TAPIR
GLOBAL CAPTIVE ACTION RECOMMENDATIONS

PARTICIPANT'S FIRST DRAFT

12 March 1994

Report from the workshop held
8-12 March 1994

Edited and Compiled by
Rick Barongi, Michael Dee, Lewis Green, Diane Ledder, Sharon Matola, Onnie Byers

Compiled by the Workshop Participants

A Collaborative Workshop

SSC Tapir Specialist Group

AZA Tapir Taxon Advisory Group

IUCN/SSC Captive Breeding Specialist Group

A Publication of the IUCN/SSC Captive Breeding Specialist Group
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SECTION 1

GLOBAL CAPTIVE ACTION RECOMMENDATIONS FOR TAPIRS

GLOBAL CAPTIVE ACTION RECOMMENDATIONS (GCAR) FOR TAPIRS

Introduction

Reduction and fragmentation of wildlife populations and habitat are occurring at a rapid and accelerating rate. For an increasing number of taxa, the results are small and isolated populations at risk of extinction. A rapidly expanding human population, now estimated at 5.25 billion, is expected to increase to 8 billion by the year 2025. This expansion and concomitant utilization of resources has momentum that cannot be stopped, the result being a decreased capacity for all other species to simultaneously exist on the planet.

As wildlife populations diminish in their natural habitat, wildlife managers realize that management strategies must be adopted that will reduce the risk of extinction. These strategies will be global in nature and will include habitat preservation, intensified information gathering, and in some cases, scientifically managed captive populations that can interact genetically and demographically with wild populations.

Within the Species Survival Commission (SSC) of IUCN-The World Conservation Union, the primary goal of the Captive Breeding Specialist Group (CBSG) is to contribute to the development of holistic and viable conservation strategies and management action plans. Toward this goal, CBSG is collaborating with agencies and other Specialist Groups worldwide in the development of scientifically-based processes, on both a global and regional basis, with the goal of facilitating an integrated approach to species management for conservation.

In addition to managing the natural habitat, conservation programs leading to viable populations may sometimes require a captive component. In general, captive populations and programs, or the use of captive technologies, can serve several roles in holistic conservation: 1) as genetic and demographic reservoirs that can be used to reinforce wild populations either by revitalizing populations that are languishing in natural habitats or by re-establishing by translocation populations that have become depleted or extinct; 2) providing scientific resources for information and technology that can be used to protect and manage wild populations; and 3) as living ambassadors that can educate the public as well as generate funds for *in situ* conservation.

It is proposed that, when captive populations or captive technology can assist species conservation, captive and wild populations should, and can be, intensively and interactively managed with interchanges of animals occurring as needed and as feasible. Captive populations should be a support, not a substitute, for wild populations. There may be problems with respect to disease, logistics, and financial limitations. In the face of the immense extinction crisis facing many taxa, these issues must be addressed and resolved immediately.

Captive breeding programs have limited resources. Priorities must be developed cooperatively among all regions of the world for program development and resource allocation, the purpose of the Global Captive Action Recommendation process. Once global priorities are known, regional captive propagation programs can be developed to assist in practical conservation.

Global Captive Action Recommendations (GCARs)

GCARs are derived from the Conservation Assessment and Management Plan process. The CAMP recommends which species/subspecies deserve attention, and the GCAR determines global priorities and a target number of individuals of each taxa needed to sustain a healthy world population. In addition, current distribution of the world's captive population is indicated in an effort to assist discussion, within individual regions, of regional responsibility for carrying out these captive management recommendations. This system assumes that captive populations be treated as an integral part of the metapopulations being managed by conservation strategies and action plans. Viable metapopulations may need to include captive components. The IUCN Policy Statement on Captive Breeding recommends, in general, that captive propagation programs be a component of conservation strategies for taxa in which the wild population is below 1,000 individuals. Captive and wild populations should and can be intensively and interactively managed with interchanges of animals occurring as needed and as feasible, after appropriate analysis. There may be problems with interchanges including epidemiologic risks, logistic difficulties, and financial limitations. However, limited but growing experience suggests that these problems can be resolved. Strategies and priorities should maximize options while minimizing regrets for species conservation.

Captive populations are a support and a reservoir, not a substitute, for wild populations. A primary focus of the GCAR is on captive propagation programs that can serve as genetic and demographic reservoirs to support survival and recovery of wild populations in the future. The purpose of the GCAR workshop is to provide strategic guidance for captive management enabling regional programs to interact and combine to catalyze a truly effective global effort. An important aspect is establishing global target population size goals (i.e., how many individuals ultimately to maintain). More specifically, GCARs recommend which taxa are most in need of captive propagation and thus:

1) which taxa in captivity should remain there,
2) which taxa not yet in captivity should be there, and
3) which taxa currently in captivity should no longer be maintained there.

There are multiple genetic and demographic objectives affecting the captive population target: some taxa require large population sizes for a long time, where others need small nuclei or reduced gene pools that can be expanded later, if needed. One result of the GCAR will be an ability to logically adjust current captive population sizes in various regions, hopefully to better sustain threatened taxa as well as to identify new space available for conserving other species/subspecies receiving insufficient attention.

In summary, the GCAR provides the strategic framework for establishing global priorities that, in turn, can be used by all regional taxon advisory groups to formulate, coordinate, and implement effective Regional Collection Plans that together will have a true global conservation impact.

GCAR Workshop Goals

The goals of the Tapir GCAR were:

1) to review CAMP data and discuss required changes;
2) to prioritize taxa in need of captive management and to identify global target population sizes; and
3) to evaluate the direction of regional collection plans on the basis of global conservation priorities identified by the GCAR process.

The GCAR Process

A major consideration in establishing priority species for captive management is the category of threat assigned to the taxon. Mace-Lande criteria (Mace & Lande, 1991) were applied to each taxon during the CAMP process. This process assessed threat in terms of the likelihood of extinction within a specified time period and defined three categories:

Critical	50% probability of extinction within 5 years or two generations, whichever is longer
Endangered	20% probability of extinction within 20 years or 10 generations, whichever is longer
Vulnerable	10% probability of extinction within 100 years

In assessing threat according to Mace-Lande criteria, workshop participants also used information on the status and interaction of habitat and other characteristics (Table 1). Information about population trends, fragmentation, range, and stochastic environmental events, real and potential, also were considered.

When *ex situ* management was recommended, the "level" of captive program was also determined, reflecting status, prospects in the wild, and taxonomic distinctiveness. The captive levels used during the CAMP workshop are defined below.

> **Level 1 (1)** - A captive population is recommended as a component of a conservation program. This program has a tentative goal of developing and managing a population sufficient to preserve 90% of the genetic diversity of a population for 100 years (90%/100). The program should be further defined with a species management plan encompassing the wild and captive populations and implemented immediately with

available stock in captivity. If the current stock is insufficient to meet program goals, a species management plan should be developed to specify the need for additional founder stock. If no stock is present in captivity then the program should be developed collaboratively with appropriate wildlife agencies, SSC Specialist Groups, and cooperating institutions.

Level 2 (2) - Similar to the above except a species/subspecies management plan would include periodic reinforcement of captive population with new genetic material from the wild. The levels and amount of genetic exchange needed should be defined in terms of the program goals, a population model, and species management plan. It is anticipated that periodic supplementation with new genetic material will allow management of a smaller captive population. The time period for implementation of a Level 2 program will depend on recommendations made at the CAMP workshop.

Other captive recommendations include:

Level 3 (3) - A captive program is not currently recommended as a demographic or genetic contribution to the conservation of the species/subspecies but is recommended for education, research, or husbandry.

No (N) - A captive program is not currently recommended as a demographic or genetic contribution to the conservation of the species/subspecies. Taxa already held in captivity may be included in this category. In this case species/subspecies should be evaluated either for management toward a decrease in numbers or for complete elimination from captive programs as part of a strategy to accommodate as many species/subspecies as possible of higher conservation priority as identified in the CAMP or in SSC Action Plans.

Pending (P) - A decision on a captive program will depend upon further data either from a PHVA, a survey, or existing identified sources to be queried.

The GCAR workshop process entailed consideration of all relevant data in intensive and interactive discussion. The objectives were systematic decision-making, captive program prioritization, initial selection of global species target population sizes, and identification of regional distribution of each taxon. Second, a determination needed to be made about which species/subspecies, and how many individual animals of each, should be included in this global captive program. Target population sizes were computed using the program CAPACITY 3 (Ballou, 1992).

Detemining Global Target Populations Using CAPACITY 3

Using the CAPACITY program global target population sizes were determined to achieve the captive program goals recommended for a particular taxon. The CAMP and GCAR processes

attempt to achieve goal of maintenance of 90% of the program's original founder's heterozygosity for 100 years. Other program parameters that were set and manipulated are:

* generation length
* annual growth rate of the population
* size of the current captive population, and the effective population size
* the estimated Ne/N ratio
* % diversity retained to date
* current year

General steps used for computing global target population numbers using Ballou's Capacity Program 3.0:

1) Calculate the N by assessing the total number of individuals in captivity (from the ISIS TAG report).

2) Estimate the generation length by determining the median between the earliest age of reproduction and oldest age for reproduction, adjusting for decreasing reproduction with increasing age, if applicable.

3) Determine the crude lambda value which is the projected growth rate of the population under ideal conditions. If no better data are available, lambda can be estimated as the crude rate of change (CRC) found in the ISIS TAG report. When the CRC value is less than 1.0, it is necessary to artificially increase lambda to 1.1.

4) Determine the Ne (effective population size) as the number of living breeders (LivBr) taken from the ISIS TAG report, unless more accurate data are available.

5) Calculate the NE/N (effective population divided by the total population) by dividing the number of living breeders by the total number in captivity.

6) Consider 100% diversity at the onset of the program, and the current year as 0 unless the population has been in captivity for a period of time and the loss of genetic diversity is known.

7) Using the above parameters, the target populations are computed for different program lengths (50, 100, 150, 200 years). All world target numbers are based on a 100 year management program with 90% retention of heterozygosity.

8) In some cases, it may be necessary to modify the variables of effective population size (i.e., the number of available animals may be too few to establish a viable program, and it will be necessary to plan to import new founders into the management program).

9) Where more accurate information is available (from current international studbooks, for example) those data should be used in place of ISIS values.

10) It in imperative that all details involving the computation of global target populations are documented and included in the final GCAR report.

Mace-Lande categories and criteria for threat.

POPULATION TRAIT	CRITICAL	ENDANGERED	VULNERABLE
Probability of extinction	50% within 5 years or 2 generations, whichever is longer	20% within 20 years or 10 generations, whichever is longer	10% within 100 years
	OR	**OR**	**OR**
	Any 2 of the following criteria:	Any 2 of following criteria or any 1 CRITICAL criterion	Any 2 of following criteria or any 1 ENDANGERED criterion
Effective population N_e	$N_e < 50$	$N_e < 500$	$N_e < 2{,}000$
Total population N	$N < 250$	$N < 2{,}500$	$N < 10{,}000$
Subpopulations	≤ 2 with $N_e > 25$, $N > 125$ with immigration < 1/generation	≤ 5 with $N_e > 100$, $N > 500$ or ≤ 2 with $N_e > 250$, $N > 1{,}250$ with immigration < 1/gen.	≤ 5 with $N_e > 500$, $N > 2{,}500$ or ≤ 2 with $N_e > 1{,}000$, $N > 5{,}000$ with immigration < 1/gen.
Population Decline	> 20%/yr. for last 2 yrs. or > 50% in last generation	> 5%/yr. for last 5 years or > 10%/gen. for last 2 years	> 1%/yr. for last 10 years
Catastrophe: rate and effect	> 50% decline per 5-10 yrs. or 2-4 generations; subpops. highly correlated	> 20% decline/5-10 yrs, 2-4 gen > 50% decline/10-20 yrs, 5-10 gen with subpops. highly correlated	> 10% decline/5-10 yrs. > 20% decline/10-20 yrs. or > 50% decline/50 yrs. with subpops. correlated
OR			
Habitat Change	resulting in above pop. effects	resulting in above pop. effects	resulting in above pop. effects
OR			
Commercial exploitation or Interaction/introduced taxa	resulting in above pop. effects	resulting in above pop. effects	resulting in above pop. effects

Regional Responsibilities

It is also crucial to begin to define regional interest in each recommended species/subspecies, information that later will drive regional responsibilities (i.e., the development of Regional Collection Plans) to preserve an overall viable world population. GCAR spreadsheets are constructed with columns for identification of regions currently holding the taxon and the number of specimens in captivity within that region. Depending on the current captive population distribution and the global target recommendations for the taxon, regional populations targets can be set by each organized region of the zoo and aquarium community.

A review draft of the GCAR report was produced at the workshop. This draft will be distributed by the CBSG to all participants and to TAG chairs and Species Conservation Coordinators for review and final comments before the document is finalized and distributed globally. The intent is to facilitate regional interaction to optimize the use of captive apace and resources for international conservation. The GCAR document is a "living" set of guidelines, meaning that it will be reassessed and revised continually based upon new information and shifting needs.

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SECTION 2

SUMMARY TABLES

Table 1. Number of Tapirid taxa in wild by range country or region and by Mace-Lande category of threat.

REGION/ COUNTRY	MACE/LANDE CATEGORY					TOTAL
	CRITICAL	ENDANG	VULNER	SECURE	UNKN	
S & C AMERICA	1	2	3	0	0	6
SE ASIA	0	2	0	0	0	2
N. AMERICA	0	0	0	0	0	0
EUROPE	0	0	0	0	0	0
INDIA	0	0	0	0	0	0
CHINA	0	0	0	0	0	0
JAPAN	0	0	0	0	0	0
AUSTRALASIA	0	0	0	0	0	0
TOTAL	1	4	3	0	0	8

** some taxa were assigned to more than one region

Table 2. Number of Tapirid taxa in wild by range country or region and by level of captive management recommended.

REGION/ COUNTRY	TYPE OF CAPTIVE PROGRAM					TOTAL
	LEVEL 1	LEVEL 2	LEVEL 3	PENDING	NO PROG	
S & C AMERICA	2	0	0	3	1	6
SE ASIA	1	0	0	1	0	2
N. AMERICA	0	0	0	0	0	0
EUROPE	0	0	0	0	0	0
INDIA	0	0	0	0	0	0
CHINA	0	0	0	0	0	0
JAPAN	0	0	0	0	0	0
AUSTRALASIA	0	0	0	0	0	0
TOTAL	3	0	0	4	1	8

Table 3. Summary of Tapirid taxa recommended for captive populations by M/L category of threat and type of captive population recommended.

MACE/LANDE	CAPTIVE POPULATION TYPES RECOMMENDED						TOTALS For LEVELS 1-3
	TAXA	LEVEL 1	LEVEL 2	LEVEL 3	P	NO PROG	
CRITICAL	1	1	0	0	0	0	1
ENDANGERED	4	2	0	0	2	0	2
VULNERABLE	3	0	0	0	2	1	0
SECURE	0	0	0	0	0	0	0
UNKNOWN	0	0	0	0	0	0	0
TOTAL	8	3	0	0	4	1	3

Table 4. Summary of Tapirid taxa recommended for captive populations and represented in captivity by M/L category of threat and type of captive population recommended.

MACE/LANDE	CAPTIVE POPULATION TYPES RECOMMENDED						TOTALS For LEVELS 1-3
	TAXA	LEVEL 1	LEVEL 2	LEVEL 3	P	NO PROG	
CRITICAL	1	1	0	0		0	1
ENDANGERED	2	2	0	0		0	2
VULNERABLE	1	0	0	0		1	0
SECURE	0	0	0	0		0	0
UNKNOWN	0	0	0	0		0	0
TOTAL	4	3	0	0		1	3

Table 5. Current numbers of Tapirid taxa in regional captive populations by Mace-Lande category of threat.

REGION/ COUNTRY	MACE/LANDE CATEGORY					TOTAL
	CRITICAL	ENDANG	VULNER	SECURE	UNKN	
S & C AMERICA	1	1	0	0	0	2
SE ASIA	0	0	0	0	0	0
N. AMERICA	1	2	1	0	0	4
EUROPE	1	1	1	0	0	3
INDIA	0	0	0	0	0	0
CHINA	0	0	0	0	0	0
JAPAN	0	0	0	0	0	0
AUSTRALASIA	0	0	0	0	0	0
TOTAL	3	4	2	0	0	9

** some taxa were assigned to more than one region

Table 6. Current numbers of Tapirid specimens in regional captive populations by Mace-Lande category of threat.

REGION/ COUNTRY	MACE/LANDE CATEGORY					TOTAL
	CRITICAL	ENDANG	VULNER	SECURE	UNKN	
S & C AMERICA	1	18	2	0	0	21
SE ASIA	0	26	0	0	0	26
N. AMERICA	8	89	1	0	0	98
EUROPE	1	41	10	0	0	52
INDIA	0	0	0	0	0	0
CHINA	0	0	0	0	0	0
JAPAN	0	0	0	0	0	0
AUSTRALASIA	0	0	0	0	0	0
AFRICA	0	2	0	0	0	2
TOTAL	10	176	13	0	0	197

** some taxa were assigned to more than one region

Table 7. Number of Tapirid taxa held in captive populations by range country or region and by level of captive management recommended.

REGION/ COUNTRY	TYPE OF CAPTIVE PROGRAM					TOTAL
	LEVEL 1	LEVEL 2	LEVEL 3	PENDING	NO PROG	
S & C AMERICA	2	0	0	0	2	4
SE ASIA	2	0	0	0	0	2
N. AMERICA	3	0	0	0	1	4
EUROPE	2	0	0	1	1	4
INDIA	0	0	0	0	0	0
CHINA	0	0	0	0	0	0
JAPAN	1	0	0	0	0	1
AUSTRALASIA	0	0	0	0	1	1
AFRICA	1	0	0	0	1	2
TOTAL	11	0	0	1	6	18

Table 8. Current numbers of Tapirid specimens in regional captive populations by level of captive management recommended.

REGION/ COUNTRY	TYPE OF CAPTIVE PROGRAM					TOTAL
	LEVEL 1	LEVEL 2	LEVEL 3	PENDING	NO PROG	
S & C AMERICA	19	0	0	0	33	52
SE ASIA	22	0	0	0	14	36
N. AMERICA	97	0	0	0	74	171
EUROPE	42	0	0	0	93	135
INDIA	0	0	0	0	0	0
CHINA	0	0	0	0	0	0
JAPAN	4	0	0	0	0	4
AUSTRALASIA	0	0	0	0	0	0
AFRICA	2	0	0	0	2	4
TOTAL	190	0	0	0	216	402

Table 9. Tapirid Global Captive Population Projections.

TAXON		Existing N	Recommended N	Existing Ne	Recommended Ne	Captive space required for recommended N		
Tapirus	pinchaque	10	20	4	10	56	198	332
Tapirus	bairdi	57	57	28	28	38	92	138
Tapirus	indicus	114	114	57	57	38	86	124

Assuming:
Gen Length = 11 yrs
Ne/N = 0.5
Male:Female ratio = 1:1
Current captive cage space = 414
Lambda = 1.1 for T. pinchaque raised from .979 to 1.1
Calculations based on CAPACITY#, Table 3, Length of Program vs Generation time

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SECTION 3

GCAR SPREADSHEET CATEGORY DEFINITIONS
AND SPREADSHEET

GLOBAL CAPTIVE ACTION RECOMMENDATIONS (GCAR) SPREADSHEET CATEGORIES

The Global Captive Action Plan (GCAP) spreadsheet is a working document that provides information that can be used to assess the degree of threat and recommend conservation action.

The first part of the spreadsheet summarizes information, usually gathered during the Conservation Assessment and Management Plan (CAMP) Workshop process, on the status of the wild population and level of captive program recommended for each taxon. This information can be used to identify priorities for captive management action for taxa.

TAXON

SCIENTIFIC NAME: Scientific names of extant taxa: genus, species, subspecies.

WILD POPULATION

EST #: Estimated numbers of individuals in the wild. If specific numbers are unavailable, estimate the general range of the population size.

M/L STS: Status according to Mace/Lande criteria (see attached explanation).

C = Critical
E = Endangered
V = Vulnerable
S = Secure
EXT = Extinct

CAPTIVE PROGRAM RECOMMENDATIONS

Recommendation:	**Level of Captive Program:**
Level 1 (1)	A captive population is recommended as a component of a conservation program. This program has a tentative goal of developing and managing a population sufficient to preserve 90% of the genetic diversity of a population for 100 years (90%/100). The program should be further defined with a species management plan encompassing the wild and captive populations and implemented immediately with available stock in captivity. If the current stock is insufficient to meet program goals, a species management plan should be developed to specify the need for additional founder stock. If no stock is present in captivity then the program should be developed collaboratively with appropriate wildlife agencies, SSC Specialist Groups, and cooperating institutions.

Level 2 (2) Similar to the above except a species/subspecies management plan would include periodic reinforcement of captive population with new genetic material from the wild. The levels and amount of genetic exchange needed should be defined in terms of the program goals, a population model, and species management plan. It is anticipated that periodic supplementation with new genetic material will allow management of a smaller captive population. The time period for implementation of a Level 2 program will depend on recommendations made at the CAMP workshop.

No (N) A captive program is not currently recommended as a demographic or genetic contribution to the conservation of the species/subspecies. Taxa already held in captivity may be included in this category. In this case species/subspecies should be evaluated either for management toward a decrease in numbers or for complete elimination from captive programs as part of a strategy to accommodate as many species/subspecies as possible of higher conservation priority as identified in the CAMP or in SSC Action Plans.

Pending (P) A decision on a captive program will depend upon further data either from a PHVA, a survey, or existing identified sources to be queried.

WORLD

The information entered into this section of the GCAR spreadsheet defines the current global captive population and will be used to calculate target populations for each taxon recommended for captive management.

N:	Size of the current captive population
Gen Lgth:	Generation length
Ne:	Effective population size
Lambda:	Annual growth rate of the population
Trg Pop:	Target Population size computed using Ballou's CAPACITY program. This is the proposed number of individuals that must be maintained in captivity in order to carry out the level of captive program recommended for that taxon.

DISTRIBUTION OF CAPTIVE POPULATION

Loc: Location of a captive population of a particular taxon. This can be one of the organized regions of the zoo and aquarium world, a region not represented by a formal zoo association, or a specific country holding that taxon.

Pop: The number of individuals of a particular taxon currently maintained in the specified region.

GLOBAL CAPTIVE ACTION RECOMMENDATIONS FOR TAPIRS

	TAXON		CAMP DATA			WORLD CAPTIVE POPULATION					DISTRIBUTION OF CAPTIVE POPULATION											
	SCIENTIFIC NAME		Wild Est#	New IUCN Sts	Rec	N	Gen Lgth	Ne	Lambda	Trg Pop	Loc	Pop	Loc	Pop	Loc	Pop	Loc	Pop	Loc	Pop	Loc	Pop
	Perisso-dactyla																					
	Tapiridae																					
1	Tapirus	terrestris			N	215	9		0.994	100	S&C Am	31	Sea za	14	AS MP	12	Afri ca	2	Eur ope	83	N Am	73
2	Tapirus	terrestris terrestris	<30000 >18000	CD	N	13	9		1.034	0	S&C Am	2							Eur ope	10	N Am	1
3	Tapirus	terrestris aenigmaticu	<500 >200	EN	P	0	9	0		0												
4	Tapirus	terrestris colombianu	<1000 >200	CD	P	0	9	0		0												
5	Tapirus	terrestris spegazzini	<1000 >200	VU	P	0	9	0		0												
6	Tapirus	pinchaque	<1000 >200	CR	1	10	9		0.979	100	S&C Am	1							Eur ope	1	N Am	8
7	Tapirus	bairdii	<6300 >2500	EN	1	57	9		1.080	150	S&C AM	18	Sea za	7							N Am	32
8	Tapirus	indicus	<2000 >700	EN	1	114	9		1.036	150			Sea za	19			Afri ca	2	Eur ope	36	N Am	57
9	Tapirus	indicus sumatranus	<1000 >200	EN	P	5	9			50									Eur ope	5		

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SECTION 4

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