay and W to CW Peru	NGT – in USA declining in may areas and considered threatened or of special concern in several states due to habitat destruction; uncommon to rare in parts of C America; locally common in Columbia	DERP/REHAB
little bittern <i>Ixobrychus minutus</i>	C & S Europe and N Africa E to W Siberia and through Iran to NE India; Africa S of Sahara; Madagascar; SW & E Australia; S New Guinea	NGT – population decline since middle of century due to habitat destruction and pollution; frequent to uncommon in Africa; uncommon in Madagascar; rare and local in Australia though may be commoner than thought	NOT RECOMMENDED
yellow bittern <i>Ixobrychus sinensis</i>	Indian subcontinent though SE Asia to SE USSR and Japan; Indonesia, Philippines, New Guinea and Micronesia; Seychelles	NGT – common to frequent in many areas; protected and considered beneficial by rice growers in China and Borneo	NOT RECOMMENDED
Schrenck's bittern <i>Ixobrychus eurhythmus</i>	SE Siberia to Japan, S to E China	NGT – considered near-threatened but no information available on population sizes; uncommon in USSR; uncommon and local in Japan; common in SE China	NOT RECOMMENDED
cinnamon bittern <i>Ixobrychus cinnamomeus</i>	Indian subcontinent through SE Asia to NE China; Maldives; Sri Lanka; Andaman & Nicobar Is	NGT – widespread and common in most of range; well adapted to man-made habitats and most populations appear healthy	NOT RECOMMENDED
dwarf bittern <i>Ixobrychus sturmii</i>	Africa S of Sahara, avoiding arid zones	NGT – widespread but uncommon to rare throughout extensive range	NOT RECOMMENDED
black bittern <i>Ixobrychus flavicollis</i>	SE Asia from Pakistan to SE China and S to Indonesia and Philippines; Solomon Is.; Moluccas, New Guinea and Bismarck Archipelago S to W, N and E Australia	NGT – probably much overlooked due to secretive habits; in Australia, may have declined considerably in last 50 years due to destruction of riverine habitats and salinization of rivers; fairly common SW India in areas of heavy rainfall	NOT RECOMMENDED
South American bittern <i>Botaurus pinnatus</i>	E Mexico; SE Nicaragua to Ecuador and Guianas, S through Brazil to Paraguay and NE Argentina	NGT – rarely seen due to secretive nature, might be commoner than thought; can be quite numerous in places	NOT RECOMMENDED

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
North American bittern <i>Botaurus lentiginosus</i>	N and C America from S and C Canada to Panama; West Indies	NGT – populations difficult to estimate; declining in USA due to loss of marsh habitat; ENDANGERED in Illinois, Indiana, Ohio and of SPECIAL CONCERN in others	DERP/REHAB
Eurasian bittern <i>Botaurus stellaris</i>	Palearctic and Oriental regions and N Afrotropical region; S Africa	NGT – considered near-threatened; general decline due to habitat destruction, pollution, hunting and collecting of eggs and chicks; marked decline in S Africa due to loss of wetlands	NOT RECOMMENDED
Australasian bittern <i>Botaurus poiciloptilus</i>	SW and SE Australia, Tasmania and New Zealand; New Caledonia and Loyalty Island	NGT – rarely seen due to secretive habits; locally common in Australia; declining due to draining of wetlands	NOT RECOMMENDED
SCOPIDAE hamerkop <i>Scopus umbretta</i>	most of tropical Africa S of Sahara, SW Arabia, Madagascar	NGT – frequent to locally abundant in African range; widespread and locally common in Madagascar; protected by native superstition; probably increasing at present due to creation of artificial wetlands though could suffer from deterioration of water quality due to excessive use of pesticides	PMP John Azua, Curator of Birds Denver Zoological Gardens 2300 Steele Street Denver, CO 80205-4899 Phone: (303) 376-4800 e-mail: jazua@denverzoo.org
CICONIIDAE wood stork <i>Mycteria americana</i>	SE states of USA, Mexico through C and S America to N Argentina	NGT –in USA ENDANGERED at national level; Mexican population declining due to collection of eggs and young and most recently, habitat destruction; throughout range, habitat destruction is probably main threat followed by hunting and egg-collecting in much of Latin America; has occasionally bred in	DERP/REHAB Donna Bear-Hull, Curator Birds Jacksonville Zoo and Gardens 370 Zoo Parkway Jacksonville, FL 32218-5799 Phone: (904) 757-4463 e-mail: bear-hulld@JaxZoo.org
milky stork <i>Mycteria cinerea</i>	S Viet Nam, Peninsular Malaysia, Sumatra, Java and Sulawesi	VULNERABLE – CITES 1 in Viet Nam and Malaysia; stronghold in E Sumatra; destruction of suitable nest-sites for fish ponds, agriculture and timber extraction is main threat as well as increased capture for food by growing human population and general disturbance	PMP Andrea Worrall, Animal Care Manager San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: AWorrall@sandiegozoo.org

FAMILY Common Name Scientific Name	Distribution	Conservation Status*	TAG Recommendations
yellow-billed stork <i>Mycteria ibis</i>	Africa S of Sahara, Madagascar	NGT – is common to abundant throughout range; locally common in WC Madagascar	PMP Andrea Worrall, Animal Care Manager San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: AWorrall@sandiegozoo.org
painted stork <i>Mycteria leucocephala</i>	India and Sri Lanka to Indochina and S China	NGT – regionally threatened in SE Asia, colonies require protection; locally common in parts of India; despite protection, on verge of extinction in Thailand where was once common; status in Burma, Laos and Kampuchea unknown	PMP Debbie Gungle, Lead Bird Keeper San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: dgungle@sandiegozoo.org
Asian openbill <i>Anastomus oscitans</i>	India and Sri Lanka to Thailand and Indochina	NGT – commonest Asian stork though regionally threatened in SE Asia; main problems appear to be hunting and trapping, habitat destruction and possibly contamination through accumulation of pesticides in snails; has been proposed as an indicator species of pollution levels	NOT RECOMMENDED
African openbill <i>Anastomus lamelligerus</i>	Africa S of Sahara; Madagascar	NGT – common in suitable habitat; African population considered stable to increasing; on Madagascar, has declined due to destruction of colonies by villagers	DERP/DISPLAY
black stork <i>Ciconia nigra</i>	breeds across Palearctic; winters in NE and E Africa through N India to SE and E China; SW Spain; Malawi and Namibia to South Africa	NGT – CITES II; has declined throughout range; threatened in W Europe; deforestation, wetland conversion and pesticides worsen situation; still common to increasing in parts of E Europe; frequently locally common in South Africa	NOT RECOMMENDED

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
Abdim's stork <i>Ciconia abdimii</i>	Africa S of Sahara and SW Arabia; breeds north of equator, spends rest of year in E and S Africa	NGT – common, locally abundant; protected by local superstitions as bringer of rain; encouraged to nest on roofs for good luck; breeds well in zoos.	PMP Valerie Nichols, Keeper Disney's Animal Kingdom PO Box 10000 Lake Buena Vista, FL 32830 Phone: (407) 939-6382 e-mail: valerie.d.nichols@disney.com
woolly-necked stork <i>Ciconia episcopus</i>	tropical Africa; India to Indochina and N Malay Peninsula; Philippines; Java and Wallacea	NGT – widespread but uncommon throughout and probably regionally threatened in SE Asia; main problem fragmentation of habitat; a lot of survey work required especially to establish habitat requirements	DERP/DISPLAY
Storm's stork <i>Ciconia stormi</i>	Borneo, Sumatra, and peninsular Malaysia	INDETERMINATE – should probably now be considered ENDANGERED; rarest of all storks after <i>L. dubius</i> ; not well adapted to disturbed habitat; solitary habits make it vulnerable to human persecution; recently discovered Thai population probably already exterminated or most certainly doomed	DERP/RESEARCH Michael Mace, Curator Birds San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org
maguari stork <i>Ciconia maguari</i>	S America E of Andes, from Venezuela to Argentina	NGT – decline in last ten years due to agricultural development including excessive use of pesticides; young birds still being taken for food; local in Columbia; stable in Brazil; stable but uncommon in Bolivia; widespread and abundant in Argentina	DERP/DISPLAY TAG RECOMMENDED STORK FOR SOUTH AMERICAN THEMED EXHIBITS
European white stork <i>Ciconia ciconia</i>	Europe, W Asia, S Africa; Turkistan; winters Iran to India	NGT – considered near-threatened; problems include habitat alteration, drainage of wetlands, excessive use of pesticides; collision with power lines, and hunting; object of research and considerable conservation effort for many years; protected by superstition in parts of Iran and Europe and for being a useful pest controller in Africa; breeds well	PMP Tom Schneider, Curator Birds Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: tschneider@detroitzoo.org

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
Oriental white stork <i>Ciconia boyciana</i>	SE Siberia, parts of NE China; winters in S and SE China	ENDANGERED - CITES I; exterminated from Japan and Korea where once common due to proliferation of firearms; survey work difficult as healthiest populations in remote areas; more surveys and ecological studies required as well as adequate protection	DERP Tom Schneider, Curator Birds Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717 e-mail: tschneider@detroitzoo.org
black-necked stork <i>Ephippiorhynchus asiaticus</i>	India; S New Guinea, N and NE Australia	NGT – widespread but nowhere common; secure populations in Australia and S New Guinea; conversion of wetlands in Asia main factor for decline as well as fragmented populations; highly susceptible to disturbance; conservation recommendations include CITES I inclusion, protection of nesting trees full time, breeding of birds; other threats include invasion of <i>Mimosa pigra</i> in wetlands, salinization and siltation of wetlands due to destruction of levees by feral buffalo and human development; has benefited from artificial wetlands	NOT RECOMMENDED
saddle-billed stork <i>Ephippiorhynchus senegalensis</i>	tropical Africa from Senegal to Ethiopia and S to South Africa	NGT – widespread but usually uncommon; population considered stable though susceptible to changes in wetlands such as excessive use of pesticides and conversion for agriculture; CITES III in Ghana	PMP Jocelyn Womack, Senior Keeper Dallas Zoo and Dallas Aquarium at Fair Park 650 S. R.L. Thornton Frwy Dallas, TX 75203 Phone: (214) 948-0575 email: jockjakfitz@aol.com
Jabiru <i>Jabiru mycteria</i>	Neotropical region from Mexico through C America and N South America to N Argentina and Uruguay	NGT – CITES I – considered near threatened; regionally threatened C American populations; suffering from habitat degradation, hunting and disturbance; widespread but not abundant in Venezuela; considered widespread, abundant and relatively secure in Pantanal of Brazil, Paraguay and Argentina; popular for food on Amazon especially fat young	PHASE OUT

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
lesser adjutant <i>Leptoptilos javanicus</i>	India and Sri Lanka to S China, Indochina and Indonesia	VULNERABLE – declining throughout range due to habitat destruction, disturbance and direct persecution; strongest population in E Sumatra	DERP/RESEARCH Chris Sheppard, Curator Ornithology WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100 e-mail: csheppard@wcs.org
greater adjutant <i>Leptoptilos dubius</i>	N India to Indochina	ENDANGERED – recommended for CITES I; now on verge of extinction due to destruction of potential nesting, feeding and roosting sites, poisoning by pesticides; conservation priorities include effective protection of remaining sites, surveys in search of other populations, and serious attempt at breeding; has never bred in	NOT RECOMMENDED
marabou <i>Leptoptilos crumeniferus</i>	tropical Africa	NGT – frequent, common or abundant throughout range; able to exploit ever-increasing rubbish amounts generated by humans; appearance and habits may have made it less attractive to hunters; may be protected by local superstition; CITES III in Ghana; large numbers in but only bred occasionally	PMP Paul Schutz, Zoological Manager Disney's Animal Kingdom PO Box 10000 Lake Buena Vista, FL 32830 Phone: (407) 939-6382 e-mail: paul.j.schutz@disney.com
shoebill <i>Balaeniceps rex</i>	S Sudan and S Ethiopia to S Zaire and N Zambia	INSUFFICIENTLY KNOWN – CITES II; widespread but local with most of population in Sudan and Uganda; vulnerable due to habitat destruction and disturbance, large scale drainage schemes and burning of papyrus for livestock grazing; has only bred once in	DERP/RESEARCH Michael Mace, Curator Birds San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org
THRESKIORNITHIDAE sacred ibis <i>Threskiornis aethiopicus</i>	Africa S of Sahara, SE Iraq; Madagascar; Aldabra Is.	NGT – widespread and common to very common; effective legal protection and management have improved breeding success; CITES III in Ghana	DERP

FAMILY Common Name Scientific Name	Distribution	Conservation Status*	TAG Recommendations
black-headed ibis <i>Threskiornis melanocephalus</i>	Pakistan and Nepal through India to Sri Lanka; NE China; Viet Nam; Java and possibly Sumatra; Philippines	NGT – declining in many areas due to growing human populations; highly vulnerable to drainage and agricultural conversion though commonly uses rice paddies; also affected by hunting and pesticide poisoning	PHASE OUT
Australian white ibis <i>Threskiornis molucca</i>	Australia through New Guinea to S Moluccas and E Lesser Sundas; Solomon Is.	NGT – common in Australia, numbers increasing due to conversion of land from woodland for farming; In Moluccas, not uncommon on Seram and recorded on other islands but status uncertain	NOT RECOMMENDED
straw-necked ibis <i>Threskiornis spinicollis</i>	Australia; New Guinea; Tasmania; Bass Strait Is.	NGT – most widespread and abundant ibis in Australia; conversion of woodlands to pasture, irrigation and cultivation schemes increased numbers; some natural wetlands used for breeding destroyed or altered, flood-mitigation works threaten use of temporary waters	DERP Lee Schoen, Curator of Birds Audubon Zoo PO Box 4327 New Orleans, LA 70178-4327 Phone: (504) 861-2537 e-mail: lschoen@auduboninstitute.org
Indian black ibis <i>Pseudibis papillosa</i>	Pakistan, Nepal & India S to Mysore and E to Assam	NGT – still locally common in India and S Nepal; severely affected by wetland conversion and agricultural development	NOT RECOMMENDED
white-shouldered ibis <i>Pseudibis davisoni</i>	S Viet Nam and Borneo	CRITICALLY ENDANGERED; range much reduced; unchecked drainage and conversion of wetlands throughout SE Asia had serious effects along with succession of wars in area; shy nature and limited survey work suggest might be more common than is thought; considered extinct in Thailand	NOT RECOMMENDED
giant ibis <i>Thaumatibis (Pseudibis) gigantea</i>	S Viet Nam	CRITICALLY ENDANGERED – always uncommon, probably close to extinction; large size makes it vulnerable to hunting; loss of wetlands one cause of decline; continuous wars in range make accurate surveys impossible	NOT RECOMMENDED
Waldrapp/northern bald ibis <i>Geronticus eremita</i>	Morocco and Algeria, S to W Sahara; SE Turkey; SW Arabia and Yemen	CRITICALLY ENDANGERED – CITES I ; habitat conversion for agriculture and direct persecution main reasons for decline but parallel slump in Asia suggest undetermined natural factors may be responsible for declines with human pressure exacerbating situation; breeds easily in	SSP Mark Hofling, Supervisor/Omithology WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100 e-mail: mhofling@aol.com

FAMILY Common Name Scientific Name	Distribution	Conservation Status*	TAG Recommendations
southern bald ibis <i>Geronticus clavus</i>	restricted to highlands of SE South Africa	RARE – CITES II; severe overgrazing of grasslands and drainage of wetlands significant to decline; suffered considerable human predation of eggs, chicks and adults; has full legal protection and breeds in several protected areas; breeding programs underway	PMP Mark Hofling, Supervisor/Ornithology WCS/Bronx Zoo 2300 Southern Boulevard Bronx, NY 10460-1090 Phone: (718) 220-5100 e-mail: mhofling@aol.com
Japanese crested ibis <i>Nipponia nippon</i>	only known population in Quinling Mts, Shanxi, Province, NE China	ENDANGERED – CITES I; drastic decline due to deforestation of pine woodlands, human persecution and mercury poisoning; little success with breeding program; population receives effective protection and supplementary feeding in winter	NOT RECOMMENDED
olive ibis <i>Bostrychia olivacea</i>	Sierra Leone, Liberia; Cameroon, Gabon, Congo, Zaire; mountains of Kenya and Tanzania	NGT – rare to uncommon; retiring habits, dense forest habitat, and limited survey work may limit known numbers; declined markedly after most of forests converted to plantations	NOT RECOMMENDED
dwarf olive ibis <i>Bostrychia o. bocagei</i>	São Tomé Island	CRITICALLY ENDANGERED – CITES I; recent tendency to consider as full species. Not known ever to have been common, declined markedly after most of forest on island converted to plantations, mostly in 1890-1915. Last record in 1928 until rediscovered. Five birds seen in 1989 and 1 in 1990. Not yet known if viable population survives.	NOT RECOMMENDED
spot-breasted ibis <i>Bostrychia rara</i>	Liberia to Cameroon, Gabon, Zaire and extreme NE Angola	NGT – very little known; uncommon throughout most of range; in NE Gabon, fishermen known to take nestlings; preference for dense rain forest suggests forest destruction main threat; CITES III in Ghana	NOT RECOMMENDED
Hadada ibis <i>Bostrychia hagedash</i>	Senegal E to Zaire and Kenya S to Zambezi Valley; Sudan and Ethiopia, Uganda through NW Tanzania	NGT – population expanding to west, due to proliferation of new tree species, reservoir construction, arrival of cattle that provide insects that are main prey, reduced human persecution following legal protections; CITES III in Ghana	DERP McCall Lowe, Keeper San Francisco Zoological Gardens 1 Zoo Road San Francisco, CA 94132-1098 Phone: (415) 753-7080 e-mail: McCall Lowe@sfzoo.org

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
wattled ibis <i>Bostrychia carunculata</i>	restricted to the highlands of Ethiopia	NGT – no quantitative details available; seems to be locally common to very common; adapted well to living in humanized zones	NOT RECOMMENDED
plumbeous ibis <i>Theristicus caerulescens</i>	Bolivia and C Brazil to Paraguay, N Argentina and Uruguay	NGT – generally uncommon and little known but locally common in areas; increasing in frontier zones of N and W Paraguay	NOT RECOMMENDED
buff-necked ibis <i>Theristicus caudatus</i>	Columbia and Venezuela to French Guiana, S to Mato Grosso Brazil; E Bolivia to SE Brazil, Paraguay, N Argentina, and Uruguay	NGT – common throughout range; commonest where forest has been cleared for cattle, supposedly because cattle cause increase in insects; receives protection from farmers for pest control	NOT RECOMMENDED
black-faced ibis <i>Theristicus melanopsis</i>	highlands of Ecuador, Peru, NW Bolivia and extreme N. Chile; S Chile and S Argentina; coastal Peru	NGT – common in S Chile and S Argentina but uncommon to rare in coastal Peru and N Chili; species Red Listed as VULNERABLE in Chile although common in S	NOT RECOMMENDED
sharp-tailed ibis <i>Cercibis oxycerca</i>	E Columbia, Venezuela and Guyana; Amazonian Brazil to NW Mato Grosso	NGT – local and uncommon throughout range; no evidence that low numbers due to anything other than natural causes; readily uses muddy rice fields; impact of man on populations unknown	NOT RECOMMENDED
green ibis <i>Mesembrinibis cayennensis</i>	E Costa Rica, Panama and Columbia; E of Andes from S Venezuela and the Guianas S through E Ecuador, E Peru, E Bolivia and Brazil to Paraguay and extreme NE Argentina	NGT – uncommon to locally fairly common; marked decline in French Guiana due to intense hunting pressure; vulnerable to destruction of forest habitat; uses abandoned overgrown coffee plantations in Surinam and in Costa Rica lives in swamps surrounded by second growth and heavily logged forests	NOT RECOMMENDED
whispering ibis <i>Phimosus infuscatus</i>	NE Columbia, E Ecuador and NW Brazil E through Venezuela to Guyana and Surinam; C, E and S Brazil, S of Amazon, E Bolivia through Paraguay to NE Argentina and Uruguay	NGT – generally common but rather local; frequently visits rice fields and other cultivation where vulnerable to pesticides	NOT RECOMMENDED
American white ibis <i>Eudocimus albus</i>	Baja California E to N Carolina and S through Mexico, C America and Greater Antilles to Columbia, NW Venezuela, W Ecuador and extreme NW Peru	NGT – still abundant locally in SE USA; uncommon in Ecuador and Columbia; expanding in Venezuela where is now competing with <i>E. ruber</i> and some hybridization occurring; main threats throughout range are loss of breeding sites and feeding habitat and pollution	DERP/REHAB

FAMILY Common Name Scientific Name	Distribution	Conservation Status*	TAG Recommendations
scarlet ibis <i>Eudocimus ruber</i>	N & E Columbia and E Ecuador to N Venezuela, the Guianas and coastal Brazil as far as Amazon Delta	NGT – CITES II; still common to abundant in places; declining throughout most of range; main causes of decline: alteration of habitat with construction of drainage canals and containing dikes in <i>llanos</i> ; destruction of mangroves along coast, human disturbance including hunting, pesticides	PMP Brigitte Thompson, Mammal Keeper I Sonora Desert North Carolina Zoological Park 4401 Zoo Parkway Asheboro, NC 27205-1425 Phone: (336) 879-7000 e-mail: brigitte.thompson@nczoo.org
glossy ibis <i>Plegadis falcinellus</i>	wide discontinuous distribution from S Europe, Africa and Madagascar to C and S Asia, Philippines, Sulawesi and Java; S New Guinea and Australia; Atlantic coast of N America, West Indies to Venezuela	NGT – Atlantic coast populations expanding into Canada; fairly common in Madagascar; undoubtedly affected by habitat destruction, disturbance, hunting and pesticides but dramatic changes in both distribution and numbers seem to be typical of species; populations generally expanding	DERP/REHAB
white-faced ibis <i>Plegadis chihi</i>	C California and NW USA S down both coasts of Mexico; SC South America from SE Bolivia, Paraguay and S Brazil to NC Chile, NC Argentina and Uruguay	NGT - locally abundant in S of range where is commonest ibis; uncommon to locally common in N America where expanding W; use of pollutants reduced and breeding successes recovered; much less common in Chile, decline due to drainage of swamps in C Chile	DERP/REHAB
puna ibis <i>Plegadis ridgwayi</i>	highlands of C Peru S to Bolivia , N Chile and NW Argentina; Peruvian coast	NGT – common in Peru and Bolivia; red-listed in Chile where classed as VULNERABLE	DERP Joe Barkowski, Curator of Birds Sedgwick County Zoo 5555 W. Zoo Boulevard Wichita, KS 67212-1698 Phone: (316) 660-9453 e-mail: jcbksi@aol.com

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
Madagascar crested ibis <i>Lophotibis cristata</i>	Madagascar	NGT – considered near-threatened; forest habitat disappearing and is hunted for food; despite legal protection, still suffers intensive trapping and hunting; using secondary forest and breeding in large trees shading vanilla plantations	DERP Michael Mace, Curator Birds San Diego Zoo's Wild Animal Park 15500 San Pasqual Valley Road Escondido, CA 92027-7017 Phone: (760) 747- 8702 e-mail: mmace@sandiegozoo.org
Eurasian spoonbill <i>Platalea leucorodia</i>	S Spain, Holland and SE Europe to C and E Asia extending S to Persian Gulf, India and Sri Lanka; islands off coast of Mauritania; coasts of Red Sea and Somalia	NGT – CITES II; breeding range discontinuous; marked declines throughout range due to drainage of wetlands, pollution and human exploitation of eggs and nestlings	NOT RECOMMENDED
black-faced spoonbill <i>Platalea minor</i>	breeding only known in N Korea	ENDANGERED – breeding area in N Korea effectively protected but drainage and general alteration of wetlands still threatens wintering sites	NOT RECOMMENDED
African spoonbill <i>Platalea alba</i>	Senegal to Ethiopia S to Cape Province; Madagascar	NGT – generally uncommon and patchily distributed but locally common, especially on Rift Valley Lakes of Kenya; in Madagascar still common around some lakes of W coast but seriously threatened by destruction of breeding colonies	PMP Bonnie Van Dam, Associate Curator/Birds Detroit Zoological Park 8450 West 10 Mile Road Royal Oak, MI 48067-3001 Phone: (248) 541-5717, e-mail: bvandam@detroitzoo.org
royal spoonbill <i>Platalea regia</i>	Australia and New Guinea; Java and Sulawesi through Lesser Sundas and Moluccas to S New Guinea and Solomon Is.	NGT – generally common in suitable habitat in E & N Australia; rare in SW; vulnerable to disturbance, especially when breeding; construction of artificial wetlands has provided additional feeding habitat	NOT RECOMMENDED
yellow-billed spoonbill <i>Platalea flavipes</i>	Australia	NGT – uncommon to locally common in suitable habitat; natural freshwater wetlands have been altered by drainage, clearing, grazing, increased salinity, burning and groundwater extraction; irrigation and construction of dams and channels have provided new feeding habitats and range seems to be expanding; very vulnerable to human disturbance	NOT RECOMMENDED

FAMILY Common Name Scientific Name	Distribution	Conservation Status*	TAG Recommendations
roseate spoonbill <i>Platalea ajaja</i>	SE USA and West Indies through Mexico and C America to S America: E of Andes, S to N Argentina; W of Andes in W Ecuador and NW Peru	NGT; USFWS Migratory Bird Treaty Act – uncommon to locally common throughout extensive range; declines in USA due to mosquito control programs and habitat alterations; Pantanal population apparently declining; main threats throughout range are alteration of breeding and feeding habitats, hunting and pollution	PMP Laurie McGivern, Supervisor Houston Zoo, Inc. 1513 N MacGregor Drive Houston, TX 77030-1603 Phone: (713) 533-6801 e-mail: LDMCG@aol.com

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<p>FAMILY</p> <p>Common Name</p> <p>Scientific Name</p>	<p>Distribution</p>	<p>Conservation Status*</p>	<p>TAG Recommendations</p>
<p>PHOENICOPTERIDAE</p> <p>Caribbean flamingo</p> <p><i>Phoenicopterus ruber ruber</i></p>	<p>Caribbean; Yucatan, Mexico; Galapagos Islands. Observed in S US Gulf Coast from Florida to Texas</p>	<p>NGT – CITES II; USFWS Migratory Bird Treaty Act. Has declined markedly in four main colonies in Mexico, Cuba, Bahamas and Netherlands Antilles, all colonies are protected but expansion of salt pans removed all but one of the breeding sites</p>	<p>PMP</p> <p>Peter Shannon, Curator of Birds</p> <p>Albuquerque Biological Park</p> <p>903 10th Street SW</p> <p>Albuquerque, NM 87102-4029</p> <p>Phone: (505) 248-8500</p> <p>e-mail: pshannon@cabq.gov</p>
<p>greater flamingo</p> <p><i>Phoenicopterus ruber roseus</i></p>	<p>S Spain and S France E to Kazakhstan; S through N, W and E Africa to South Africa and through Middle East to India and Sri Lanka</p>	<p>Increasing in Mediterranean due to improved protection; thought to be threatened and declining in Kazakhstan; breeds fairly well in</p>	<p>PMP</p> <p>Tom Schneider, Curator Birds</p> <p>Detroit Zoological Park</p> <p>8450 West 10 Mile Road</p> <p>Royal Oak, MI 48067-3001</p> <p>Phone: (248) 541-5717</p> <p>e-mail: tschneider@detroitzoo.org</p>
<p>Chilean flamingo</p> <p><i>Phoenicopterus chilensis</i></p>	<p>C Peru S through Andes to Tierra del Fuego; E to S Brazil and Uruguay</p>	<p>NGT – CITES II; most numerous and widespread flamingo in South America; marked decline in C Chile and Argentina due to habitat alterations; subjected to intensive egg-harvesting; breeds fairly well in</p>	<p>PMP</p> <p>Amanda Hall, Keeper</p> <p>Scovill Zoo</p> <p>71 S. Country Club Road</p> <p>Decatur, IL 62521-4470</p> <p>Phone: (217) 421-7435</p> <p>e-mail: ahall@decparcs.com</p>
<p>lesser flamingo</p> <p><i>Phoeniconaias minor</i></p>	<p>Rift Valley of E Africa; Namibia/Botswana, Mauritania/Senegal, and NW India/Pakistan</p>	<p>NGT – CITES II; most numerous flamingo; difficult to breed in , probably due to specialized feeding habits</p>	<p>PMP</p> <p>Laurie Conrad, Asst. Curator Birds</p> <p>Sea World San Diego</p> <p>500 Sea World Drive</p> <p>San Diego, CA 92109-7904</p> <p>Phone: (619) 222-6363</p> <p>e-mail: laurie.conrad@SeaWorld.com</p>

FAMILY Common Name <i>Scientific Name</i>	Distribution	Conservation Status*	TAG Recommendations
Andean flamingo <i>Phoenicoparrus andinus</i>	restricted to high Andes from S Peru through Bolivia to N Chile and NW Argentina	NGT – CITES II; considered near-threatened; habitat loss due to diversion of streams by man; egg-harvesting; construction of roads for mining and oil exploration permitting foxes access to colonies; vigilance of colonies and establishment of national flamingo reserve should improve protection; very difficult to breed in , probably due to specialized feeding habits	NOT RECOMMENDED
puna (James') flamingo <i>Phoenicoparrus jamesi</i>	extreme S Peru, W Bolivia, N Chile and NW Argentina	NGT – CITES II; considered near-threatened; in category INSUFFICIENTLY KNOWN; most localized species; considered rarest flamingo; egg-harvesting and loss or deterioration of habitat, due to pollution and diversion of streams for human purposes have clearly had negative effects; rare in where it has never bred	NOT RECOMMENDED

Space Survey Results

Black-crowned Night Heron <i>Nycticorax nycticorax</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Biodome de Montreal	0.1	Y, 1
Brookgreen Gardens	0.3.16	N
Buttonwood Park Zoo	2.0	Y, 1
Cameron Park Zoo	0.0.5	Y, 5
Cape May Co Park and Zoo	1.0	Y,1
Cosley Zoo	0.0.1	Y, 1
Coyote Point Museum	0.1	
Elmwood Park Zoo	1.0	N
Jackson Zoological Society	0.0.2	N
The Living Desert	2.3.2	N
Riverside Zoo	1.0	
Salisbury Zoo	1.1.2	N
Tulsa Zoo	0.0.2	Y, 2.2
Virginia Aquarium & Marine Science	2.2.4	N
Woodland Park Zoo	1.0	Y, 0.1
Black-crowned night heron	Current Holdings	Future Capacity
Species Total Capacity:	10.11.34	69
	(55)	

Boat-billed Heron <i>Cochlearius cochlearius</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Caldwell Zoo	2.0	Y, 4
Chaffee Zoo of Fresno	0.1 (SOON 0.2)	Y, 1.1
Dallas Zoo	1.0	Y, 6
Denver Zoo	2.2	Y, 2
Detroit Zoo	1.2.5	N
Dickerson Park Zoo	3.1	N
Fort Wayne Children's Zoo	2.2	Y, 2
Granby Zoo	2.1	N
Jacksonville Zoo & Garden	5.6	Y, 6
Knoxville Zoological Gardens	1.4.1	N
Lee Richardson Zoo	0.0.2	Y, 2
Nashville Zoo	0.2	Y, 2.2
National Aviary	3.2.2	N
NZP Conservation & Research Ctr	1.1.1	Y, 5
Oklahoma City Zoo	1.0	N
Reid Park Zoo	0.3	N
Riverbanks Zoo	1.1	N
San Antonio Zoo	1.1.2	N
Sea World San Antonio	1.0	Y, 1
Sedgwick County Zoo	3.3	Y, 2
Zoo New England	1.0	Y, 2.3
Boat-billed Heron	Current Holdings	Future Capacity
	31.32.13	
Species Total Capacity:	(48)	89+

Great Blue Heron <i>Ardea herodias</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Bergen County Zoo	0.0.1	Y, 1
Brookgreen Gardens	0.0.3	Y, 4
Cape May Co Park and Zoo	1.0	N
Coyote Point Museum	0.1	
The Living Desert	0.0.1	Y
Tautphaus Park zoo	0.0.1	N
Virginia Aquarium & Marine Science	0.0.2	N
Great Blue Heron	Current Holdings	Future Capacity
	0.1.8	
Species Total Capacity:	(9)	14

Goliath Heron <i>Ardea goliath</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Dallas Zoo	0.1	Y, 1
Jacksonville Zoo & Gardens	1.0	Y, 1
San Antonio Zoo	1.1	Y
San Diego Wild Animal Park	1.1	Y, 3
Goliath Heron	Current Holdings 3.3	Future Capacity
Species Total Capacity:	(6)	11+

Green Heron <i>Butorides virescens</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Brookfield Zoo	0.2	Y, 2
Buttonwood Park Zoo	1.0	N
Cameron Park Zoo	0.0.1	Y, 3
Coyote Point Museum	0.1	
Detroit Zoo	0.0.1	N
Jacksonville Zoo & Gardens	0.0.1	Y, 3
Lincoln Park Zoo	0.1	Y, 6
The Living Desert	2.1	N
Maryland Zoo in Baltimore	3.0	N
Oregon Zoo	0.1	N
Philadelphia Zoological Society	0.1	
Santa Ana Zoo	0.0.1	Y, 2
Sequoia Park Zoo	0.0.1	Y, 1
Tulsa Zoo	0.1	Y, 2.2
Woodland Park Zoo	0.1	Y, 1.0
Green Heron	Current Holdings 6.9.5	Future Capacity
Species Total Capacity:	(20)	42

Black-headed Heron <i>Ardea melanocephala</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
San Diego Wild Animal Park	1.1	N
Black-headed Heron	Current Holdings 1.1	Future Capacity
Species Total Capacity:	(2)	2

Black Heron <i>Egretta ardesiaca</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
San Diego Wild Animal Park	2.0	Y, 2
Black Heron	Current Holdings 2.0	Future Capacity
Species Total Capacity:	(2)	4

Little Blue Heron <i>Egretta caerulea</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Brookfield Zoo	0.1	Y, 4
Buttonwood Park Zoo	1.0	Y, 1
Caldwell Zoo	0.0.1	Y, 3
Cameron Park Zoo	0.1	Y, 3
Hutchinson Zoo	0.0.4	N
Knoxville Zoological Gardens	1.0	Y, 1
Lee Richardson Zoo	0.0.3	Y, 3
Maryland Zoo in Baltimore	1.0.2	N
NZP Conservation & Research Ctr	0.4	Y, 2
Omaha's Henry Doorly Zoo	1.1.4	Y
San Antonio Zoo	0.3	Y
Virginia Aquarium & Marine Science	0.0.1	Y
Little Blue Heron	Current Holdings 4.10.15	Future Capacity
Species Total Capacity:	(29)	46+

Indian Pond Heron <i>Ardeola grayii</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
San Diego Zoo	2.0	N
Indian Pond Heron	Current Holdings 2.0	Future Capacity
Species Total Capacity:	(2)	2

Javan Pond Heron <i>Ardeola speciosa</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Miami Metro Zoo	5.5.22	N
San Diego Zoo	1.2	Y, 2.1
Javan Pond Heron	Current Holdings 6.7.22	Future Capacity
Species Total Capacity:	(35)	38+

Great Egret <i>Casmerodius albus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Bergen County Zoo	0.0.1	Y, 1
Brookfield Zoo	0.1	Y, 2
Dallas Zoo	1.1.2	Y, 1.1
The Living Desert	0.0.1	Y, 1
Virginia Aquarium & Marine Science	0.0.1	Y
Great Egret	Current Holdings 1.2.5	Future Capacity
Species Total Capacity:	(8)	14+

Cattle Egret <i>Bubulcus ibis</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Albuquerque Biological Park	3.2	Y
Audubon Zoo	0.0.1	N
Blank Park Zoo	2.2.0	Y, 6
Brookgreen Gardens	1.0.4	Y, 3
Cameron Park Zoo	1.0.3	Y, 10
Chaffee Zoo of Fresno	3.4	N
Cheyenne Mountain Zoo	0.0.16	Y, 30
Cincinnati Zoo & Botanical Garden	0.0.1	N
Columbus Zoo & Aquarium	0.0.8	N
Dallas Zoo	1.1.5	Y, 7
David Traylor Zoo of Emporia	0.0.15	N
Denver Zoo	3.2	N
El Paso Zoo	5.1.1	N
Elmwood Park Zoo	0.0.4	N
Granby Zoo	5.5	N
Happy Hollow Zoo	0.0.1	N
Honolulu Zoo	2.0	N
Hutchinson Zoo	0.0.2	N
Kansas City Zoo	1.1	Y, 2
Knoxville Zoological Gardens	0.0.5	N
Lee Richardson Zoo	0.0.8	N
Lincoln Children's Zoo	1.0	N
Maryland Zoo in Baltimore	1.1.2	Y, 1
Niabi Zoo	1.1.0	Y, 6
NZP Conservation & Research Ctr	1.0	Y, 2
Omaha's Henry Doorly Zoo	20.15.130	Y
Oregon Zoo	0.0.2	N
Red River Zoo	0.0.2	Y, 6
Roosevelt Park Zoo	2	Y
Salisbury Zoo	1.0.2	Y, 2
San Antonio Zoo	1.1.5	Y
Racine Zoo	0.0.6	N
San Diego Zoo	0.0.2	N
Santa Barbara Zoological Gardens	1.0	N
Scovill Zoo	1.1	N
Sunset Zoo	0.0.2	N
Tautphaus Park Zoo	2.1.1	N
Toronto Zoo	0.2	Y
Virginia Aquarium & Marine Science	1.0.6	N
Cattle Egret	Current Holdings	Future Capacity
	55.28.230	
Species Total Capacity:	(313)	388+

Snowy Egret <i>Egretta thula</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Bergen County Zoo	0.0.1	Y, 3
Brookfield Zoo	0.1	Y, 10
Brookgreen Gardens	1.1	Y, 5
Cameron Park Zoo	0.1.2	Y, 10
Cincinnati Zoo & Botanical Garden	0.1	Y, 5
Coyote Point Museum	0.1	
Lincoln Children's Zoo	1.1	N
The Living Desert	0.0.1	Y, 1.2
Los Angeles Zoo	0.1	Y, 1
Omaha's Henry Doorly Zoo	0.0.10	Y
Virginia Aquarium & Marine Science	0.0.1	Y
Snowy Egret	Current Holdings	Future Capacity
Species Total Capacity:	2.6.15 (23)	60+

Tri-colored Heron <i>Egretta tricolor</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Cincinnati Zoo & Botanical Garden	1.1	N
Virginia Aquarium & Marine Science	0.0.1	Y
Tri-colored Heron	Current Holdings	Future Capacity
Species Total Capacity:	1.1.1 (3)	3+

Yellow-crowned Night Heron <i>Nyctanassa violacea</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Brookgreen Gardens	2.0	Y, 5
Caldwell Zoo	0.1.4	N
Dallas World Aquarium	0.0.4	N
Riverside Zoo	1.0	
Salisbury Zoo	1.1	N
Virginia Aquarium & Marine Science	1.1.2	N
Yellow-crowned Night Heron	Current Holdings	Future Capacity
Species Total Capacity:	5.3.10 (18)	23

Hamerkop <i>Scopus umbretta</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Adventure Aquarium	1.1	N
Albuqueraue Biological Park	1.0	Y
BREC's Baton Rouge Zoo	0.0.2	N
Busch Gardens	2.2	Y, 2
Calgary Zoo	1.1	N
Chaffee Zoo of Fresno	1.1.3	N
Chehaw Wild Animal Park	0.1	Y, 1
Columbus Zoo & Aquarium	0.1	N
Dallas Zoo	1.1	N
Denver Zoo	1.1	Y, 2
Detroit Zoo	1.0	Y, 1.1
Disney's Animal Kingdom	2.1.1	N
Fort Worth Zoo	1.0	Y,1
Honolulu Zoo	4.3	N
Houston Zoo	1.1	N
Jacksonville Zoo & Gardens	1.1	N
Kansas City Zoo	1.1	N
Lee Richardson Zoo	0.0.1	Y, 3
Lincoln Children's Zoo	1.1	N
Lincoln Park Zoo	1.0	Y, 2
Little Rock Zoo	1.0	N
Maryland Zoo in Baltimore	1.1	N
Montgomery Zoo	1.1	N
National Aviary	1.0	Y, 2
Natural Encounters Inc.	0.0.1	N
NZP Conservation & Research Ctr	1.1	N
Oakland Zoo	1.1	N
Omaha's Henry Doorly Zoo	2.1.3	Y
Oregon Zoo	1.0.0	Y, 0.1
Philadelphia Zoological Society	1.1	N
San Antonio Zoo	1.0	N
San Diego Wild Animal Park	3.3	Y, 3
San Diego Zoo	1.1	N
San Francisco Zoo	1.1	N
Sea World Orlando	2.1	N
The Toledo Zoo	1.0	Y, 0.1 (COMING)
Topeka Zoo	0.1	N
Toronto Zoo	1.0	N
Zoo Atlanta	1.0	Y, 0.1
Zoo New England	1.0	Y, 0.1
Hamerkop	Current Holdings	Future Capacity
Current Max. Capacity	41.31.11	
	(83)	105+

African Openbill <i>Anastromus lamelligerus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Cameron Park Zoo	2.0	Y, 2
Fort Worth Zoo	1.1	Y,2
Miami Metro Zoo	2.1	N
San Diego Wild Animal Park	2.2	N
San Diego Zoo	3.3	N
San Francisco Zoo	2.0	Y, 0.1
Toronto Zoo	0.1	Y
African Openbill	Current Holdings	Future Capacity
	11.6	
Species Total Capacity:	(17)	22

Black Stork <i>Ciconia nigra</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Binder Park Zoo	0.2	N
Central Park Zoo	1.1.0	N
Fort Wayne Children's Zoo	2.3	N
San Diego Wild Animal Park	1.1	Y, 1
Black Stork	Current Holdings	Future Capacity
	4.7	
Species Total Capacity:	(11)	12

Black-necked Stork <i>Ephippiorhynchus asiaticus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Miami Metro Zoo	1.0	N
San Antonio Zoo	2.0	Y
Black-necked Stork	Current Holdings	Future Capacity
	3.0	
Species Total Capacity:	(3)	3+

White Stork <i>Ciconia maguari</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Birmingham Zoo	1.1	Y, 2
Calgary Zoo	1.0	Y, 1
Cheyenne Mountain Zoo	2.0	N
Cleveland Metro Park Zoo	4.3.3	N
Dallas Zoo	1.1	N
Detroit Zoo	4.4	N
Dickerson Park Zoo	1.1	N
Disney's Animal Kingdom	2.0	N
Fort Wayne Children's Zoo	3.0	N
Honolulu Zoo	2.0	N
Indianapolis Zoo	1.1	N
Lee Richardson Zoo	0.0.2	Y, 2
Lincoln Children's Zoo	1.1	N
Lincoln Park Zoo	1.1	N
Maryland Zoo in Baltimore	1.1	Y, 1
Memphis Zoo	0.1	Y, 1
Mesker Park Zoo	1.1	Y,4
Miami Metro Zoo	2.2	N
National Aviary	1.1	N
Omaha's Henry Doorly Zoo	3.1.1	Y
Pueblo Zoo	1.1	
Racine Zoo	1.0	Y,1.2
San Antonio Zoo	1.1	N
San Diego Wild Animal Park	1.1	N
Sedgwick County Zoo	5.2	Y, 5
The Toledo Zoo	2.0	Y, 0.2
White Stork	Current Holdings	Future Capacity
	41.24.6	
Species Total Capacity:	(71)	92+

Sunbittern <i>Eurypyga helias</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Dallas Zoo	1.0	Y, 1
Philadelphia Zoological Society	1.0	N
Riverbanks Zoo	1.1	N
Sunbittern	Current Holdings	Future Capacity
	3.1	
Species Total Capacity:	(4)	5

Marabou Stork <i>Leptoptilos crumeniferus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Albuquerque Biological Park	2.0	N
Binder Park Zoo	1.1	Y, 2
BREC's Baton Rouge Zoo	0.0.2	N
Calgary Zoo	1.1	N
Cameron Park Zoo	1.0	Y, 3
Cleveland Metro Park Zoo	2.1	Y, 3
Dallas Zoo	3.2	Y, 3
Disney's Animal Kingdom	6.7.1	Y, 3
Granby Zoo	1.1	Y
Honolulu Zoo	1.0	N
Indianapolis Zoo	0.1	Y, 1.0
Jacksonville Zoo & Gardens	2.0	Y, 4
Lion Country Safari	1.1	Y
Memphis Zoo	1.1	N
Miami Metro Zoo	4.2	N
Montgomery Zoo	1.0	Y, 1
Natural Encounters Inc.	3.2	N
NZP Conservation & Research Ctr	1.1	N
Omaha's Henry Doorly Zoo	1.0	Y
Phoenix Zoo	1.1	Y, 2
Reid Park Zoo	1.0	Y, 2.2
San Antonio Zoo	2.0	Y
San Diego Wild Animal Park	2.1	Y, 1
San Diego Zoo	1.1	N
San Francisco Zoo	1.3	Y, 2.0 or 1.1
St. Augustine Alligator Farm Zoological Park	2.0	N
Toronto Zoo	2.2.1	Y
Tulsa Zoo	0.1	Y, 3.3
Marabou Stork	Current Holdings	Future Capacity
Species Total Capacity:	42.28.7	
	(77)	168+

Maguari Stork <i>Ciconia maguari</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Audubon Zoo	1.1	Y, 1.1
Miami Metro Zoo	0.2	Y, 2
San Francisco Zoo	2.1	N
Maguari Stork	Current Holdings	Future Capacity
Species Total Capacity:	3.4	
	(7)	11

Oriental Stork <i>Ciconia boyciana</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
San Diego Wild Animal Park	1.0	N
Oriental Stork	Current Holdings 1.0	Future Capacity
Species Total Capacity:	(1)	1

Yellow-billed Stork <i>Mycteria cinerea</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Dallas Zoo	0.1	Y, 9
Disney's Animal Kingdom	3.1	Y, 0.2
Fort Worth Zoo	2.1.1	Y, 2
Jacksonville Zoo & Gardens	2.3.2	N
Lion Country Safari	0.1	Y
The Living Desert	2.2	Y
Phoenix Zoo	1.1	Y, 4
San Diego Wild Animal Park	6.3	Y, 2
Sea World Orlando	2.1	N
Zoo New England	1.0	Y, 1.2
Yellow-billed Stork	Current Holdings 17.13.2	Future Capacity
Species Total Capacity:	(32)	68+

Storm's Stork <i>Ciconia stormi</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Denver Zoo	2.0	Y, 2
Miami Metro Zoo	1.0	Y, 1
San Diego Wild Animal Park	5.2	N
San Diego Zoo	1.1	N
Sea World San Diego	1.1	Y
Storm's Stork	Current Holdings 12.4	Future Capacity
Species Total Capacity:	(16)	19+

Jabiru <i>Jabiru mycteria</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Dallas World Aquarium	0.2	N
Jabiru	Current Holdings	Future Capacity
	0.2	
Species Total Capacity:	(2)	2

Milky Stork <i>Mycteria cinerea</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Audubon Nature Institute Species Survival Center	7.12	Y
Audubon Zoo	2.2	N
San Diego Zoo	2.5	Y, 2.0
Milky Stork	Current Holdings	Future Capacity
	11.19	
Species Total Capacity:	(30)	50+

Lesser Adjutant <i>Leptoptilos javanicus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Cincinnati Zoo & Botanical Garden	1.1	N
Bronx Zoo	4.5	
Lesser Adjutant	Current Holdings	Future Capacity
	(5.6)	
Species Total Capacity:	11	11

Wood Stork <i>Mycteria americana</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Brookfield Zoo	0.2	Y, 4
Dallas Zoo	0.1	Y, 6
Houston Zoo	1.0	Y, 1
Jacksonville Zoo & Gardens	0.0.1	Y
Wood Stork	Current Holdings 1.3.1	Future Capacity
Species Total Capacity:	(5)	16+

Hybrids	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Los Angeles Zoo	0.1	N
Hybrids	Current Holdings (1)	Future Capacity
Species Total Capacity:	1	1

Painted Stork <i>Mycteria leucocephala</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Cheyenne Mountain Zoo	2.0	N
Disney's Animal Kingdom	2.1	Y, 1.2
Miami Metro Zoo	3.4.1	N
San Antonio Zoo	3.1	N
San Diego Wild Animal Park	7.7	Y, 1
Painted Stork	Current Holdings 17.13.1	Future Capacity
Species Total Capacity:	(31)	35

Saddle-billed Stork <i>Ephippiorhynchus senegalensi</i>	Data From Space Survey	
	Zoo	Current Population Size
Albuquerque Biological Park	1.2	N
Audubon Nature Institute Species Survival Center	0.1	Y, 2.1
Birmingham Zoo	1.1	Y, 4
BREC's Baton Rouge Zoo	0.0.2	N
Calgary Zoo	1.0	Y, 1
Cincinnati Zoo & Botanical Garden	0.1	Y, 2
Dallas Zoo	2.2	Y, 1.1
Denver Zoo	1.1	Y, 2
Detroit Zoo	1.1	N
Disney's Animal Kingdom	2.2	N
Fort Worth Zoo	1.1	N
Houston Zoo	0.1	Y, 1
Jacksonville Zoo & Gardens	2.2	N
Kansas City Zoo	1.1	N
Maryland Zoo in Baltimore	1.1	N
Miami Metro Zoo	1.1	N
Nashville Zoo		Y, 1
North Carolina Zoo	1.1	N
Oklahoma City Zoo	1.1	N
Omaha's Henry Doorly Zoo	0.1	Y
Oregon Zoo	1.1	N
Philadelphia Zoological Society	1.1	N
San Diego Wild Animal Park	1.3.1	Y, 1
San Diego Zoo	1.1	N
Sea World Orlando	1.1	N
Sedgwick County Zoo	1.1	N
The Toledo Zoo	1.1	N
Zoo New England	1.1	N
Saddle-billed Stork	Current Holdings	Future Capacity
Species Total Capacity:	24.30.3	
	57	58

Shoebill <i>Balaeniceps rex</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
San Diego Wild Animal Park	2.3	N
Tampa's Lowry Park Zoo	2.2	N
Houston Zoo, Inc.	1.1	N
Dallas World Aquarium	1.1	N
Shoebill	Current Holdings	Future Capacity
	6.7	
Species Total Capacity:	(13)	13

White-bellied or Abdim's Stork <i>Ciconia abdimii</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Adventure Aquarium	4.3	N
Audubon Nature Institute Species Survival Center	1.5	Y
Busch Gardens	4.9.5	Y, 10
Caldwell Zoo	0.0.2	Y, 2
Dallas Zoo	2.0	Y, 2
Disney's Animal Kingdom	2.2	N
Houston Zoo	1.1	Y, 1
Jacksonville Zoo & Gardens	1.1.2	Y, 2
Knoxville Zoological Gardens	2.0	N
Lincoln Park Zoo	2.1	N
Maryland Zoo in Baltimore	2.2	N
Miami Metro Zoo	2.1	N
San Antonio Zoo	1.1	N
Sea World Orlando	2.1	N
Abdim's Stork	Current Holdings	Future Capacity
	12.4	
Species Total Capacity:	(16)	19

Woolly-necked Stork <i>Ciconia episcopus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Denver Zoo	1.1	Y, 2
Miami Metro Zoo	0.2	N
Woolly-necked Stork	Current Holdings	Future Capacity
	1.3	
Species Total Capacity:	(4)	6

Southern Bald Ibis <i>Geronticus calvus</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Albuquerque Biological Park	0	
Calgary Zoo	1.1	N
Disney's Animal Kingdom	2.1	Y, 0.1
Houston Zoo	1.1	N
San Diego Wild Animal Park	6.5	N
Lowry Park Zoo	4	
Southern Bald Ibis	Current Holdings 10.8	Future Capacity
Species Total Capacity:	(18)	29

Hadada Ibis <i>Bostrychia hagedash</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Dallas Zoo	0.0.1	Y, 3
Jacksonville Zoo & Gardens	1.1	N
Linclon Park Zoo	1.1	N
Natural Encounters Inc.	2.0	N
Oakland Zoo	1.1	N
Oregon Zoo	1.2.1	N
San Diego Wild Animal Park	1.0	N
San Francisco Zoo	2.3	N
Sea World Orlando	0.0.2	Y, 1
Zoo New England	6.4	Y, 0.2
Hadada Ibis	Current Holdings 15.12.4	Future Capacity
Species Total Capacity:	(31)	37

Madagascar Crested Ibis <i>Lophotibis cristata</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Disney's Animal Kingdom	0.1	Y, 1.0
San Diego Wild Animal Park	2.2.1	N
San Diego Zoo	1.1	N
Madagascar Crested Ibis	Current Holdings 3.4.1	Future Capacity
Species Total Capacity:	(8)	9

Sacred Ibis <i>Threskiornis aethiopicus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Audubon Zoo	0.2	2.0.4
BREC's Baton Rouge Zoo	0.0.4	N
Busch Gardens	4.5.6	Y, 10
Caldwell Zoo	3.6	Y, 10
Cameron Park Zoo	2.1.1	Y, 6
Cape May Co Park and Zoo	0.3	N
Chaffee Zoo of Fresno	2.3.4	N
Columbus Zoo & Aquarium	1.1	N
Dallas Zoo	3.1.1	Y, 5
David Traylor Zoo of Emporia	2.1	Y
Disney's Animal Kingdom	2.1	Y, 0.2
Honolulu Zoo	3.0	N
Montgomery Zoo	1.1	N
National Aviary	0	
Niabi Zoo	1.1.0	Y, 10
Oakland Zoo	0.2	N
Oregon Zoo	0	6
Palm Beach Zoo	0.0.2	Y, 4
San Antonio Zoo	9.6.9	N
San Diego Wild Animal Park	2.2	N
Santa Barbara Zoological Gardens	5.0	Y, 5
Sequoia Park Zoo	0.1.1	Y, 2
Tautphaus Park Zoo	2.2.2	N
Toronto Zoo	2.1.11	N
Sacred Ibis	Current Holdings	Future Capacity
	42.36.30	
Species Total Capacity:	(108)	160+

Scarlet Ibis <i>Eudocimus ruber</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Albuquerque Biological Park	2.3.1	Y
Bergen County Zoo	1.1	Y, 2
Biodome de Montreal	4.0	N
Birmingham Zoo	7.7	Y, 6
Bramble Park Zoo	6	N
BREC's Baton Rouge Zoo	0.0.1	N
Caldwell Zoo	9.8.3	N
Cameron Park Zoo	3.3	Y, 6
Cape May Co Park and Zoo	2.2	Y, 4
Central Park Zoo	2.0	N
Chaffee Zoo of Fresno	2.1.1	Y, 3
Charles Paddock Zoo	1.1	N
Cincinnati Zoo & Botanical Garden	4.1.7	N
Cleveland Metro Park Zoo	0.3	N
Dallas World Aquarium	2.0	Y
Dallas Zoo	3.4	Y, 7

Scarlet Ibis <i>Eudocimus ruber</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Detroit Zoo	2.3.5	N
Dickerson Park Zoo	0.2	Y, 4
El Paso Zoo	4.2	Y, 6
Fort Wayne Children's Zoo	8.11	N
Granby Zoo	1.2	Y
Great Plains Zoo	2.3	Y, 3
Honolulu Zoo	0.2.6	N
Houston Zoo	1.0.3	N
Jacksonville Zoo & Gardens	6.3	Y, 4.4
Lincoln Children's Zoo	2.2	N
Lincoln Park Zoo	0.1	N
Little Rock Zoo	1.3	N
Los Angeles Zoo	2.1	N
Mesker Park Zoo	2.2	N
Minnesota Zoo	3.0	MAYBE
Montgomery Zoo	2.5.3	Y, 1
Moody Gardens, Inc.	2.7.1	Y, 4.4
National Aquarium in Baltimore	1.1	Y, 2
North Carolina Zoo	7.0	Y, 2.0
NZP Conservation & Research Ctr	2.6	N
Omaha's Henry Doorly Zoo	5.4.10	Y
Palm Beach Zoo	3.7.6	N
Phoenix Zoo	2.4	Y, 2
Pittsburgh Zoo & PPG Aquarium	1	N
Reid Park Zoo	1.2	Y, 3.3
San Antonio Zoo	15.20.9	N
San Diego Wild Animal Park	1.1.2	N
San Diego Zoo	2.1	N
Santa Ana Zoo	4.0.0	Y, 3-4
Santa Barbara Zoological Gardens	0.2	Y, 5
Sea World Orlando	0.0.10	Y, 2
Sea World San Antonio	12.5.13	Y, 10
Sea World San Diego	7.2.12	N
Sedgwick County Zoo	0.1	N
Seneca Park Zoo	1.1	Y, 2
Topeka Zoo	0.1.1	N
Toronto Zoo	0.0.3	N
Tulsa Zoo	2.1	Y, 4.4
Utah's Hogle Zoo	0.3	Y, 1
Vancouver Aquarium	3.3	N
Zoo New England	2.1	Y, 1.2
Scarlet Ibis	Current Holdings	Future Capacity
Species Total Capacity:	74.68.44 (186)	293+

Straw-necked Ibis <i>Threskiornis spinicollis</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Audubon Zoo	2.0	0.2.4
Columbus Zoo & Aquarium	2.0	N
Kansas City Zoo	5.4	N
Omaha's Henry Doorly Zoo	0.1.17	Y
Sedgwick County Zoo	5.2	Y, 6
Sunset Zoo	0	
Straw-necked Ibis	Current Holdings 14.7.17	Future Capacity
Species Total Capacity:	(38)	12+

White-faced Ibis <i>Plegadis chihi</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
BREC's Baton Rouge Zoo	0.0.2	N
Denver Zoo	1.0	N
Maryland Zoo in Baltimore	0.2	N
Mesker Park Zoo	2.1	N
NZP Conservation & Research Ctr	3.1.1	N
Oregon Zoo	1.0	Y, 0.2
Phoenix Zoo	1.0.1	Y, 3
Sea World Orlando	0.3.3	Y, 1
Sea World San Diego	4.5.1	
White-faced Ibis	Current Holdings 10.11.8	Future Capacity
Species Total Capacity:	(29)	35

Waldrapp <i>Geronticus eremita</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Chehaw Wild Animal Park	3.0	Y, 3
Cincinnati Zoo & Botanical Garden	1.1.1	N
Cleveland Metro Park Zoo	3.3.4	Y, 6
Denver Zoo	1.2	N
Houston Zoo	4.4	Y, 2-4
Lee Richardson Zoo	0.0.2	Y, 2
The Living Desert	5.5	N
National Aviary	1.1	N
Philadelphia Zoological Society	7.9	N
Riverside Zoo	1.2	Y, 5
San Diego Wild Animal Park	2.0	N
San Diego Zoo	1.2	Y, 1.0
San Francisco Zoo	4.1	N
Zoo New England	2.3	N
Waldrapp	Current Holdings 35.33.7	Future Capacity
Species Total Capacity:	(75)	96

White Ibis <i>Eudocimus albus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Bergen County Zoo	1.0	Y, 3
Biodome de Montreal	1.0	Y, 1
Brookfield Zoo	3.2	Y, 10
Brookgreen Gardens	0.2.15	Y, 5
Caldwell Zoo	3.0	Y, 3
Honolulu Zoo	0.1.4	N
Los Angeles Zoo	1.0	Y,2
Nashville Zoo	0	
Oklahoma City Zoo	0.2	N
Sea World San Diego	0.0.1	N
Topeka Zoo	0	
Tulsa Zoo	1.1	Y, 4.4
Virginia Aquarium & Marine Science	0.0.3	Y
White Ibis	Current Holdings 9.8.23	Future Capacity
Species Total Capacity:	(40)	52+

Puna Ibis <i>Plegadis ridgway</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Oklahoma City Zoo	2.4	N
Sedgwick County Zoo	9.8.4	Y, 10
Puna Ibis	Current Holdings 12.12.4	Future Capacity
Species Total Capacity:	(28)	38

Black-faced Ibis <i>Theristicus melanopis</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Cincinnati Zoo & Botanical Garden	1.0	Y, 10
Black faced Ibis	Current Holdings 1.0	Future Capacity
Species Total Capacity:	(1)	11

Roseate Spoonbill <i>Ajaia ajaja</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Audubon Zoo	3.0	N
Bergen County Zoo	1.1.1	Y, 1
Biodome de Montreal	2.0	Y, 2
Birmingham Zoo	1.2.2	Y, 5
Bramble Park Zoo	4	N
BREC's Baton Rouge Zoo	0.0.6	N
Caldwell Zoo	7.9.5	Y, 8
Calgary Zoo	2.2	N
Cape May Co Park and Zoo	1.2	Y,3
Chaffee Zoo of Fresno	1.3.2	Y, 3
Charles Paddock Zoo	2.1	N
Cincinnati Zoo & Botanical Garden	0.1	Y, 3
Cleveland Metro Park Zoo	2.1	N
Dallas World Aquarium	3.0	Y
Dallas Zoo	9.9	Y, 18
David Traylor Zoo of Emporia	1.1	Y
Denver Zoo	5.4	Y, 2
Disney's Animal Kingdom	1.0	Y, 3.4
Fort Worth Zoo	11.10.5	Y,10
Honolulu Zoo	5.4.3	N
Jacksonville Zoo & Gardens	6.3.2	Y, 4
Knoxville Zoological Gardens	3.3.1	Y, 9
Little Rock Zoo	4.0	N
Los Angeles Zoo	1.2.1	N
Montgomery Zoo	1.0	Y, 1
National Aviary	2.2	N
NZP Conservation & Research Ctr	1.1	Y, 2
Omaha's Henry Doorly Zoo	10.6.28	Y
Palm Beach Zoo	5.8.6	N
Phoenix Zoo	1.1	Y, 2
Reid Park Zoo	1.1	Y, 3.3
San Diego Wild Animal Park	0.1	N
Scovill Zoo	2.2	N
Sea World San Antonio	7.6	Y, 7
Sedgwick County Zoo	3.6	Y, 10
Seneca Park Zoo	1.1	Y, 4
Tautphaus Park Zoo	1.1	N
Topeka Zoo	0.2	N
Tulsa Zoo	1.3	Y, 5.5
Utah's Hogle Zoo	1.2	N
ZOOAMERICA Wildlife Park	1.0.3	N
Roseate Spoonbill	Current Holdings	Future Capacity
	96.87.63	
Species Total Capacity:	(246)	363+

African Spoonbill <i>Platalea alba</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
Calgary Zoo	1.0	Y, 2
Cameron Park Zoo	0.1	Y, 3
Dallas Zoo	1.1	Y, 16
Detroit Zoo	10.10	Y, 24
Disney's Animal Kingdom	8.6	N
Honolulu Zoo	4.0	N
Jacksonville Zoo & Gardens	1.2	Y, 6
Maryland Zoo in Baltimore	3.4	N
Oakland Zoo	1.1	N
Oregon Zoo	0.1.0	Y, 4.4
San Diego Wild Animal Park	2.2	N
San Diego Zoo	3.0	Y, 0.1
African Spoonbill	Current Holdings	Future Capacity
Species Total Capacity:	34.28.0 (62)	122

Eurasian Spoonbill <i>Platalea leucorodia</i>	Data From Space Survey	
Zoo	Current Population Size	Future Capacity by 2011
San Diego Zoo	2.0	Y, 0.1
Eurasian Spoonbill	Current Holdings	Future Capacity
Species Total Capacity:	2.0 (2)	2

Caribbean Flamingo <i>Phoenicopterus ruber</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Abilene Zoo	6.6	Y, 12
Africam Safari	0	
Albuquerque Biological Park	17.10	Y
Audubon Zoo	67.50	75.75
Birmingham Zoo	11.6	Y, 20
Brevard Zoo	0.0.2	Y, 10
Bronx Zoo	6.8	
Cape May Co Park and Zoo	1.1	Y,4
Chaffee Zoo of Fresno	13.11.24	Y, 12
Charles Paddock Zoo	3.4	Y, 3
Columbus Zoo & Aquarium	9.7	Y, 5
Como Zoo & Conservatory	3.3	N
Dallas World Aquarium	12.12.2	N
Dallas Zoo	22.12	Y, 34
Denver Zoo	3.4	Y, 2
Fort Worth Zoo	18.4	Y,20
Granby Zoo	10.9	Y
Henry Vilas Zoo	10	Y
Honolulu Zoo	4.5.7	N
Jacksonville Zoo & Gardens	0	Y, 40
Lion Country Safari	5.12	Y
Los Angeles Zoo	12.4	N
Maryland Zoo in Baltimore	9.5	Y, 1
Miami Metro Zoo	21.18.9	N
Moody Gardens, Inc.	1.5	Y, 6.6
Nashville Zoo	0	30
National Aviary	0	
NZP Conservation & Research Ctr	25.22.3	Y, 20
Ocean Park	0	
Oklahoma City Zoo	5.5.5	Y, 20
Omaha's Henry Doorly Zoo	7.2.7	Y
Palm Beach Zoo	10.8	Y, 20
Philadelphia Zoological Society	7.9.1	Y, 10
Riverbanks Zoo & Botanical Garden	35.15	Y, 10
Sacramento Zoo	20.18.0	Y, 15
Salisbury Zoo	11.0	Y, 3
San Antonio Zoo	35.26.14	N
San Diego Zoo	34.36.18	Y, 12
Sea World Orlando	0.0.66	N
Sea World San Antonio	2.2.4	Y, 4
Sea World San Diego	95.87.18	N
Sedgwick County Zoo	0.0.39	Y, 21
Six Flags	45	Y, 20
Sunset Zoo	8.5	N
Toronto Zoo	4.5.14	
Tulsa Zoo	20.12	Y, 40
Zoo New England	16.16	Y, 9.9
Caribbean Flamingo	Current Holdings	Future Capacity
Species Total Capacity:	581.440.262	
	(1283)	1500+

Greater Flamingo <i>Phoenicopterus roseus</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Africam Safari	9.9.11	Y, 16
Akron Zoological Park	7.5	N
Cape May Co Park and Zoo	1.1	Y,4
Cincinnati Zoo & Botanical Garden	17.21.5	Y, 10
Detroit Zoo	30.25.3	Y, 80
Disney's Animal Kingdom	38.52.1	Y, 10
Fort Wayne Children's Zoo	0	
Jackson Zoological Society	4.9	Y, 30
Los Angeles Zoo	14.19.2	N
Northeastern Wisconsin Zoo	0	
Ocean Park	0	
Omaha's Henry Doorly Zoo	0	
San Antonio Zoo	0	
San Diego Wild Animal Park	56.60.6	N
Sedgwick County Zoo	0.0.37	Y, 23
Greater Flamingo	Current Holdings	Future Capacity
Species Total Capacity:	161.180.63	
	(404)	500+

Chilean Flamingo <i>Phoenicopterus chilensis</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Africam Safari	9.9.11	Y, 9
Akron Zoological Park	21.5	N
Birmingham Zoo	2.3	Y, 10
Blank Park Zoo	12.12	Y, 24
BREC's Baton Rouge Zoo	0.0.58	N
Brevard Zoo	0.0.8	Y, 10
Bronx Zoo	31.28	
Brookfield Zoo	0	
Caldwell Zoo	26.32.1	Y, 20
Calgary Zoo	22.10	Y, 2
Cleveland Metro Park Zoo	14.6.17	Y, 10
Columbus Zoo & Aquarium	0.0.3	N
Como Zoo & Conservatory	0.0.11	N
Dallas Zoo	10.14	Y, 24
Denver Zoo	26.17	Y, 2
Detroit Zoo	15.13	Y, 40
Dickerson Park Zoo	7.6	Y, 20
Ellen Trout Zoo	16.16.1	N
Elmwood Park Zoo	2.2	N
Fort Worth Zoo	25.18.3	Y, 10
Great Plains Zoo	8.8	Y, 14
Greenville Zoo	5.2	N
Henry Vilas Zoo	17	Y
Houston Zoo	21.23	Y, 10
Indianapolis Zoo	9.8	Y, 12
John Ball Zoological Garden	7.7	Y, 10
Kansas City Zoo	8.8	
Lee Richardson Zoo	0.0.4	Y, 4
Lincoln Park Zoo	32.15	Y, 16
Little Rock Zoo	10.10	Y, 60
Los Angeles	39.53	Y, 20
Memphis Zoo	14.16.2	N
Montgomery Zoo	13.8.1	Y, 8
North Carolina Zoo	8.8	N
Oklahoma City Zoo	8.10.5	Y, 25
Omaha's Henry Doorly Zoo	0	Y, 17
Phoenix Zoo	16.25	Y, 15
Pittsburgh Zoo & PPG Aquarium	9	N
Reid Park Zoo	5.6	Y, 24
Roger Williams Park Zoo	5.2	Y, 7
Rolling Hills	3.1	Y, 11
Roosevelt Park Zoo	6	Y
San Antonio Zoo	11.15.4	N
San Diego Wild Animal Park	29.30	N
San Francisco Zoo	26.16	N
Santa Barbara Zoological Gardens	17.27	Y, 60
Scovill Zoo	4.7	N
Sea World Orlando	0.2.142	N
Sea World San Antonio	12.14.18	Y, 10

Chilean Flamingo <i>Phoenicopterus chilensis</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Topeka Zoo	1.1	N
Woodland Park Zoo	15.12	Y, 10.13
Zoo Atlanta	41.43	N
Zoo New England	14.15	Y, 11.10
Chilean Flamingo	Current Holdings	Future Capacity
	547.506.320	
Species Total Capacity:	(1373)	1500+

Lesser Flamingo <i>Phoenicopterus minor</i>	Data From	Space Survey
Zoo	Current Population Size	Future Capacity by 2011
Caldwell Zoo	10.9	Y, 10
Cameron Park Zoo	13.0	Y, 20
Chehaw Wild Animal Park	3.6	Y, 10-20
Cleveland Metro Park Zoo	20.4	Y, 6
Dallas Zoo	12.6	Y, 38
Disney's Animal Kingdom	12.7	Y, 15-20
Fort Worth Zoo	33.19.1	Y, 15
Honolulu Zoo	0.6.18	N
Jacksonville Zoo & Gardens	6.5	Y, 15
Kansas City Zoo	0.0.11	Y, 4
Minnesota Zoo	14.7.1	N
Northeastern Wisconsin Zoo	0	
Oakland Zoo	16.6	N
Omaha's Henry Doorly Zoo	0	
San Antonio Zoo	17.4.16	Y
San Diego Wild Animal Park	42.34.6	N
San Diego Zoo	22.10	Y, 30
Sea World San Diego	28.11.16	N
Lesser Flamingo	Current Holdings	Future Capacity
	217.115.68	
Species Total Capacity:	(400)	600+