Marker-Kraus L. Notes on Amanda Lee's draft of cheetah management guidlines.

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Abstract: Notes on Amanda Lee's draft of cheetah management guidelines for species kept in captivity. Corrections, comments and adds from Laurie Marker-Kraus.

MANAGEMENT GUIDELINES FOR SPECIES KEPT IN CAPTIVITY

Page 4 - Longevity-Use International Cheetah Studbook information: Cheetah longevity has increased significantly over 41 year period: by 1978-1988, 38% of animals lived over 5 years; 17%lived over 10; and 3%reached 15 years. To review this see TAble 8 of 1988 SB. There have been only a few (less than 5) that have lived to be 20 years old.

Page 5 - Under DISTRIBUTION - population should be southern Africa not South Africa.

Page 6 - 2nd paragraph - southern Africa, not South. The Status of the Cheetah that we sent to you lists the various parks in Africa that still have cheetah, although there are only a few numbers. That report was done as the Draft Document for the IUCN SSC Cat Specialist Group Cat Action Plan for the cheetah (ref. throughout this as IUCN Status Report).

Page 6 - Size of Masai Mara Reserve is 1510 km2. Size of Gemsbok Park in Botswana is 24,800 km2, and in South Africa 9,591 km2.

Page 7 - Table of parks - add other countries ie. Etosha National Park, Namibia; Hwange National Park, Zimbabwe; See our IUCN Status Report.

Page 7 - directly below table, 5 lines are repeated from previous page, 2nd paragraph. Begins Available carcass data....

Page 7 - Population Density in Namibia - Study done in 1985-1987 was in one of the highest density areas in the country of 1 per 50km2 (D. Morsbach, 1987, Cat News). Add this to table on next page.

Page 9 - Under Conservation Status - Asian population only found in Iran (100-200), now, see our IUCN Status Report for current details.

Page 10 - Top of page-2 populations East and southern (not South Africa)

Page 10 - In Asia - Only in Iran- see our IUCN Status Report.

Page 11 - 2nd paragraph-O'Brien et al usually consider the cheetah to be a survivor. 2nd paragraph end- the comparison between the work in the Serengeti is hard to compare to most of the work we all (o'Brien et al) have done on the genetics, because the amount of genetic impoverishment is greater in the southern African animal (which is mostly what is in captivity) than the East African animals. In the 1989 Marker & O'Brien we do comment briefly on the hybrid vigor between captive hybrids. Therefore, it is not a fair comparison to what genetic problems we have seen in captivity, as most of the genetic work has been done on southern African cheetah.

Page 11 - end of page - anti-predator control measures - include live trapping in Namibia and it does work very well in Namibia. Live Traps are set at "play trees" and several thousand have been caught in Namibia in the past 10 years (see CITES, 1992 document I sent you, the majority of those animals, killed and live caught as well as most that have been trophy hunted, were caught in a trap first).

Page 13 - end of 2nd paragraph, after Ledger - use recent CITES quotas in Namibia, Botswana, and Zimbabwe. Include that the trophy hunting is not the problem, but the indiscriminate live trapping. After Myers, next paragraph include the importance of ongoing monitoring research is necessary where hunting is allowed.

Page 16 - above Sanctuary - At present IUCN laws prohibit the re-location of animals that are of different sub-species. As per Marker & O'Brien, 1989, hybridization is presented as a possible way to strengthen the species, therefore relocating of animals could be a possibility.

Page 17 - before last paragraph - the majority of the remaining free-ranging cheetah are outside of game reserves, and most are not where there are pastoral farmers. The majority of the free-ranging cheetahs are in direct conflict with commercial livestock farming which is drastically different that how pastoralist farm livestock. Commercial farms are extensive with little protection management used.

Page 17 - last paragraph - Iran is different now than 15 years ago and the cheetah population is not growing as it was, see IUCN Status Report. Prey is very scarce now and the remaining cheetahs mostly eat rabbits.

Page 19 - What cheetahs eat include Fringe-eared Oryx (Oryx besia), and Gemsbok (Oryx gazella).
Page 21 - Sexuality Maturity - 1988 Int. SB has Figure about captive reproduction (see page 8A, Figure 1).

Page 22 - Seasonality - See 1988 Int. SB. Page 10 A has chart for months of all litters born in captivity.

Page 23 - No reference in Reference Section for Schaller & Demorest 1986

Page 25 - Cub mortality - other large predators are the greatest factor to limit populations in National Parks-but not outside of the national parks, then competition with humans and livestock.

Page 25 - 3rd Paragraph under Cub mortality - Reference to the mimicry of cub mantle to that of Honey Badger also use R. Eaton, 1976. A possible cased of mimicry in large mammals Evolution 30(4):853-56.

Page 27 - 3rd paragraph before Behavior section-In Namibia we continue to hear reports that cheetah cubs are seen in the presence of two adults. We think it could possibly be a female cub from the previous litter.

Page 28 - 4th paragraph before Locomotion-describe "playtrees". The "Playtrees" are such that they are open and the trunk is slightly sloping so that the cheetah can run up it or jump into the branches. The "playtrees" are used very regularly and the branches are used to defecate on. We think these trees are very significant in marking the large territories that the cheetahs have and are used by both males and females. Also the trees are used for viewing the surrounding area, and often the cheetahs are seen running, jumping and playing in and around the trees.

Page 29 - Include?? Yes, but possibly under the physiology section, and more could be included on these adaptations as well.
Page 30 - 2nd paragraph, missing the word be ..at the beginning of the sentence, Once thought to be..

Page 36 - Cooperation - I once saw three male cheetahs hunt an adult Fringe-eared Oryx in Amboseli National Park. The three males cooperated in a way that I thought you would be interested. One male was on the throat, and the other two males were holding down the rear of the Oryx. Once they got the oryx down, then the three took turns (it seemed) they changed from one to the other one on the throat bite, one holding down on the rear of the oryx, and the other watching and looking like a guard, then after about 5 minutes they switched positions. This went on for about 20 minutes until they began to eat.

Page 39 - Predation on cheetahs - Baboons are also known to prey on young cubs here in Namibia.

Page 39 - Social Structure - We hear of numerous sightings of mixed groups, here in Namibia. Reports include female and other adult plus cubs of all ages, also, large groups being seen often 8 or 9 animals, and reports of 15 and 19 animals being seen. These reports are from reliable sources.

Page 40 - 1st paragraph, 1st sentence - Recent research in East Africa.. include that in Namibia other groups consisting of mixes of cubs of various sizes and more than one female with cubs.

Page 40 - 3rd paragraph - change South West Africa to Namibia/SW Africa. All South West Africa's should read Namibia/SW Africa. Also sightings of 15-19 animals have been reported in Namibia and not uncommon to seer 8 or 9 together, we have been here doing our research for over one year and these are continuous reports we have received.

Page 41 - Home Range in Namibia - Males up to 800 km2 and females up to 1,500 km2 (D. Morsbach, 1987 in Cat News).

Page 42 - before Table change South West Africa to Namibia/SW Africa. The "Playtrees" are thought to be used in territorial marking, and are used by both males and females.

Page 42 - Table of Home Ranges add Namibia ref. Morsbach 1987, Cat News

Page 43 - end of Territoriality - Male cheetahs in Namibia have home range of 800 km2, and use "Playtrees" to defecate and urinate on. More males are caught at these "playtrees" than are females

Page 44 - Middle of 1st full Paragraph. I have seen females in captivity urinate "mark" on trees quite often at Wildlife Safari. The area was very large (7-8 acres) and there were lots of trees in the area.

Page 45 - 1st real paragraph, middle of page - Loss of territory for males in Namibia is most often due to Live Trapping at the "Playtrees". The trapping creates an open territory and a vacuum or funnel affect occurs where many cheetahs come into the area to try to fill the open territory. At the "playtrees" considerably more males than females are caught.

Page 46 - Composition - end of that section. In Namibia, male groups of two or more are also found. We are collecting blood and biological samples from animals caught for genetic studies and family relatedness will be able to ascertained from these lab results.

Page 51 - 1st paragraph change South West Africa to Namibia/SW Africa.

Section 2. Management in Captivity

Page 3 - Paragraph 2 - the Mounds at St. Louis were a problem due to cleaning of them (personal communication from Birkel to Marker-Kraus)

Page 8 - Supplementation - Too much calcium can cause Osteochondrosis Dissecans. A detailed report of this disease in cheetah was recently written up by the Western Plains Zoo in Dubbo, Australia.

Page 11 - top of page refer to too much calcium as well causing Osteochondrosis Dissecans reported by Western Plains Zoo, Australia by Dr. David Blyde, 1991. This disease is probably hereditary in nature.

Page 13 - last paragraph - change South West Africa to Namibia/SW Africa

Page 15 - Effective Breeding Size - add the Ne for the world population in 1988 Int. SB. see page 15. The Ne was 74.4 at that time. I haven't worked it out for the world population in 1989-1991.

Page 15 - 3rd Paragraph - The United States population has increased from 1986-1991 by 73 animals, from 193 animals in 1986 to 266 animals in 1991.

Page 15 - Next paragraph the population in the United States is also over-represented by certain founders and these are many of the same founders that are over represented in the British Isles. This could become a problem in the long-term as cooperative breeding programs between the two geographical areas increases.

Page 16 - Managing the Breeding Population - 3rd to the last line in the paragraph 340 animals - add in the United States.

Page 16 - Artificial Techniques and Stimulating Ovulation - Both of these sections could have more, as there has a lot of recent work done on cheetahs in these areas by the NOAHS Center researchers at the National Zoo in Washington, DC, by Drs. David Wildt, JoGayle Howard, and Annie Donoghue. If you contact them I'm sure they would send you very quickly some information for these sections.

Page 18 - Question - This will assist in the growth founder, and breeding animals which will allow for a more wide spread population. Over time this will increase the diversity through shear numbers of animals.

Page 18 - Artificial Insemination - 3rd paragraph end - The field research has been conducted in East Africa. The captive population is mainly from southern Africa/Namibian stock, which is more genetically compromised. The comparisons need to be clarified, as the problems appear to be different for the East and southern AFrican animals. In a paper I am preparing right now for Zoo Biology, I am showing that the problems are greater for the southern African animals in captivity vs those that are East/southern Hybrids.

Page 18 - end of A-I section-there have been several cases of congenital infant deaths including, cleft pallets, congenital heart problems, two heads, and six legs to name a few.

Page 19 - end of 1st paragraph, Nutritional factors - DeWildt has had few animals reproduce in comparison to how many they have held at their facility and, although they have had a lot of cubs born, they have had a very high infant mortality.

Page 19 - end of 2nd paragraph - Reproduction has occurred at several facilities which fed the diets that were in question to cause reproductive problems.

Page 20 - Enclosure size - all facilities in the world are included in the Studbook Questionnaire Summary, I sent you a copy of the summary pages, but the full report is available at Peter Olney's office.

Page 21 - Paragraph before Human Contact section - Cheetahs lived and reproduced successfully at the Wildlife Safari with tigers housed in the middle of the cheetah compound.

Page 21 - Human Contact section - DeWildt has been open for the public for the past 9+ years now and are still breeding successfully.

Page 22 - Before Social Management section - Successful reproduction has occurred with tame animals at Wassenaar Breeding Center in Holland; and in the United States at White Oak Plantation Breeding Center, ST. Louis Zoo and Frank Gilberts Private Facility.

Page 22 - end 1st paragraph of Female isolation - Wildlife Safari had very good success breeding cheetahs in a Drive-through section where cheetahs were all together in a 7-8 acre area.

Page 24 - Sex ration - Strong possibility that one male in a team or group of brothers is the breeder, have seen this with three brother teams at the Wildlife Safari. Also have seen only one male breed with one female or visa versa when there was a group of males and females to choose from, this is strongly mate choice. Have seen aggression causing death of both male and female animals.

Page 25 - second to the last line change South West Africa to Namibia/SWA

Page 26 - Monthly distribution of litters in the World use 1988 Int. SB.

Page 26 - middle of page - research by the NOAHS team of reproductive physiologist may have found that the cheetah is not an induced ovulator.

Page 29 - Under Male section - 2nd paragraph, Wassenaar Breeding Center, in Holland, puts female into male's pen with him not there, then changes and puts the male in, this occurs daily. The male then goes around and sniffs where the female has been and will alert them when the female is in heat by increased urination and excitement at the smell.

Page 30 - Last paragraph - Wassenaar also says female into males enclosure works best and they have had excellent success with this.
Page 33 - top of page, Marker & O'Brien, 1989 didn't say early removal of cubs by mother, or introducing male to female with large cubs.

Page 33 - end of 3rd paragraph under Pregnancy - At Wildlife Safari we built den boxes that were up against the fence and had an opening at the back which we could open from the fence. This rear opening allowed us to check the cubs without disturbing the female. The female did not take on the typical threat behavior that occurred when we approached from the front. We even used this rear opening to feed the female with meat on the end of a stick or paddle. It worked very well as we were able to keep a close eye on the cubs without disturbing the female.

Page 33 - 4th Paragraph under Pregnancy - Put female into cubing enclosure 2 to 3 weeks before cubing. At Wildlife Safari, we had a very nervous female who used three den boxes.

Page 34 - 4th paragraph under Birth, one litter at San Diego Wild Animal Park has been reported to have been born over a two day period - with a full day delay in between the cubing process.

Page 35 - Top of page- World average litter size 1956 - 1990 is 3.0 cubs with 1793 cubs being born in 541 litters.

Page 35 - Monitoring Development - At Wildlife Safari, we checked the cubs from a window opening at the rear of the den box.

Page 36 - Incidents - One litter of cubs born at Wildlife Safari, cubs eyes were open at birth.

Page 37 - Diet - Nutritional Problems include too little calcium and too much calcium (Western Plain Zoo case of Osteochondrosis Dissecans).

Page 37 - Vaccinations - use better vaccination schedule: the majority of facilities vaccinate cubs for the first time between 6-8 weeks of age then second shot-10-12 weeks, and third shot-14-16 weeks, then boosters are given at one year and for adults annually. Vaccinations include feline rhinotracheitis, panleukopenia, and calcici virus. Rabies vaccinations are usually given annually beginning at one year (no problems reported with rabies vaccine). There have been many reported problems with vaccine breaks using modified live vaccines, reports have come from: Columbus Zoo; Krefelder Zoo; St. Louis Zoo; Whipsnade Park; Wildlife Safari; Moscow Zoo. Most Zoos use a Killed vaccine.

Page 38 - Cub Deaths - Reported in both 1988 Int. SB (see page 17A) and Marker-O'Brien, 1989 (pg 9) as to infant mortality caused from stillbirths, premature births, congenital defects, infection, mother neglect, or cannibalism.

Page 41 - Sending hand rearing packet.

Page 44 - See Hand rearing packet - See San Diego, Columbus and White Oak protocol.

Page 44 - 2nd to last line- Stimulation of cub is very important to assist with urination, defecation and aids digestion.

Page 47 - 2nd Table- the world population has increased from 1988 to 1990. The year end population of cheetah in the world in 1990 was 912 animals. All world figures were taken the Int.SB except the 1990 figure, which is incorrect. Thus the end percentage changes to 8.6%

Page 47 - last Table figures are not correct, as not all zoo's respond to the IZY questionnaire. The In.SB figures are most accurate.

	1988	1989	1990
Total maintained	334.370	420.454.6	455.469.11
% Captive Born	69%	74.3%	72.3%
No. Collections	140	150	154

These figures would then change the last three lines of that page.

Page 48 - Table Cheetah births in Captivity use 1990 figures for International (Marker-Kraus, 1991 (1990 Int.SB))

	1990
No. Institutions	21
No. Litters	34
No. Cubs	116 (61.55)
Cub Deaths	16 (6.10)
Infant Mortality	13.8%

Page 49 - top of page if you want to use the 1990 figures, of eh 116 cubs born internationally in 1990, 16 died, an infant mortality of 13.7% (Marker-Kraus, 1991 (1990 Int.SB).

Page 49 - Table Showing international breeding of cheetah in captivity should be from Int. SB.

	1988	1989	1990
Cubs born	59.53.9	58.56.17	61.55
Cubs died (30 days)	29	27	16
% survival	74%	79%	86%

Page 49 - Question to me - The US SSP Research Plan has designated the Namibian population as an important population to learn more about since the majority of the cheetahs in captivity have come or are coming from Namibia, and there is no information about this population. We are looking at what a healthy wild population looks like to compare to the captive populations. Always there is the long-range goal of re-introduction.

Page 50 - 1st Paragraph - Use of Micro chips are a very good idea, but at this time there are several types of chips and they are not universal as one type of receiver doesn't read other types of chips. The Int. SB strongly recommends tattooing the cheetah in the inner thigh.

Page 50 - Catching and handling - the use of a squeeze cage is very useful for the routine collection of blood without immobilizing the animal.

Page 51 - Transport - At Columbus Zoo, the trailer is backed up to the gate which it fits into perfectly. The cheetah walks into the trailer with the use of food as a bait. The cheetahs get used to it very quickly.

Page 51 - End of Transport the word should be seropositive not negative.

Page 52 - add new 1991 CITES Laws here as it pertains to Namibia, Zimbabwe and Botswana.

Page 58 - Recommended Research - Should include the US SSP Research Based Master Plan which is discussed at end of Marker & O'Brien 1989, and at the end of the 1988 Int. SB. Research should also include more research into the free-ranging populations and ways of stabilizing them for the future (which is what we have dedicated our time to now with the Cheetah Preservation Fund).

Dear Amanda: Here are my comments, I hope that these comments will assist with your important publication. The work you have done has been needed for a long time, as no where is the such a complete report of the cheetah under one cover. It would be very good if all facilities that have cheetah could receive a copy, if you would be interested we could include it in the next International Cheetah Studbook, or if you are not interested in that is there a possibility that the document could be mailed to all facilities that have cheetahs? If so I would be very happy to supply you with a list of those facilities.

I have put a few more articles in the mail for your reference. If I can be of any further help please let me know. I will look forward to keeping in touch with you.

Most Sincerely,

Laurie Marker-Kraus
International Cheetah Studbook Keeper
Co-Director, Cheetah Preservation Fund