

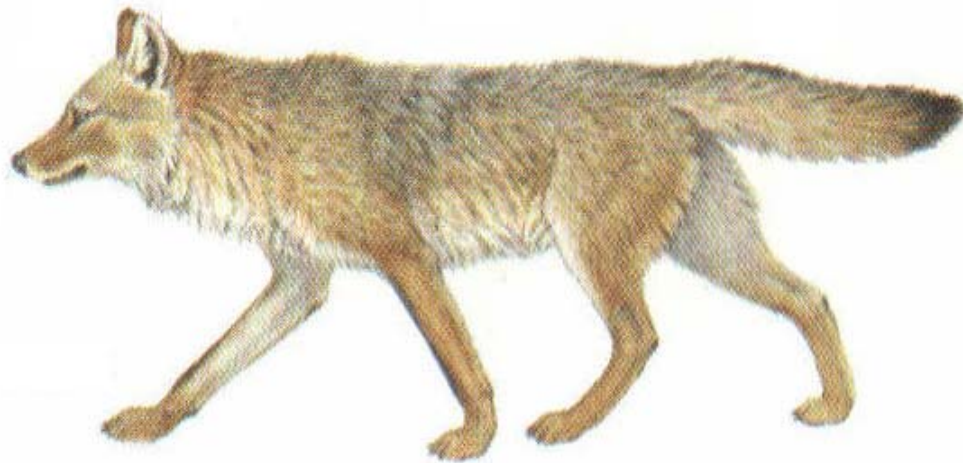
Summary Population Analysis And Breeding/Transfer Plan

15 July 2002

Red Wolf

Canis rufus gregoryi

Species Survival Plan[®]



Species Coordinator

Will Waddell, Point Defiance Zoo & Aquarium

REGIONAL STUDBOOK KEEPER

Will Waddell, Point Defiance Zoo & Aquarium

SPMAG ADVISOR

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Executive Summary

Breeding/Transfer Plan - Red Wolf SSP[®]

The captive population of red wolves consists of 164 (79.85) animals at 32 participating institutions as of July 2002. The population has been growing steadily in captivity since the early 1970s, with a slight decline in numbers in recent years. The target population size set by the SSP and the Canid Taxon Advisory Group is 250.

Current gene diversity for the managed population is 90.45% with 8.33 founder genomes surviving, which represents the descendants of 12 founders. Founder Genome Equivalents (fge) = 5.23. When gene diversity falls below 90%, reproduction could be increasingly compromised by lower birth weights, smaller litter sizes, and greater neonatal mortality among other factors. To maintain gene diversity at or above 90% for a few more years, without importation of additional founders, the population needs to increase in size and/or increase the proportion of breeders in the population. More realistically, gene diversity can be maintained at or above 85% for 21 years at the current population size and with a growth rate of 4%, or for 29 years with a maximum population size of 250.

Demography		
	Current	Target
Current Population Size	164(79.85)	250
Specimens Excluded from Genetic Analyses	19	
Number of Participating Institutions	32	
Mean Generation Time (years)	5.22	
Number of Transfers Within SSP (Breeding/Space)	To be determined	
Number of Specimens to Import/Export	0	
Genetics		
	Current	Potential
Number of Founders	12	0
Founder Genome Equivalents (FGE)	5.23	8.31
Current Gene Diversity (% of Wild)	90.45	93.98
Mean Inbreeding Coefficient	0.0542	
Years to 90% Gene Diversity	0	
Gene Diversity at 100 years	74.71	

For the 2003 breeding season, 37 breeding recommendations have been recommended; all of which will maintain or increase gene diversity if they are successful. Eighteen animals were determined not to be good candidates for breeding and were removed from analysis for the pool of potential pairs. Of these, 2.1 have been permanently sterilized, 5.0 are either aspermic or oligospermic, and 0.9 are considered post-reproductive.

Pairings are based on mean kinship, avoidance of inbreeding, avoidance of linking rare and common lineages, and logistical constraints identified by the participating institutions. Although inbreeding should be avoided in order to maintain a healthy captive population, it has become increasingly difficult to avoid in this population since no additional founders exist. Higher levels of inbreeding will need to be tolerated in forming reproductive pairs and long term genetic goals will need to be set at lower than 90% gene diversity. The Red Wolf Recovery Plan (USFWS) sets target gene diversity to be retained at 80 – 85%. The SSP should continue to monitor the population and consider, from a health standpoint, the level of inbreeding that is tolerable in this species.

The SSP also recommends reproductive evaluations, in the form of year round fecal sampling, of all females that may be considered for breeding this season or in the near future. Further instructions and protocol will be provided by contacting Dr. Karen Goodrowe, Red Wolf SSP Reproduction Advisor, PDZA (253-404-3680 – kareng@tacomaparks.com).

Summary Actions 2002-2003: The RWSSP recommended establishing 37 breeding pairs with no exportations or importations. Since establishing breeding and transfer recommendations at the Toronto meeting, to this current finalized document, a number of changes were required to make adjustments in the Toronto recommendations due to deaths in the population, medical issues involving wolves designated for breeding or transfer, needs of the free ranging population, and space or logistical considerations.

Summary of 2001-2002 activities

❖ 34 pairing recommended

- Average age male ~ 7 yr old (1-15)
- Ave. age female ~7.5 yr. old (1-13)
- 2 pairings not completed – space/logistics
- 3 males aspermic/poor quality/quantity
- 2 wolves died prior to season
- 2 wolves died during/after season

❖ 25 pairings made (75% of recommended pairings)

- 8 known to conceive – 30%
- 12.15 (27) pups
- 2.4 did not survive
 - 2.0 died in-utero
 - fostered
- 8.11 (19) survived – 70%
- Ave. age sires at whelping – 7.6 yr
- Ave. age dam at whelping – 6.8 y

Acknowledgements

The Red Wolf SSP master planning meeting was hosted by the Toronto Zoo in Scarborough, Ontario, Canada on 12 – 13 July 2002 and was attended by the following:

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Laurie Spangler, Mill Mountain Zoo
Sherry Samuels, North Carolina Museum Life & Science
Karen Goodrowe, Point Defiance Zoo & Aquarium
Bud Fazio, U. S. Fish and Wildlife Service

SUMMARY BREEDING/TRANSFER PLAN
Red Wolf SSP July 2002

STUD_ID	LOCATION	LOCAL_ID	SEX	RECOMMENDATION
348	PROVIDNCE	911002	Neutered Female	Hold and Do Not Breed
359	LOWRY	100236	Neutered Male	Hold and Do Not Breed
364	TACOMA	0364	Female	Hold and Do Not Breed
387	SYRACUSE	M90082	Male	Breed with 690
390	FOSSILRIM	5038	Female	Hold and Do Not Breed
406	NCS RAL	10406	Male	Hold and Do Not Breed
409	TACOMA	0409	Female	Hold and Do Not Breed
419	SIOUX FAL	1439	Female	Hold and Do Not Breed
432	ASHEVILLE	432	Male	Breed with 983
436	TACOMA	0436	Male	Hold and Do Not Breed
439	TACOMA	0439	Female	Hold and Do Not Breed
441	ASHEBORO	1473	Female	Hold and Do Not Breed
469	LOWRY	100817	Male	TBD
471	ASHEBORO	1474	Male	TBD
477	BREVARD	940651	Male	Hold and Do Not Breed
478	AWENDA	478	Male	Breed with 818
479	CARLOS AV	890182	Male	Breed with 937
482	ASHEBORO	1467	Male	Hold and Do Not Breed
483	CARLOS AV	483	Female	Hold and Do Not Breed
491	WCSRC	9906	Male	Breed with 925
492	TACOMA	0492	Male	Hold and Do Not Breed
493	MILL MOUN	436	Female	Hold and Do Not Breed
494	TALLAHASE	494	Female	Hold and Do Not Breed
511	FRESNO	6583	Male	TBD
513	FOSSILRIM	5028	Male	Hold and Do Not Breed
514	FOSSILRIM	5029	Male	Hold and Do Not Breed
515	TACOMA	0515	Female	Hold and Do Not Breed
516	CHATT NAT	516	Female	Hold and Do Not Breed
520	MANTEO	520	Male	Hold and Do Not Breed
521	AWENDA	521	Male	Hold and Do Not Breed
531	TACOMA	531	Female	Breed with 651
533	CARLOS AV	533	Female	Hold and Do Not Breed
534	CARLOS AV	534	Female	Hold and Do Not Breed
535	CARLOS AV	535	Female	Transfer and Do Not Breed
537	MANTEO	537	Male	Hold and Do Not Breed
543	TACOMA	0543	Male	Hold
549	TALLAHASE	97L002	Male	Breed with 578
550	ASHEBORO	1382	Female	Hold and Do Not Breed
551	ASHEBORO	1383	Female	Hold and Do Not Breed
557	VICTOR TX	960029	Female	Breed with 1092
559	JACKSONVL	801304	Female	Breed with 1091
562	TACOMA	0562	Female	Breed with 652
568	TACOMA	0568	Male	Hold
569	TACOMA	M0002	Male	Breed with 603
571	BRIDGEPRT	101336	Female	Breed with 817
574	TACOMA	0574	Male	Breed with 1098
576	TACOMA	0576	Female	Breed with 924
578	LOWRY	101351	Female	Breed with 549
579	FORTWORTH	200766	Female	Breed with 956 or 957
603	TACOMA	0603	Female	Breed with 569

STUD_ID	LOCATION	LOCAL_ID	SEX	RECOMMENDATION
604	AWENDA	0604	Female	Breed with 689
605	FORTWORTH	200931	Male	TBD
606	TACOMA	0606	Female	TBD
607	TACOMA	0607	Female	Breed with 956 or 957
619	CARLOS AV	619	Male	Transfer and Do Not Breed
620	CHATT NAT	620	Male	Hold and Do Not Breed
621	CARLOS AV	621	Male	Transfer and Do Not Breed
622	KNOXVILLE	1568	Female	Hold and Do Not Breed
624	PROVIDNCE	931051	Female	Breed with 1097
632	NCS RAL	10632	Male	Hold and Do Not Breed
636	TREVOR	93M423	Male	TBD
637	GOLDENPND	637	Female	Breed with 791
640	AWENDA	640	Male	Breed with 744
645	GREENBAY	990003	Male	Hold and Do Not Breed
646	GREENBAY	990004	Female	Hold and Do Not Breed
647	TALLAHASE	00L007	Female	Breed with 722
648	TACOMA	0648	Female	Breed with 939
651	TACOMA	0651	Male	Breed with 531
652	TACOMA	0652	Male	Breed with 562
687	TACOMA	0687	Male	Hold and Do Not Breed
688	TACOMA	0688	Male	Hold and Do Not Breed
689	SPRINGFIE	_____	Male	Breed with 604
690	SYRACUSE	M01009	Female	Breed with 387
692	FOSSILRIM	_____	Female	Hold and Do Not Breed
701	TACOMA	0701	Male	Hold and Do Not Breed
702	TACOMA	0702	Male	Hold and Do Not Breed
703	TACOMA	0703	Female	Hold and Do Not Breed
704	TACOMA	0704	Female	Hold and Do Not Breed
705	TACOMA	0705	Female	Hold and Do Not Breed
719	MANTEO	719	Female	Breed with 953 or 1117
720	MANTEO	720	Female	Breed with 953 or 1117
722	GOLDENPND	722	Male	Breed with 647
723	AWENDA	723	Male	Hold and Do Not Breed
724	AWENDA	724	Male	Hold and Do Not Breed
725	LOWRY	100721	Female	TBD
726	LOWRY	100722	Female	TBD
729	MANTEO	10729	Male	Hold and Do Not Breed
730	ASHEBORO	1385	Female	Hold and Do Not Breed
740	BLOOMINGT	M94042	Male	Breed with 819
742	BLOOMINGT	M94046	Male	Hold and Do Not Breed
743	WCSRC	9503	Female	Breed with 816
744	WCSRC	9504	Female	Breed with 640
790	TACOMA	0790	Male	Breed with 1123
791	CARLOS AV	791	Male	Breed with 637
792	TACOMA	0792	Female	TBD
793	BREVARD	940650	Female	Hold and Do Not Breed
816	MILL MOUN	467	Male	Breed with 743
817	BRIDGEPRT	101335	Male	Breed with 571
818	AWENDA	818	Female	Breed with 478
819	WCSRC	20009	Female	Breed with 740
842	JACKSONVL	801303	Male	Transfer and Do Not Breed
917	KNOXVILLE	1896	Neutered Male	Hold and Do Not Breed
918	DURHAN MS	918	Female	Hold and Do Not Breed
919	ASHEBORO	1409	Female	Hold and Do Not Breed

STUD_ID	LOCATION	LOCAL_ID	SEX	RECOMMENDATION
921	ALEXANDRI	M00090	Female	Breed with 923
923	ALEXANDRI	M00095	Male	Breed with 921
924	TACOMA	0924	Male	Breed with 576
925	TACOMA	0925	Female	Breed with 491
932	TALLAHASE	01L008	Male	TBD
937	MANTEO	937	Female	Breed with 479
938	TACOMA	0938	Female	TBD
939	TACOMA	0939	Male	Breed with 648
953	DURHAM MS	953	Male	Breed with 719 or 720
956	SIOUX FAL	2161	Male	Breed with 579
957	SIOUX FAL	2163	Male	Breed with 607
958	SIOUX FAL	2164	Female	Breed with 1131
974	MANTEO	10974	Male	Hold and Do Not Breed
983	ASHEVILLE	983	Female	Breed with 432
1009	TACOMA	01009	Female	Hold and Do Not Breed
1010	TACOMA	01010	Female	Hold and Do Not Breed
1020	WHEELING	3053	Male	Hold and Do Not Breed
1021	WHEELING	3052	Female	Hold and Do Not Breed
1091	ASHEBORO	1562	Male	Breed with 559
1092	VICTOR TX		Male	Breed with 557
1095	TACOMA	01095	Male	Hold and Do Not Breed
1096	TACOMA	01096	Female	Hold and Do Not Breed
1097	PROVIDNCE	100119	Male	Breed with 624
1098	TACOMA	01098	Female	Breed with 574
1117	WCSRC	200105	Male	Breed with 719 or 720
1118	WCSRC	200106	Female	Breed with 780
1121	RACINE	M0133	Male	Hold and Do Not Breed
1122	RACINE	M0134	Male	Hold and Do Not Breed
1123	RACINE	M0135	Female	Breed with 790
1124	BREVARD	940712	Male	Hold and Do Not Breed
1125	BREVARD	940713	Male	Hold and Do Not Breed
1126	BRIDGEPRT	101360	Female	Hold and Do Not Breed
1127	BRIDGEPRT	101359	Female	Hold and Do Not Breed
1128	JACKSON	200136	Female	Hold and Do Not Breed
1129	JACKSON	200137	Female	Hold and Do Not Breed
1130	JACKSON	200138	Female	Hold and Do Not Breed
1131	BINGHAMTO	211010	Male	Breed with 958
1193	DURHAM MS	2M0202	Male	Hold and Do Not Breed
1194	DURHAM MS	3M0202	Male	Hold and Do Not Breed
1195	DURHAM MS	4M0202	Female	Transfer and Do Not Breed
1196	DURHAM MS	5M0202	Female	Transfer and Do Not Breed
1197	DURHAM MS	6M0202	Female	Transfer and Do Not Breed
1200	ASHEBORO	1573	Male	Hold and Do Not Breed
1201	ASHEBORO	1574	Male	Hold and Do Not Breed
1203	ASHEBORO	1576	Female	Hold and Do Not Breed
1204	ASHEBORO	1577	Female	Hold and Do Not Breed
1223	TACOMA	01223	Male	Hold and Do Not Breed
1224	TACOMA	01224	Female	Hold and Do Not Breed
1225	TACOMA	01225	Female	Hold and Do Not Breed
1226	TACOMA	01226	Female	Hold and Do Not Breed
1227	TACOMA	01227	Female	Hold and Do Not Breed
1228	TACOMA	01228	Female	Hold and Do Not Breed

BREEDING & TRANSFER PLANS by INSTITUTION

Institution: ALEXANDRI

Alexandria Zoological Park
P.O. Box 71
Alexandria, LA, 71301-4240
Leslie Whitt, Director
(318)473-1385

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
923	M	5	HOLD	ALEXANDRI	BREED	921	Current pairing established last year and produced 1.1 pups, however neither pup survived
921	F	5	HOLD	ALEXANDRI	BREED	923	See above

Summary:

1 male, 1 female **before** recommendations
1 male, 1 female **after** recommendations

Institution: ASHEBORO

North Carolina Zoological Park
4401 Zoo Pkwy.
Asheboro, NC, 27203-9416
Lorraine Smith, Curator of Mammals
(336)879-7603

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
441	F	12	HOLD	ASHEBORO	PAIR WITH	TBD	Unlikely to reproduce due to age. Can be paired with a compatible male if needed.
471	M	11	HOLD	ASHEBORO	TBD		Recommended to breed with 637F (Golden Pond) at Trevor, but report on health condition (Nov. 02) determined unable to transfer.
482	M	11	HOLD	ASHEBORO	DO NOT BREED		
550	f	10	HOLD	ASHEBORO	DO NOT BREED		
551	F	10	HOLD	ASHEBORO	DO NOT BREED		Possible transfer TBD
730	F	8	HOLD	ASHEBORO	DO NOT BREED		
919	F	5	HOLD	ASHEBORO	DO NOT BREED		
1091	M	2	SEND TO	JACKSONVILLE	BREED WITH	559	Male paired last year with 441 but her age limited reproductive success. Male's young age allows breeding potential in future.
1200	M	0	HOLD	ASHEBORO	DO NOT BREED		
1201	M	0	HOLD	ASHEBORO	DO NOT BREED		
1203	F	0	HOLD	ASHEBORO	DO NOT BREED		
1204	F	0	HOLD	ASHEBORO	DO NOT BREED		

Summary:

5 males, 7 females **before** recommendations
4 males, 7 females **after** recommendations

Institution: ASHEVILLE

Western NC Nature Center
 Gashes Creek Rd.
 Asheville, NC, 28805
 Bob Fay, Animal Curator
 (828)298-5600 x309

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
432	M	12	HOLD	ASHEVILLE	BREED WITH	983	Current paired established late last season. Male is proven but at or near reproductive senescence. Last year was first breeding opportunity for female.
983	F	4	HOLD	ASHEVILLE	BREED WITH	432	See above.

Summary:

1 male, 1 female **before** recommendations

1 male, 1 female **after** recommendations

Institution: AWENDA

Cape Romain National Wildlife Refuge
 390 Bulls Island Rd.
 Awenda, SC, 29429
 George Garris, Refuge Manager
 (843)928-3264

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
449	F	11	HOLD	AWENDA	PAIR WITH	TBD	Female has been free-ranging on Island for several years. Need to replace with younger female.
478	M	11	HOLD	AWENDA	BREED WITH	818	Pair produced one pup last year but did not survive. Housed at Sewee.
521	M	10	HOLD	AWENDA	DO NOT BREED		
604	F	9	SEND TO	SPRINGFLD	BREED WITH	689	
640	M	9	HOLD	AWENDA	BREED WITH	744	Receive 744 from WCSRC. First breeding opportunity for female.
723	M	8	HOLD	AWENDA	DO NOT BREED		Housed at Sewee
724	M	8	HOLD	AWENDA	DO NOT BREED		Housed at Sewee
780	M	7	HOLD	AWENDA	BREED WITH	1118	Receive 1118 from WCSRC for release on Bulls Isl and paired with male 780 who is free-ranging on Isl.
818	F	6	HOLD	AWENDA	BREED WITH	478	See above.
1165	F	1	SEND TO	MANTEO	RELEASE		
1166	M	1	SEND TO	MANTEO	RELEASE		

Summary:

7 males, 4 females **before** recommendations

6 males, 4 females **after** recommendations

Institution: BINGHAMTO

Ross Park Zoo
 185 Park Ave.
 Binghamton, NY, 13903
 Steve Contento, Director
 (607)724-5461

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
1131	M	1	HOLD	BINGHAMTO	BREED WITH	958	Receive 958F from Great Plains Zoo, SD. First breeding opportunity for both wolves.

Summary:

1 male, 0 female **before** recommendations
 1 male, 1 female **after** recommendations

Institution: BLOOMINGT

Miller Park Zoo
 1020 S Morris Ave.
 Bloomington, IL, 61701-6351
 John Tobias, Director
 (309)434-2825

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
740	M	8	SEND TO	WCSRC	BREED	819	
742	M	8	HOLD	BLOOMINGT	PAIR WITH	535	Receive 535F from Wildlife Science Center, MN. Reproduction unlikely based on previous semen evaluation of male.

Summary:

2 males, 0 female **before** recommendations
 1 male, 1 female **after** recommendations

Institution: BREVARD

Brevard Zoo
 8225 N. Wickham Rd.
 Melbourne, FL, 32940-7924
 Michelle Smurl, Curator
 (321)254-9453 x17

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
477	M	11	HOLD	BREVARD	DO NOT BREED		
793	F	7	HOLD	BREVARD	DO NOT BREED		
1124	M	1	HOLD	BREVARD	DO NOT BREED		
1125	M	1	HOLD	BREVARD	DO NOT BREED		

Summary:

3 males, 1 female **before** recommendations

3 males, 1 female **after** recommendations

Institution: BRIDGEPRT

Beardsley Zoological Gardens
 1875 Noble Ave.
 Bridgeport, CT, 06610
 Don Goff, General Curator
 (203)394-6564

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
571	F	10	HOLD	BRIDGEPRT	BREED WITH	817	Maintained in family group last year as breeding pair but no pups
817	M	6	HOLD	BRIDGEPRT	BREED WITH	571	See above.
1126	F	1	SEND TO	VALIVMUS*	DO NOT BREED		*Virginia Living Museum pending Non-AZA approval
1127	F	1	SEND TO	VALIVMUS	DO NOT BREED		See above.

Summary:

1 male, 3 females, **before** recommendations

1 male, 1 female, **after** recommendations

Institution: CARLOS AV

Wildlife Science Center (Carlos Avery)
 5463 West Broadway
 Forest Lake, MN, 55025
 Margaret Callahan, Director
 (651)464-3993

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
479	M	12	HOLD	CARLOS AV	BREED WITH	937	Receive 937F from Manteo. First breeding opportunity for female.
483	F	12	HOLD	CARLOS AV	PAIR WITH	TBD	Female unlikely to reproduce due to age. Can be paired with male if needed.
533	F	10	HOLD	CARLOS AV	DO NOT BREED		
534	F	10	HOLD	CARLOS AV	DO NOT BREED		
535	F	10	SEND TO	BLOOMINGT	DO NOT BREED		
619	M	9	SEND TO	WCSRC	DO NOT BREED		
621	M	9	SEND TO	WCSRC	DO NOT BREED		
791	M	7	TBD	CARLOS AV TREVOR	BREED WITH	TBD 637?	Planning to send male to Trevor as replacement for 471M (Asheboro) pairing with 637F (Golden Pond)

Summary:

4 males, 4 females **before** recommendations
 1-2 males, 4 females **after** recommendations

Institution: CHATT NAT

Tennessee Wildlife Center
 400 Garden Road
 Chattanooga, TN, 37419
 Debbie Lipsey, Animal Manager
 (423)821-1160 x106

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
516	F	10	HOLD	CHATT NAT	DO NOT BREED		
620	M	9	HOLD	CHATT NAT	DO NOT BREED		

Summary:

1 male, 1 female **before** recommendations
 1 male, 1 female **after** recommendations

Institution: DURHAM MS

N C Museum of Life and Science
 433 Murray Ave.
 Durham, NC, 27704
 Sherry Samuels, Animal Director
 (919)220-5429 x333

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
918	F	5	HOLD	DURHAN MS	DO NOT BREED		
953	M	4	SEND TO	MANTEO	BREED WITH	720	
1193	M	0	HOLD	DURHAN MS	DO NOT BREED		
1194	M	0	HOLD	DURHAN MS	DO NOT BREED		
1195	F	0	SEND TO	OKLAHOMA	DO NOT BREED		
1196	F	0	SEND TO	OKLAHOMA	DO NOT BREED		
1197	F	0	SEND TO	OKLAHOMA	DO NOT BREED		

Summary:

3 males, 4 females **before** recommendations
 2 males, 1 female **after** recommendations

Institution: FORTWORTH

Fort Worth Zoo
 1989 Colonial Parkway
 Fort Worth, Texas 76110
 Stacey Johnson, Curator
 (817)759-7190

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
579	F	10	HOLD	FT WORTH	BREED WITH	956	Receive 956M (or 957M) from Great Plains Zoo. First breeding opportunity for male.
605	M	9	HOLD	FT WORTH	TBD		Recommended for transfer to Tacoma for breeding, but health issues determined unable to transfer.

Summary:

1 male, 1 female **before** recommendations
 1-2 male, 1 female **after** recommendations

Institution: FOSSILRIM

Fossil Rim Wildlife Center
P.O. Box 2189
Glen Rose, TX, 76043
Mary Jo Stearns, Curator
(254)897-2960 x314

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
390	F	13	HOLD	FOSSIL RIM	DO NOT BREED		
513	M	10	HOLD	FOSSIL RIM	DO NOT BREED		
514	M	10	HOLD	FOSSIL RIM	DO NOT BREED		
692	F	8	HOLD	FOSSIL RIM	DO NOT BREED		

Summary:

2 male, 2 female **before** recommendations
2 male, 2 female **after** recommendations

Institution: FRESNO

Chaffee Zool Gardens of Fresno
894 W Belmont Ave.
Fresno, CA, 93728-2891
Dale Thompson, General Curator
(559)498-4981

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
511	M	10	SEND TO	TBD	TBD		Transfer male and replace with wolves following completion of pen modification.

Summary:

1 male, 0 female **before** recommendations
0 male, 0 female **after** recommendations - TBD

Institution: GOLDENPND

Land Between the Lakes
 100 Van Morgan Dr.
 Golden Pond, KY, 42211
 Steve Bloemer, Biologist
 (270)924-2000

Institutional notes: Plan to send two male siblings 1200 & 1201 from Asheboro.

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
637	F	9	SEND TO	TREVOR	BREED WITH	791	
722	M	8	SEND TO	TALLAHASE	BREED WITH	647	

Summary:

1 male, 1 female **before** recommendations
after recommendations to be determined

Institution: GREENBAY

NEW Zoo
 P.O. Box 23600
 Green Bay, WI, 54305-3600
 Neil Anderson, Director
 (920)434-8597

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
645	M	9	HOLD	GREENBAY	DO NOT BREED		
646	F	9	HOLD	GREENBAY	DO NOT BREED		

Summary:

1 male, 1 female **before** recommendations
 1 male, 1 female **after** recommendations

Institution: JACKSON

Jackson Zoo
 2918 W. Capitol St.
 Jackson, MS 39209
 Dave Wetzel, Animal Curator
 (601) 352-2590

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
1128	F	1	HOLD	JACKSON	DO NOT BREED		
1129	F	1	HOLD	JACKSON	DO NOT BREED		
1130	F	1	HOLD	JACKSON	DO NOT BREED		

Summary:

0 male, 3 female **before** recommendations
 0 male, 3 female **after** recommendations

Institution: JACKSONVL

Jacksonville Zoological Gardens
8605 Zoo Parkway
Jacksonville, FL, 32218-5769
Craig Miller, Curator of Mammals
(904)757-4463 x136

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
559	F	10	HOLD	JACKSONVL	BREED WITH	1091	Receive 1091 from Asheboro.
842	M	6	SEND TO	TALLAHASE	PAIR WITH	494	

Summary:

1 male, 1 female **before** recommendations
1 male, 1 female **after** recommendations

Institution: KNOXVILLE

Knoxville Zoological Gardens
P.O. Box 6040
Knoxville, TN, 37914
Lisa New, Animal Director
(865)637-5331 x329

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
622	F	9	HOLD	KNOXVILLE	DO NOT BREED		
917	m	5	HOLD	KNOXVILLE	DO NOT BREED		

Summary:

1 male, 1 female **before** recommendations
1 male, 1 female **after** recommendations

Institution: LOWRY

Lowry Park Zoological Garden
 7530 North Blvd.
 Tampa, FL, 33604-4756
 Jennifer Hackshaw, General Curator
 (813)935-8552 x221

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
359	m	13	HOLD	LOWRY	TBD		
469	M	11	HOLD	LOWRY	BREED WITH	725	New pairing. First breeding opportunity for both wolves.
578	F	10	HOLD	LOWRY	BREED WITH	549	Receive 549 from Tallahase. Female's age limits reproductive success.
726	F	8			BREED WITH	479	479M current location is Wildlife Science Center (Carlos Avery). First breeding opportunity for both wolves. Female has been implanted with MGA. Location to be determined.
725	F	8	HOLD	LOWRY	BREED WITH	469	New pairing. First breeding opportunity for both wolves.

Summary:

2 males, 3 females **before** recommendations
after recommendations to be determined

Institution: MANTEO

Alligator River National Wildlife Refuge
 P.O. Box 1969
 Manteo, NC, 27954
 Art Beyer, Biologist
 (919)473-1131 x241

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
520	M	10	HOLD	MANTEO	DO NOT BREED		
537	M	10	HOLD	MANTEO	DO NOT BREED		
719	F	8	HOLD	MANTEO	BREED WITH	953	Receive 953 from Durham.
720	F	8	HOLD	MANTEO	BREED WITH	1117	Receive 1117 from WCSRC.
729	M	8	HOLD	MANTEO	DO NOT BREED		
937	F	4	SEND TO	CARLOS AV	BREED WITH	479	
974	M	3	HOLD	MANTEO	DO NOT BREED		

Summary:

4 males, 3 females **before** recommendations
 6 males, 2 females **after** recommendations

Institution: MILL MOUN

Mill Mountain Zoo
 P.O. Box 13484
 Roanoke, VA, 24034
 Laurie Spangler, Cons. Coordinator
 (540)343-3241

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
493	F	11	HOLD	MILL MOUN	DO NOT BREED		
816	M	8	HOLD	MILL MOUN	BREED	743	Receive 743 from WCSRC. First breeding opportunity for female.

Summary:

1 male, 1 female **before** recommendations
 1 male, 2 females **after** recommendations

Institution: NCSU-USFWS

Department of Clinical Sciences
 College of Veterinary Medicine
 North Carolina State University
 4700 Hillsborough St.
 Raleigh, NC 27606
 Michael Stoskopf, DVM
 (919)513-6279

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
406	M	12	HOLD	NCSU-USFWS	DO NOT BREED		
632	M	9	HOLD	NCSU-USFWS	DO NOT BREED		

Summary:

2 males, 0 females **before** recommendations
 2 male, 0 female **after** recommendations

Institution: OKLAHOMA

Oklahoma City Zoo
 2101 N.E. 50th St.
 Oklahoma City, OK 73111
 Eddie Witte, Senior Keeper
 (405) 425-0240

Institutional Notes: New RWSSP Cooperator **will receive female siblings 1195, 1196, 1197 from Durham, NC.**

Institution: PROVIDNCE

Roger Williams Park Zoo
 1000 Elmwood Ave.
 Providence, RI, 02907-3600
 Ron Martini, Lead Keeper
 (401)785-3510

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
348	f	14	HOLD	PROVIDNCE	DO NOT BREED		
624	F	9	HOLD	PROVIDNCE	BREED WITH	1097	Pair had 3 pups last season but did not survive.
1097	M	2	HOLD	PROVIDNCE	BREED WITH	624	See above.

Summary:

1 male, 2 females **before** recommendations
 1 male, 2 females **after** recommendations

Institution: RACINE

Racine Zoological Garden
 2131 N Main St.
 Racine, WI, 53402
 Juliette Paradoski, Registrar
 (262)636-9423

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
1121	M	1	HOLD	RACINE	DO NOT BREED		
1122	M	1	HOLD	RACINE	DO NOT BREED		
1123	F	1	SEND TO	TACOMA	BREED WITH	790	First breeding opportunity for female.

Summary:

2 males, 1 female **before** recommendations
 2 males, 0 female **after** recommendations

Institution: SIOUX FAL

Great Plains Zoo
 805 S Kiwanis
 Sioux Falls, SD, 57104-3714
 Dan Brands, Director
 (605)367-7003

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
419	F	12	HOLD	SIOUX FAL	DO NOT BREED		
956	M	4	SEND TO	FORTWORTH	BREED WITH	579	First breeding opportunity for male.
957	M	4	HOLD	SIOUX FAL	BREED WITH	607	Receive 607 from Tacoma. Transfer occurred but female killed by male prior to breeding season.
958	F	4	SEND TO	BINGHAMTO	BREED WITH	1131	First breeding opportunity for both.

Summary:

2 males, 2 females **before** recommendations
 1 males, 2 females **after** recommendations

Institution: SPRINGFIE

Henson Robinson Zoo
1100 E Lake Dr.
Springfield, IL, 62707
Talon Thorton, Director
(217)753-6217

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
689	M	8	HOLD	SPRINGFIE	BREED WITH	604	Receive 604 from Cape Romain NWR.

Summary:

1 male, 0 female **before** recommendations
1 male, 1 female **after** recommendations

Institution: SYRACUSE

Burnet Park Zoo (Rosamond Gifford Zoo)
1 Conservation Place
Syracuse, NY, 13204-2504
Tom LaBarge, Large Mammals Mgr.
(315)435-8511

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
387	M	13	HOLD	SYRACUSE	PAIR WITH	690	Maintain as pair, breeding unlikely due to age of male and medical issues.
690	F	8	HOLD	SYRACUSE	PAIR WITH	387	

Summary:

1 male, 1 female **before** recommendations
1 male, 1 female **after** recommendations

Institution: TACOMA

Point Defiance Zoo & Aquarium

5400 N Pearl St.

Tacoma, WA, 98407-3218

Will Waddell, RWSSP Coordinator

(253)858-9172

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
364	F	13	HOLD	TACOMA	PAIR WITH	TBD	Unlikely to reproduce due to age. NOTE: Paired with 687
409	F	12	HOLD	TACOMA	DO NOT BREED		
436	M	12	HOLD	TACOMA	DO NOT BREED		
439	F	12	HOLD	TACOMA	DO NOT BREED		
492	M	11	HOLD	TACOMA	DO NOT BREED		
515	F	10	HOLD	TACOMA	DO NOT BREED		
531	F	10	HOLD	TACOMA	BREED WITH	651	Female proven but age limits breeding potential. Male is proven. NOTE: 531 died prior to breeding season.
543	M	10	HOLD	TACOMA	PAIR WITH	TBD	Reproductive evaluation last year indicates unlikely to reproduce. NOTE: Paired with 792
562	F	10	HOLD	TACOMA	BREED WITH	652	Maintain pairing. Have produced litters last two seasons but litter size small.
568	M	10	HOLD	TACOMA	PAIR WITH	TBD	Male is aspermic. May consider using as "indicator" for possible AI.
569	M	10	HOLD	TACOMA	BREED WITH	603	Maintain pairing. Pair produced pups last season but they were dead in-utero.
574	M	10	HOLD	TACOMA	BREED WITH	1098	Maintain pairing. Although reproductive evaluation on male last year indicate marginal sperm quality will give pair another year together.
576	F	10	HOLD	TACOMA	BREED WITH	924	Female's age limits successful breeding. Will try her with young male.
603	F	9	HOLD	TACOMA	BREED WITH	569	See 569M above.
606	F	9	HOLD	TACOMA	TBD		Current health issues prevent pairing. NOTE: 606 euthanized prior to breeding season.
607	F	9	SEND TO	SIoux FAL	BREED WITH	956 or 957	Female is proven. First breeding opportunity for male.
648	F	9	HOLD	TACOMA	BREED WITH	939	Maintain pairing. Female has had breeding opportunities in the past but no pups.
651	M	9	HOLD	TACOMA	BREED WITH	531	See 531F above. NOTE: 651 paired with 1096
652	M	9	HOLD	TACOMA	BREED WITH	562	See 562F above.
687	M	8	HOLD	TACOMA	DO NOT BREED		NOTE: Paired with 364
688	M	8	HOLD	TACOMA	DO NOT BREED		
701	M	8	HOLD	TACOMA	DO NOT BREED		
702	M	8	HOLD	TACOMA	DO NOT BREED		
703	F	8	HOLD	TACOMA	DO NOT BREED		
704	F	8	HOLD	TACOMA	DO NOT BREED		
705	F	8	HOLD	TACOMA	DO NOT BREED		
790	M	7	HOLD	TACOMA	BREED WITH	1123	Receive 1123 from Racine. New pairing. Male paired with older female previous season.
792	F	7	HOLD	TACOMA	BREED WITH	TBD	NOTE: Paired with 543
924	M	5	HOLD	TACOMA	BREED WITH	576	See 576F above.
925	F	5	HOLD	TACOMA	BREED WITH	491	Receive 491 from WCSRC. New pairing. Both are proven.
938	F	5	HOLD	TACOMA	BREED WITH	TBD	NOTE: AI planned
939	M	5	HOLD	TACOMA	BREED WITH	648	See 648F above.
1009	F	3	HOLD	TACOMA	DO NOT BREED		NOTE: AI planned
1010	F	3	HOLD	TACOMA	DO NOT BREED		NOTE: AI planned
1095	M	2	HOLD	TACOMA	DO NOT BREED		

1096	F	2	HOLD	TACOMA	DO NOT BREED		NOTE: Paired with 651
1098	F	2	HOLD	TACOMA	BREED WITH	574	See 574M above.
1223	M	0	HOLD	TACOMA	DO NOT BREED		
1224	F	0	HOLD	TACOMA	DO NOT BREED		
1225	F	0	HOLD	TACOMA	DO NOT BREED		
1226	F	0	HOLD	TACOMA	DO NOT BREED		
1227	F	0	HOLD	TACOMA	DO NOT BREED		
1228	F	0	HOLD	TACOMA	DO NOT BREED		

Summary:

17 males, 26 females **before** recommendations
18 males, 26 females **after** recommendations

Institution: TALLAHASE

Tallahassee Mus.History & Natural Sc
3945 Museum Dr.
Tallahassee, FL, 32310
Mike Jones, Animal Curator
(904)575-8685

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
494	F	11	HOLD	TALLAHASE	PAIR WITH	842	Unlikely to reproduce due to female's age.
549	M	10	SEND TO	LOWRY	BREED WITH	578	
647	F	9	HOLD	TALLAHASE	BREED WITH	722	Receive 722 from Golden Pond (LBL).
932	M	5	SEND TO	LOWRY	BREED WITH	725	

Summary:

2 males, 2 females **before** recommendations
2 males, 2 females **after** recommendations

Institution: TREVOR

Trevor Zoo
Millbrook School Rd.
Millbrook, NY, 12545
John Meigs, Director
(845)677-3704

Institutional notes: Male diagnosed with progressive retinal atrophy and will be euthanized. Recommendation to **receive 637F from Golden Pond (LBL), KY and 791M from Carlos Av, MN.**

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
636	M	9	HOLD	TREVOR	TBD		

Summary:

1 male, 0 female **before** recommendations
1 male, 1 female **after** recommendations

Institution: VICTOR TX

Texas Zoo
 110 Memorial Dr.
 Victoria, TX, 77901
 Jean Benchimol, Director
 (361)573-7681

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
557	F	10	HOLD	VICTOR TX	BREED WITH	1092	Maintain pairing. Female's age limits reproductive success.
1092	M	2	HOLD	VICTOR TX	BREED WITH	557	See above.

Summary:

1 male, 1 female **before** recommendations
 1 male, 1 female **after** recommendations

Institution: WCSRC

Wild Canid Survival & Res Center
 P.O. Box 760
 Eureka, MO, 63025
 Sue Lindsey, Executive Director
 (636)938-6490

Institutional notes: **Receive 619M and 621M from Carlos Av, MN.**

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
491	M	11	SEND TO	TACOMA	BREED WITH	925	New pairing. Both are proven.
743	F	8	SEND TO	MILL MOUN	BREED WITH	816	
744	F	8	SEND TO	AWENDA	BREED WITH	640	
819	F	4	HOLD	WCSRC	BREED WITH	740	Receive 740 from Miller Park.
1117	M	1	SEND TO	MANTEO	BREED WITH	719	
1118	F	1	SEND TO	AWENDA	BREED WITH	780	

Summary:

2 males, 4 females **before** recommendations
 3 males, 1 female **after** recommendations

Institution: WHEELING

Oglebay's Good Children's Zoo
 Oglebay Park
 Wheeling, WV, 26003
 Penny Miller, Director
 (304)243-4027

ID	Sex	Age	Disposition	Location	Breeding	With	Notes
1020	M	3	TBD	WHEELING	TBD		
1021	F	3	TBD	WHEELING	TBD		

Summary:

1 male, 1 female **before** recommendations
after recommendations – to be determined

Appendix A

Summary of Data Used to Prepare Breeding & Transfer Plan

Project: Red Wolf SSP Masterplan – 2002-03

Report compiled under Population Management 2000, version 1.13

2:34:40 PM, 7/12/2002

Comments: From meeting July 12-13th 2002 at Toronto Zoo, Scarborough, Ontario, Canada

Demographic data from: C:\SPARKS\redwork\MRWcap.PRN and C:\SPARKS\redwork\FRWcap.PRN

Data exported on: 2 Aug 2002

Data compiled by: WILLIAM WADDELL

Data current thru: 1 Jun 2002

Scope of data:

Filter Conditions In Effect: Dates: Between 01/01/1980 and 11/07/2002

User Defined Fields: "C" \$ upper(CAPFREE)

Genetic data from: C:\SPARKS\redwork\RedWolfcap.ped

Dates: As of 11/07/2002

Status: Living on 11 Jul 2002

Report prepared by: William Waddell, Red Wolf SSP Coordinator, Point Defiance Zoo & Aquarium and Randy Fulk, RWSSP SPMAG, North Carolina Zoo

Appendix B

List of Individuals Excluded from the Genetic Analyses

Studbook ID	Local ID	Location	Sex	Reason
348	911002	PROVIDNCE	Neutered Female	sterile
359	100236	LOWRY	Neutered Male	sterile
364	0346	TACOMA	Female	age
390	5038	FOSSILRIM	Female	age
409	0409	TACOMA	Female	age
419	1439	SIOUX FAL	Female	age
436	0436	TACOMA	Male	repro evaluation
439	0439	TACOMA	Female	age
441	1473	ASHEBORO	Female	age
482	1467	ASHEBORO	Male	repro evaluation
483	483	CARLOS AV	Female	age
493	436	MILL MOUN	Female	age
494	494	TALLAHASE	Female	age
568	0568	TACOMA	Male	aspermic
574	0574	TACOMA	Male	repro evaluation
636	93M423	TREVOR	Male	PRA
742	M94046	BLOOMINGT	Male	repro evaluation
917	1896	KNOXVILLE	Neutered Male	cryptorchid

Appendix B Life Tables

Male

Age (x)	Px	lx	Mx	Vx	Ex	Risk-Qx	Risk-Mx
0	0.67	1.000	0.000	1.198	6.210	433.6	304.9
1	0.853	0.670	0.018	1.727	7.011	269.6	248.6
2	0.883	0.571	0.310	2.116	6.938	219.4	211.4
3	0.890	0.504	0.458	2.184	6.702	197.6	185.7
4	0.895	0.449	0.485	2.074	6.390	172.0	162.9
5	0.905	0.402	0.445	1.894	5.991	147.6	142.5
6	0.903	0.363	0.410	1.718	5.522	128.7	123.9
7	0.885	0.328	0.393	1.568	5.057	113.0	105.3
8	0.873	0.290	0.378	1.433	4.615	86.6	79.4
9	0.870	0.253	0.370	1.299	4.149	62.9	60.0
10	0.870	0.220	0.350	1.144	3.619	43.3	39.8
11	0.850	0.192	0.310	0.989	3.043	24.5	24.3
12	0.773	0.163	0.340	0.894	2.508	19.5	17.1
13	0.643	0.126	0.440	0.829	2.107	9.4	8.9
14	0.535	0.081	0.490	0.695	1.844	8.0	5.7
15	0.500	0.043	0.368	0.420	1.615	4.0	3.3
16	0.375	0.022	0.123	0.123	1.341	2.0	1.2
17	0.125	0.008	0.000	0.000	1.111	1.0	0.6
18	0.000	0.001	0.000	0.000	1.000	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000

r = 0.0694

lambda = 1.0719

N = 79.00

N(at 20 yrs) = 316.83

T = 5.70

Female

Age (x)	Px	lx	Mx	Vx	Ex	Risk-Qx	Risk-Mx
0	0.630	1.000	0.000	1.227	6.513	452.0	317.6
1	0.895	0.630	0.072	1.795	7.527	260.2	244.9
2	0.915	0.564	0.300	2.042	7.216	218.4	206.6
3	0.920	0.516	0.435	2.035	6.776	188.9	180.0
4	0.920	0.475	0.498	1.864	6.278	169.9	163.2
5	0.915	0.437	0.478	1.596	5.752	146.4	140.7
6	0.903	0.400	0.410	1.318	5.228	134.4	126.0
7	0.890	0.361	0.373	1.086	4.715	118.2	113.5
8	0.880	0.321	0.363	0.863	4.197	93.8	88.7
9	0.868	0.282	0.320	0.614	3.657	70.3	66.0
10	0.830	0.245	0.243	0.371	3.126	45.8	42.5
11	0.765	0.203	0.143	0.172	2.655	32.3	28.9
12	0.703	0.156	0.043	0.043	2.243	19.7	17.2
13	0.653	0.109	0.000	0.000	1.824	10.3	8.5
14	0.470	0.071	0.000	0.000	1.419	5.3	3.5
15	0.155	0.034	0.000	0.000	1.134	3.0	1.6
16	0.000	0.005	0.000	0.000	1.000	0.000	0.000
17	0.000	0.000	0.000	0.000	0.000	0.000	0.000
18	0.000	0.000	0.000	0.000	0.000	0.000	0.000
19	0.000	0.000	0.000	0.000	0.000	0.000	0.000

r = 0.0693

lambda = 1.0718

N = 85.00

N(at 20 yrs) = 339.85

T = 5.07

Appendix D Ordered Mean Kinship List

Males

Females

SB#	MK	%Known	Age	Location	SB#	MK	%Known	Age	Location
923	0.085	100.00	5	ALEXANDRI	531	0.084	100.00	10	TACOMA
924	0.085	100.00	5	TACOMA	648	0.088	100.00	9	TACOMA
569	0.089	100.00	10	TACOMA	925	0.088	100.00	5	TACOMA
939	0.090	100.00	5	TACOMA	578	0.088	100.00	10	LOWRY
1092	0.092	100.00	2	VICTOR TX	579	0.088	100.00	10	FORTWORTH
1091	0.092	100.00	2	ASHEBORO	571	0.088	100.00	10	BRIDGEPRT
491	0.092	100.00	11	WCSRC	557	0.089	100.00	10	VICTOR TX
1122	0.093	100.00	1	RACINE	559	0.089	100.00	10	JACKSONVL
537	0.093	100.00	10	MANTEO	938	0.090	100.00	5	TACOMA
1121	0.093	100.00	1	RACINE	983	0.090	100.00	4	ASHEVILLE
387	0.093	100.00	13	SYRACUSE	576	0.090	100.00	10	TACOMA
471	0.094	100.00	11	ASHEBORO	562	0.091	100.00	10	TACOMA
740	0.094	100.00	8	BLOOMINGT	637	0.091	100.00	9	GOLDENPND
605	0.094	100.00	9	FORTWORTH	720	0.093	100.00	8	MANTEO
479	0.094	100.00	11	CARLOS AV	1225	0.093	100.00	0	TACOMA
956	0.094	100.00	4	SIOUX FAL	1224	0.093	100.00	0	TACOMA
1131	0.094	100.00	1	BINGHAMTO	624	0.093	100.00	9	PROVIDNCE
469	0.094	100.00	11	LOWRY	603	0.093	100.00	9	TACOMA
478	0.094	100.00	11	AWENDA	1226	0.093	100.00	0	TACOMA
957	0.094	100.00	4	SIOUX FAL	604	0.093	100.00	9	AWENDA
842	0.095	100.00	6	JACKSONVL	1227	0.093	100.00	0	TACOMA
723	0.095	100.00	8	AWENDA	1228	0.093	100.00	0	TACOMA
816	0.095	100.00	6	MILL MOUN	719	0.093	100.00	8	MANTEO
724	0.095	100.00	8	AWENDA	958	0.094	100.00	4	SIOUX FAL
432	0.095	100.00	12	ASHEVILLE	607	0.094	100.00	9	TACOMA
651	0.095	100.00	9	TACOMA	1123	0.094	100.00	1	RACINE
722	0.095	100.00	8	GOLDENPND	744	0.094	100.00	8	WCSRC
1223	0.095	100.00	0	TACOMA	743	0.094	100.00	8	WCSRC
817	0.096	100.00	6	BRIDGEPRT	725	0.095	100.00	8	LOWRY
1117	0.096	100.00	1	WCSRC	726	0.095	100.00	8	LOWRY
953	0.096	100.00	4	DURHAN MS	818	0.095	100.00	6	AWENDA
1020	0.096	100.00	3	WHEELING	1021	0.096	100.00	3	WHEELING
790	0.096	100.00	7	TACOMA	937	0.096	100.00	5	MANTEO
652	0.096	100.00	9	TACOMA	1098	0.096	100.00	2	TACOMA
974	0.097	100.00	4	MANTEO	1009	0.096	100.00	3	TACOMA
640	0.097	100.00	9	AWENDA	792	0.096	100.00	7	TACOMA
543	0.097	100.00	10	TACOMA	1010	0.096	100.00	3	TACOMA
492	0.097	100.00	11	TACOMA	921	0.096	100.00	5	ALEXANDRI
645	0.097	100.00	9	GREENBAY	819	0.097	100.00	6	WCSRC
1097	0.097	100.00	2	PROVIDNCE	550	0.097	100.00	10	ASHEBORO
632	0.097	100.00	9	NCS RAL	1118	0.097	100.00	1	WCSRC
932	0.097	100.00	5	TALLAHASE	1096	0.097	100.00	2	TACOMA
1095	0.097	100.00	2	TACOMA	646	0.097	100.00	9	GREENBAY
687	0.098	100.00	8	TACOMA	515	0.098	100.00	10	TACOMA
688	0.098	100.00	8	TACOMA	1203	0.098	100.00	0	ASHEBORO
1201	0.098	100.00	0	ASHEBORO	692	0.098	100.00	8	FOSSILRIM
513	0.098	100.00	10	FOSSILRIM	919	0.098	100.00	5	ASHEBORO
514	0.098	100.00	10	FOSSILRIM	1204	0.098	100.00	0	ASHEBORO
477	0.098	100.00	11	BREVARD	551	0.098	100.00	10	ASHEBORO

SB#	MK	%Known	Age	Location		SB#	MK	%Known	Age	Location
549	0.098	100.00	10	TALLAHASE		647	0.098	100.00	9	TALLAHASE
791	0.098	100.00	7	CARLOS AV		516	0.098	100.00	10	CHATT NAT
511	0.098	100.00	10	FRESNO		690	0.099	100.00	8	SYRACUSE
1200	0.098	100.00	0	ASHEBORO		1195	0.099	100.00	0	DURHAN MS
1194	0.099	100.00	0	DURHAN MS		1197	0.099	100.00	0	DURHAN MS
1193	0.099	100.00	0	DURHAN MS		1196	0.099	100.00	0	DURHAN MS
406	0.099	100.00	12	NCS RAL		918	0.100	100.00	5	DURHAN MS
689	0.099	100.00	8	SPRINGFIE		793	0.100	100.00	7	BREVARD
729	0.100	100.00	8	MANTEO		1127	0.101	100.00	1	BRIDGEPRT
1125	0.101	100.00	1	BREVARD		730	0.101	100.00	8	ASHEBORO
1124	0.101	100.00	1	BREVARD		1129	0.101	100.00	1	JACKSON
620	0.103	100.00	9	CHATT NAT		1128	0.101	100.00	1	JACKSON
619	0.103	100.00	9	CARLOS AV		1130	0.101	100.00	1	JACKSON
701	0.103	100.00	8	TACOMA		1126	0.101	100.00	1	BRIDGEPRT
702	0.103	100.00	8	TACOMA		705	0.103	100.00	8	TACOMA
621	0.103	100.00	9	CARLOS AV		703	0.103	100.00	8	TACOMA
520	0.106	100.00	10	MANTEO		622	0.103	100.00	9	KNOXVILLE
521	0.106	100.00	10	AWENDA		704	0.103	100.00	8	TACOMA
						533	0.104	100.00	10	CARLOS AV
						534	0.104	100.00	10	CARLOS AV
						535	0.104	100.00	10	CARLOS AV

Descendent Mean Kinship = 0.096

Appendix E Founder Statistics

SB#	Sex	Living/ Dead	Contribution	Representation	Allele Retention	Potential Retention	Number of Descendants
6	M	D	0.1531	25.0310	0.9265	0.9265	161.00
8	M	D	0.1305	21.3280	0.8545	0.8545	162.00
11	M	D	0.0692	11.3130	0.8980	0.8980	79.00
12	F	D	0.1388	22.6880	0.9000	0.9000	161.00
13	F	D	0.1215	19.8590	0.8125	0.8125	157.00
14	F	D	0.0551	9.0000	0.5760	0.5760	151.00
16	F	D	0.0233	3.8130	0.4425	0.4425	77.00
24	M	D	0.1510	24.6880	0.9750	0.9750	153.00
26	M	D	0.0400	6.5310	0.4440	0.4440	95.00
33	M	D	0.0486	7.9380	0.4310	0.4310	151.00
34	M	D	0.0573	9.3750	0.8215	0.8215	69.00
42	M	D	0.0119	1.9380	0.2645	0.2645	49.00

Appendix F

Definitions

Management Terms

SSP Complete Analysis and Breeding and Transfer Plan - 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 Species Survival Plan. Full Participation is required of all AZA member institutions. MOPs are required of all AZA non-member institutions.

Full Participation - AZA policy stating that AZA member institutions proclaim a level of participation (Breeding, Holding, Support) to each SSP in which the institution participates, and that AZA member institutions implement the SSP Complete Analysis and Breeding Plan once the institution has been given the opportunity to respond to a draft plan. Further explanation can be found in the AZA Resource Center at www.aza.org.

MOP, Memorandum of Participation - A document to be secured by each SSP Coordinator from every AZA non-member institution participating in the SSP. This document ensures that the SSP Complete Analysis and Breeding Plan will be implemented by the non-member institution. Further explanation can be found in the AZA Resource Center at www.aza.org.

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

P_x, 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.

Q_x, Mortality -- Probability that an individual of age x dies during time period. $Q_x = 1 - P_x$
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").

l_x, 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.

M_x, 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 M_x as 1/2 the average number of young born to animals in that age class. This provides a somewhat less "noisy" estimate of M_x , though it does not allow for unusual sex ratios. The fecundity rates provide information on the age of first, last, and maximum reproduction.

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

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

Risk (Q_x or M_x) -- The number of individuals that have lived during an age class. The number at risk is used to calculate M_x and Q_x 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 will produce a number of future offspring equal to its reproductive value, V_x .

FOKE, First Order Kin Equivalents -- The number of first-order kin (siblings or offspring) that would contain the number of copies of an individual's 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.