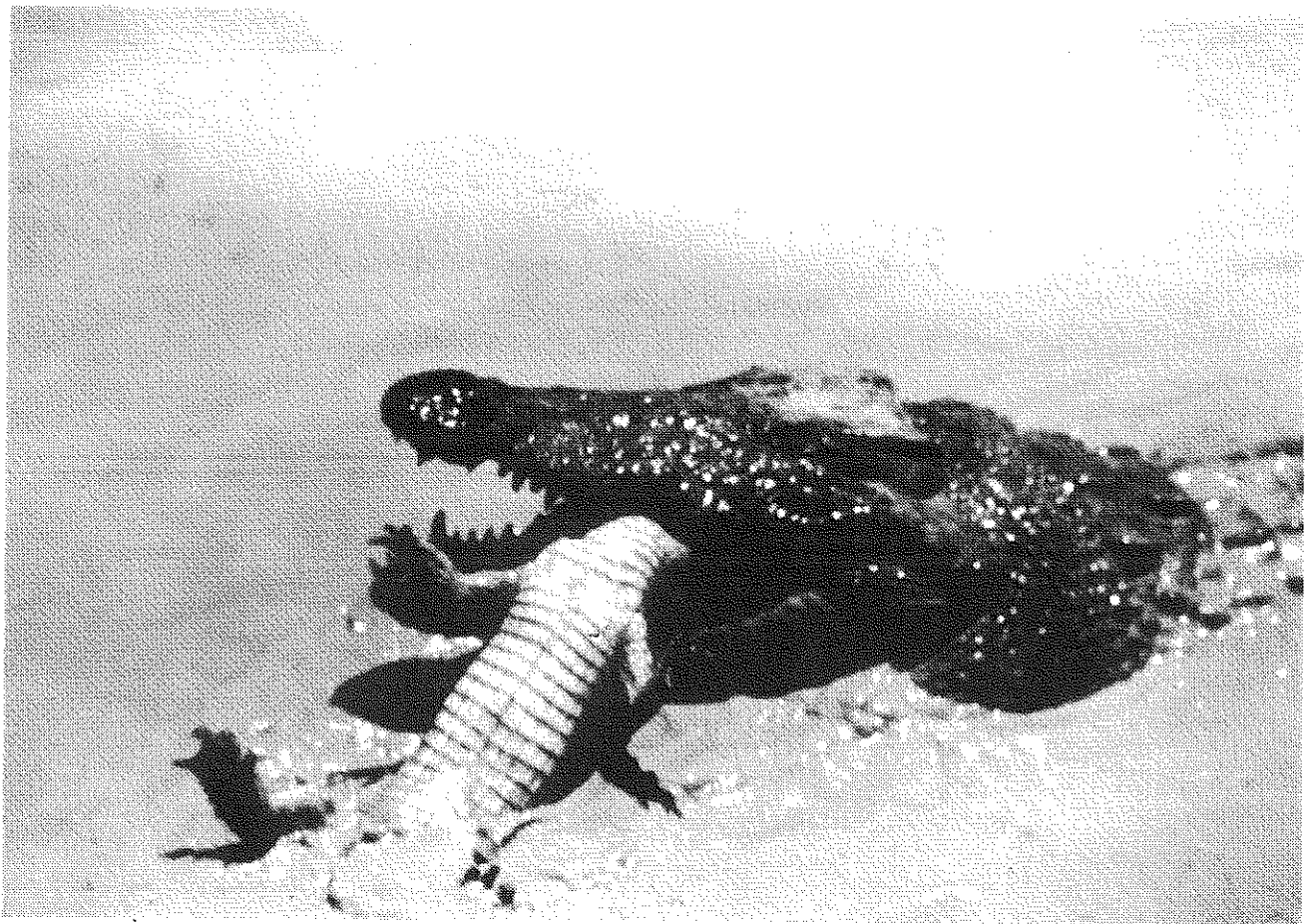


CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 13 No. 1 ■ JANUARY 1994 - MARCH 1994



IUCN World Conservation Union ■ Species Survival Commission

CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 13 Number 1
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IUCN--The World Conservation Union
Species Survival Commission

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COVER PHOTO: Cannibal crocodile; A Nile crocodile, *Crocodylus niloticus*, in Madagascar eats a smaller conspecific. O. Behra photo.

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GUEST EDITORIAL

CAPTIVE BREEDING OF CROCODYLIANS:
COMMENTS ON GUEST EDITORIAL NEWSLETTER
12(2). The statement that "closed cycle captive
breeding is independent of, and has little
conservation benefit for, the wild population"
cannot go unchallenged. In South Africa, for
example, we have farmed crocodiles in "closed
cycle" farms since the inception of crocodile
farming in the early seventies. Today we have in
the region of forty farms with well over 3,000
breeding animals. Many of these crocodiles are
second and even third generation captive bred.
To say that the South African crocodile farming
industry does not benefit conservation or wild
populations of crocodiles is incorrect and rather
short sighted.

Firstly, crocodiles have been hunted in the
wild in South Africa for their skins and for other
by products such as meat and fat, the latter for
the traditional medicine trade. Many crocodiles
have also been killed because of the threat that
they pose to people and their livestock. Today,
very few wild crocodiles are killed for their skins
as the farms produce thousands of good quality
legal skins at reasonable prices. Farms also
supply meat and fat to the trade and this has
certainly led to pressure being taken off wild
populations of Nile crocodile.

Another important aspect is the educational
function that many commercial farms fulfill. At
least ten of our farms allow members of the
public, and students, to view the crocodiles and
learn more about them. Some of these have
excellent educational programs and hundreds of
thousands of scholars have visited these facilities.

At present it is estimated that South Africa
has about 10,000 crocodiles left in the wild. This
includes crocodiles in protected areas such as
Kruger National Park, Ndumu and St. Lucia.

This is not much when compared with wild
alligator populations in Florida. With so few
crocodiles left in the wild we have no reason to
harvest from the wild when we have stable
production from our farming industry. The
farming industry poses no threat to the
crocodiles still in the wild.

The CSG should not interfere with private
enterprise. Many farmers have invested more
than their life savings into commercial crocodile
farming and this has not been to the detriment of
the species. In bad times, when prices drop and
grading becomes more stringent, many of them
operate at a loss. In good times, and after many
years of trial and error, they hope to make a
profit. That is what business is all about and
such entrepreneurs certainly do not need the
CSG interfering with their enterprises.

Just as the sustainable use of wildlife benefits
the species and creates income for many people,
so too does closed cycle breeding benefit the
species and provide employment. Countries like
Thailand and South Africa, with commercial
enterprises that have been developed over many
years and at great expense, are not really
involved in Sustainable Use programs. The
editorial infers that such countries should
perhaps not be involved in farming crocodiles. It
was, not so long ago, argued that captive
breeding aided conservation because pressure
was taken off the wild populations. Is this no
longer the case?

The suggestion that captive bred animals
should be released into the wild to support
Sustainable Use objectives is questionable. What
about conservation of genetic integrity?
Additionally, in areas where there are no longer
any crocodiles, the problems that caused their
demise need to be addressed before re-
introduction can be considered. The editorial
states, "... if the wild population then recovers,
and ranching becomes feasible... ". This may
apply to a few countries but in most countries,
and certainly in South Africa, the wild
populations will never recover as virtually
nothing is being done to protect suitable habitat.
Even in protected areas, polluted waters from
beyond the boundaries wreak havoc. Our rivers
are badly polluted, too much water is extracted
for agriculture and our rapidly expanding
population needs more land for themselves and
their livestock.

The statement that "the CSG should take the
position that it only supports programs with

conservation merit and will oppose commercialization that is harmful to the objectives of conservation and Sustainable Use" appears to be nothing more than a deliberate attempt to support Sustainable Use programs at the cost of closed cycle captive breeding. For many years it has been argued that captive breeding aids conservation by taking pressure of wild crocodiles. Good quality farm skins are preferred in trade to wild skins and farms are a lot easier to regulate in international trade. Many farmers have gone to great length and expense to spread the conservation message and help an animal that is not cuddly and popular. Many of them go to great trouble and expense to support the CSG, attending meetings and donating money to assist CSG activities. Cognizance should be taken that, despite substantial investments, most crocodile farmers have traded at a loss for years.

A framework was proposed for a CSG position on this issue (NEWSLETTER 12(2):3), here are some comments referred to the nine points raised there:

1) It is fine for CSG to support the use of wildlife in trade where there is conservation benefit for habitats and wild populations. But it should also be recognized that closed cycle farms do have conservation benefit by taking the pressure of wild populations as described above. This is certainly the case in South Africa. The conservation benefit of education should also be recognized. Protection of habitats is the main conservation problem and conservation bodies seem powerless to oppose major development. While it may be relatively easy to push for conservation of rhino or panda habitat it is a difficult task to get the public excited about conserving crocodiles. Ironically it is often the people involved in closed cycle farms who understand the problems crocodiles face and go out of their way to fight for conservation of their habitat.

2. Ranching eggs and juveniles from the wild may be preferable to closed cycle captive breeding but is this honestly in the best interests of the crocodiles, or just in the interest of the people operating such systems? We think it unlikely that these programs really do provide adequate safeguards against overexploitation and habitat destruction from industrial or agricultural development and pollution.

3) Why should closed cycle captive breeding be discouraged outside the normal range of

species at this late stage when such operations have been permitted throughout the world for the last 20 years? The Nile crocodile is farmed in Cape Province, southern Natal, western Transvaal and Namibia in areas that extend well beyond the current range of the species. About a third of South African farms are located outside the current range of the species.

4) We think the proposal for CSG to examine proposals to extend trade based on conservation merit is sound.

5) If captive breeding programs that put existing ranching programs at a disadvantage were opposed by CSG then crocodile farming in South Africa, as well as Thailand, Namibia, and Zimbabwe, would have to be opposed.

6) There is significant trade in most species of crocodilians that are farmed commercially and opposition from CSG to the establishment of new large commercial farms that operate within the law and in compliance with CITES would be blatant interference with free enterprise. We do not think this should be the objective of the CSG.

7) The suggestion to evaluate programs on relative conservation costs and benefit is a valid point. Many programs are questionable and funds wasted in this manner may be used more constructively elsewhere.

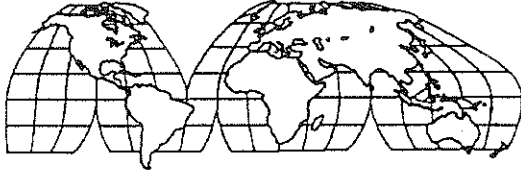
8) The statement that CSG should call for the establishment of wild populations and conversion of existing farms to ranches defies an answer! In South Africa the available habitat can sustain the approximately 10,000 wild crocs that remain. Ranching of such a limited resource should not be seriously contemplated. In areas where there are no longer crocodiles there are definite problems that need to be addressed and crocodiles cannot just be released anywhere.

9) The recognition of the conservation value of captive breeding for severely threatened species seems ironic when most of the husbandry techniques now in use were developed on commercial farms.

In conclusion, the comments and proposals offered by the editorial in Newsletter 12(2) are sad and it will be a turning point for crocodile conservation and the skin trade if these philosophies are adopted. Several years back crocodile populations were severely depleted by the trade but it was the commercial trade that counteracted this threat. The greatest threat, as we approach the twenty first century is loss of habitat. We have very little power when it comes to fighting such loss. -- Johan Marais and

Professor G. A. Smith, *Crocodilian Study Group of Southern Africa*, P.O. Box 3103, Halfway House 1685, South Africa.

AREA REPORTS



AFRICA

Ethiopia:

CROCODILE RESTOCKING OPERATION. Nile crocodiles were excessively exploited between 1960 and 1970, and as a result the population of crocodiles in major lakes and rivers of Ethiopia have declined significantly. This condition forced a ban on crocodile hunting and at the same time the crocodile was placed on Appendix I of CITES. After a decade or so, assessments of the crocodile numbers of the most depleted populations in Lake Abaya and Lake Chamo revealed an encouraging recovery. Based upon this a ranching scheme has been adopted by the Ethiopian Wildlife Conservation Organization to increase the sustainable yield by rearing hatchlings to commercial size in captivity after natural emergence from protected nests. One of the objectives of the ranch is to contribute to the conservation of the crocodile resource of the country through restocking.

To implement this policy a restocking operation was initiated at Arba Minch crocodile farm in October 1993. Areas free from disturbance were selected and 465 six year old captive raised crocodiles were released into Lakes Abaya and Chamo. These represent 5% of the entire ranch population of crocodiles. The crocodiles of Lake Abaya have been heavily utilized and still no significant change could be seen compared to Lake Chamo and other water bodies of the country. Therefore 300 of the crocodiles were released into Lake Abaya at three sites and 165 crocodiles were returned to lake Chamo. All these released crocodiles were marked by cutting the first scute of their tail and their length and sex recorded. A total of 47

males from 1.3 to 2.2 meters and 418 females of length 1.3 - 2.5 meters were released. The survival and adaptation of these crocodiles will be monitored on a regular basis by the staff of the Arba Minch farm and the results will be reported in the future.

In other news, farm staff report that while culling crocodiles in July a clutch of eggs was found laid in the pond of a group of seven year old crocodiles raised on the farm. This may indicate a more rapid attainment of maturity in these farm reared crocodiles. The clutch has been preserved for future study. -- Tadesse Hailu, P.O. Box 386, *Ethiopian Wildlife Conservation Organization*, Addis Ababa, & W. Kumara, *Arba Minch Crocodile Farm*, P.O. Box 42, Arba Minch, Ethiopia.



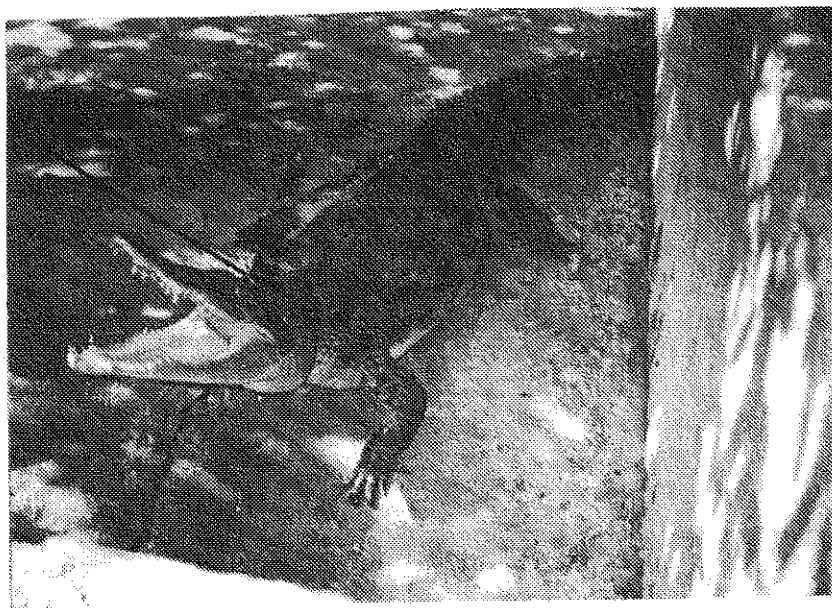
Staff at Arba Minch crocodile farm load a Nile crocodile for restocking. T. Hailu photo

Mauritania:

CROCODILES ON THE DESERT'S DOORSTEP. A number of animal species have already disappeared from different regions of the Sahara and Sahel, representing a considerable percentage of the existing biodiversity.

In Mauritania, mammals such as *Gazella dorcas* and *Acinonyx jubatus*, birds such as *Struthio camelus* and *Otis arabs* and reptiles like *Testudo sulcata* have been extirpated in the last 10 years. The 1992 CSG Crocodile Action Plan

even had the Nile crocodile (*Crocodylus niloticus*) listed as extirpated. However, in 1993 I received a report written by three young French people who followed in the footsteps of the great naturalist, Theodor Monod. In 1937, during one of his desert trips, Monod wrote in his journal: "De Moudjeria je ferai un détour pour aller saluer les crocodiles de Matmâta" (from Moudjeria I will make a detour to go and greet the crocodiles at Matmâta).



Nile crocodile raised at Arba Minch Crocodile Farm, Ethiopia.

With no crocodile experience these 3 young French students arrived in Mauritania assuming they could confirm the presence of the Nile crocodile in the Tagant Highlands (400m high).

Travelling almost 1,000 km into the Tagant massif, they were able to identify the presence of Nile crocodiles in five "gueltas" (sites of permanent water), Matmâta, Ederoum, Amzouzeff, Rh Zembou and Laout. It seems that a crocodile skull from Matmâta can now be found in the Museum of Natural History in Paris. The crocodiles in Mauritania do not conflict with people because they are found in isolated areas and their population density is low.

Copies of this information will be sent to the French Cooperation Agency which is helping the Mauritanian Government rehabilitate dams in the Tagant area and to Vivian de Buffrenil and Roger Bour at the Museum in Paris, in the hope

that they can raise some funds for more research and conservation action.

I am sure that all CSG members will join me to thank Seved Robin and his two colleagues, Danae Riboud and Eric Marcellin for their concern about crocodiles and hope that their interest continues. -- Olivier Behra, *Deputy Vice Chairman Africa, BIODIV, Lot VX 18 Andrefandrova, Antananarivo, Madagascar.*

South Africa:

LOCAL MARKET FOR FINISHED CROCODILE PRODUCTS. Sales of crocodile products in South Africa can be divided into leather sales and meat sales. A recent analysis of retail sales of exotic leather has revealed some interesting factors and shows the value of understanding markets. Crocodile leather products were third in retail volume in South Africa behind ostrich (1st) and buffalo (2nd), with small items heading the sales volume followed by handbags

and then belts. Johannesburg is the largest retail market and enquiries were made there among wholesale and retail vendors and the public to establish the reasons for the position of crocodile leather in the market. Vendors named the following factors:

- 1) Crocodile leather was too expensive compared with other products.
- 2) Crocodile skins were not readily available.
- 3) Crocodile is stiff compared to the very popular ostrich.
- 4) Crocodile leather has many flaws.
- 5) South Africans couldn't afford crocodile products.

The general public, including both overseas and South African buyers, gave similar information:

- 1) They preferred ostrich.
- 2) They were deterred at the point of sale by the

high price of crocodile products.

3) They were not aware of the different types of crocodilian leather and in particular were not aware of the superior quality of crocodile as opposed to caiman leather. Many South African buyers have never heard of caiman.

4) South African customers tended to be indifferent to the conservation aspect of buying products.

The the most common questions asked by tourists were, "Where does crocodile leather come from? i.e. was it locally produced?" and, "Why is it more expensive than ostrich?" The major reasons for the preference for ostrich seem to be based in its more pliable nature and lower price. Wholesale prices for equivalent objects in crocodile run 50% - 80% higher than ostrich while buffalo runs around half the ostrich price. After markups of 80%-120% and across the board VAT taxes of 14% the retail price of crocodile is around 30-85% higher than ostrich and the buffalo remains at a third to a half the cost of ostrich. The distribution of sales among tourists and South Africans showed major differences. German tourists purchased 65% of crocodile items sold, followed by other European and US tourists (20%), Taiwanese (10%) and South Africans (5%). These proportions were similar for ostrich but completely reversed for buffalo with South Africans buying 90% of sales and other Europeans the remainder.

In conclusion the analysis comments on the vulnerable nature of in-country sales as tourism is declining in South Africa. A program of price incentives, unified labelling as South African product and improving supplies was proposed. -- Andrew Ericson, *Cango Crocodile Ranch*, From NILE CROCODILE FARMERS ASSOCIATION NEWSLETTER No. 9, December 1993:37-40.

WESTERN ASIA

India:

MUGGER CROCODILE CONSERVATION IN GUJARAT. As part of the crocodile conservation project, Gujarat Forest Department has set up two crocodile rearing centers at Sasan in 1977 and Gandhinagar in 1979. Mugger crocodiles, *Crocodylus palustris*, have been bred in captivity and 857 muggers have been reintroduced into three water bodies located in the Gir forest. We have been monitoring the population in one

release location, Kamaleshwar lake, since June 1990. In 1977, Whitaker reported 51 wild muggers with 6 breeding females at this lake. Now there are more than 200 with over 50 breeding females. This indicates that some of the released stock has entered the breeding class. We have also recorded more than 60 burrows around the lake, some of which are used for nesting. One of us (B.C. Choudhury) is presently studying the use of burrows of the muggers in this area.

Since the initiation of the crocodile conservation project in 1977 no attempt has been made to assess the distribution of crocodiles throughout the state of Gujarat. In addition to the Gir populations there are unconfirmed reports of muggers in the Ghed and Vanakaner area and more than 30 wild crocodiles were recorded by us at Bhuj. Kamaleshwar Lake dam construction and other drastic habitat alterations are effecting the crocodiles. During 1992 most of the eggs were predated because of the absence of nest guarding females, which may be the result of the release of reservoir water after nesting.

Of the 1,200 muggers released in India at over 30 sites, the great majority (857) were placed in the Gir forest. This, and similar, protected areas allow crocodiles to be released with minimal conflict with people. Unfortunately, repeated stocking of captive raised mugger into the same place also leads to unwanted effects such as cannibalism, emigration and predation due to overcrowding. The water bodies where most crocodiles have been released are subject to severe fluctuation of water level between monsoon (wet) and summer (dry) seasons. As a result the muggers are crowded, short of food and fall prey to other carnivorous animals. We recorded in 1992, a fight between a mugger and lion at the carcass of a dead buffalo lying 25 m from the water, in which the crocodile was killed and eaten by the lion.

In addition to the two rearing centers, the Baroda Zoo (since 1964), Ahmedabad Zoo (since 1967) and Junagadh Zoo (since 1990) are also successfully breeding muggers. Due to improved management of captive breeding and rearing, mortality has decreased and all the breeding institutions have large numbers of muggers available to be reintroduced. The accumulated captive stock are expensive to maintain unless they can also earn some revenue. To cut costs captives are fed meat only diets that lead to vitamin deficiencies and disease.

In Gujarat much could be done to improve mugger survival. The few pockets where they survive naturally could be salvaged and the Wildlife Protection Act gives protection from poaching and habitat loss. A major problem is the lack of identified suitable reintroduction sites. The future success of the crocodile rehabilitation scheme will depend crucially on the identification of new reintroduction sites. -- V. Vijaya Kumar, *Dept. Biosciences, Saurashtra University, Rajkot 360 005, Gujarat*, & B.C. Choudhury, *Wildlife Institute of India, P.O. Box 18, Dehra Dun 248 001, India*.

Iran:

NUMBERS OF CROCODILES IN IRAN. The crocodile in Iran (*Crocodylus palustris* - Gando) is a very shy animal. The extreme shyness of this harmless and holy animal, coupled with the remoteness of its habitat and the difficulty of the terrain, makes observation difficult. To observe them we have to wait behind the Phragmites and Tamarisk vegetation at sheltered sites on the rivers and ponds. The Gando lives in the Sarbaz and Kajou rivers and ponds where it prefers deep ponds and sheltered river banks during the day. At night Gando move around the rivers searching for food. Because these animals are quick to hide at the least disturbance and live in a difficult and isolated area, it has been difficult to take a precise census of the population.

From 25 August to 1 September 1992 a statistical survey of Gando was carried out with the cooperation of the Department of the Environment of Sistan and Baluchistan Province and in conjunction with colleagues in the province. Twenty six personnel participated in this first experimental project.

Despite the numerous difficulties and obstacles we were able to survey the ponds existing during the survey period. Many factors, including climate, the migration of villagers and the resultant drainage canals and water pumping cause continuous changes along these rivers. Personnel stood near the ponds watching carefully from morning until night and counted crocodiles seen.

We recorded 46 Gando in the Kajou river which included 16 in the river and from 1 to 3 Gando in each of 16 nearby ponds. In the Sarbaz river and associated ponds we counted 72 Gando, including the Sarbaz river with 10, Geriban pond with 9, Shakar Jangle with 6, Hoot Kat pond with

5 and 23 nearby ponds holding from 1 - 4 Gando. Thus the total number of Gando recorded in this survey was 118. -- Haji Gholi Kami, *Herpetology Section, National History Museum, Ghaem Magham Ave. No. 9, Tehran*, & Mohammed Saghari, *Dept. of Environment, P.O. Box 15875-5181, Tehran, Iran*.



Mr. M. Saghari with a female *C. palustris* of 175 cm (23 kg) from Delgan Pond near the Sarbaz River, Iran. Meigouni photo.

Pakistan:

STATUS REPORT OF CROCODILES IN PUNJAB PROVINCE. The marsh crocodile (*Crocodylus palustris*) was already rare by 50 years ago and is now extinct in the wild in Punjab Province. The marsh crocodile existed throughout the Punjab province in the Indus river system and in ponds and dhands (irrigation ponds) throughout the Indus plains. All the large rivers of the Punjab have now been dammed to provide irrigation. Fragmentation and decreased water flow adversely affected fish populations. Necessary shelter was also reduced. The irrigation caused a rise in ground water levels water logging the productive land. To ameliorate this situation a large scale drainage program was conducted and ponds and dhands were drained to increase agricultural areas. This has reduced habitat to such an extent that crocodiles, both mugger and gharial, are now extinct in the wild. However,

large water storage dams and barrages provide some suitable habitat and some natural dhands still exist.

A captive propagation facility has been constructed at Punjab Wildlife Breeding Center, Faisalabad, where ponds and tanks have been constructed for adult, sub-adult and hatchling crocodiles. Some individuals have been procured from other areas in the provinces of Sind and Baluchistan and two pairs are expected to breed in 1993. The Government of India have very kindly agreed to provide 300 young crocodiles of 1.5 m length, payment for which has already been made. Necessary documents are awaited. When these crocodiles are received they will be kept at the breeding center, and on their increase, will be released into natural habitat. Chasma Barrage and Taunsa Barrage Wildlife Sanctuaries located on the river Indus and Patisar Lak, a 2,000 ha lake in the Lal Suhanra National Park have been selected as release sites. It is also hoped to procure some gharial from India and conduct a similar captive breeding and restocking program. Protection of suitable habitat and managing conflicts with people and fisheries are anticipated to be important management issues. Both species of crocodile are protected under the Punjab Wildlife Act 1974 and killing, capturing and trade in the private sector is prohibited. This program is supported by the Government of Punjab, including funding of the captive propagation efforts. -- Aziz Aslam Khan, *Director General, Wildlife and Parks, Punjab, 2 Sanda Road, Lahore, Pakistan.*

EASTERN ASIA & OCEANIA

China:

NEW ALLIGATOR BREEDING CENTER. Qiongsan Tian Yi Alligator Development Co. (QTYAD) has been developing a breeding facility for Chinese alligator in Hainan Province. Its breeding farm is in Da-zhi-po, Qiongsan County. QTYAD had planned to bring in 50 Chinese alligators from Anhui Research Center for Chinese Alligator (ARCCAR) in September of 1991. However, in September of 1993 QTYAD decided to obtain 140 surviving alligators from the Chongming Island Farm which had suffered from water quality and developed illness (NEWSLETTER 12(2):5). QT

has now engaged Zhang Zheng-dong (Associate Research Professor at ARRCAR) as Research Professor and Professor Huang Zheng-yi (Professor of Environmental and Resource Biology, Fu-dan University) as technical advisor and establish the South China Research Center of Chinese Alligator Reproduction -- Zhang Zheng-dong, *Anhui Research Center for Chinese Alligator Reproduction, Xuancheng, Anhui, Peoples Republic of China.*

Papua New Guinea:

PNG ADOPTS CROC MARKING SCHEME. Papua New Guinea's management authority for CITES has informed the Secretariat that since July 1993 it has been implementing the "Universal Tagging System" recommended in Resolution Conference 8.14 for the identification of crocodilian skins.

Under this system PNG is tagging saltwater crocodile (*Crocodylus porosus*) skins with dark red tags (Nos. PG930001 POR - PG9305000 POR) and black tags (Nos. PG9300001 POR - PG9301000 POR). New Guinea crocodile (*C. novaeguineae*) are being tagged with dark green tags (Nos. PG9300001 NOV - PG9315000 NOV) and black tags (Nos. PG9300001 NOV - PG9302000 NOV). The black tags are used on confiscated skins. In conjunction with the new tagging system PNG is also using a new stamp for document approval. Further details are available in CITES Notification 759. -- from TRAFFIC/US, Vol 13, Number 1:11.



Official stamp of the PNG Management Authority.

CENTRAL & SOUTH AMERICA

Brazil:

MAMIRAUÁ ECOLOGICAL STATION. John

Thorbjarnarson visited Brazil in November to assist project coordinator Dr. Marcio Ayres, Wildlife Conservation Society Research Zoologist, and Ronis da Silveira develop a project on crocodilians within this 1.4 million ha reserve. Ronis has just finished his masters degree working with Bill Magnusson on the ecology of *Caiman* and *Melanosuchus* in the Anavilhanas Archipelago on the Rio Negro. The Mamiraua area is comprised of an extensive "varzea" (seasonally flooded) forest at the confluence of the Japura and Amazon Rivers, just upstream of Tefé, which was made famous by Henry Walter Bates in his "The Naturalist on the River Amazons". We visited several sites within the reserve using a 20m long boat, the "Uacari", as our base, surveying the many lakes found in the area. We encountered a good population of both *Caiman crocodilus* and *Melanosuchus niger*, however, both are hunted for meat by local villagers. Hunting takes place at the height of the dry season (September - November) and the meat is sold mostly in the lower Amazon or upstream in Leticia, Colombia. Reportedly much of the meat is sold as piracu, a large Amazon fish (*Arapaima gigas*) that is widely consumed in the region. The first week we were in the reserve IBAMA caught 6 caiman hunters and threw them into jail, confiscating a large amount of meat. The hunters were later released but a federal police enquiry has been initiated to determine who is purchasing the meat.

Because of hunting, the black caiman are restricted mostly to the interior lakes that are hard to reach. In some of these areas we saw large numbers of *Melanosuchus* up to nearly 4 m TL. The rivers and caños also had large numbers of two species of freshwater dolphin (*Inia* and *Sotalia*) as well as incredible numbers of fish that filled our boat during nocturnal surveys. -- John Thorbjarnarson, NYZS The Wildlife Conservation Society, 185th Street and Southern Boulevard, Bronx, NY 10460-1099, USA.

Colombia:

CITES INSPECTION VISIT. A CITES delegation visited Colombia from 27 February through 19 March 1994 to review that country's program of wildlife farming, with special emphasis on *Caiman crocodilus*. The mission consisted of Dr. Obdulio Menghi, CITES Secretariat, Switzerland; Dr. Robert (Hank) Jenkins,

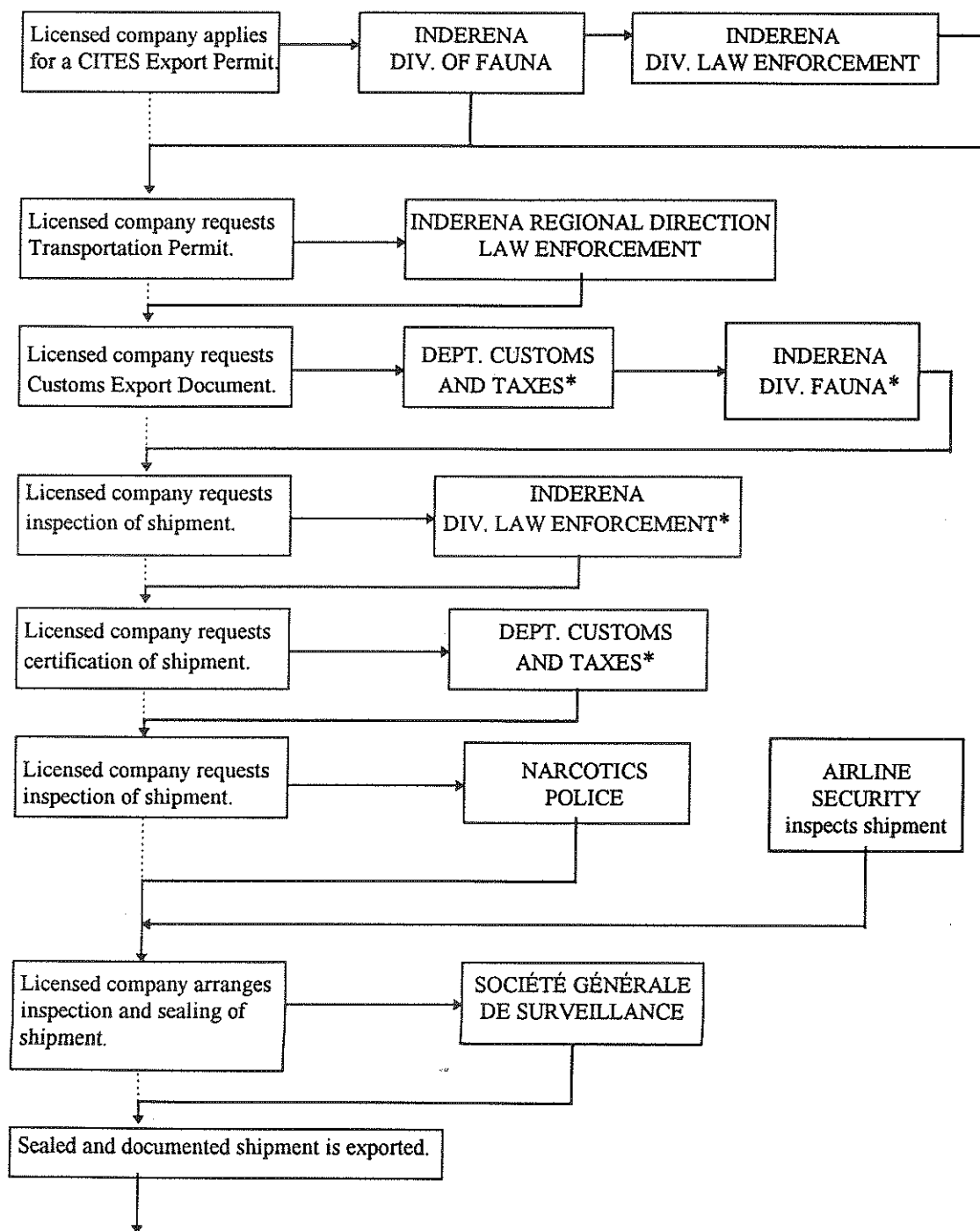
Chairman of the CITES Animals Committee, and Australian Nature Conservation Agency, Australia; Prof. Wayne King, Deputy Chairman of the CSG and Curator of Herpetology, Florida Museum of Natural History, USA; Dr. José Ayarzagüena, Agencia Española de Cooperación Internacional, Venezuela; and Juan Villalba-Macias, TRAFFIC Sudamerica, Uruguay. The group met with officials of the Nacional Institute of Renewable Natural Resources and the Environment (INDERENA), the Ministry of Agriculture, the Colombian Association of Wildlife Farmers (AZOOCOL), and many individuals involved in law enforcement and trade.

The mission started its work by teaching a four day workshop on CITES law, history and implementation, particularly as it applies to wildlife ranching and farming, permits, universal tagging, hide and product identification. The workshop also covered aspects of the biology of Colombia's crocodilians. The delegation, accompanied by Antonio Villa, Chief of INDERENA's Division of Fauna; Mario Orlando Lopez, also from the Division of Fauna; Miguel Stambulie, President of AZOOCOL's Board of Directors; and Eduardo Espinosa F., Executive Director of AZOOCOL, then visited wildlife farms scattered throughout Colombia. At the end of the first week, Menghi and Villalba departed for other meetings with officials in neighboring countries, but Jenkins, King and Ayarzagüena remained.

Under Colombian law, new wildlife farms must operate under an 'experimental' license during which they construct their facilities, obtain their breeding stock from the wild, and initiate breeding operations. After a minimum of two years, the farm may then apply for a 'commercial' license that allows the commercial sale of animals or skins. Before the commercial license is issued, however, the farm is inspected by INDERENA to verify that it is capable of sustaining its breeding operation and that it appears to be economically viable.

The number of licensed commercial farms producing skins and meat for the international market are 43 farms for *Caiman crocodilus fuscus* (an additional 28 are still experimental) and 7 for *Caiman crocodilus crocodilus* (an additional 10 are experimental). The CITES delegation visited 27 private and 3 government stations, the majority in the northern provinces of Bolívar, Atlántico, and Sucre, but also including

STEPS REQUIRED FOR WILDLIFE EXPORTATION FROM COLOMBIA



* Shipment is inspected and checked against appropriate CITES Export, Transportation, and Customs Export document and minor discrepancies are corrected to assure contents correspond to documents. Customs also checks with INDERENA Div. Fauna to be sure shipment is authorized. When inspection is complete, both INDERENA and Customs stamp the CITES Export Permit and Customs Export Document with their agency seals and sign it.

the southcentral province of Huila, and the llanos provinces of Meta and Arauca in the east. On the closed-cycle commercial farms visited, *Caiman crocodilus crocodilus* and *Caiman crocodilus fuscus* were produced for the hide and meat market, and *Iguana iguana*, *Tupinambis* sp., and *Boa constrictor* for the pet trade. In addition, private experimental farms and government farms and research stations were visited on which multiple generations of *Crocodylus acutus*, *Crocodylus intermedius*, *Paleosuchus palpebrosus*, *Paleosuchus trigonatus*, and various land and freshwater turtles are being bred. An experimental farm also exists for *Melanosuchus niger*, though a lack of time precluded a visit by the delegation. However, INDERENA officials affirm that commercial farms have not been, and will not be, licensed for any of the Appendix I species until a program for monitoring the status of the wild populations is implemented and registration of the farms following CITES Conf. Res. 8.15 followed.

The mission was able to answer many of the concerns that have been expressed outside Colombia about the ability of the farms to produce the numbers of skins and animals reported by INDERENA. First, INDERENA mistakenly reported to the CITES that nearly 500,000 caiman skins were exported in 1993. However, that was the number allowed under the export permits issued, not the number of skins exported. Records available to the CITES delegation clearly showed that many of these export permits were returned to INDERENA for cancellation when the sale fell through. The actual number of caiman skins exported from Colombia in 1993 was around 230,000.

In order to monitor farm operations, INDERENA requires each of the wildlife farmers to submit every 3-months an extremely detailed report on the farm inventory, facilities, and other aspects of operation. In the experience of the CITES delegation, no other country requires such detailed reporting from crocodilian farmers. In addition, INDERENA requires each farmer applying for an export permit to follow an elaborate system of checks involving numerous government agencies (see figure). The last step in the process, that of having the export shipment inspected and sealed by the Société Générale de Surveillance, a Swiss company, was instituted by AZOOCOL for its members. All of these regulations have been instituted in a deliberate effort to assure that all

exports are legal under both Colombian law and under CITES. The CITES delegation was able to verify that these procedures are implemented - they exist in fact, not just on paper.

The delegation concluded its work convinced that Colombia farms can produce the number of skins and offspring they report, and that the wildlife officials are committed to keeping the trade legal and in full compliance with the CITES. Occasional illegal shipments undoubtedly will occur as they do in every nation, but in Colombia they should be no more frequent than they are anywhere else. The final report of the mission, containing a review of Colombian wildlife law, details of the farming program, and a number of recommendations for improving the program, was submitted to the 31st Meeting of the CITES Standing Committee in Geneva, 21--25 March 1994. The CITES visit was supported by INDERENA, AZOOCOL and CITES. -- Prof. F. Wayne King, *Florida Museum of Natural History, Gainesville, FL 32611, U.S.A.*

Costa Rica:

CROCODILES PREDATE ON SEA TURTLES. It has long been reported by researchers at Santa Rosa National Park, Costa Rica, that a population of American crocodiles (*Crocodylus acutus*) inhabits a freshwater lagoon adjacent to Playa Nancite, which is a major nesting locality for the Olive Ridley sea turtle (*Lepidochelys olivacea*). During a study by Gina Zanella monitoring sea turtle nesting between July and December 1990, more than 40,000 turtles were recorded nesting at Playa Nancite, most arriving in mass emergences of thousands of individuals termed "arribadas", that are typical for this species.

Observations of turtles found dead on the beach during this period indicated that of 15 dead turtles, 9 had clear signs of being predated by crocodiles, 2 were apparently killed by people and for 4 others the cause of death could not be clearly determined.

While making observations from a headland overlooking the beach during a study radio tracking turtles during 1991 and 1992, Pam Plotkin was able to observe that a single large crocodile, estimated to be 2.5 - 3 m total length, is probably responsible for these attacks on sea turtles. This individual is a well known long term resident of the lagoon behind the beach and has been named "Tosty" by biologists working there. A number of smaller crocodiles also live in the

lagoon but Tosty is the largest and is presumed to be a male. He has been observed crossing the sandy beach to enter the sea then swimming parallel to the beach, usually within 100m, apparently hunting turtles. While he has not actually been observed to take a turtle, on one occasion he was seen clearly stalking a single nesting female, but was unfortunately disturbed by people before the actual act of predation was observed. Crocodile predation on sea turtles has been reported in northern Australia (*C. porosus* on *Chelonia mydas* and *Natator depressa*- *C. Limpus* pers. comm.) and is probably a normal phenomenon wherever the crocodiles are large enough to handle adult sea turtles. It may be noteworthy that Rileys are the smallest sea turtles (65-70 cm carapace) which makes them vulnerable to predation by even medium size crocodiles like Tosty. -- P. Plotkin, NOAA, National Marine Fisheries Service, Silver Spring, MD 20910, USA, & Gina Zanella, Universidad Nacional Autonoma, Costa Rica.

French Guyana:

BLACK CAIMAN IN KAW SWAMP. During a short trip to French Guyana field work was carried out on the black caiman in the Kaw Swamp. In 1989 when I last visited the area I determined that the black caiman was not just restricted to the Kaw Swamp (including the Kaw River) but was found in the River Approuague also. However, they are not found in the Onanary or Kourouai Rivers which run into the Approuague River.

The distribution of black caiman in the River Approuague is interesting because of the proximity (approx. 10 km) to the sea. At this location crocodiles are subject to the effects of tides and salt water. However, the caiman are only found near to some large islands that lie midstream. These are the sites where fresh water enters the river, which may explain this distribution. Recent work in Brazil indicates that black caiman have a water composition preference (Bill Magnusson pers. comm.). Maybe the same thing is occurring in French Guyana.

Although crocodile conservation work in French speaking countries has only constituted a tiny proportion of the conservation and management efforts for crocodilians globally, still, this survey suggests that the population of black caiman in this area has increased between 1989 and 1993. However most (98%) of the

animals spotted during the night counts were small, less than 1.3 m.

Although black caiman are strictly protected, night time hunting of other crocodiles is allowed. Anyone who has been on a river at night and tried to distinguish species at gunshot range will recognize the difficulties this poses and we are concerned at the legislative text as set by the French Ministry of the Environment.

A project is now underway to create Kaw National Park and Dr. Leon Sanite, the Director of the Regional Delegation for Architecture and Environment, has a strong conservation interest in the black caiman. As a result we hope to continue studying this population and even though it may be unrealistic to try and understand its ecology in full on a short term basis, we may at least be able to raise concern for the species and adopt realistic conservation measures. -- Olivier Behra, Deputy Vice Chairman Africa, BLODEV, Lot VX 18 Andrefandrova, Antananarivo, Madagascar.

Paraguay:

PARAGUAY CAIMAN SURVEY. During November 1993, the status of the caimans of Paraguay was surveyed by Aida Luz Aquino, Chief of the Office of CITES--Paraguay, René Palacios, CITES--Paraguay caiman survey coordinator, Dr. Norman J. Scott, U.S. National Biological Survey, and Prof. Wayne King, Deputy Chairman of the CSG. A total of 73 sites were surveyed in 34 different locations, scattered throughout the range of *Caiman yacare* and *Caiman latirostris* in western and northern Paraguay.

The survey team encountered numerous populations of *Caiman yacare* as dense as 400-800 caimans/km, and the population in Arroyo Syry that flows into Laguna General Diaz had a density of 1,017 caiman/km. These densities are presumed to be caiman aggregated as a result of the dry season. They are nevertheless indicative of the very abundant populations of caimans in these areas. These populations were so dense that it proved impossible to survey them using standard survey techniques. Caimans were so abundant and so close together that it was not possible to write fast enough to record the usual data before some animals had submerged or moved to new positions, making it impossible to keep track of which individuals had been recorded and which had not. In these

populations, it was necessary to make a simple count of the total number of caimans present, followed by a transect through the population to record the frequency of various size classes. Nowhere has any caiman species been eliminated from its historical range in Paraguay, though *Caiman latirostris* remains threatened.

The results of the survey, containing a list of recommendations, were reported to the CITES Secretariat. The recommendations provide the basis for a sustainable utilization program for *Caiman yacare*. The first small, experimental harvest is anticipated in 1994. The harvest quota is expected to be expanded in later years once the results of the first year's harvest has been analyzed and the wild populations resurveyed. The report also included recommendations for the creation of a new three nation, trans-border, national park located in extreme northeastern Paraguay, extreme southeastern Bolivia, and the adjacent pantanal of Brazil. In addition, although it was not a goal of the survey effort, it quickly became clear that through the concerted efforts of the Paraguay officials, illegal trade in caiman skins shipped out of Paraguay has come to an end. The warehouses that used to be filled with skins smuggled from Brazil and Bolivia now stand empty. The survey was supported by the Japan Leather and Leather Goods Industries Association (JLIA) and its International Communication Division, with additional support from the Government of Paraguay and UNDP. -- Prof. F. Wayne King, *Florida Museum of Natural History, Gainesville, FL 32611, U.S.A*

Venezuela:

ORINOCO CROCODILE STUDIES. John Thorbjarnarson visited with Andres Eloy Seijas in Guanare and met Myrian Lugo of the Estación de Biología Tropical Roberto Franco in Villavicencio, Colombia. Myrian will be conducting surveys of Orinoco crocodiles in Colombia and had come to Venezuela to get some experience. Myrian was able to join Andres Eloy and Carlos Chavez on surveys in Caño Guaritico and Río Cojedes and John joined Myrian and Carlos for a survey in the Río Cojedes region, finding a very high concentration of crocodiles in one short stretch of river (over 80 seen in 18 km!). Jose Ayarzagüena has been working in this area for a number of years and Andres Eloy and Carlos are working with Profauna to establish a new National Wildlife

Refuge to protect this population. Problems exist from water contamination by agricultural runoff and there is a plan to build a dam upstream of this location. Despite the problems the crocodile population looked healthy and the juveniles we captured were all fat.

Following a nocturnal survey of the Río Tucupido reservoir with Andres Eloy, where a small crocodile population is trying to adapt to life in a lake that has apparently little food, Myrian and I conducted a follow up survey on the crocodiles released in the Caño Guaritico. We recaptured 8 crocodiles, all of which were growing at record rates (25 - 30 cm in 6 months). Some of these crocs had moved up to 50-60 km downstream since their release. The river was full of fish and this was one of the few times I have seen the water literally boiling with Pirañas! In January, Vincent Priou came for a visit. Vincent wants to start work on *Melanosuchus* in French Guyana and is travelling around South America learning about black caiman before he begins his work. -- John Thorbjarnarson, *NYZS The Wildlife Conservation Society, 185th Street and Southern Boulevard, Bronx, NY 10460-1099, USA.*

NORTH AMERICA

Mexico:

CROCODYLUS ACUTUS SURVEYS ON THE SANTIAGO RIVER. Within the Proyecto Hidroelectrico de Aguamilpa, a dam was built for hydroelectric purposes and closed in 1993, flooding an area of 12,800 hectares at the Santiago River basin in the Mexican State of Nayarit. Before the flooding, several surveys were conducted in order to assess *Crocodylus acutus* present, and the impact of the project upon them. Aerial surveys were conducted along the deep canyons to be inundated on both the Santiago River (65 km) and its tributary the Huaynamota River (30 km). The surveys took place on 25 March and 23 June 1992 between 11.30 am and 13.30 pm from a LAMA helicopter flying at 100 feet altitude and speed of 65 knots.

Crocodiles were observed in 8 isolated pools of both rivers, far from the small villages scattered along them. Total counts in March were 34 crocodiles (26 for Santaigo River and 8 for Huaynamota), and just 12 in June. During the March survey the air temperature was lower

than in June and most of the crocodiles were seen basking on the river banks. In June it was very hot and all the crocodiles were seen swimming or partially submerged at the shore of the river. The higher June temperature may explain the difference in the surveys as the rivers were still unaltered in June. From some crocodile body tracks measured at the river banks we assume that most of the crocodiles seen were above 3 m and several were above 4 m in total length.

We are certain that the crocodile population will be impacted by the dam. The flooded area will be used as floodchannel, for irrigation and for fisheries. It is possible that the nests and eggs laid in 1993 were flooded and the crocodiles will need to find new nesting places in the future. In 1993 a faunal rescue project was conducted by biologists of Proyecto Hidroeléctrico de Aguamilpa, and some crocodiles were located to safe places, however, most of them still remain in the flooded area.

It is recommended that more surveys be carried out to assess the status of the population at present and to suggest conservation practices. These surveys were part of an environmental impact study conducted for the Comisión Federal de Electricidad (Proyecto Hidroeléctrico de Aguamilpa) to whom I am grateful for all the support provided to the study. -- Gustavo Casas Andreu, Instituto de Biología, Universidad Nacional Autónoma de México, Apartado Postal 7-153, 04510, D.F., México.

DONATIONS OF CROCODYLIANS TO THE MIGUEL ALVAREZ DEL TORO ZOO. Information about crocodilians received by the Miguel Alvarez del Toro Zoo in Chiapas, Mexico, were extracted from a review of 64 donation documents. There were 84 specimens of the three species of Mexican crocodilians: 29 *Caiman crocodilus*

fuscus, 12 *Crocodylus acutus*, 41 *Crocodylus moreletii* and 2 *Crocodylus* sp. Most of the animals were obtained from two localities in Chiapas. Ten caimans and 5 American crocodiles came from Tonala and 1 American crocodile and 5 Morelet's crocodile from Ocosingo. Another seven crocodilians came from other states of Mexico. Eight animals were obtained from non historical or atypical localities and in 13 cases we have no record of the animals origin.

The manner of acquisition of these animals was: gifts 50%, captured 41.2%, purchased 3% and rescued from illegal trade 5.8%. These crocodilians had been held in captivity for a variable time before they arrived at the zoo from: 67% less than one month, 17.5% 1-12 months



Female *Crocodylus moreletii* guarding her nest, Buenavista Crocodile Farm, Tabasco, Mexico. Xochitl Aguilar photo.

and 15% more than 1 year.

Documents for 84 animals were reviewed, however, the actual number could be up to 120 as not all arrivals were registered. The number of animals represents the approximate status of these species as they occur in Chiapas. Caiman and Morelet's crocodile are the more frequent crocodilians and *C. acutus* is rather rare. Healthy free living crocodiles have been observed in some places where they are not naturally recorded but I think these may be captive and pet crocodiles which have escaped or been abandoned. There are some irregularly constructed farms which permit the escape of crocodiles.

Accurate registries are needed for a better

knowledge of the crocodilian population and traffic. -- Luis Sigler MVZ, *Instituto de Historia Natural, A.P. 6 Tuxtla Gutierrez, CP 29000, Chiapas, Mexico.*

United States:

DRAFT RECOVERY PLAN FOR SALTWATER CROCODILES IN PALAU. The US Fish and Wildlife Service has released a draft recovery plan for the saltwater crocodile population found in Palau, a US Trust Territory in the Pacific. The Draft Recovery Plan was prepared for FWS by Peter Brazaitis and is the procedure by which the US implements recovery actions for endangered species under the Endangered Species Act of 1979. The Plan recommends a comprehensive program including acquisition of critical habitat, location and protection of additional populations, development of a crocodile research and education facility and imposing increased enforcement to prevent illegal taking of crocodiles. A total budget of \$2,118,000 is proposed over the period 1994 -2013 and criteria are proposed for determining when the population has recovered. Goals of the program are to establish at least three protected wild populations and demonstrate a population increase over two crocodile generations. The plan calls for additional surveys to identify small numbers of crocodiles that may be using small freshwater bodies, including old bomb craters, in the interior of the islands.

Crocodiles in Palau were surveyed by Messel and King in 1990. An estimated population of around 150 individuals was reported to be distributed between three localities. A deliberate attempt at exterminating crocodiles caused decline to the present level and development and illegal killing, motivated largely by fear of crocodiles, continue to threaten this population. A small group of crocodiles have been accumulated in captivity and are presently held as nucleus for educational and sustainable commercial use. A contentious proposal of the recovery plan is the disposition of this captive group which was collected with local permits, but without necessary US Fish and Wildlife Service permits (see NEWSLETTER 11(2):4-5).

Public comment on the draft recovery plan is invited and copies may be obtained from -- U.S. Fish and Wildlife Service, Pacific Islands Office, P.O. Box 50167, Honolulu, Hawaii 96850, USA.

ZOOS



CUBAN CROCODILES IN RUSSIAN ZOOS. Information was requested by CSG concerning the presence of Cuban crocodiles in Russia and the former USSR and I have located the following information. The Moscow Zoo has never had any Cuban crocodiles. They are collecting representatives of all the genera of Crocodylia and now have all except *Gavialis*. The rarest species they ever had was a couple of Chinese alligators which were sent to the Bronx Zoo. The Zoo publishes a report in Russian annually called "Informatsionnye materialy o zooparkakh" (Information materials on Zoos) and I have extracted the following information from the 1991 and 1993 reprints.

Cuban Crocodiles in USSR's and Former USSR's Zoos.

Zoo	1991 (males, females, juveniles)	1992
Alma-ata	1.0.0	1.0.0
Baku	1.1.0	1.0.0
Kaunas	1.0.0	-
Kharkov	1.0.0	-
Kiev	1.1.0	0.1.0
Odessa	1.1.0	-
Tula	0.1.0	-
Kalingrad	0.1.0	1 sex unreported

For additional information on other crocodiles you could contact Alexei Makarov at Moscow Zoo, Bolshaya Gruzinskaya ul, d.1. Moscow.

I am organizing a Russian Nature Newsletter for individuals and organizations here and abroad interested in supporting conservation in the former Soviet Union. -- Nikolai Formozov, Moscow State University, Dept. of Vertebrate Zoology and General Ecology, Moscow 119899, Russia.

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The following 1993 publications on crocodilians are extracted from WILDLIFE REVIEW provided by Mr. Terry Sexson, editor of WILDLIFE REVIEW, and the *National Biological Survey, Office of Information Transfer, 1201, Oak Ridge Drive, Suite 200, Fort Collins, CO 80525, USA.*

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REQUESTS



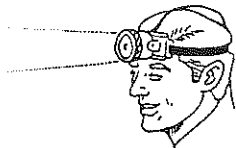
CROCODILE BLOOD PARASITES. Fritz Huchzermeyer and Mike Peirce are asking for blood smears from wild and wild caught crocodiles and possibly as well from farmed crocodiles reared or kept in open pens in areas where wild crocodiles also occur. Specimens from all crocodilian species are needed. Their aim is to make a detailed study of crocodilian blood parasites of the genera *Haemogregarina* and *Hepatozoon*, of which only a few species have been described.

The thin blood smears should be air dried and then fixed in methylated spirits and dried again. They should be marked or numbered and accompanied by a list containing the following details for each smear: Species of crocodile, length, live or dead, if dead time elapsed after death, source of the crocodile (farm, wild, captive), date and locality of the smear. The list should also show the name and address of the collector. A drop of blood can often be obtained when tagging crocodiles, removing

immobilization darts and similar non lethal opportunities. Blood is easily obtained from hunted or farm slaughtered crocodiles or directly from the heart of dead crocodiles. Please contact either Fritz or Mike for further instructions and send smears firmly wrapped and securely packed to either of us at the following addresses. -- Dr. F. W. Huchzermeyer, *Onderspoort Veterinary Institute, Private Bag X5, 0110 Onderstepoort, South Africa*, & Dr. M.A. Peirce, *16 Westmoreland Close, Woollahill, Wokingham, Berks RG11 9A2, England*.

[Editors note: Blood smears, like whole blood, organs, DNA, flanks and skins, constitute 'parts and derivatives' under CITES. It is therefore necessary to have CITES permits from the appropriate National Management Authorities, depending on the CITES appendix listing of the specimen, for export and import of such materials. It was clearly not the intention of CITES to impede research but it seems to be an unfortunate consequence. One saving factor is that exchange of scientific specimens between registered institutions such as zoos and museums is usually readily permitted and many such institutions already operate under comprehensive permits for scientific exchange. Check with your Management Authority.]

PERSONALS



Jonathan V. Lello, Crookes Bros. Ltd., P.O. Renishaw 4181, Natal, South Africa, sends the following

information.

Crocworld has been sold by owners, Crookes Brothers Ltd, in what must be one of the largest sales of crocodile livestock (9,050 crocodiles). The new owner is Caiman Investments managed by Mr. Arthur Wilmans. Unfortunately we are going through the worst drought in recorded history in our area and the very poor market for hides is a factor in our decision to sell.

I shall miss crocodiles greatly and I leave Crocworld just as egg laying, the best

season, is starting.

After being an intensive care male nurse in the Angola/Namibia bush war and then studying agriculture and majoring in botany, I entered into crocodile farming totally "green". I was told that I would be greatly rewarded, which I most certainly was. I have had the pleasure of attending the last two CSG meetings and had started work on a paper for the next meeting in Thailand.

I would like to thank all the crocodilian people for sharing their friendship and knowledge with me. I will, however, be staying on Crookes Bros. Ltd. and will transfer to a banana, sugar cane and beef farm just south of the Kruger National Park. One conciliation is that the river which runs through the farm has crocodiles and hippos in it.

If any friends do come to South Africa please come and visit. My postal address remains the same. Thank you all.

Dr. Tej Kumar Shrestha, Central Department of Zoology, Kirtipur Campus, Tribhuvan University, P.O. Box 6133, Kathmandu, Nepal, writes with great pleasure to announce he has been awarded his degree of Doctor of Science (D.Sc.) of Bhopal University, India, for his work on Ecology, Ethology and Biology of Wildlife of Nepal. He thanks his advisors and supporters in CSG for their support and advice.

Scott Frazier, International Waterfowl and Wetlands Bureau (IWRB), Slimbridge, Gloucester, GL2 7BX, United Kingdom, has recently taken the post of RAMSAR/Wetland sites officer with IWRB after working in Indonesia for the last six years. IWRB is affiliated with the Asian Wetland Bureau (AWB) and is represented by AWB in the Asia/Pacific region. He remains keenly interested in crocodilian affairs and hopes to keep in touch via the NEWSLETTER.

Perran Ross, Executive Officer of the CSG, will spend the period 10 April to 20 May with the CSG Chairman in Australia and Thailand. Communications requiring urgent response should be sent to him c/o Bond University, Gold Coast, Qld 4229, Australia, Fax: 617 595 1046.

Ian Brooks, Gwembe Crocodiles Ltd., P.O. Box 630162, Choma, Zambia, hopes that the attached recipe for Sina's Crocodile Curry will, in its small way, help promote crocodile products. He explains that this is one of the finest curries you will ever taste. With it he has converted some of the most delicate palates into devout croc meat connoisseurs.

SINA'S CROCODILE CURRY

Ingredients:

- 2½ kg croc tail (2 medium tails)
- 2 fresh lemons & 1 Tablespoon salt
- 3 medium onions, chopped
- 1 Tablespoon garlic, minced
- 3 medium potatoes, peeled and chopped
- 3 tomatoes, chopped
- ½ cup peas
- 1 cup cooking oil
- 1 Tablespoon red hot curry powder (to taste)
- 2-3 Tablespoon curry powder
- 2 Tablespoon chicken stock
- 2-3 teaspoon sugar
- 1-2 teaspoon salt
- 2 tsp vinegar
- 1½ - 2 cups fresh cream

1. Remove Crocodile meat from the bone, remove all fat and cut into bite size chunks. Place in a bowl and sprinkle with the salt & lemon juice mixture. Stir well and set aside for 20-30 minutes. After it has soaked, rinse croc in cold water and drain well.
2. Sauté onions and garlic in oil. Add the croc meat using your hands to squeeze out excess water. Cook for 10-15 minutes.
3. Boil peeled chopped potatoes in a separate pan -- don't overcook, potatoes should be crunchy. Drain and set aside.
4. Add potatoes, tomatoes and peas to the croc mixture and stir gently. Add curry powders, chicken stock and vinegar, then add sugar and salt to taste. Simmer for 10-15 minutes.
5. Add the fresh cream, simmer for 20 -30 minutes on medium- low heat. Stir gently from the bottom to prevent sticking, being careful not to break up the meat.

Dr. A.K. Srivastava, National Laboratory Animal Center, C.D.R.I, Post Box No. 173, Lucknow, 226 001 India, completed his PhD on the Indian Gharial as part of the FAO/UNDP project on

endangered crocodilian species. Inspired by his grandfather's and father's service in the State Forest and Wildlife Department he has maintained a keen interest in wildlife since childhood and completed studies on Biology of the Indian Gharial with special reference to its behavior for his doctoral research. He is now an active member of the Bombay Natural History Society and several other Indian scientific and conservation organizations. He intends to pursue his career in the broad field of crocodile management and biology and looks forward to contact and advice from CSG members.

The CSG NEWSLETTER is produced and distributed by the Crocodile Specialist Group of the Species Survival Commission, IUCN - World Conservation Union. CSG NEWSLETTER provides information on the conservation, status, news and current events concerning crocodilians, and on the activities of the CSG. The NEWSLETTER is distributed to CSG members and, upon request, to other interested individuals and organizations. All subscribers are asked to contribute news and other materials. A voluntary contribution (suggested \$40.00 US per year) is requested from subscribers to defray expenses of producing the NEWSLETTER. All communications should be addressed to: Dr. J. P. Ross, Executive Officer CSG, Florida Museum of Natural History, Gainesville, FL 32611, USA.

EDITORIAL POLICY - The newsletter must contain interesting and timely information. All news on crocodilian conservation, research, management, captive propagation, trade, laws and regulations is welcome. Photographs and other graphic materials are particularly welcome. Information is usually published, as submitted, over the author's name and mailing address. The editors also extract material from correspondence or other sources and these items are attributed to the source. The information in the newsletter should be accurate, but time constraints prevent independent verification of every item. If inaccuracies do appear, please call them to the attention of the editors so that corrections can be published in later issues. The opinions expressed herein are those of the individuals identified and, unless specifically indicated as such, are not the opinions of the CSG, the SSC, or the IUCN-World Conservation Union.

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Chairman: Professor Harry Messel, Executive Chancellor, Bond University, Australia.

For further information on the CSG and its programs, on crocodile conservation, biology, management, farming, ranching, or trade, contact the Executive Officer or Regional Vice Chairmen:

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