Complete Analysis and
Breeding and Transfer Recommendations

Sunbittern

Eurypyga helias

Population Management Plan

Studbook Keeper and Population Manager

Joanne Earnhardt, Lincoln Park Zoo

SPMAG ADVISOR

Joanne Earnhardt, AZA Population Management Center

April 2006

This report prepared with assistance from the
American Zoo and Aquarium Association Population Management Center In Chicago

Executive Summary

Breeding and Transfer Recommendations for Sunbittern (*Eurypyga helias)*
Population Management Plan for 2006

Current Population

There are currently N = 101 animals (52 males; 38 females; 11 unknowns) at 42 institutions. The target population size designated by the Gruiformes Taxon Advisory Group is 130.

Demographic Summary Table:

Current size of managed population	101 (52.38.11)
# Specimens excluded from management	0
Mean generation time	7.6 years
Potential population growth rate	1.073
# Births - April 2004 to April 2006	13 (2.4.7)
# Deaths - April 2004 to April 2006	14 (3.4.7)

Genetic Summary Table:

	Current	Potential
Founders	14	0 additional
Founder genome equivalents	6.96	10.62
Founder genome surviving	10.62	10.62
Gene diversity retained	0.928	0.953
Population mean kinship	0.072	
Ne/N	0.33	
Mean inbreeding	0.017	
% of pedigree known	95	

Population Management: Based on PM2000 analysis, the population is projected to retain 79% of gene diversity for 100 years, and to retain 90% of gene diversity for 17 years.

The PMP plans to set goals based on a ZooRisk analysis which will follow completion of the 2006 breeding and transfer plan. The interim strategy is to do the best genetic and demographic management possible.

The PMP recommends 20 pairs to breed to 1) improve the genetic and demographic status of the population and 2) provide birds to institutions wanting to exhibit sunbitterns. Four birds are recommended for transfers to 1) meet institutional needs to move birds and 2) pair birds for companionship.

Breeding and Transfer Recommendations for the Sunbittern (*Eurypyga helias)*
Population Management Plan

Prepared April 2006, this plan updates previous sets of Breeding and Transfer Recommendations for this species.

Population Manager, Studbook keeper, SPMAG advisor:

Joanne Earnhardt
Director, Alexander Center of Applied Population Biology
Lincoln Park Zoo
2001 N. Clark St., Chicago, IL 60614
Phone 312-742-7745
FAX 312-742-7220
Email : Joanne@lpzoo.org

This plan was prepared and distributed with the assistance of the AZA Population Management Center in Chicago
pmc@lpzoo.org

Table of Contents

Pueblo Zoo / PUEBLO
Albuquerque Biological Park / RIO GRAND
San Antonio Zoo / SAN ANTON
San Diego Zoological Garden / SANDIEGOZ
Santa Ana Zoo / SANTA ANA
South Carolina Aquarium / SC AQUAR
San Diego Wild Animal Park / SD-WAP
Woodland Park Zoological Gardens / SEATTLE
Sedgwick County Zoo / SEDGWICK
St. Louis Zoo / ST LOUIS
Staten Island Zoo / STATEN IS
Toledo Zoological Gardens / TOLEDO
Metropolitan Toronto Zoo / TORONTO
Tulsa Zoo / TULSA

III. **Appendices**

1. Summary of Data Exports
2. Life Table
3. Ordered Mean Kinship
4. Definitions
6. Institutional representatives

Description of Population Status

Introduction: Comprehensive genetic and demographic analyses of sunbitterns were performed in April 2006, resulting in the current plan for this species. Plan analyses were performed using SPARKS 1.5 and PM2000, version 1.202.

Managed Population: The current population size is 101, distributed among 42 institutions. No individuals were excluded from the population for reproductive or genetic reasons. The population is considered those specimens held by AZA accredited institutions.

Demography: The North American Regional population dates to the beginning of the 20th century with the importation of birds by the Philadelphia Zoo. The population began to breed consistently in the mid-1970s, grew each year until 1996, and for the last decade, the growth rate has slowed and the population size has remained between 104 and 114 specimens (Fig. 1). This species is long-lived and has a long period of reproduction (age 2-20). There is high chick mortality. In part this mortality may be due to practices by some institutions that have avoided hand-rearing chicks to prevent producing imprinted adult birds; these chicks are allowed to die. However, there is an intermediate approach that can be successful. Lincoln Park Zoo has a protocol for supplemental hand-feeding as an alternative to hand rearing or letting the chick die (contact me for the protocol). The reproduction and mortality rates for each sex are recorded in Appendix 2. The current population is 101 specimens and the Gruiformes TAG is tentatively setting the target population size at 130. The age structure of the population has remained relatively constant over the last few years (Figure 2).

Census History

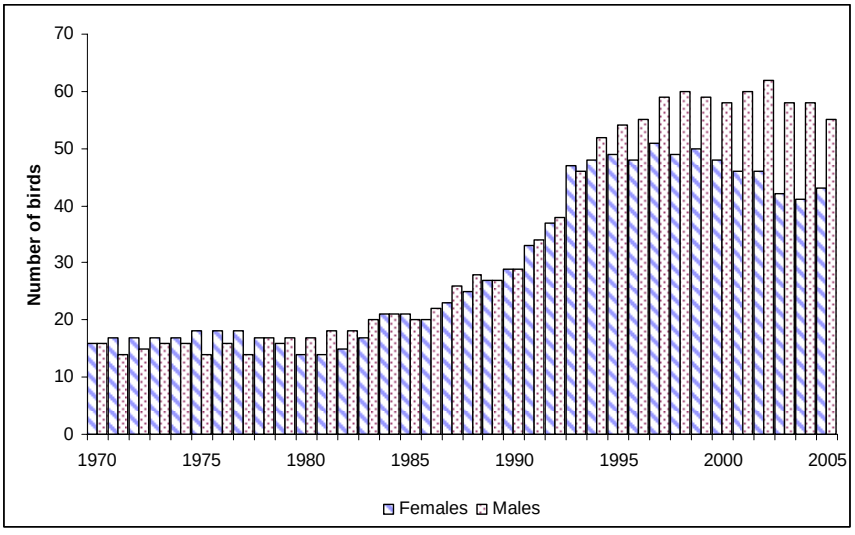

Figure 1. Population census showing number of male and females as of December 31 for each calendar year.

Age Distribution

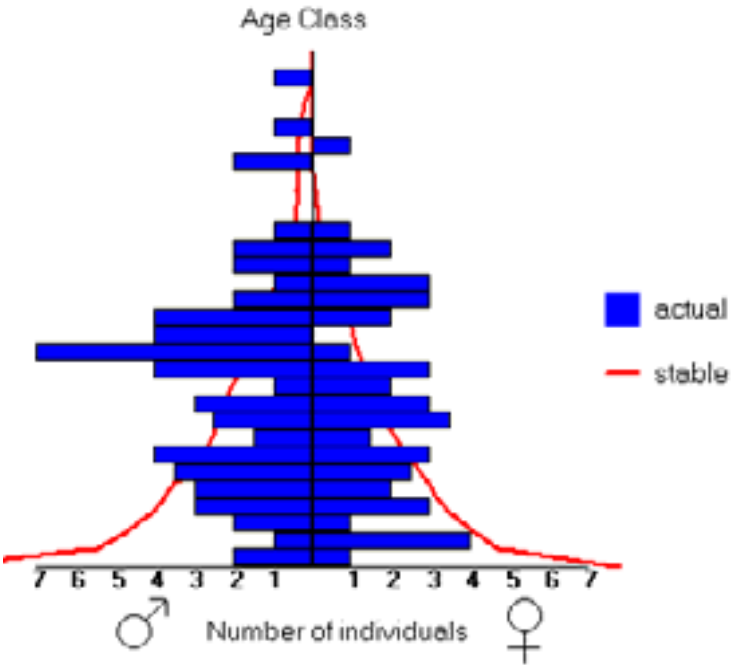

Figure 2. Age structure of sunbitterns in the PMP.

Demographic Summary Table:

Current size of managed population	101 (52.38.11)
# Specimens excluded from management	0
Mean generation time	7.6 years
Potential population growth rate	1.073
# Births - April 2004 to April 2006	13 (2.4.7)
# Deaths - April 2004 to April 2006	14 (3.4.7)

Genetics: The population has maintained 92.8% gene diversity for the last 4 years but the % of the pedigree known has decreased from 99.5% to 95%. To prevent further erosion of % known pedigree, specimens with a high degree of unknowns in their pedigree were not given breeding recommendations.

Genetic Summary Table:

	Current	Potential
Founders	14	0 additional
Founder genome equivalents	6.96	10.62
Founder genome surviving	10.62	10.62
Gene diversity retained	0.928	0.953
Population mean kinship	0.072	
Ne/N	0.33	
Mean inbreeding	0.017	
% of pedigree known	95	

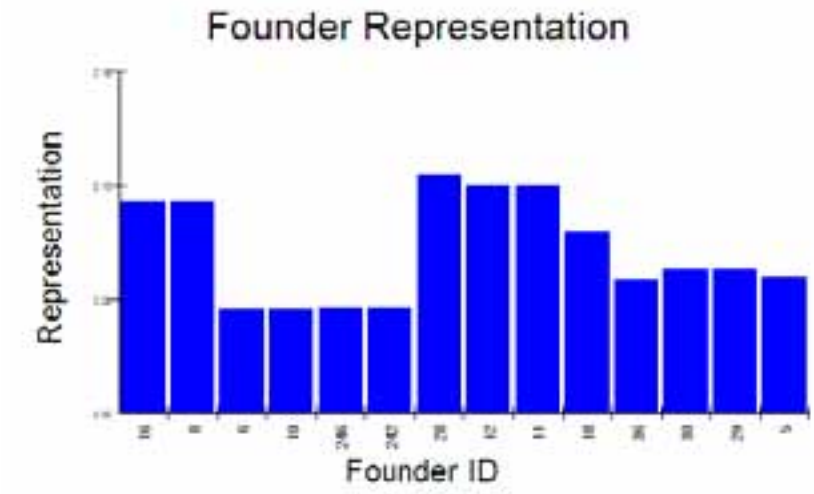

Figure 2. Founder representation graph illustrating differences in founder lineages in the living population.

Population Management: Based on PM2000 analysis, the population is projected to retain 79% of gene diversity for 100 years, and to retain 90% of gene diversity for 17 years.

The PMP plans to set goals based on a ZooRisk analysis which will follow completion of the 2006 breeding and transfer plan. The interim strategy is to do the best genetic and demographic management possible.

The PMP recommends 20 pairs to breed to 1) improve the genetic and demographic status of the population and 2) provide birds to institutions wanting to exhibit sunbitterns. Four birds are recommended for transfers to 1) meet institutional needs to move birds and 2) pair birds for companionship.

Summary of Breeding and Transfer Recommendations

ID	Location	Local ID	Sex	Disposition	Location	Breeding	With	
236	ASHEBORO	22635	M	HOLD	ASHEBORO	BREED WITH	442	2 clutches
442	ASHEBORO	22735	F	HOLD	ASHEBORO	BREED WITH	236	2 clutches
182	AUDUBON	1834	F	HOLD	AUDUBON	BREED WITH	211	2 clutches
211	AUDUBON	100094	M	HOLD	AUDUBON	BREED WITH	182	2 clutches
122	BALTIM AQ	880307	F	HOLD	BALTIM AQ	BREED WITH	446	2 clutches
446	BALTIM AQ	102024	M	HOLD	BALTIM AQ	BREED WITH	122	2 clutches
288	BIODOME	1029	M	HOLD	BIODOME	BREED WITH	465	2 clutches
465	BIODOME	1593	F	HOLD	BIODOME	BREED WITH	288	2 clutches
153	BIRMINGHM	1770	M	HOLD	BIRMINGHM	BREED WITH	195	2 clutches
195	BIRMINGHM	2189	F	HOLD	BIRMINGHM	BREED WITH	153	2 clutches
399	CENTRALPK	C01011	F	HOLD	CENTRALPK	BREED WITH	500	2 clutches
500	CENTRALPK	C01106	M	HOLD	CENTRALPK	BREED WITH	399	2 clutches
165	CHICAGOBR	890137	M	HOLD	CHICAGOBR	BREED WITH	527	2 clutches
66	CHICAGOLP	B8138	M	HOLD	CHICAGOLP	BREED WITH	473	2 clutches
473	CHICAGOLP	21309	F	HOLD	CHICAGOLP	BREED WITH	66	2 clutches
543	CHICAGOLP	21689	M	HOLD	CHICAGOLP	DO NOT BREED		Future breeder
293	CINCINNAT	295258	M	HOLD	CINCINNAT	BREED WITH	358	2 clutches
358	CINCINNAT	201037	F	HOLD	CINCINNAT	BREED WITH	293	2 clutches
521	CINCINNAT	203012	M	HOLD	CINCINNAT	DO NOT BREED		Lower genetic value
549	CINCINNAT	205020	U	HOLD	CINCINNAT	DO NOT BREED		Unknown sex
550	CINCINNAT	205058	U	HOLD	CINCINNAT	DO NOT BREED		Unknown sex
464	COLUMBIA	6803	M	HOLD	COLUMBIA	DO NOT BREED		Response not received
170	DALLAS	906764	M	HOLD	DALLAS	DO NOT BREED		quarantine
251	DALLAS WA	1A0095	F	HOLD	DALLAS WA	DO NOT BREED		Response not received
266	DALLAS WA	98A028	M	HOLD	DALLAS WA	DO NOT BREED		Response not received
289	DALLAS WA	1A0097	M	HOLD	DALLAS WA	DO NOT BREED		Response not received
425	DALLAS WA	97A033	M	HOLD	DALLAS WA	DO NOT BREED		Response not received
499	DALLAS WA	1A0098	U	HOLD	DALLAS WA	DO NOT BREED		Unknown sex
533	DALLAS WA	3A011	U	HOLD	DALLAS WA	DO NOT BREED		Unknown sex
477	DES MOINE	1395	M	HOLD	DES MOINE	BREED WITH	538	2 clutches
296	DETROIT	4262	F	HOLD	DETROIT	DO NOT BREED		Future breeder
88	FRANKLINP	84448	M	HOLD	FRANKLINP	BREED WITH	158	2 clutches
158	FRANKLINP	89A935	F	HOLD	FRANKLINP	BREED WITH	88	2 clutches
468	FRESNO	200034	F	HOLD	FRESNO	BREED WITH	505	2 clutches
505	FRESNO	230007	M	HOLD	FRESNO	BREED WITH	468	2 clutches
511	FRESNO	220090	M	HOLD	FRESNO	DO NOT BREED		Lower genetic value
512	JACKSONVL	603349	M	HOLD	JACKSONVL	DO NOT BREED		Lower genetic value

ID	Location	Local ID	Sex	Disposition	Location	Breeding	With	
356	LOSANGELE	96379	M	HOLD	LOSANGELE	DO NOT BREED		Response not received
531	LOWRY	205246	U	HOLD	LOWRY	DO NOT BREED		Unknown sex
532	LOWRY	205396	M	HOLD	LOWRY	DO NOT BREED		Response not received
76	MILWAUKEE	B3688	F	HOLD	MILWAUKEE	BREED WITH	183	1 clutch
183	MILWAUKEE	B2386	M	HOLD	MILWAUKEE	BREED WITH	76	1 clutch
527	MILWAUKEE	B4058	F	SEND TO	CHICAGOBR	BREED WITH	165	2 clutches
213	NY BRONX	922242	M	HOLD	NY BRONX	BREED WITH	537	2 clutches
481	NZP-WASH	_____	F	HOLD	NZP-WASH	BREED WITH	56	2 clutches
56	NZP-WASH	205380	M	HOLD	NZP-WASH	BREED WITH	481	2 clutches
235	NZP-WASH	212763	M	HOLD	NZP-WASH	DO NOT BREED		Lower genetic value
542	NZP-WASH	215505	F	HOLD	NZP-WASH	DO NOT BREED		Lower genetic value
214	OMAHA	6361	M	HOLD	OMAHA	DO NOT BREED		Response not received
225	OMAHA	6896	F	HOLD	OMAHA	DO NOT BREED		Response not received
259	OMAHA	7864	M	HOLD	OMAHA	DO NOT BREED		Response not received
444	OMAHA	10636	U	HOLD	OMAHA	DO NOT BREED		Unknown sex
463	OMAHA	10921	U	HOLD	OMAHA	DO NOT BREED		Unknown sex
485	OMAHA	11823	U	HOLD	OMAHA	DO NOT BREED		Unknown sex
283	ORLANDO	SB2502	M	HOLD	ORLANDO	DO NOT BREED		Lower genetic value
482	ORLANDO	SB2509	U	HOLD	ORLANDO	DO NOT BREED		Broken bill
483	ORLANDO	SB2510	M	HOLD	ORLANDO	DO NOT BREED		Lower genetic value
518	ORLANDO	SB2513	M	HOLD	ORLANDO	DO NOT BREED		Lower genetic value
522	ORLANDO	SB2514	F	HOLD	ORLANDO	DO NOT BREED		Lower genetic value
123	PHILADELP	203560	M	HOLD	PHILADELP	DO NOT BREED		quarantine
351	PHOENIX	7766	F	TBD	PHOENIX	BREED WITH	285	2 clutches
404	PITTS CA	4653	F	HOLD	PITTS CA	BREED WITH	475	2 clutches
475	PITTS CA	6474	M	HOLD	PITTS CA	BREED WITH	404	2 clutches
285	PROVIDNCE	942074	M	TBD	PROVIDNCE	BREED WITH	351	2 clutches
234	PUEBLO	930042	M	HOLD	PUEBLO	DO NOT BREED		Lower genetic value
139	RIO GRAND	B21782	M	HOLD	RIO GRAND	DO NOT BREED		Per institution
77	SAN ANTON	960334	M	HOLD	SAN ANTON	DO NOT BREED		Need records
306	SAN ANTON	940743	M	HOLD	SAN ANTON	DO NOT BREED		Need records
359	SAN ANTON	950534	M	HOLD	SAN ANTON	DO NOT BREED		Need records
365	SAN ANTON	950933	M	HOLD	SAN ANTON	DO NOT BREED		Need records
443	SAN ANTON	A00044	F	HOLD	SAN ANTON	DO NOT BREED		Need records
474	SAN ANTON	A00043	F	HOLD	SAN ANTON	DO NOT BREED		Need records
412	SANDIEGOZ	897446	F	HOLD	SANDIEGOZ	DO NOT BREED		Lower genetic value
441	SANDIEGOZ	399128	M	HOLD	SANDIEGOZ	DO NOT BREED		Lower genetic value

ID	Location	Local ID	Sex	Disposition	Location	Breeding	With	
471	SANDIEGOZ	300341	M	HOLD	SANDIEGOZ	DO NOT BREED		Lower genetic value
369	SANTA ANA	B96057	F	HOLD	SANTA ANA	DO NOT BREED		Lower genetic value
506	SANTA ANA	B01015	F	HOLD	SANTA ANA	DO NOT BREED		Lower genetic value
507	SANTA ANA	B02061	F	HOLD	SANTA ANA	DO NOT BREED		Lower genetic value
524	SC AQUAR	800123	M	HOLD	SC AQUAR	DO NOT BREED		Response not received
140	SD-WAP	488495	F	HOLD	SD-WAP	DO NOT BREED		Lower genetic value
427	SD-WAP	397188	M	HOLD	SD-WAP	DO NOT BREED		Lower genetic value
544	SD-WAP	805062	M	HOLD	SD-WAP	DO NOT BREED		Need records
545	SD-WAP	805063	F	HOLD	SD-WAP	DO NOT BREED		Need records
547	SD-WAP	806020	U	HOLD	SANDIEGOZ	DO NOT BREED		Lower genetic value
167	SEATTLE	910009	F	HOLD	SEATTLE	BREED WITH	303	2 clutches
174	SEATTLE	910008	F	HOLD	SEATTLE	BREED WITH	279	2 clutches
279	SEATTLE	940143	M	HOLD	SEATTLE	BREED WITH	174	2 clutches
303	SEATTLE	200332	M	HOLD	SEATTLE	BREED WITH	167	2 clutches
438	SEDGWICK	8958	M	HOLD	SEDGWICK	BREED WITH	479	2 clutches
479	SEDGWICK	9635	F	HOLD	SEDGWICK	BREED WITH	438	2 clutches
503	ST LOUIS	101617	F	HOLD	ST LOUIS	DO NOT BREED		Future breeder
186	STATEN IS	010601	F	HOLD	STATEN IS	DO NOT BREED		Response not received
194	STATEN IS	010613	F	HOLD	STATEN IS	DO NOT BREED		Response not received
205	TOLEDO	911622	F	HOLD	TOLEDO	DO NOT BREED		Lower genetic value
370	TOLEDO	1284	M	HOLD	TOLEDO	DO NOT BREED		Lower genetic value
537	TOLEDO	4230	F	SEND TO	NY BRONX	BREED WITH	213	2 clutches
538	TOLEDO	4263	F	SEND TO	DES MOINE	BREED WITH	477	2 clutches
548	TOLEDO	4446	U	HOLD	TOLEDO	DO NOT BREED		Lower genetic value
420	TORONTO	33071	F	HOLD	TORONTO	DO NOT BREED		Response not received
424	TORONTO	33072	F	HOLD	TORONTO	DO NOT BREED		Response not received
262	TULSA	11018	M	HOLD	TULSA	DO NOT BREED		Future breeder

RECOMMENDATIONS BY INSTITUTION

Please add studbook numbers to your institutions records database.

ASHEBORO

North Carolina Zoological Park
Asheboro, NC

ID	Local ID	Sex	Disposition	Location	Breeding	With
236	22635	M	HOLD	ASHEBORO	BREED WITH	442
442	22735	F	HOLD	ASHEBORO	BREED WITH	236

AUDUBON

Audubon Zoo
New Orleans, LA

ID	Local ID	Sex	Disposition	Location	Breeding	With
182	1834	F	HOLD	AUDUBON	BREED WITH	211
211	100094	M	HOLD	AUDUBON	BREED WITH	182

BALTIM AQ

National Aquarium in Baltimore Inc
Baltimore, MD

ID	Local ID	Sex	Disposition	Location	Breeding	With
122	880307	F	HOLD	BALTIM AQ	BREED WITH	446
446	102024	M	HOLD	BALTIM AQ	BREED WITH	122

NOTE: While this female is imprinted and the pair has been unsuccessful, additional females are unavailable right now. Continue this pairing another year.

BIODOME

Biodome de Montreal
Montreal, Quebec

ID	Local ID	Sex	Disposition	Location	Breeding	With
288	1029	M	HOLD	BIODOME	BREED WITH	465
465	1593	F	HOLD	BIODOME	BREED WITH	288

BIRMINGHM

Birmingham Zoo
Birmingham, AL

ID	Local ID	Sex	Disposition	Location	Breeding	With
153	1770	M	HOLD	BIRMINGHM	BREED WITH	195
195	2189	F	HOLD	BIRMINGHM	BREED WITH	153

NOTE: To minimize consequences of hand rearing, consider housing pair in an exhibit without visitor access for a period of time.

CENTRALPK

Central Park Wildlife Center
New York, NY

ID	Local ID	Sex	Disposition	Location	Breeding	With
399	C01011	F	HOLD	CENTRALPK	BREED WITH	500
500	C01106	M	HOLD	CENTRALPK	BREED WITH	399

CHICAGOBR

Chicago Zoological Park
Brookfield, IL

ID	Local ID	Sex	Disposition	Location	Breeding	With
165	890137	M	HOLD	CHICAGOBR	BREED WITH	527
527		F	RECEIVE	MILWAUKEE	BREED WITH	165

This female is imprinted and may not breed. However if they are compatible, an offspring would be valuable.

CHICAGOLP

Lincoln Park Zoo

ID	Local ID	Sex	Disposition	Location	Breeding	With
66	B8138	M	HOLD	CHICAGOLP	BREED WITH	473
473	21309	F	HOLD	CHICAGOLP	BREED WITH	66
543	21689	M	HOLD	CHICAGOLP	DO NOT BREED	

CINCINNAT

Cincinnati Zoo & Botanical Garden
Cincinnati, OH

ID	Local ID	Sex	Disposition	Location	Breeding	With
293	295258	M	HOLD	CINCINNAT	BREED WITH	358
358	201037	F	HOLD	CINCINNAT	BREED WITH	293
521	203012	M	HOLD	CINCINNAT	DO NOT BREED	
549	205020	U	HOLD	CINCINNAT	DO NOT BREED	
550	205058	U	HOLD	CINCINNAT	DO NOT BREED	

COLUMBIA

Riverbanks Zoo and Garden
Columbia, SC

ID	Local ID	Sex	Disposition	Location	Breeding	With
464	6803	M	HOLD	COLUMBIA	DO NOT BREED	

DALLAS

Dallas Zoo
Dallas, TX

ID	Local ID	Sex	Disposition	Location	Breeding	With
170	906764	M	HOLD	DALLAS	DO NOT BREED	

DALLAS WA

Dallas World Aquarium
Dallas, TX

ID	Local ID	Sex	Disposition	Location	Breeding	With
251	1A0095	F	HOLD	DALLAS WA	DO NOT BREED	
266	98A028	M	HOLD	DALLAS WA	DO NOT BREED	
289	1A0097	M	HOLD	DALLAS WA	DO NOT BREED	
425	97A033	M	HOLD	DALLAS WA	DO NOT BREED	
499	1A0098	U	HOLD	DALLAS WA	DO NOT BREED	
533	3A011	U	HOLD	DALLAS WA	DO NOT BREED	

NOTE: Please sex #499 and 533 and notify the studbook keeper.

DES MOINE

Blank Park Zoo of Des Moines
Des Moines, IA

ID	Local ID	Sex	Disposition	Location	Breeding	With
477	1395	M	HOLD	DES MOINE	BREED WITH	538
538		F	RECEIVE	TOLEDO	BREED WITH	477

DETROIT

Detroit Zoological Institute
Royal Oak, MI

ID	Local ID	Sex	Disposition	Location	Breeding	With
296	4262	F	HOLD	DETROIT	DO NOT BREED	

FRANKLINP

Zoo New England (Franklin Pk)
Boston, MA

ID	Local ID	Sex	Disposition	Location	Breeding	With
88	84448	M	HOLD	FRANKLINP	BREED WITH	158
158	89A935	F	HOLD	FRANKLINP	BREED WITH	88

FRESNO

Chaffee Zool Gardens of Fresno
Fresno, CA

ID	Local ID	Sex	Disposition	Location	Breeding	With
468	200034	F	HOLD	FRESNO	BREED WITH	505
505	230007	M	HOLD	FRESNO	BREED WITH	468
511	220090	M	HOLD	FRESNO	DO NOT BREED	

NOTE: Few females are available right now. The pair (468/505) are still young and should be given another season to breed. #511 would not be a good genetic partner for 468.

JACKSONVL

Jacksonville Zoological Gardens
Jacksonville, FL

ID	Local ID	Sex	Disposition	Location	Breeding	With
512	603349	M	HOLD	JACKSONVL	DO NOT BREED	

NOTE: this male is currently not recommended to breed.

LOSANGELE

Los Angeles Zoo
Los Angeles, CA

ID	Local ID	Sex	Disposition	Location	Breeding	With
356	96379	M	HOLD	LOSANGELE	DO NOT BREED	

LOWRY

Lowry Park Zoological Garden
Tampa, FL

ID	Local ID	Sex	Disposition	Location	Breeding	With
531	205246	U	HOLD	LOWRY	DO NOT BREED	
532	205396	M	HOLD	LOWRY	DO NOT BREED	

NOTE: Please sex #531 and notify the studbook keeper (Joanne@lpzoo.org).

MADISON

Henry Vilas Zoo
Madison, WI

NOTE: wait for offspring from this year's recommendations.

MILWAUKEE

Milwaukee County Zoological Gardens
Milwaukee, WI

ID	Local ID	Sex	Disposition	Location	Breeding	With
76	B3688	F	HOLD	MILWAUKEE	BREED WITH	183
183	B2386	M	HOLD	MILWAUKEE	BREED WITH	76
527	B4058	F	SEND TO	CHICAGOBR	BREED WITH	165

NOTE: Please breed one more time.

NY BRONX

The Wildlife Conservation Society
Bronx, NY

ID	Local ID	Sex	Disposition	Location	Breeding	With
213	922242	M	HOLD	NY BRONX	BREED WITH	537
537		F	RECEIVE	TOLEDO	BREED WITH	213

NZP-WASH

National Zoological Park - Wash
Washington, DC

ID	Local ID	Sex	Disposition	Location	Breeding	With
56	205380	M	HOLD	NZP-WASH	BREED WITH	481
235	212763	M	HOLD	NZP-WASH	DO NOT BREED	
542	215505	F	HOLD	NZP-WASH	DO NOT BREED	
481	_____	F	HOLD	NZP-WASH	BREED WITH	56

NOTE: Please send local ID for #481.

OMAHA

Omaha's Henry Doorly Zoo
Omaha, NE

ID	Local ID	Sex	Disposition	Location	Breeding	With
214	6361	M	HOLD	OMAHA	DO NOT BREED	
225	6896	F	HOLD	OMAHA	DO NOT BREED	
259	7864	M	HOLD	OMAHA	DO NOT BREED	
444	10636	U	HOLD	OMAHA	DO NOT BREED	
463	10921	U	HOLD	OMAHA	DO NOT BREED	
485	11823	U	HOLD	OMAHA	DO NOT BREED	

NOTE: Please sex #444, 463, and 485 and notify studbook keeper.

ORLANDO

Sea World Orlando
Orlando, FL

ID	Local ID	Sex	Disposition	Location	Breeding	With
283	SB2502	M	HOLD	ORLANDO	DO NOT BREED	
482	SB2509	U	HOLD	ORLANDO	DO NOT BREED	
483	SB2510	M	HOLD	ORLANDO	DO NOT BREED	
518	SB2513	M	HOLD	ORLANDO	DO NOT BREED	
522	SB2514	F	HOLD	ORLANDO	DO NOT BREED	

PHILADELP

Philadelphia Zoological Garden
Philadelphia, PA

ID	Local ID	Sex	Disposition	Location	Breeding	With
123	203560	M	HOLD	PHILADELP	DO NOT BREED	

Consider making a pair from #351 and #285 at either institution.

PHOENIX

Phoenix Zoo
Phoenix, AZ

ID	Local ID	Sex	Disposition	Location	Breeding	With
351	7766	F	TBD	PHOENIX	BREED WITH	285

PROVIDNCE

Roger Williams Park Zoo
Providence, RI

ID	Local ID	Sex	Disposition	Location	Breeding	With
285	942074	M	TBD	PROVIDNCE	BREED WITH	351

PITTS CA

National Aviary in Pittsburgh
Pittsburgh, PA

ID	Local ID	Sex	Disposition	Location	Breeding	With
404	4653	F	HOLD	PITTS CA	BREED WITH	475
475	6474	M	HOLD	PITTS CA	BREED WITH	404

PUEBLO

Pueblo Zoo
Pueblo, CO

ID	Local ID	Sex	Disposition	Location	Breeding	With
234	930042	M	HOLD	PUEBLO	DO NOT BREED	

RIO GRAND

Albuquerque Biological Park
Albuquerque, NM

ID	Local ID	Sex	Disposition	Location	Breeding	With
139	B21782	M	HOLD	RIO GRAND	DO NOT BREED	

SAN ANTON

San Antonio Zool. Gardens & Aquarium
San Antonio, TX

ID	Local ID	Sex	Disposition	Location	Breeding	With
77	960334	M	HOLD	SAN ANTON	DO NOT BREED	
306	940743	M	HOLD	SAN ANTON	DO NOT BREED	
359	950534	M	HOLD	SAN ANTON	DO NOT BREED	
365	950933	M	HOLD	SAN ANTON	DO NOT BREED	
443	A00044	F	HOLD	SAN ANTON	DO NOT BREED	
474	A00043	F	HOLD	SAN ANTON	DO NOT BREED	

NOTE: Please clarify your holdings. Which males and females are still in your collection? When I know which birds you have, I will give you a breeding recommendation.

SANDIEGOZ

San Diego Zoological Garden
San Diego, CA

ID	Local ID	Sex	Disposition	Location	Breeding	With
412	897446	F	HOLD	SANDIEGOZ	DO NOT BREED	
441	399128	M	HOLD	SANDIEGOZ	DO NOT BREED	
471	300341	M	HOLD	SANDIEGOZ	DO NOT BREED	

SANTA ANA

Santa Ana Zoo
Santa Ana, CA

ID	Local ID	Sex	Disposition	Location	Breeding	With
369	B96057	F	HOLD	SANTA ANA	DO NOT BREED	
506	B01015	F	HOLD	SANTA ANA	DO NOT BREED	
507	B02061	F	HOLD	SANTA ANA	DO NOT BREED	

SC AQUAR

South Carolina Aquarium
Charleston, SC

ID	Local ID	Sex	Disposition	Location	Breeding	With
524	800123	M	HOLD	SC AQUAR	DO NOT BREED	

SD-WAP

San Diego Wild Animal Park
Escondido, CA

ID	Local ID	Sex	Disposition	Location	Breeding	With
140	488495	F	HOLD	SD-WAP	DO NOT BREED	
427	397188	M	HOLD	SD-WAP	DO NOT BREED	
544	805062	M	HOLD	SD-WAP	DO NOT BREED	
545	805063	F	HOLD	SD-WAP	DO NOT BREED	
547	806020	U	HOLD	SD-WAP	DO NOT BREED	

NOTE: #544 and 545 should not breed until pedigree information is provided by the breeder.

SEATTLE

Woodland Park Zoological Gardens
Seattle, WA

ID	Local ID	Sex	Disposition	Location	Breeding	With
167	910009	F	HOLD	SEATTLE	BREED WITH	303
174	910008	F	HOLD	SEATTLE	BREED WITH	279
279	940143	M	HOLD	SEATTLE	BREED WITH	174
303	200332	M	HOLD	SEATTLE	BREED WITH	167

NOTE: These pairs can also be switched to improve prospects for breeding.

SEDGWICK

Sedgwick County Zoo
Wichita, KS

ID	Local ID	Sex	Disposition	Location	Breeding	With
438	8958	M	HOLD	SEDGWICK	BREED WITH	479
479	9635	F	HOLD	SEDGWICK	BREED WITH	438

ST LOUIS

St. Louis Zoological Park
St. Louis, MO

ID	Local ID	Sex	Disposition	Location	Breeding	With
503	101617	F	HOLD	ST LOUIS	DO NOT BREED	

STATEN IS

Staten Island Zoo
Staten Island, NY

ID	Local ID	Sex	Disposition	Location	Breeding	With
186	010601	F	HOLD	STATEN IS	DO NOT BREED	
194	010613	F	HOLD	STATEN IS	DO NOT BREED	

TOLEDO

Toledo Zoological Gardens
Toledo, OH

ID	Local ID	Sex	Disposition	Location	Breeding	With
205	911622	F	HOLD	TOLEDO	DO NOT BREED	
370	1284	M	HOLD	TOLEDO	DO NOT BREED	
537	4230	F	SEND TO	NY BRONX	BREED WITH	213
538	4263	F	SEND TO	DES MOINE	BREED WITH	477
548	4263	U	HOLD	TOLEDO	DO NOT BREED	

TORONTO

Toronto Zoo
Scarborough, Ontario

ID	Local ID	Sex	Disposition	Location	Breeding	With
420	33071	F	HOLD	TORONTO	DO NOT BREED	
424	33072	F	HOLD	TORONTO	DO NOT BREED	

TULSA

Tulsa Zoo and Living Museum
Tulsa, OK

ID	Local ID	Sex	Disposition	Location	Breeding	With
262	11018	M	HOLD	TULSA	DO NOT BREED	

Appendix 1: Studbook export filters for genetic and demographic analyses

Studbook information:
Data exported on: 3 Apr 2006
Data compiled by: Joanne Earnhardt
Data current thru: 1 Apr 2006
Scope of data: Regional

Demographic data from: C:\SPARKS 1.5\truesun06\MTRUESU~.PRN and C:\SPARKS 1.5\truesun06\FTRUESU~.PRN
Demographic filter conditions:
Dates: Between 01/01/1970 and 01/04/2006
Association: \Sparks\AZA.fed

Genetic data from: C:\SPARKS 1.5\truesun06\Sunbittern 2006.ped
Genetic filter conditions:
Dates: As of 01/01/2006
Association: \Sparks\AZA.fed
Status: Living on 1 Jan 2006

Date used for calculations: 4/3/2006

Report compiled under Population Management 2000, version 1.202

Appendix 2: Life Table data for males and females

	Males					Females				
Age	Qx	Px	Lx	Mx	Vx	Qx	Px	Lx	Mx	Vx
0	0.500	0.500	1.000	0.000	1.333	0.500	0.500	1.000	0.000	1.333
1	0.100	0.900	0.500	0.060	2.261	0.100	0.900	0.500	0.070	2.258
2	0.060	0.940	0.450	0.210	2.572	0.030	0.970	0.450	0.180	2.515
3	0.050	0.950	0.423	0.290	2.685	0.090	0.910	0.437	0.320	2.663
4	0.020	0.980	0.402	0.320	2.667	0.020	0.980	0.397	0.350	2.663
5	0.050	0.950	0.394	0.430	2.611	0.050	0.950	0.389	0.370	2.571
6	0.070	0.930	0.374	0.370	2.491	0.070	0.930	0.370	0.460	2.510
7	0.000	1.000	0.348	0.370	2.364	0.040	0.960	0.344	0.400	2.328
8	0.020	0.980	0.348	0.250	2.163	0.090	0.910	0.330	0.450	2.210
9	0.000	1.000	0.341	0.430	2.076	0.030	0.970	0.300	0.360	2.012
10	0.000	1.000	0.341	0.250	1.768	0.060	0.940	0.291	0.320	1.854
11	0.050	0.950	0.341	0.320	1.672	0.030	0.970	0.274	0.470	1.724
12	0.040	0.960	0.324	0.280	1.520	0.040	0.960	0.266	0.490	1.394
13	0.040	0.960	0.311	0.180	1.387	0.040	0.960	0.255	0.360	1.010
14	0.050	0.950	0.299	0.420	1.358	0.050	0.950	0.245	0.180	0.730
15	0.060	0.940	0.284	0.170	1.065	0.240	0.760	0.233	0.040	0.687
16	0.070	0.930	0.267	0.210	1.028	0.090	0.910	0.177	0.130	0.842
17	0.180	0.820	0.248	0.210	1.002	0.260	0.740	0.161	0.190	0.921
18	0.130	0.870	0.203	0.560	1.010	0.410	0.590	0.119	0.510	1.159
19	0.170	0.830	0.177	0.250	0.567	0.000	1.000	0.070	0.640	0.938
20	0.000	1.000	0.147	0.000	0.376	0.000	1.000	0.070	0.320	0.320
21	0.000	1.000	0.147	0.000	0.404	0.000	1.000	0.070	0.000	0.000
22	0.000	1.000	0.147	0.000	0.433	0.000	1.000	0.070	0.000	0.000
23	0.000	1.000	0.147	0.000	0.466	0.000	1.000	0.070	0.000	0.000
24	0.000	1.000	0.147	0.500	0.500	1.000	0.000	0.070	0.000	0.000
25	0.000	1.000	0.147	0.000	0.000	1.000	0.000	0.000	0.000	0.000
26	0.000	1.000	0.147	0.000	0.000	1.000	0.000	0.000	0.000	0.000
27	0.610	0.390	0.147	0.000	0.000	1.000	0.000	0.000	0.000	0.000
28	1.000	0.000	0.057	0.000	0.000	1.000	0.000	0.000	0.000	0.000
29	1.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000

Qx = mortality; Px = survival; Lx = cumulative survivorship; Mx = fecundity; Vx = expected future reproduction

Projected population growth rates

Males: r = 0.0714; lambda = 1.0740; R0 = 1.760; T = 7.92

Females: r = 0.0700; lambda = 1.0725; R0 = 1.674; T = 7.36

Appendix 3: Ordered mean kinships

	Males					Females				
Rank	Stbk#	MK	Known	Age	Location	Stbk#	MK	Known	Age	Location
1	66	0.0457	100.0	25	CHICAGOLP	76	0.0460	100.0	23	MILWAUKEE
2	56	0.0494	100.0	28	NZP-WASH	122	0.0501	100.0	19	BALTIM AQ
3	139	0.0501	100.0	18	RIO GRAND	473	0.0585	100.0	5	CHICAGOLP
4	183	0.0533	100.0	16	MILWAUKEE	468	0.0593	100.0	6	FRESNO
5	475	0.0535	100.0	5	PITTS CA	158	0.0627	100.0	17	FRANKLINP
6	505	0.0585	100.0	4	FRESNO	251	0.0639	100.0	14	DALLAS WA
7	500	0.0585	100.0	5	CENTRALPK	399	0.0643	100.0	10	CENTRALPK
8	170	0.0592	100.0	17	DALLAS	358	0.0677	100.0	11	CINCINNAT
9	165	0.0610	100.0	17	CHICAGOBR	225	0.0688	100.0	14	OMAHA
10	266	0.0627	100.0	13	DALLAS WA	140	0.0702	100.0	18	SD-WAP
11	153	0.0630	100.0	18	BIRMINGHM	404	0.0704	100.0	10	PITTS CA
12	524	0.0645	100.0	2	SC AQUAR	351	0.0718	100.0	11	PHOENIX
13	306	0.0651	100.0	12	SAN ANTON	296	0.0718	100.0	12	DETROIT
14	359	0.0651	100.0	11	SAN ANTON	479	0.0731	100.0	6	SEDGWICK
15	365	0.0651	100.0	11	SAN ANTON	186	0.0745	100.0	16	STATEN IS
16	77	0.0659	100.0	23	SAN ANTON	167	0.0745	100.0	17	SEATTLE
17	88	0.0672	100.0	22	FRANKLINP	443	0.0751	100.0	8	SAN ANTON
18	285	0.0679	100.0	12	PROVIDNCE	474	0.0751	100.0	7	SAN ANTON
19	356	0.0679	100.0	11	LOSANGELE	195	0.0751	100.0	15	BIRMINGHM
20	213	0.0705	100.0	14	NY BRONX	465	0.0751	100.0	7	BIODOME
21	532	0.0707	100.0	2	LOWRY	442	0.0751	100.0	8	ASHEBORO
22	441	0.0708	100.0	8	SANDIEGOZ	369	0.0755	100.0	10	SANTA ANA
23	370	0.0714	100.0	10	TOLEDO	424	0.0756	100.0	9	TORONTO
24	438	0.0716	100.0	8	SEDGWICK	420	0.0756	100.0	9	TORONTO
25	423	0.0716	100.0	10	MOODY	194	0.0756	100.0	15	STATEN IS
26	297	0.0716	100.0	12	DETROIT	174	0.0756	100.0	16	SEATTLE
27	262	0.0718	100.0	13	TULSA	205	0.0757	100.0	15	TOLEDO
28	279	0.0718	100.0	12	SEATTLE	537	0.0761	100.0	1	TOLEDO
29	214	0.0718	100.0	14	OMAHA	538	0.0761	100.0	1	TOLEDO
30	235	0.0718	100.0	14	NZP-WASH	527	0.0761	100.0	3	MILWAUKEE
31	477	0.0731	100.0	6	DES MOINE	182	0.0772	100.0	16	AUDUBON
32	471	0.0734	100.0	6	SANDIEGOZ	542	0.0791	100.0	1	NZP-WASH
33	234	0.0745	100.0	14	PUEBLO	503	0.0794	100.0	4	ST LOUIS
34	259	0.0745	100.0	13	OMAHA	263	0.0810	100.0	13	ORLANDO
35	427	0.0751	100.0	9	SD-WAP	412	0.0823	100.0	9	SANDIEGOZ
36	236	0.0756	100.0	14	ASHEBORO	522	0.0839	100.0	3	ORLANDO
37	211	0.0763	100.0	15	AUDUBON	481	0.0839	100.0	7	NZP-WASH
38	303	0.0770	100.0	12	SEATTLE	506	0.0866	100.0	4	SANTA ANA
39	289	0.0777	100.0	12	DALLAS WA	507	0.0866	100.0	4	SANTA ANA
40	293	0.0777	100.0	12	CINCINNAT	87	0.0876	100.0	22	SANDIEGOZ
41	288	0.0783	100.0	12	BIODOME	545	---	---	2	SD-WAP
42	512	0.0791	100.0	4	JACKSONVL					
43	504	0.0794	100.0	4	MADISON					
44	425	0.0797	100.0	9	DALLAS WA					
45	464	0.0797	100.0	7	COLUMBIA					
46	511	0.0807	100.0	4	FRESNO					
47	283	0.0816	100.0	12	ORLANDO					
48	483	0.0839	100.0	6	ORLANDO					
49	518	0.0839	100.0	5	ORLANDO					
50	123	0.0853	100.0	19	PHILADELP					
51	446	0.0866	100.0	9	BALTIM AQ					
52	544	---	---	2	SD-WAP					

Ordered Mean Kinships for Unknown sex animals

Rank	Stbk#	MK	Known	Age	Location
1	444	0.0714	50.0	8	OMAHA
2	499	0.0731	100.0	5	DALLAS WA
3	533	0.0734	100.0	3	DALLAS WA
4	531	0.0752	100.0	3	LOWRY
6	482	0.0839	100.0	6	ORLANDO
7	463	---	---	7	OMAHA
8	485	---	---	6	OMAHA

Appendix 4: Definitions

Management Terms

PMP Complete Analysis and Breeding and Transfer Recommendations – The document resulting from a Master planning Session and a 30 day comment period of a draft plan providing breeding and transfer recommendations for a Population Management Plan. Full Participation is NOT required of all AZA member institutions; participation is voluntary. MOPs are NOT required of all AZA non-member institutions. Recommendations involving non-AZA institutions do not imply endorsement of the non-member by the AZA or the SPMAG Advisor.

Demographic Terms

Age Distribution -- A two-way classification showing the numbers or percentages of individuals in various age and sex classes.

Population Growth Rate (Lambda, λ) -- The proportional change in population size from one year to the next. Lambda can be based on life-table calculations (the expected lambda) or from observed changes in population size from year to year. A lambda of 1.11 means a 11% per year increase; lambda of .97 means a 3% decline in size per year.

Px, Age-Specific Survival – The probability that an individual of age *x* survives one time period; is conditional on an individual being alive at the beginning of the time period. Alternatively, the proportion of individuals which survive from the beginning of one age class to the next.

Qx, Mortality – Probability that an individual of age *x* dies during time period. Qx = 1-Px
The proportion of individuals that die during an age class. It is calculated from the number of animals that die during an age class divided by the number of animals that were alive at the beginning of the age class (i.e.-"at risk").

lx, Age-Specific Survivorship – The probability that a new individual (eg., age 0) is alive at the beginning of age x. Alternatively, the proportion of individuals which survive from birth to the beginning of a specific age class.

Mx, Fecundity – The average number of same-sexed young born to animals in that age class. Because SPARKS is typically using relatively small sample sizes, SPARKS calculates Mx as 1/2 the average number of young born to animals in that age class. This provides a somewhat less "noisy" estimate of Mx, though it does not allow for unusual sex ratios. The fecundity rates provide information on the age of first, last, and maximum reproduction.

Vx, **Reproductive Value** – The expected number of offspring produced this year and in future years by an animal of age x.

Ex, Life Expectancy – Average years of further life for an animal in age class x.

Risk (Qx or Mx) – The number of individuals that have lived during an age class. The number at risk is used to calculate Mx and Qx by dividing the number of births and deaths that occurred during an age class by the number of animals at risk of dying and reproducing during that age class.

Genetic Terms

Current Gene Diversity (GD) -- 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 be identical by descent. Gene diversity is calculated from allele frequencies, and is the heterozygosity expected in progeny produced by random mating, and if the population were in Hardy-Weinberg equilibrium.

Effective Population Size (Inbreeding N_e) -- The size of a randomly mating population of constant size with equal sex ratio and a Poisson distribution of family sizes that would (a) result in the same mean rate of inbreeding as that observed in the population, or (b) would result in the same rate of random change in gene frequencies (genetic drift) as observed in the population. These two definitions are identical only if the population is demographically stable (because the rate of inbreeding depends on the distribution of alleles in the parental generation, whereas the rate of gene frequency drift is measured in the current generation).

Founder – An individual obtained from a source population (often the wild) that has no known relationship to any individuals in the derived population (except for its own descendants).

Founder Genome Equivalents (FGE) – The number wild-caught individuals (founders) that would produce the same amount of gene diversity as does the population under study. The gene diversity of a population is 1 - 1 / (2 * FGE).

Founder Genome Surviving – The sum of allelic retentions of the individual founders (i.e, the product of the mean allelic retention and the number of founders).

Inbreeding Coefficient (F) -- Probability that the two alleles at a genetic locus are identical by descent from an ancestor common to both parents. The mean inbreeding coefficient of a population will be the proportional decrease in observed heterozygosity relative to the expected heterozygosity of the founder population.

Mean Generation Time (T) -- The average time elapsing from reproduction in one generation to the time the next generation reproduces. Also, the average age at which a female (or male) produces offspring. It is not the age of first reproduction. Males and females often have different generation times.

Mean Kinship (MK) -- The mean kinship coefficient between an animal and all animals (including itself) in the living, captive-born population. The mean kinship of a population is equal to the proportional loss of gene diversity of the descendant (captive-born) population relative to the founders and is also the mean inbreeding coefficient of progeny produced by random mating. Mean kinship is also the reciprocal of two times the founder genome equivalents: MK = 1 / (2 * FGE). MK = 1 - GD.

Percent Known -- Percent of an animal's genome that is traceable to known Founders. Thus, if an animal has an UNK sire, the % Known = 50. If it has an UNK grandparent, % Known = 75.

KV, Kinship Value – *The weighted mean kinship of an animal, with the weights being the reproductive values of each of the kin. The mean kinship value of a population predicts the loss of gene diversity expected in the subsequent generation if all animals were to mate randomly and all were to produce the numbers of offspring expected for animals of their age.*

GU, Genome Uniqueness – Probability that an allele sampled at random from an individual is not present, identical by descent, in any other living individual in the population. GU-all is the genome uniqueness relative to the entire population. GU-Desc is the genome uniqueness relative to the living non-founder, descendants.

Prob Lost – Probability that a random allele from the individual will be lost from the population in the next generation, because neither this individual nor any of its relatives pass on the allele to an offspring. Assumes that each individual wil produce a number of future offspring equal to its reproductive value, Vx.

FOKE, First Order Kin Equivalents – The number of first-order kin (siblings or offspring) that would contain the number of copies of an individuals alleles (identical by descent) as are present in the captive-born population. Thus an offspring or sib contributes 1 to FOKE; each grand-offspring contributes 1/2 to FOKE; each cousin contributes 1/4 to FOKE. FOKE = 4*N*MK, in which N is the number of living animals in the captive population.

Representation -- Number of copies of a founder's genome that are present in the living descendants. Each offspring contributes 0.5 to Representation, each grand-offspring contributes 0.25, etc.

Allele Retention – The probability that a gene present in a founder individual exists in the living, descendant population.

Appendix 5: Institutional representatives

Name	Zoo	Email
Mark Myers	Audubon Zoological Gardens	birds@audubooninstitute.org
Serge Pepin	Biodome de Montreal	spepin@ville.montreal.qc.ca
Tim Snyder	Birmingham Zoo	tsnyder@birminghamzoo.com
Kevin Drees	Blank Park Zoo	kevin.drees@blankparkzoo.com
Chris Sheppard	Bronx Zoo/WCS	csheppard.wcs@mcimail.com
Anne Oiler	Brookfield Zoo	anoiler@brookfieldzoo.org
Kapetanakos, Yula	Central Park Wildlife Center	ykapetanakos@wcs.org
Dale Thompson	Chaffee Zoological Gardens	toucan@chaffeezoo.org
David Oehler	Cincinnati Zoo	sinornis513@aol.com
Jan Raines	Dallas World Aquarium	learjan@hotmail.com
Chris Brown	Dallas Zoo	avicons@airmail.net
Thomas Schneider	Detroit Zoological Institute	tschneider@detroitzoo.org
Fred Beall	Franklin Park Zoo (Zoo New England)	fbeall@zoonewengland.com
Donna Bear-Hull	Jacksonville Zoo	bear-hulld@jacksonvillezoo.org
Megan Ross	Lincoln Park Zoo	mross@lpzoo.org
Susie Kasielke	Los Angeles Zoo	Skasielk@ZOO.LACITY.ORG
Jennifer Hackshaw	Lowry Park Zoo	lpz61@aol.com
Jeff Stafford	Madison - Henry Vilas	stafford@co.dane.wi.us
Kim Smith	Milwaukee Country Zoo	ksmith@milwcnty.com
Lori Smith	National Aquarium in Baltimore	lsmith@aqua.org
Nicole Begley	National Aviary in Pittsburgh	nicole.begley@aviary.org
Paul Tomassoni	National Zoological Park	tomassonip@.si.edu
Ken Reininger	North Carolina Zoo	ken.reininger@ncmail.net
Dan Cassidy	Omaha's Henry Doorly Zoo	danc@omahazoo.com
Aliza Baltz, PhD	Philadelphia Zoological Garden	Baltz.Aliza@phillyzoo.org
Geoff Hall	Phoenix Zoo	ghall@thephxzoo.com
Marilyn McBirney	Pueblo Zoo	marilyn.pueblozoo@coyotenet.net
Peter Shannon	Rio Grande	pshannon@cabq.gove
Martin Vince	Riverbanks Zoological Park & Botanical Garden	mvince@riverbanks.org
Pat Sharkey	Roger Williams Park Zoo	psharkey@rwpzoo.org
Mike Macek	Saint Louis Zoo	macek@stlzoo.org
Josef San Miguel	San Antonio Zoo	curbirds@sazoo-aq.org
Michael Mace	San Diego WAP	mmace@sandiegozoo.org
Dave Rimlinger	San Diego Zoo	drimlinger@sandiego.org
Connie Sweet	Santa Ana Zoo	csweet@ci.santa-ana.ca.us
Sherry Branch	Sea World Orlando	sherry.branch@seaworld.com
Jason Crichton	South Carolina Aquarium	jcrichton@scaquarium.org
Joe Barkowski	Sedgwick County Zoo	jbarkowski@scz.org
Ken Kawata	Staten Island Zoo	sizoobob@aol.com
Robert Webster	Toledo Zoological Gardens	robert.webster@toledozoo.org
Tom Mason	Toronto Zoo	tmason@torontozoo.ca
Diane Fell	Tulsa Zoo	dianefell@ci.tulsa.ok.us
	Woodland Park Zoo	bruce.bohmke@zoo.org