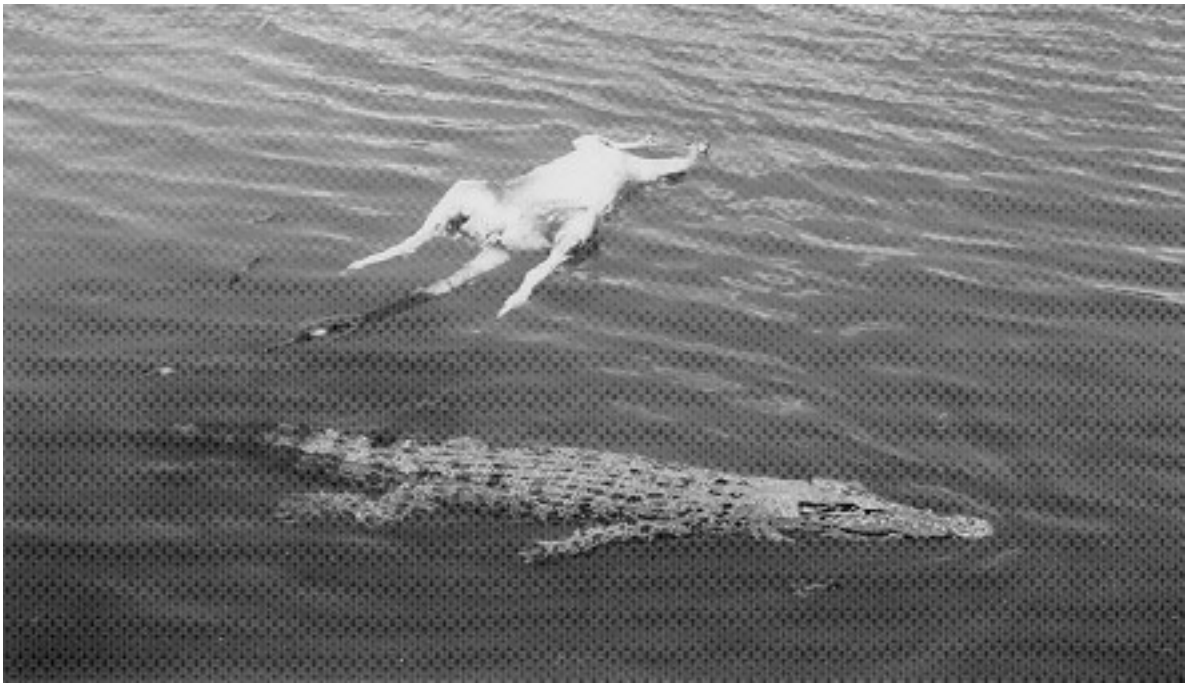
CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 13 NUMBER 3, JULY 1994 - SEPTEMBER 1994 --- WWW EDITION

IUCN--The World Conservation Union
Species Survival Commission



Cover photo: *C. porosus*, approx. 4m, with dead kangaroo, Watson River, Queensland, Australia. See story below under 'Australia.' Jack Shield photo.

TABLE OF CONTENTS

- PATRONS
- GUEST EDITORIAL
- RESPONSE
- STEERING COMMITTEE REPORT
- AREA REPORTS
- AFRICA

    - Congo:
    - Kenya:
    - South Africa:
- WESTERN ASIA
    - India:
    - Nepal:
- EASTERN ASIA & OCEANIA
    - Australia:
    - Philippines:
    - Singapore:
- EUROPE
    - France:
    - Norway:
    - Sweden:
- CENTRAL & SOUTH AMERICA
    - Argentina:
    - Brazil:
    - Colombia:
    - Dominican Republic:
    - Ecuador:
    - French Guyana:
    - Venezuela:
- NORTH AMERICA
    - United States:
- SCIENCE
- PUBLICATIONS
- TRADE
- ZOOS
- REQUESTS
- PERSONALS
- NEWSLETTER SUBSCRIPTIONS
- EDITORIAL POLICY
- CSG OFFICERS AND STEERING COMMITTEE MEMBERS

The CSG NEWSLETTER is produced in both printed and www editions by the Crocodile Specialist Group of the Species Survival Commission, IUCN - World Conservation Union. The NEWSLETTER provides information about crocodilians, their conservation, status, and management, and on the activities of the CSG. The hardcopy edition of the NEWSLETTER is distributed to CSG members and, upon request, to other interested individuals and organizations. We hope you find this www edition of use. All subscribers and users are asked to contribute news and other materials---see Editorial Policy below. As a professional courtesy, the sources of the news and information are identified throughout the NEWSLETTER. If you use any of the information provided in the NEWSLETTER, please continue that courtesy and cite the source. Subscribers who receive the printed edition of the NEWSLETTER are requested to make a

voluntary contribution (suggested $40.00 US per year) to defray expenses of publication and mailing. Comments concerning the NEWSLETTER or this www page should be addressed to the CSG Editorial Office: Dr. J.P. Ross, Executive Officer, Florida Museum of Natural History, Gainesville, FL 32611-7800, USA.

Prof. Harry Messel, Chairman
IUCN Crocodile Specialist Group
Executive Chancellor
Bond University
Australia

PATRONS

The following Patrons of the CSG have contributed more than U.S. $500.00 during the past 12 months. The funds donated have been deposited with University of Florida Research Foundation, Inc., and are used to support the CSG program:

- Japan, JLIA- Japan Leather & Leather Goods Industries Association, CITES Promotion Committee & All Japan Reptile Skin and Leather Association, Tokyo, Japan.
- Mainland Holdings Ltd., Lae, Papua New Guinea.
- Utai Youngprapakorn, Samutprakan Crocodile Farm, Samutprakan, Thailand.
- Philippe Roggwiller, Tanneries des Cuirs d'Indochine et de Madagascar, Paris, France.
- Crocodile Farmers Association of Zimbabwe, Harare, Zimbabwe.
- Walter Herd, Offenbach (Main), Germany.
- Singapore Reptile Skin Trade Association, Singapore.
- Heng Long Leather Co. Pte. Ltd., Singapore.
- Maitree Tempsiriphong, Sriracha Farm, Chonburi, Thailand.
- Associación Colombiana de Zoocriaderos, Bogotá, Colombia.
- Reptilartenshutz, Offenbach am Main, Germany.
- Conservation Commission of the Northern Territory, Palmerston, Australia.
- A. Handoko, Salim Group, Jakarta, Indonesia.
- Kurt Preiss, Reptilia Inc., Miami, FL, USA.
- Jacques Lewkowicz, France Croco, Paris, France.
- Dr. I. Lehr Brisbin, Savannah River Ecology Laboratory, Aiken, SC, USA.
- Miguel Stambulie, Zoocriadero Bucaintu, Cartagena, Colombia.
- Prof. F. Wayne King, Gainesville, FL, USA.
- Paul H. Slade, Nell and Hermon Slade Trust, Mona Vale, Australia.
- Crocodile Management Unit, Department of Environment and Conservation, Boroko, Papua New Guinea.
- Vic Onions, Edward River Crocodile Farm, Cairns, Australia.
- Keith Cook & Alecia Darbonne, Australian Crocodile Traders, Cairns, Australia.
- IUCN-World Conservation Union, Gland, Switzerland.
- Crocodile Management Association of Thailand, Bangkok, Thailand.
- Prof. Harry Messel, Sydney, Australia.
- Rachmat Wiradinata, PT. Ekanindya Karsa, Jakarta, Indonesia.
- Wayne Sagrera, Vermilion Gator Farms, Abbeville, LA, USA.

- Mauri U.S.A. Inc., New York, NY, USA.
- Robert and Ellen Young, Thonotosassa, FL,USA.
- Terry Cullen, Cullen Vivarium, Milwaukee, WI, USA.

GUEST EDITORIAL

WHERE IS CSG GOING? The CSG Newsletter has served as a vehicle for the healthy exposition of opinions [e.g. the recent debate on captive breeding in Vols. 12 (1), 12 (3) & 13 (1)]. However, the CSG could be more than a forum for debates and a proponent of past fashions. If the CSG is to be effective it must be radical, and get out in front of the fashions.

I warned of the danger of promoting farming and ranching as a panacea for conservation problems when we did not know enough about the economic foundations a decade ago (Magnusson 1984. Wildlife Society Bull. 12:194-197) In Brazil the only people who consistently made money from crocodilians have been the consultants who designed the farms. At least they knew enough not to invest their own money in the schemes. The consultants did not give common sense advice. Any business will only work if it has a good entrepreneur running it. People have successfully sold cans of air, pet rocks, even varnished cow pats. Brazilian caiman farmers wanted to know if they could launder wild-collected caiman urine through their farms and I suggested to them they could substitute bird urine. The consultant who told them that there were vast riches to be had in crocodile urine was not so gullible. The viability of a farm is increased if money from other activities can be laundered through it or the farm can be used to get tax breaks. Government subsidies, often hidden as tens of millions of dollars put into research or the provision of eggs and hatchlings can mean the difference between success and failure. Tourist dollars can help but tourism requires an investment in facilities, and the profits have to be divided by all the farms in an area because few tourists can be induced to visit more than one farm.

CSG members keep saying that "CITES has crippled the illegal trade" when in reality, economics has crippled it. The CSG needs policy in a few critical areas but has often been ineffective at responding to urgent needs. For example, I asked the CSG chairman to intervene to try and stop introduction of *Crocodylus niloticus* into South America in 1990 but little was done. The CSG had no prior policy and the Gainesville Steering Committee meeting declined to act because some members thought it might affect their economic activities. The Steering Committee did not even know that IUCN already had a policy statement on introductions and refused to take a stand based on the need for the Chairman to consult IUCN. The attitude of the Steering Committee was in stark contrast to the South American attendees who signed a petition against the importation, in some cases putting their jobs at risk. Fortunately, Richard Luxmoore persisted and the CSG presently has a position, but the position was reactive, it should have been proactive.

Should CSG oppose farming or introductions to new areas? Introduction of exotic species, and the diseases they can carry, is one of the greatest dangers to global biodiversity. Inspections at entry ports designed for domestic animals are no use for crocodilians. For example a virus introduced on crayfish from the US wiped out the European crayfish. However introductions of animals and their diseases have low chances of disastrous consequences if there are no closely related species present in the country of introduction or if the climate ensures introduced species cannot survive without human assistance. Based on this, my opinion of transfer of *C. niloticus* to Brazil is no, to the Horn

of Africa, yes. For live male alligators to Germany, why not? For live *Alligator sinensis* or *Caiman crocodilus* to USA, I say no, but a *Crocodylus porosus* farm in Canada would not worry me at all. These are biological considerations that I, as a biologist, am at least partially qualified to m ake. But if the question was about economic impacts on local markets and protectionism, I would have the humility to say, "If economists can't understand economics, far be it from me to represent myself as an expert on world trade."

We need specific information on which species can be imported into which country. The CSG needs to act now, basing such legislation on biological principles, before someone has invested a great deal of money in transplanting crocodiles. It seems a large task to have specific legislation, but some areas are clear priorities, among them South America. Some South American countries already have specific legislation against *C. niloticus*. There are CSG members with the resources and penchant for international travel who could develop such regulations based on a draft from CSG. This may be more useful than a 4 day spotlight survey which seems to do little more than irritate and belittle local biologists.

The CSG policy favouring ranching has led many ranchers in Brazil to lose their money and has led to a system which allows 80% egg harvest when the remaining 20% are wiped out by natural mortality, and is only now taking faltering steps toward independent monitoring. In Brazil, caiman ranching has not stopped the promotion of buffalo grazing in the Pantanal or prevented ranchers turning riverine forest into pasture. The greatest rates of deforestation are occurring in exactly the areas that have the largest caiman raising facilities. It did not prevent the importation of *C. niloticus*.

What has gone wrong? Basically we are discovering that "sustainable use" is not a panacea. Why doesn't the CSG adopt a balanced approach and recognize that conservation is a balanced application of preservation and economic use. For example, in the USA, crocodilians are protected by national and international legislation, preserved in National Parks, hunted in the wild and raised on farms and ranches. Let's make "balance" our catch cry and get off the other bandwagons before they crash.

The Crocodile Action Plan would be a good place to start. Habitat is the common factor in the conservation of all species. For a tiny minority, hunting may be wiping out the species but that is almost always because habitat destruction has reduced the population so that it can longer support hunting.

Species like the Chinese alligator, which will likely lose all its semi-natural habitat, pose a difficult question. Captivity is only a very short term answer. Domestic cattle and horses are among the most common ungulates, yet the wild species that gave rise to them are amongst the most endangered mammals. Most species of crocodilians, however, still have the potential to survive in the wild if we can develop balanced plans for the maintenance of their habitat.

This does not mean the arrival of some expatriate biologist mouthing catch cries such as "protection from hunting", "control of trade", "ranching" or "sustainable use". This means mapping habitat and determining the threats to that habitat. Are the threats deforestation, pollution, dams, encroachment by peasant farmers, fishing nets, construction of canals, drainage, introduction of exotic species or what? How can we conserve the habitat? Should we recommend forestry rather than agriculture? Should we recommend preservation? Is this viable? What mix of

recommendations is best for each country? How does management in one country affect the species in neighboring countries? Can sustainable use help the overall plan?

Sustainable use is only valuable if it fits into an integrated plan. The idea that making a few people economically dependent on crocodilians will ensure the crocodiles survival is ludicrous. Large development plans will always win out. Conservationists do use, and very much appreciate the support of farmers, ranchers, hunters and tanners. However the idea that we can then sit back and leave it up to those overworked businessmen to save habitats for us is a sad dream. They can help, but only if we give them an integrated plan which they can support. You get the distinct impression, and these are sentiments expressed by many observers, including many CSG members, that the CSG is so busy running around trying to control the businessmen that it does not have time to do its job of conserving species and habitats.

We shouldn't be going it alone. Conservation of habitat means integrated action by many Specialist Groups. How much time is spent at CSG meetings talking about wetlands and how much talking about artificial incubation and dollars per belly inch? It may be significant that the CSG Steering Committee members for Science are specialists in embryology and biochemistry and not specialists in habitat evaluation and conservation. Should we substitute "Balanced Program" and "Habitat Management" for the old catch cries? I believe we should and I am willing to bet the Steering Committee's spotlights that, 10 years down the track, history will prove me right. -- William, E. Magnusson, *Depto de Ecologia, INPA, CP 478, 69011-970 Manaus AM, Brazil.* [Dr. Magnusson's manuscript has been edited to fit the space available. The unedited version, including references, can be requested from the author. *Eds.*]

RESPONSE

Concerning William McMahan's piece in Newsletter Vol 12 (4), the difficulty of separating environmentally sound wildlife products from those obtained in less satisfactory ways has exercised my mind for some time. It would be highly beneficial to be able to distinguish between them. It might be possible for a responsible regulatory body to authorize some sort of mark indicating an approved product. For example, genuine vegetarian foods are identified in this way in the UK. As a pioneer in the sustainable use field perhaps CSG could give some consideration to this problem. -- David H. W. Morgan, *UK Scientific Authority for Animals, Joint Nature Conservation Committee, City Road, Peterborough, UK.*

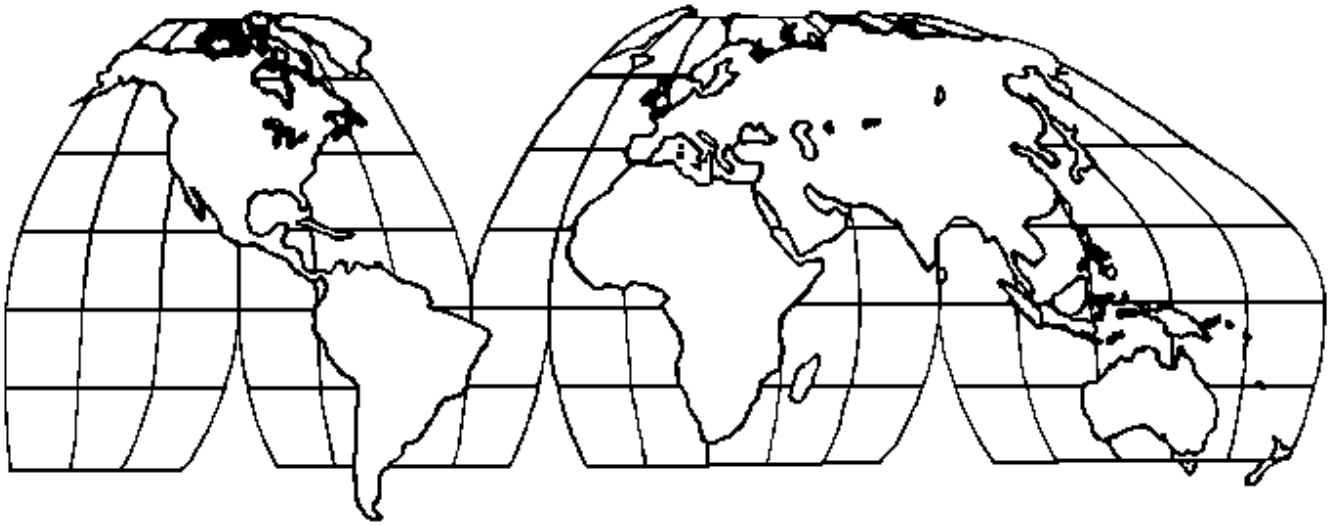
STEERING COMMITTEE

On 19 July, following extensive discussion, Professor I. Lehr Brisbin offered his resignation as Vice Chairman of North America, offering instead to serve as a Deputy Vice Chairman. Professor Messel has therefore asked Ted Joanen to once again be CSG Vice chairman for North America and Ted has accepted. Professor Brisbin, Dennis David and Ruth Elsey all will assist Ted as Deputy Vice Chairmen. At the CSG meeting in Pattaya the Chairman asked Mr. Steven Broad of TRAFFIC South East Asia to serve on the Steering Committee. Steve has become a regular and

useful contributor to CSG activities in his region. Unfortunately, the NEWSLETTER editors overlooked this addition in reformatting the Steering Committee list on the back page, although Steve was mentioned in the Meeting minutes. The editors apologize for this oversight.

[NEXT PAGE]----[TOP OF THIS PAGE]----[TABLE OF CONTENTS]

AREA REPORTS



AFRICA

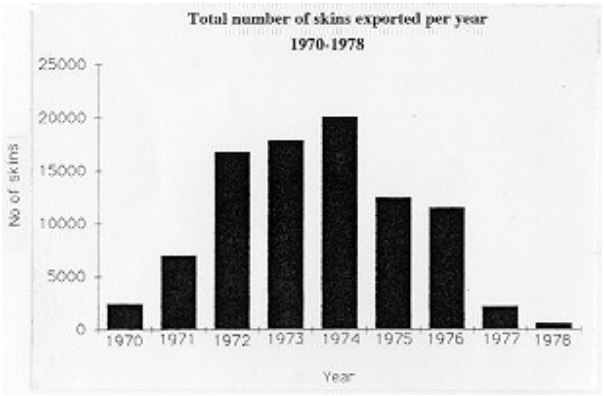
Congo:

EXPORT OF CROCODILE SKINS 1970-1978. In 1988 I was able to collect information on the export of crocodile skins from Congo. This information was extracted from very old books of the Ministry of Agriculture of the Ministry of Rural Economy and made the task of extracting the data difficult. Although the documents do not indicate from which species the skins came (*Crocodylus niloticus, C. cataphractus* or, less likely, *Osteolaemus tetraspis*), they show some incredible figures.

Nine exporters were operating during this period and sending skins all year round, with no seasonal regularity, to fifteen importers in Europe. The exports increased up to 1974, when they reached more than 20,000 skins/year. The number then declined to a low point of 588 skins exported in 1978, the last year of export (see figure).

In the absence of any means of conducting a crocodile survey this information is absolutely fascinating. These figures suggest that Congo's crocodiles have been overexploited. This appears to be particularly true when the 1975 CITES export ban for the main African countries is taken into account, causing a high demand from tanners. The 1978 figure of 588 skins exported could be an indication that the crocodile population of Congo had been severely reduced.

I was due to go back to Congo last year on the CITES Central and West Africa Project but the political situation made it too dangerous and the Congolese authorities asked us to cancel the planned survey. This would have been an opportunity to revisit sites surveyed seven years earlier, which was frustrating.



I was prompted to check the Congo export statistics again after meeting with a colleague in Gabon involved in the 1978 arrest of a person from Mali caught smuggling large numbers of skins from Gabon to Congo. These skins were exported from Gabon by the famous Mr. Diawara, hidden in oil drums to avoid export taxes. Recalling that this same name appeared in the Congo records, I re-examined these and extracted information on exports from Congo by Diawara Mamadou of 1,600 - 2,400 skins annually between in 1970-1972, and fewer (400, 184) in 1973-1974. These data suggest that a considerable portion of Congo exports in this period were in fact from neighboring countries. Mr. Diawara does not appear in the more recent export statistics and the only explanation I have is that the export route had grown even more complex, even in these apparently legal times. My colleagues from United States, Australia and Zimbabwe will understand that when addressing the complexity

of crocodilian trade in Central and West Africa , I sometimes wonder if we are working on the same planet. -- O Behra & C. Lippai, *BIODEV, Lot VX 18 Andrefandrova, Antananarivo, Madagascar.*

Kenya:

NILE CROCODILE IN KENYA. In the past *Crocodylus niloticus* was fairly abundant and widespread in Kenya. In recent years expanding human populations and adverse climatic changes have resulted in a substantial decline of crocodile numbers. The main crocodile habitats in Kenya are the Tana river, Ewaso Nyiro river, Mara river, Athi-Galana Sabaki river, Lake Turkana, Lake Victoria, Lake Baringo and the Masinga dam. There are other scattered populations in smaller lakes, rivers and man-made water bodies.

Along the rivers crocodiles are more numerous along protected and sparsely inhabited areas. Along the Tana river there is a high incidence of human-crocodile conflicts and people and livestock are regularly taken by crocodiles. Unscrupulous crocodile farms are known to indiscriminately collect eggs, hatchlings and sub-adults by assuring the local populace that they are getting rid of the pests.

Along the Mara and Ewaso Nyiro rivers crocodiles are more numerous within the Masai Mara and Samburu-Buffalo Springs Game reserves. In April 1991, I conducted a daytime count using a raft along 7.25 km of 35 km and obtained a density of 2.34 crocodiles/km. Night surveys were unfeasible due to sand banks, rocks and submerged trees.

During an excursion by boat along the Winam Gulf of Lake Victoria many small islands were visited and the fishermen interviewed on the status of crocodiles. Many fishermen occupy numerous islands and most claim that they destroy any crocodiles they come across and destroy nesting sites. Large numbers of monitor lizards (*Varanus* spp.) are attracted to the waste generated by these settlements, and may be detrimental to crocodile nest success.

On Lake Turkana crocodile densities were observed to be generally low but there is a marked increase in numbers along the shores of the Sibiloi National Park. Lake Turkana is remote but crocodiles are hunted by the El Molo and Turkana people. Central Island is an important nesting area for crocodiles although it is illegally inhabited by fishermen.

An increase in human-crocodile conflicts has instilled a negative attitude towards the crocodile in the wake of increasing competition for water for agriculture, fishing and human use. Large numbers of aquatic habitats are drying up due to adverse climatic changes and through deforestation of watersheds that causes a reduction of precipitation. There is an urgent need to increase community awareness and embark on community related projects, for example hatcheries, communal crocodile farms and ecotourism. Aerial and spotlight surveys are planned and funds are being sought for these surveys. -- P. S. Soorae, *Dept. of Herpetology, National Museums of Kenya, Nairobi, Kenya.*

South Africa:

CITES PROPOSAL UPDATE. In the Steering Committee minutes, NEWSLETTER Vol 13 (2), comments are made that I believe give a distorted picture on crocodile monitoring in South Africa. I quote, "It is noted that the survey data are becoming dated (1989) and continued monitoring is not specified". I would comment that:

i) Monitoring was not specified in the original proposal but has been included in the amended proposal.

ii) The 1989 survey refers to Transvaal Province only. This survey was of all major rivers in the Transvaal to obtain an overall picture of the crocodile population. A total of 2,256 km was flown by helicopter and fixed wing aircraft. From a financial perspective subsequent surveys have had to be restricted to known populations.

iii) The original proposal reflected annual crocodile counts from Natal from 1985 - 1992. The amended proposal includes the 1993 figures.

I therefore do not believe our data are dated and also believe that South Africa, especially Kwazulu/Natal has an extremely good track record in monitoring its crocodile population compared to other countries in Africa. -- David K. Blake, *St. Lucia Crocodile Center, Private Bag X01, St. Lucia, 3936 South Africa.* [These comments have been noted and copied to the CITES Secretariat and the CSG recommendation on the proposal modified accordingly -- *Eds.*]

WESTERN ASIA

India:

LOW SURVIVAL OF RELEASED GHARIAL. To date, 609 captive reared gharials, including 255 gharials from the Nandankanan Zoological Park stock, have been released into the Satkosia Gorge-Mahanadi River. Additionally 253 captive reared mugger crocodiles have been released into the gorge and other releases of both species are planned. At present 84 gharials and 69 muggers are being kept at the rearing pools of the Gharial Research and Conservation Unit Tikerpada.

Monitoring of the released gharials in the Gorge and River during last winter (November - February) indicated that the survival rate of the gharials is extremely low. The low survival rate is thought to be due to several adverse factors, the most serious being the effect of intensive fishing activities by people. A few of the released gharials have also been swept away to the sea by high currents during the rainy season. -- Sudakar Kar, *C.O. Chief Wildlife Warden, 315 Kharavel Nagar, Bhubaneshwar,Orissa, 751 001 India.*

STUDIES ON THE INDIAN MUGGER. Monitoring studies on restocked *Crocodylus palustris* in Andrha Pradesh between January 1987 and April 1990 showed a decreasing trend of numbers at two locations and an increase at another. At Manjira and Siwaram WLS biotic interference was maximum. Recruitment to non-breeder (subadult) sizes was very low due to low survival of hatchlings. At Ethipothalla Falls these biotic disturbances were minimal and the population is increasing.

Crocodiles were surveyed by night counts and water temperature was found to be an important factor, with maximum sightings made between 26°-28° C. During the winter two peaks of basking were noted and day counts may also be a useful method to census the crocodile population in open riverine habitat, however, in thickly vegetated sites, summer night counts were more suitable.

The use of shoreline habitat decreased gradually with age of the crocodiles with younger animals restricted to the shoreline and adults using shorelines, submerged vegetation and open water more or less equally. Food habits were studied based on fecal analysis. Sub-adults feed mainly on small fish, arthropods and amphibians. The adults ate a wide range of prey from insects to mammals, but fishes formed an important component of the diet of all sizes.

Egg laying occurred from February to April with a peak in March. The females dug trial nests before nesting which may serve to divert nesting predators or to select a suitable site and substrate. Details of clutch size, incubation and hatch success were recorded. The presence of shoreline vegetation was found to be a major limiting factor on the survival of hatchlings. Dispersal of hatchlings and movements of different size crocodiles was also studied.

Human influences such as wood cutting, reed removal and fishing all have a detrimental effect on crocodiles. Where these effects were severe and overlapped with the habitats and daily activities of the crocodiles they may prove detrimental. -- *Summarized from an abstract of a PhD thesis.* STUDIES ON THE INDIAN MUGGER CROCODILE *CROCODYLUS PALUSTRIS* (LESSON) IN ANDRA PRADESH, INDIA, V. Vijayar Kumar, *Department of Bioscience, Saurashtra University, Rajkot, 360 005 Gujarat, India.*

Nepal:

CAPTIVE BREEDING SUCCESS. After 16 years effort, for the first time captive raised gharials (7 females) laid eggs and the eggs hatched successfully. The captive raised stock were hatched during 1978 (4 females and 1 male) and 1979 (3 females) breeding seasons. Released gharials of the same age already laid eggs since 1992 in the Narayani River. The clutch size in the captive females was very small (11-29 eggs) compared with the wild (22-44). Of the seven captive nests laid this year, six produced hatchlings (hatching success 63%). We have also collected 329 eggs from 10 wild nests from the Narayani and Kali rivers. A total of 144 successfully hatched with an average hatching success of 35%. The low hatch success of the wild eggs is due to the eggs being laid in bad locations such as the water and grassland areas, instead of good sand banks. Three nests were stolen by local people.

A captive raised gharial which escaped from captivity in 1990 also laid eggs and hatched naturally 20 hatchlings in the Rapti River. This is the first record of gharial hatching in the Rapti River. The Rapti is a tributary of the Narayani which forms the northern boundary of Chitwan National Park and is fed by the Mahabharat Range (middle mountain). The Rapti is shallow compared to the Narayani and is heavily disturbed by people from the surrounding villages.

The nesting behavior of the captive gharials was different from the wild. During the incubation period the captive females defended their nests and some lie over the nest guarding it from intruders. In the wild the females leave the nest after egg laying and return only during the hatching period. -- Tirtha Maskey, *Executive Director, Central Zoo Development Committee, Ministery of Forest and Soil Conservation, Jawalakhel, Lalitpur, Nepal.*

EASTERN ASIA & OCEANIA

Australia:

AUSTRALIAN THESES ON CROCODILIANS. Shea, 1993, provided a list of theses related to herpetology spanning the period 1912 - 1993. Of the 481 works reported, the titles of 16 indicate they were related to crocodiles, 8 Honours, 2 MSc. and 6 PhD. At least 10 of these could be loosely classified as physiological and three as ecological studies while the remainder cover anatomy, evolution/phylogeny and nutrition/husbandry. Although the earliest crocodile thesis is attributed to The University of New South Wales (Heaphy 1970), only one other has been produced there (Willis 1986). Nine works were produced by graduates of the University of Sydney between 1972 and 1986, two from James Cook and one each from Australian National University, University of Queensland and University of Adelaide. Six of these works were produced during the 1970's and nine in the 1980's and only one in this decade. There is therefore (unfortunately) no indication of the rapid expansion of research interest in this area.

Alchin, J. A., 1972. Physiological thermoregulation and the role of the cardiovascular system in the convection and distribution of heat in *Crocodylus johnstoni*. B.Sc. (Hons), School of Biological Sciences, Sydney University.

Boland, J. E., 1975. Thermoregulation in *Crocodylus porosus* (Schneider). B.Sc.(Hons), School of Biological Sciences, Sydney University.

Garnett, S., 1983. Nutrition and farm husbandry of the green turtle (*Chelonia mydas*) and the estuarine crocodile (*Crocodylus porosus*). PhD.

James Cook University.

Heaphy, S. M., 1970. A study of the dorsal organs and cutaneous papillae of the Australian crocodiles. B.Sc.(Hons), School of Biological Science, University of New South Wales.

Hinchliffe, R. D., 1980. A comparison of factors affecting oxygen transport in embryonic, hatchling and juvenile *Crocodylus porosus* (Schneider). B.Sc.(Hons), School of Biological Sciences, University of Sydney.

Hunt, G. M., 1981. The relationship between digestion and body temperature in *Crocodylus porosus* (Schneider). B.Sc., School of Biological Sciences, University of Sydney.

Kirschner, D. S., 1986. Buoyancy control in the estuarine crocodile, *Crocodylus porosus* Schneider. PhD., University of Sydney.

Magnusson, W. E., 1979. Nesting ecology of *Crocodylus porosus* Schneider. PhD., University of Sydney.

Smith, A., 1987. The sex and survivorship of embryos and hatchlings of the Australian freshwater crocodile, *Crocodylus johnstoni*. PhD., Australian National University.

Taplin, L. E., 1978. Osmoregulation and salinity tolerance in *Crocodylus johnstoni* Krefft, the Australian freshwater crocodile, with some comparative studies of *Crocodylus porosus* Schneider, the estuarine crocodile. B.Sc.(Hons), Department of Zoology, James Cook University.

Taplin, L. E., 1982. Osmoregulation in the estuarine crocodile, *Crocodylus porosus*. PhD., University of Sydney.

Taylor, G. C., 1992. The control of secretion from the lingual salt glands of the estuarine crocodile, *Crocodylus porosus*. B.Sc.(Hons), Department of Zoology, University of Queensland.

Taylor, J. A., 1978. The foods and feeding habits of sub-adult *Crocodylus porosus*, Schneider, in northern Australia (Crocodylia: Reptilia). M. Sc., University of Sydney.

Whithead, P. J., 1987. Respiration and energy utilization in the eggs of the Australian freshwater crocodile, *Crocodylus johnstoni* Krefft, 1873. M.Sc. University of Adelaide.

Willis, P., 1986. Evolution and phylogeny of the Crocodilia. B.Sc.(Hons), School of Biological Science, University of New South Wales.

Wright, J. C., 1986. Diving and exercise physiology in the estuarine crocodile, *Crocodylus porosus*. PhD., University of Sydney.

-- (Source: Shea, G. M., 1993. Hidden Herpetology, a list of theses in Australian Universities to mid-1993. *In:* Lunney D. & D. Ayers, Eds. HERPETOLOGY IN AUSTRALIA: A diverse discipline. Transactions of the Royal Zoological Society of New South Wales:1-15.) -- Shelley Burgin, *University of Western Sydney-Hawkesbury, Richmond, NSW 2753, Australia.*

CROC FEEDING METHODS. While flying in a helicopter on Cape York, Australia, I came across a saltwater crocodile, *C. porosus*, about 4m long dragging a dead kangaroo by the head across the Watson River. The kangaroo was full of gas and floating nicely. When we approached, the croc tried unsuccessfully to drag its buoyant prey beneath the surface and we took a series of photos of its subsequent behavior (see cover photo above). Over a couple of hours the croc pulled the roo into shallow water and put an enormous effort into trying to break up the roo into bite size pieces. It was rolling, shaking and thrashing the body about in a great tussle, but not succeeding! The roo's body was simply too tough. The croc was able to break off the head and shred one back leg, but for practical purposes it was unable to eat the roo. I have been skeptical in the past of stories of crocs storing their prey (sometimes human) under the water until it was sufficiently decomposed to be torn apart. Now, after observing this Watson saltie, I am not so sure. -- Jack Shield, *Department of Primary Industry, 36 Shields Street, P.O. Box 652, Cairns, Qld 4870, Australia.*

Philippines:

PRESIDENTIAL REPLY. Letter received from the office of the President of the Philippines:

Dear Professor Messel:

This is to acknowledge the receipt of your letter sent to his Excellency President Fidel V. Ramos expressing your concern for the Philippine crocodile. On behalf of the President, we thank you for your concern and assure you of the government's effort to protect and conserve the Philippine crocodile.

Sincerely Yours,
Maria Asuncion Fernando
Director, Correspondence Office

***MINDORENSIS* ACTION.** Melbourne Zoo, Australia, has recently funded a community education poster for use in the Philippines as part of the "Only in the Philippines" series as an adjunct to their cooperative captive breeding program for *C. mindorensis* in conjunction with Silliman University and the PAWB. Curator Chris Banks is also looking into the feasibility of applying the `Adopt a Park' process where Zoos and similar institutions provide financial support for developing country national park management. The process has been used with some success in Indonesia where Minnesota Zoo is assisting the Ujung Kulon National Park in Java, focussing on conservation of the Javan rhino. The possibility of applying this concept to securing protected habitat for the highly endangered Philippine crocodile is under discussion with Filipino authorities and Secretary for the Environment Professor Angel Alcala. -- Chris Banks, *Curator, Melbourne Zoo, P.O. Box 74, Parkerville, Vic. 3052, Australia.*

Singapore:

THE LAST TANNER. The continued operation of Singapore's remaining tannery is tightly linked to a trip-switch as well as the vagaries of the international market. The key component is a tamper proof monitor connected to the company's water return pipe which pumps treated effluent back into the municipal system. The monitor continually checks water quality to ensure that the demanding environmental standards set by the government of Singapore are met. Should these standards be exceeded the switch can shut down the entire tanning system.

Heng Long Leather Company was founded in 1946 as a small family business catering to the domestic market. Today it is housed in a new 3,500sq m tannery complete with state-of-the-art computerized controls. The new high tech plant was opened in 1992 and is a measure of the success the company has had in adapting technology to the demands of the alligator and crocodile skin market, as well as being a major trader in ostrich skins.

Newly arrived skins, each with the required CITES tag demonstrating its legal origin, are graded, measured and stored in cold rooms to preserve their quality. Tanning and dying is done using the most modern equipment and advanced drying equipment has improved productivity without the need to rely on the weather as in the past. The company works closely with the Primary Production Department of the Singapore government which is the Management Authority for CITES. The company is also associated with the Crocodile Specialist Group, a world organization committed to the proper and sustainable use of resources to prevent the extinction of crocodiles. -- *From:* WORLD LEATHER, Vol. 6, No. 7, January 1994, submitted by Kadir Donmez, *Leather Research Lab., University of Cincinnati, P.O. Box 210014, Cincinnati, OH 45221-0014, USA.*

EUROPE

France:

EUROPE'S FIRST CROCODILE FARM USING NUCLEAR HEATED WATER. Europe's first crocodile farm opened its doors in the heart of the Rhone Valley in the village of Pierrelatte, France in June. The farm draws warm water from the cooling system of the nearby Tricastin nuclear power station. Within the 4,200 m2 heated enclosure a tropical environment has been created. The farm was conceived by Luc and Eric Fougeirol in 1986 and has benefited from consultation with Vivian de Buffrenil of the Paris Museum of Natural History. Official permission to operate the facility was obtained in 1991 and in that year 335 young crocodiles were imported from South Africa. The farm stock are 4th generation captive bred *C. niloticus*, which were 50 cm in length when they arrived and are now between 1.5 and 2 m. The farm hopes to build its stock to around 600 breeders and eventually to produce skins for the French leather industry. In the meantime the farm expects to generate income from an estimated 100,000 paying v isitors who are also expected to purchase crocodile souvenirs. -- *Press release:* L. Fougeirol, *Quartier de Faveyrolles, F-26700 Pierrelatte, France.*

Norway:

ALLIGATOR FARM PLANNED. The Norwegian government is reported to be spending 330,000 Kroner (about $50,000) to examine the feasibility of establishing a farm for alligators near Aure. The plan, which envisages raising alligators for meat and skins, is based upon warm water produced at a nearby methanol factory, which is also considered a controversial project. -- *From a newspaper article source unknown, submitted by* John Lever, *Koorana Crocodile Farm, Rockhampton, Qld, 4702 Australia.*

Sweden:

POPULAR KROKODILES. Recently 12 Cuban crocodiles were born in a park in Stockholm. The facility maintains two adults and is operated correctly and legally. There is no way that you can find any crocodile products for sale in Sweden, except for the meat which is becoming very popular. Crocodiles are also extremely popular in advertisements of all kinds. -- Tony Hakansson, *Skogsbacken 10, 17241, Sundbyberg, Sweden.*

[NEXT PAGE]----[TOP OF THIS PAGE]----[TABLE OF CONTENTS]

CENTRAL & SOUTH AMERICA

Argentina:

PROGRESS IN THE BROAD-SNOUTED CAIMAN PROJECT. Since 1991 we have located 74 Broad snouted caiman (*Caiman latirostris*) nests and we have collected 54 of these to incubate 2,033 eggs and produce 1,512 hatchlings. Up to the present, 1,401 yearlings have been released back at the same location where their eggs were collected the previous year.

Our monitoring is showing that the *C. latirostris* population is growing in Santa Fe Province because we are finding more animals (some night counts are showing 1,000% increases), more eggs and more locations where we did not find caimans before. This growth may be caused by two sources. On one hand the animals we released are appearing in the wild and are probably a significant portion of the young population at our sampling locations. On the other hand the cessation of poaching for the tanneries is a factor. The tanneries have little demand and may be waiting for the development of a management program, possibly because of low prices.

In 1994 we detected 57 nests at our study sites and harvested 44 for a total of 1,715 eggs which produced 1,196 hatchlings. We expect to release just from this harvest, more than 1,100 *Caiman latirostris* hatchlings next November.

This year we harvested the eggs at three different periods of development and we found that harvest at the early or middle of the incubation period produced better results (63.6% and 73.8% respectively) than late harvest (39.5% hatch success). We are currently working on Cholesterol (Total, HDL and LDL), Glucose and Hematocrit blood values in captive reared animals.

Photo: *Caiman latirostris* hatchlings, Santa Fe. Argentina. C. von Fink photo.

The obvious improvement of the wild population of *Caiman latirostris* in Santa Fe and Entre Rios Provinces, and the success of the use of ranching, makes us think that it will be useful for the conservation of this species to apply to move the Argentinian population of this species in Santa Fe and Entre Rio Provinces to Appendix II of CITES in the near future. -- Alejandro Larriera, *Convenio INTA/MAGIC, MUPCN,Bv. Pellegrini 3100, Santa Fe, 3000, Argentina.*

Brazil:

CAIMAN EXPORT RULES. Since 1990, Brazil has registered 75 ranching operations for commercial production of skins of caiman, *Caiman crocodilus crocodilus* and *Caiman crocodilus yacare*. As these facilities are beginning to export caiman skins, the Secretariat of CITES has called on all parties to the convention to be aware of the regulation established in Brazil which governs trade. As outlined in Resolutions No. 126 (1990) and No. 199-N (1992), all exported caiman skins must be tagged, semiprocessed to the `wet blue' stage and have a minimum belly width of 18 cm. There are additional rules governing caiman exports, and the Secretariat urges all parties to check with their office, or the Brazilian Management Authority before allowing any imports of caiman skins from Brazil. -- TRAFFIC-USA, *Vol. 13, No. 2, August 1994: page 12.*

Colombia:

LOST LUGGAGE NECESSITATES EXPORT PERMIT CHANGES. A batch of CITES export forms, sent from the CITES secretariat to the Colombian Management Authority, were lost in transit. The airline apparently diverted the forms to the middle east where they have disappeared [a familiar story to international travellers-- Eds]. The old (lost) forms are printed on chestnut colored security paper and have an INDERENA stamp. To avoid improper use of the lost forms, new Colombian CITES export forms printed on light blue security paper are now in use for all exports of wildlife from Colombia. The new forms have the following wording in "block 6":

Ministerio de Medio Ambiente
Carrera 10 no 20-30 piso 5
Santa Fe de Bogota D.C.
Colombia

The new forms are numbered from CO/A/2501 to CO/A/4500 and do not have the INDERENA logo which appeared on the old forms. All parties should verify the validity of Colombian permits with the CITES Secretariat. -- CITES Notification No. 795 *from TRAFFIC-USA, Vol. 13, No. 2, August 1994: page 12.*

NOTICIAS DEL CENSO DE CROCODILIOS. Se ha definido un proyecto marco para realizar la evaluación de las pobulacions silvestres de los crocodylia en Colombia. Este es basicamente el mismo documente ya presentado a la Secretaria CITES, pero con importantes mejoras en aspectos logistícos y administrativos. El Ministerio del Medio Ambiente hará la coordinación general; entrarán a participar desde 1996 las Corporaciones Autónoma Regionales; se constituirá un comité directivo para el Censo & Monitoreo que comprenderá a estas entidades y tambien a universidades, gremio y profesionales dedicados al estudio de los crocodilios.

El proyecto cuenta con la dirección cientifica del Dr. Jorge Hernandez (INDERENA), la coordinación administrativa del biólogo Antonio Villa (Ministro del Medio Ambiente) y la asesoría del biólogo Miguel Rodriguez (AZOOCOL). Para el dessarrollo del proyecto, se han efectuado ya los primeros contratos. Inicialmente, se contrataron dos estudios para evaluar la oferta de habitat de los crocodilios en el País. El primero se refiere a la cartogafía general, con curva de nivel por

debajo de los 500 msmn y a escala 1:1.500.000; el segundo está dirigido al la cuenca Magdalena-Cauca, tambien con curva de nivel de 500 msmn y escala 1:500.000. En el cartographia de la cuenca Magdalena-Cauca se incluyen no solo la cartographia base, los mapas de redes hidrográficas, de infrastructura vial, de asentamientos humanos y de distritos de riego, sino también un informe en el que se encuentra información de las áreas potenciales como habitats para los crocodylia, en aspectos como: sedimentos y contaminantes presentes en algunos cuerpos de agua; análisis poblacional en las zonas evaluadas; volumen, área y longitud de algunas cuerpos de agua; tipos de suelos; tipo de vegetación y algunas características climatológicas. En este momento se está preparando la contratación para elaborar la cartografia a escala 1:500.000 de las demás cuencas presentes en el país y se estan revisado aerofotografías y cartografía 1:25.000 de las areas potenciales en la cuenca Magdalena-Cauca.

Los contratos y las actividades para conteos específicos se resumen asi: la bióloga Alyeda Martinez trabaja la cuenca Magdelena-Cuaca; el zootechnista Henry Naranjo trabajará parte de las cuencas Pacifica, Amazonica y de la Orinoquía; las estudientes de tesis biología Patricia Bonilla y Sandra Barahona estan realizando el censo de *C. intermedius* en el departemento de Arauca. Las actividades de los anteriores son complementarias a las de la directora de la Estación Roberto Franco de la Universidad Nacional, Myriam Lugo, quien esta adelantando evaluaciones en la Orinoquía, y con las de la bióloga Olga Castaño del Instituto de Ciencias de la Universidad Nacional, que trabaja con la tambien bióloga Nubia Barragan y los estudientes Martin Rios y Andres Pachón, en la Amazonia.

Aunque no hay publicaciones aún, ya se han realizado conteos preliminares y de entrenamiento en algunas regiones del pais;los que adelanta la profesora Myriam Lugo en la Orinoquía; los realizados en San Marcos por Segio Medrano y Halaix Osorio; los conteos de Caiman negro realizados por Martin Rios y Andres Pachón en la Amazonia; y los primeros conteos realizados por Sandra Barahona y Patricia Bonilla de *C. intermedius* en el Departamento de Arauca.

Del 23 -26 Mayo 1994 el Dr. Jose Ayarzaguena dirigio un entrenamiento con base en la metodología usada por el en la evaluacion de poblaciones silvestres de Baba en Venezuela. El entrenamiento se efecuó en la estación de el hato "El Frio" para 4 de las personas responsables de realizar el censo de Crocodylia en Colombia. Se hicieron dos recorridos diurnos de uno de los cuerpos de agua presentes en el hato, durante los cuales se estudio la estructura de la poblacion allí presente, con base en el porcentaje de individuos por cada clase (crias, clase II, claseIII y Clase IV) y dos durante la noche con el fin de efectuar un conteo de los animales presentes. Posteriormente se hizo una estimacion de la poblacion total aignando un porcentaje arbitrario a los animales no observados, para lo cual se tuvo encuenta la presencia de vegetación y otros obstaculos que pudieran impedir la observación de toda la poblacion, y un analisis de la estructura presentatda por la poblacion. Se estudiaron tanto la metodología como la manera de analizar la información obtenida.

Del 29 de Julio al 7 de Agosto se realizó un taller teórico-práctico en Zambrano, el cual contó con el excelente apoyo logistico de la compañía Monterrey Forestal; asistieron 34 personas, la coordinación estuvo a cargo del Prof. F. Wayne King, y los biólogos Miguel Rodriguez y Antonio Villa. Los doctores John Thorbjarnarson y Andrew Odum acompañaron el taller algunos dias. Se realizaron algunos sobrevuelos con el fin de observar habitats locales y los desafios de la evaluación poblacional. Este taller estuvo precedido por un curso sobre zoocria de reptiles, en que se incluyó el tema de la evaluación poblacional de los crocodilios, realizando en Cartagena de 24-28 de Julio y al que asistieron en promedio 80 personas.

Como producto del taller y del proyecto arriba mencionado, se esta elaborando un manual donde se compliarán los fundamentos teóricos y prácticos para la evaluación de poblaciones silvestres de crocodylia en Colombia, con el fin, entre otros, de que éste sirva como base para que las Corporaciones Autónomas Regionales preparen sus proyectos de inversión, la realización de evaluaciones de poblaciones silvestres en sus territorios y adelanten la contratación y evaluación del trabajo de los profesionales a cargo de los conteos en campo. De esta manera, Colombia contará en breve con una evaluación poblacional de base e incluirá periodicamente el monitoreo de las poblaciones silvestres. -- Aleyda Martínez y Antonio Villa, *Ministerio de Medio Ambiente, Santa Fe de Bogotá, Colombia.*

CROCODILIAN CENSUS IN COLOMBIA. A project to conduct an evaluation of the wild populations of crocodilians in Colombia has been defined. This is basically the same document presented to the CITES Secretariat but with some important improvements in logistics and administration. The Ministry of the Environment will coordinate the project and after 1996 the Autonomous Regional Corporations will participate. A directive committee for Surveys and Monitoring will coordinate these government entities with universities, associations and professionals dedicated to the study of crocodilians.

The project will be under the scientific coordination of Dr. Jorge Hernández (INDERENA), administrative coordination of Antonio Villa (Min. of Envnt.) and advice of Miguel Rodriguez of AZOOCOL. The first contracts have been assigned to develop the project.

Initially two studies have been engaged to evaluate the amount of habitat for crocodilians using detailed cartographic analysis. The first refers to general maps with a scale of 1:1,500,000 and altitude contours of 500 m interval. The second is directed at the drainage of the Magdalena-Cuaca using map scales of 1:500,000. The Magdalena-Cuaca map includes not only the base map with hydrographic drainage, roads, human constructions and irrigation districts, but also integrates information on potential habitats for crocodilians. These include sediments and contamination levels of some water bodies; population analysis; volume, area and length of water bodies; soil type; vegetation and some climatic characteristics. At this moment we are preparing to elaborate the maps at a scale of 1:500,000 for the watersheds throughout the country and with aerial photographs and a scale of 1:25,000 to revise the estimation of potential area of crocodile habitat in the Magdalena-Cuaca drainage.

These tasks have been assigned to the following biologists: Aleyda Martinez is working on the Magdalena-Cauca system: Zootechnician Henry Naranjo is working of parts of the Pacific drainages, the Orinoco and the Colombian Amazon. Thesis students Patricia Bonilla and Sandra Barahona are conducting surveys of *C. intermedius* in the Arauca province. These activities are complemented by the work of Myriam Lugo, Director of the Roberto Franco Biological Station of the National University, who has previously done some evaluation of the Orinoco region, and by Olga Castaño of the Institute of Sciences, National University, who is working with biologist Nubia Barragan and students Martin Rios and Andres Pachón in Amazonia.

Although there are not yet any publications from this work, there have been some preliminary counts and training in some regions of the country; Myriam Lugo's surveys in Orinoco, those done in San Marcos by Sergio Medrano and Halaix Osorio, counts of black caiman conducted by Martin Rios and Andres Pachón in Amazonia and the first counts of *C. intermedius* in Arauca by Sandra Barahona and Patricia Bonilla. In 23 - 26 May, Dr. Jose Ayarzaguena directed a training program

based on the methods used to evaluate wild populations of Baba (*Caiman crocodilus*) in Venezuela. This training was conducted on the "El Frio" ranch and four people from the Colombia program participated. Practice surveys were conducted during the day and night on water bodies where the structure of the populations is being studied. The techniques of assigning caiman to size classes and the analysis of the data to estimate the sighting proportion were practiced and a variety of analytical techniques demonstrated.

Between 29 July and 7 August 1994, a theoretical and practical course in survey techniques was conducted at Zambrano with the excellent logistic support of the company Monterrey Forestal. The 34 participants were coordinated by Prof. F. Wayne King and biologists Miguel Rodriguez and Antonio Villa. Drs. John Thorbjarnarson (NYZS-The Wildlife Conservation Society) and Andrew Odum (Toledo Zoo) presented materials and participated for part of the course. The course undertook some aerial overflights to evaluate the work area and familiarize the participants with local habitats and the challenges of population estimation. The course was preceded by a general course in the husbandry of reptiles, which included the theme of population analysis of wild populations of crocodilians, held in Cartagena and attended by about 80 people.

As a product of the course and the Colombian crocodilian project, a manual has been assembled which compiles the fundamental theory and practice for evaluating wild crocodilian populations. This will be useful, among other things, to serve as a basis by which the Autonomous Regional Corporations will be able to prepare their local investment projects, evaluate their local crocodilian resources and later use in the establishment and evaluation of the work of professionals in charge of field surveys. In this way Colombia will shortly acquire a baseline evaluation of crocodilian populations and include periodic monitoring of the wild populations. -- *Free translation of the preceding article.*

SURVEYS OF ORINOCO CROCODILE. With financial support from NYZS-The Wildlife Conservation Society, Colciencias and the National University have begun studies of the population status of the Orinoco crocodile, *Crocodylus intermedius*, in the Orinoco region of Colombia. During January and March of 1994 the first monitoring was begun in the southwest zone of the Serranía de la Macarena and in the central channel of the River Meta and some of its tributaries. This river flows for 1,000km traversing west to east across the Colombian plains and for some years the presence of crocodiles was reported along its shores. The region is one the most marginal of the country with a poor road system. Obtaining supplies, fuel and transport equipment is as difficult as anywhere in the interior.

These difficulties were aggravated by disruptions of public order, which made us change the plans for samples that we initially drew up; limiting samples for night counts to areas where fishermen were certain that crocodiles had been seen in recent years. To date we have sampled 128 km by nocturnal survey and sighted six Orinoco crocodiles, four adults and two juveniles. In the next season of low water we plan to survey the central axis of the Guaviare-Guayabero river and the Tomo and Tupparo rivers in Vichada department and some of the rivers in Arauca department. -- Luz Myrian Lugo, *Director, Estacion de Biologia Tropical "Roberto Franco" Universidad Nacional, A.A. 2261, Villavicencio, Colombia.*

Dominican Republic:

CONSERVATION OF AMERICAN CROCODILE. The American crocodile (*Crocodylus acutus*), once widespread on the island of Hispaniola, now only survives in Lago Enriquillo, a hypersaline lake in the DR, and Etang Saumatre in Haiti. In the late 1980's and early 90's the population of Lago Enriquillo declined to about one third of its former size with a similar reduction in reproduction, mainly due to human impacts. As a result of a study carried out by the Dominican Wildlife Department, an Action Plan for the conservation of the species was elaborated and is now being implemented. Frequent patrols of the lake shore by park rangers and wildlife inspectors have stopped human disturbances. Since 1992 the adult/subadult population seems to have increased slightly and today numbers around 200 individuals. A genetic reserve of some 130 juvenile crocodiles is being raised at the Santo Domingo Zoo. Lago Enriquillo will soon have protected status as a National Park.

Lago Enriquillo has a surface area of about 200 km 2 and lies 40 m below sea level. The salinity averages around 70 ppt. In 1979, after prolonged drought, the water level was very low but Hurricane David brought heavy rain. The water level rose 5 m and the salinity fell from more than 90 ppt to 35 ppt. Total crocodile population at this time was estimated to be 300 -600 individuals and an estimated 100 -150 nest per year were laid. By 1990-91, nest surveys by the DR Wildlife Department found only 30 and 10 nests respectively. The decline was largely due to local people capturing and killing crocodiles for meat and for the fat. Additionally many crocodiles were apparently killed `just for fun' and not used at all. Other causes of population decline were entanglement in nets set for fish and robbing of nests by people. Although speculation was made that some of this mortality was for hides, no evidence has surfaced to support this.

Having recognized the need for action, assistance was sought from the German Service for Social and Technical Support (DED) which maintains a service mission in the DR. A work shop was organized in 1992 with the participation of several government institutions and NGO's. From this meeting an Action Plan and a surveillance program to protect crocodiles and their nests was developed. Today, about 20 men patrol the lake on foot and by boat and regular monthly meetings are held to coordinate the protection program.

The results of the program so far have been encouraging. Only a few incidents of crocodile killing have been reported and in 1994 apparently no nests were robbed. There has also been a beneficial side effect of the surveillance in reducing illegal hunting of ducks and pigeons and the illegal trade of parrots. The year round monitoring has yielded important data on abundance and distribution of crocodiles and resulted in an estimated population of at least 200 individuals larger than 1.5 m. Natural reproduction is on the rise with 36 nests located in 1993 and 45 in 1994. Some of these nests were located on the islands where no freshwater habitat is available for neonates. Therefore 230 neonates have been captured, marked and translocated to more suitable areas on the northern and western shore. The prognosis for continued recovery of the Lago Enriquillo population seems promising if conservation activities are continued. This work was carried out by the Departamento de Vida Silvestre and particularly Gloria Santana, David Birdsall and Hermogenes Mendez. Assistance and cooperation is gratefully acknowledged from the German Service for Social and Technical Cooperation, the Swiss Development Agency, Direccion Nacional de Parques, the Santo Domingo Zoo, and all the park rangers and wildlife inspectors who have participated in the program. -- *Extracted from a report by* Andreas Schubert, *Servicio Aleman, Apartado 761-2, Santo Domingo, Dominican Republic.*

Ecuador:

CROCODILE AND CAIMAN FARM. Aqualab S.A. in Guayaquil, Ecuador, has established a pilot farming facility for *Caiman crocodilus* and *Crocodylus acutus*. The company, which is primarily involved in aquaculture of shrimp, began raising crocodilians in 1987.

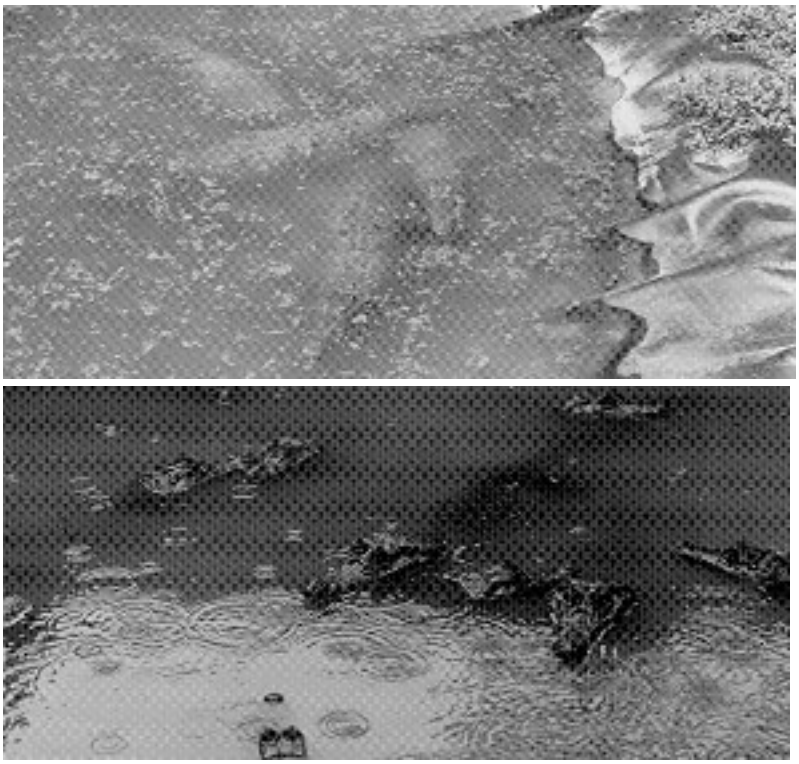


Photo: American crocodile (left) and Common caiman (right) at Aqualab S.A., Guayaquil, Ecuador. J. Forestieri photo.

They obtained a group of adults and juvenile caiman from the province of Esmarelda and some juvenile crocodiles from a nest at Sabana Grande (Chongón) in the province of Guayas. Additional adult crocodiles were obtained from a laboratory and from an animal captured by fishermen near Guyaquil. The animals were initially fed red meat, chicken viscera and beef lungs. Since 1992, all the animals have also been fed marine fish, specially Larimus sp. and growth has improved. This change was prompted by the observation that a hatchling that escaped and lived for four months in an enclosure used to raise shrimp, showed a marked improvement in growth compared to its siblings.

In 1991, the adult caiman began to nest. Unfortunately the eggs were accidently destroyed. Subsequent nesting has also had poor success due to flooding of the nest (1992) and the failure of artificial incubation in Vermiculite (1993). Nevertheless, mortality of the other specimens has been low and some experience has been gained in treating various conditions.

At present about 25 individuals of each species are being held and a proposal has been prepared to expand the operation for conservation purposes. The company is well aware of the restrictions imposed by Ecuador and CITES on commercial animal trade and has recently visited the facilities of Monterey Forestal, in Colombia, to obtain husbandry information. -- Jose Forestieri, *Aqualab S. A., P.O. Box 0901-6201, Guyaquil, Ecuador.*

French Guyana:

[*Translation of a letter received in response to the CSG letter sent in May.*]

Professor H. Messel
Monsieur:

The Minister of Environment, Mr. Michel Barnier, received your letter of 10 May 1994 in which you provided your recommendations concerning the conservation of black caiman in French Guyana. He has read them with care and transmitted them to M. Simon, Director of Nature and Protection (French Guyana) and asked him to examine your recommendations attentively.

I ask you to receive, sir, the assurance of my best wishes.

Sincerely yours,
Bernard Testu
Chef de Cabinet
Ministere de L"Environment
Ave. de Segur
75302 Paris, France

GROWTH RATE OF WILD BLACK CAIMAN HATCHLINGS. On 9 April 1994, wild hatchlings of Black caiman that had previously been seen and caught on 4 December 1993, were found again and measured. This occurred during night counts of the left shore of Aipoto Island on the Approuague river of the Kaw region in French Guyana. This was the only clutch found on the island and the animals were still in exactly the same place, concentrated in an area of 10 - 20 m.

Photo: Olivier Behra and captured hatchling Black caiman. O. Behra photo.

The island is close to an estuary and is affected by the tide. During high tide the water's edge is hidden in the branches covering the shore, but at low tide there are two to five meters of shore line visible. It is a muddy bank with no vegetation and the baby black caimans can be seen close to each other in full view. In December 1993, only a few hatchlings were caught and measured but they all seemed to be the same size, between 30 and 31 cm. In April 1994 I managed to catch and measure 35 of the 38 hatchlings spotted (see photo). These had an average size of 39.77 cm with a range of 32-44 cm. More than 70% of the animals measured 40-43 cm. These animals have been marked by cutting the caudal scutes and I hope to look for them again in August or September 1994. -- Olivier Behra, *BIODEV, Lot VX 18 Andrefandrova, Antananarivo, Madagascar.*

[NEXT PAGE]----[TOP OF THIS PAGE]----[TABLE OF CONTENTS]

Venezuela:

A LONGIROSTRINE *CAIMAN CROCODILUS* FROM CENTRAL VENEZUELA. While undertaking field work in Venezuela during 1993 Stefan Gorzula photographed the skull of a caiman showing exaggerated extension of the rostrum (see photos). The specimen was photographed at San Carlos de Rio Negro, Amazonas Province, and came from the alto Pasimoni River. The elongated rostrum of this specimen is intermediate in shape between specimens from Rio Apaporis, Colombia, and the Llanos of Venezuela. The presence of a long snouted caiman in this locality supports the suggestion of Jose Ayarzaguena 1984 (Mem. Soc. Cienc. Nat. La Salle 44 (122):123-140) that *Caiman crocodilus apaporiensis* is only the extreme end of a cline in buccal morphology that extends NW-SE across Venezuela. -- Stefan Gorzula, *614 West Main Street, Newburn, TN 38059, USA*.

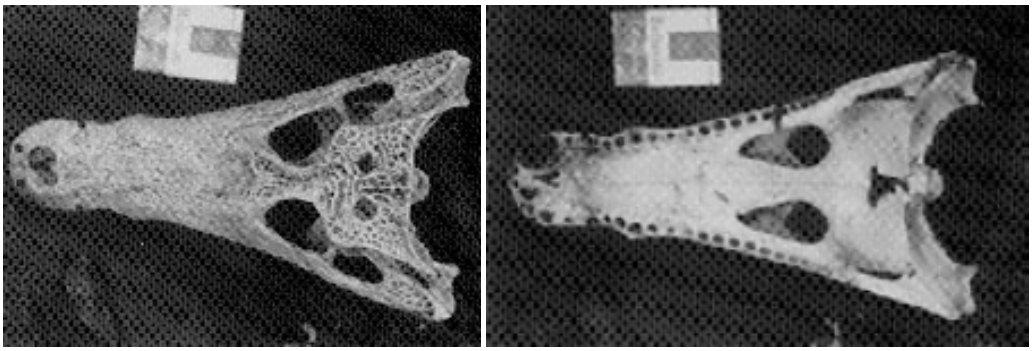


Photo: Longirostrine *Caiman crocodilus*, cranial length 29.2 cm. S. Gorzula photo.

COMMERCIAL HARVEST OF CAIMANS IN VENEZUELA 1993 AND 1994 SEASONS. During the harvest seasons of 1993 and 1994 PROFAUNA (The Servicio Autónomo de Fauna of the Ministry of the Environment and Renewable Natural Resources), issued permits for taking 23,739 and 26,010 specimens respectively of baba (*Caiman crocodilus*). The number of applications and licenses issued for hunting were 253 and 189 in 1993 and 347 and 295 in 1994. These resulted in totals of 23,147 individuals in 1993 and 25,621 individuals in 1994 being recorded at the warehouse centers.

Photo: *Crocodylus acutus*, 2 years old raised at the PROFAUNA station, Maracay, Venezuela. A. Velasco photo.

The method employed to assign the quotas in recent seasons was based on the results of the studies titled "SITUACION ACTUAL DE LAS POBLACIONES VENEZOLANAS DE BABA (*CAIMAN CROCODILUS*) SOMETIDAS A APROVECHAMIENTO" conducted by PROFAUNA during 1991 and 1992, known as the Proyecto MARNR-CITES, which indicated the population status found in each of the ecological regions into which the western Llanos of the country is divided.

The procedure used in recent years is as follows:

1) The ecological region where each of the licence applicants was located was identified using the map or maps sent by the applicant, which indicated the boundaries of the property and a map indicating where the different ecological regions

are found.

2) For each property applying, information contained in technical reports sent by the applicant was analyzed. These reports indicated population estimations and size structure of populations for each water body of the property.

3) The values generated by the indicated reports were compared with the regional average values derived independently by the MARNR-CITES study and adjustments to the estimated population data were calculated using the following standards:

Table: Regional average values from the MARNR-CITES Survey. Region Ind/ha % Class IV

Alto Apure	0.22	24.0%
Bajo Apure	0.39	23.3%
Cajon de Arauca	0.19	24.4%
Aguas Claras	0.10	20.0%
Llanos Boscosos	0.15	18.0%
Arismmendi	0.35	23.0%

Additional adjustments were made based on the greatest densities seen on properties of different size. Properties greater than 12,500 ha (Hatos and Grandes Hatos) were assigned the average regional values from MARNR-CITES study. Intermediate size properties from 1,000 ha- 12,500 ha (Fundos and Funditos) were assigned a maximum density of 0.5 ind/ha and the very smallest properties (less than 1,000 ha) the highest densities that were considered were 1.0 ind/ha. These considerations separate the differences in relation to the land area and water area, which are responsible for the major variations from average values in particular properties of small area. In all cases the density adjustments were made before calculating the allowed harvest.

The reported proportion of adult (Class IV) individuals reported was also checked against the regional average values. This size class consists of adult males of more than 1.8m total length and is the part of population which is harvested. The percentage of individuals in Class IV for the properties of each region in particular were not allowed to be in any case greater than those indicated earlier. If they were then the regional average value was used to calculate the harvest.

Finally, the allowed harvest for each property was calculated as 20% of the adjusted values of Class IV individuals.

The results obtained in these seasons in which the values of density and structure obtained in the PROFAUNA study were used, has been shown to be a better tool for the sustainable management of this resource, and supports the work on eliminating the collection of "technical studies" in future seasons. -- *Translated from a report by* Roldan de Sola & Alvaro Velasco, *Servicio Autonomo de Fauna, Min. del Ambiente y de los Recursos Naturales Renovables, Edificio Camejo, Nivel Mezzanina, Centro Simon Bolivar, Caracas 1010, Venezuela.*

PROGRAMA SOBRE LA CONSERVACIÓN DEL CAIMÁN DE LA COSTA. El Ministerio del Ambiente y do los Recursos Naturales renovables de Venezuela por medio del Srvicio Autónomo de Fauna (PROFAUNA) y la Fundación para el Dessarrollo de la Ciencia y la Tecnología del Estado Aragua (FUNDICITE-Aragua), vienen implementado desde el año 1990, el proyecto denominado "Programa de Evaluación, Seguimiento y Recuperación de la población del Caimán de la Costa (*Crocodylus acutus*) en la Bahia de Turiamo en el Estado Aragua".

Dicho proyecto tiene como objectivos el determinar el estado actual de la poblacion de caiman de la costa en el área del estudio; recuperar los niveles poblacionales mediante la captura de neonatos, su cría en cautiverio y posterior liberación en la Bahía; evaluar las condiciones fisicoquímicas del agua de la laguna y evaluar otras áreas costeras para identificar zonas potenciales para liberar y repoblar con la especie. Entre los resultados mas importante, podemos destacar que la máxima población de adultos observadas hasta hoy es de 14 individuos en 1990, 101 crías y restos tres nidos en 1993. Actualmente, PROFAUNA mantiene en cautiverio aproximadamente 80 caimes entre los 2 y 1 año, recluidas en las Estacion de PROFAUNA, Maracay, Estado Aragua.

Entre los meses de Agosto y Septiembre de este año, se organizará un taller con todos los involucrados, a fin de evaluar los resultados obtenidos durante cuatro años de estudio y actualizar los objectivos y metas del mismo. -- Alfredo Lander

& Francisco Bisbal, *PROFAUNA, Aptdo. 184, Maracay, Edo. Aragua, and Alvaro Velasco, PROFAUNA Caracas, Venezuela.*

PROGRAM OF CONSERVATION OF *C. ACUTUS* IN VENEZUELA. The Ministry of Environment and Renewable Natural Resources, through PROFAUNA, and the Foundation for Development of Science and Technology of the State of Aragua has conducted a project called "Program of Evaluation, Tracking and Recovery of the *Crocodylus acutus* population of the Bay of Turiamo in Aragua State".

The objectives of the project are to determine the status of the population in the study area; recover the population levels by capturing hatchlings, raising them in captivity and later releasing them in the bay; evaluating the physico-chemical conditions of the bay and evaluating additional areas with potential for release and restocking this species.

Among the most important results, we have been able to detail that the maximum adult population to date was 14 individuals in 1990 and 101 juveniles and three nests in 1993. At the moment PROFAUNA is maintaining approximately 80 crocodiles of one and two years of age in captivity, which are held at the PROFAUNA station at Maracay.

Between August and September of this year we will organize a meeting of all those involved to evaluate the results obtained during the last four years and define the objectives and methods of the project. -- *Free translation of the preceding article.*

NORTH AMERICA

United States:

GEOGRAPHIC GETS IT WRONG. The following letter is copied with permission and demonstrates the continuing need for educating everyone about sustainable use (Eds).

Mr. Chris Johns, Photographer
National Geographic Society

Dear Mr. Johns:

I was disappointed to learn you decided not to allow the use of your outstanding alligator photo from the cover of National Geographic magazine when you learned our sustainable use displays included manufactured products. Your initial reaction to the use of alligator products is precisely the dilemma and misunderstanding we frequently face.

The concept of sustained use must include the economic incentive to manage, conserve, use and consume products or the cycle is incomplete. My purpose is not to pursue further the use of your photo (which I think is the single best photo ever taken of an alligator and illustrates in a frame the symbol the alligator is becoming for sustained use through ranching programs), but to provide a little more perspective on sustained use. If we cannot reasonably explain the concept to wildlife photographers, naturalists and other conservationists -- our chances seem much more difficult with the general public. I hope you will review the booklet involved and if the opportunity arises, discuss the sustained use concept with someone you may know with World Wildlife Fund or IUCN. Both have adopted resolutions embracing and more recently encouraging sustained use, particularly of alligators and other crocodilians where vital wetland habitat is at stake.

In my own state of Florida the alligator is in trouble only on Lake Apopka, where massive drainage of marshes, pesticides and pollution threaten the alligator population. Lake Okeechobee and the Everglades may not be far behind, but that new voice you hear of support for restoration and conservation of the Everglades will be alligator farmers and trappers, and perhaps private landowners, who realize that sustained use is the best long term conservation strategy for some wildlife like alligators, to the benefit of all marshes. Thanks for taking time to consider these points.

Sincerely,
J. Don Ashley
Ashley Associates Inc.
P.O. Box 13679
Tallahassee, FL 32317, USA

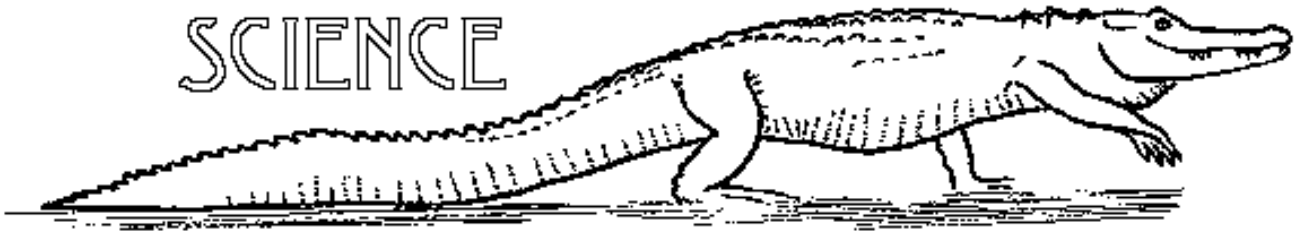
JLIA GROUP VISITS USA. A delegation from the Japan Leather and Leather Goods Industries Association visited Florida and Louisiana in mid July to examine sustainable use programs and farm operations. The group, led by Mr. Akira Saikyo and co-leader Mr. Ryoichi Yoshikawa, included Mr. N. Ishii, Mr. T. Kataoka, Mr. K. Kekka, Mr. T. Tanabe, Mr. M. Shindo, Dr. T. Tsubouchi of Japan Wildlife Research Center and Mr. M. Kobayashi of Ministry of International Trade and Industry. The group was introduced to alligator farmers, state wildlife management personnel, tanners and biologists and inspected a number farms and facilities. The Group also undertook field inspections of alligator habitat and egg collection in Florida and Louisiana and was treated to some outstanding social hospitality by their hosts throughout the region. The group expressed thanks to all the people who assisted them and particularly to Mr. Don Ashley and his family, and the CSG for facilitating their visit.

TOILET TRAINED GATOR. For 42 years Pearl and Mel Pederson of McHendry County, Illinois, kept an alligator named Alice as a family pet. However, in January paramedics discovered Alice when they responded to an emergency call after 75 year old Pearl had a stroke. Over family protests the animal was removed by police but the elderly couple are now happy that Alice, who is likely to outlive them, will be given a home in a Texas zoo. The alligator used to sit on her tail and beg for food at mealtimes, took baths with the four Pederson children, and sometimes snuggled into bed with Pearl. An animal expert said the most unusual thing about Alice is that she was toilet trained. -- *From TORONTO GLOBE & MAIL, 16 March 1994, reprinted from GAINESVILLE HERPETOLOGICAL SOCIETY NEWSLETTER, Vol. X, No. 8, April 1994.*

AMERICAN ALLIGATOR CYCLE OF PROTECTION. A.A.C.O.P. was developed by the Florida Alligator Trappers Association and has been operating independently since June 1993. The goals of the program are to educate the public of the importance of protecting all American Alligator habitat, which in turn protects the alligators and wildlife within it. To make the public aware of programs and alligator products available to the public to support the continuance of the management programs and protection of habitats, and through the "Cycle of Protection" Program, to have resources easily available to consumers on every aspect of the American Alligator industry.

The program is headed by Mike Fagan and administrator Lynanne Lawhead and expresses its philosophy in the logo indicating the linkage between habitat, alligator programs, products and consumers. The logo shows an alligator walking in its natural habitat with encroachment from agriculture and urbanization. Major programs which the group is developing are an Educational Program on alligator management, a Curriculum Program on Sustainable Resource Use for primary school students, an Ecological Program for conservationists, Resource information for the public and industry, Public safety information and demonstrations and collecting historical information on the alligator industry. A questionnaire on educational needs for alligator programs was distributed in the spring to solicit inputs from a wide variety of people on the program. A.A.C.O.P. acquired the newsletter GATORTALES from the Alligator Trappers Association in May 1994 and is currently working to expand membership and spread information about the pr ogram. For additional information and to join, contact: -- Lynanne Lawhead, *A.A.C.O.P., P.O. Box 1637, Dade City, Fl 33526-1637, USA.*

SCIENCE



AUTOMATIC ENVIRONMENTAL DATA LOGGERS. Advances in microchip technology and miniaturization have brought compact, cheap and reliable environmental data collectors within the reach of routine field studies. As an example, the Hobo TM series from Onset Instruments can record temperature, humidity or light intensity and are available in waterproof containers. Typical specifications include dimensions of approximately 10 cm x 6 cm diam, 2 year battery life, response time of about 3 minutes, and programmable data collection of up to 1,800 measurements. These units can be operated in conjunction with standard PC software that specifies data collection schedules and receives data for storage, analysis and graphing. Measurements that used to involve tedious and expensive personnel schedules can now be easily automated. Prices, including software, run in the $200 -$300 range. Applications for crocodilian studies might include nest and incubator monitoring, survey conditions and ecological studies. Detai ls available from Onset Instruments, 536 MacArthur Blvd., Pocasset, MA 02559-3450, USA. -- *From information submitted by* Andy Odum, *Toledo Zoo, Box 4010, Toledo, OH 43609, USA.*

HEPATITIS IN HATCHLING NILE CROCS. An investigation into the cause of acute mortality in farmed hatchling *Crocodylus niloticus* led to the isolation of chlamydia from the livers of affected animals. Prominent pathological findings were acute hepatitis with intracellular chlamydial colonies and generalised oedema. A chlamydia presumed to be *C. psittaci* was isolated from livers of affected hatchlings. Mortality subsided after treatment with oxytetracycline. This disease is now recognised as a major problem on crocodile farms in Zimbabwe. -- *Abstracted from* Huchzermeyer F.W., G.H. Gerdes, C.N. Foggin, K.D.A. Huchzermeyer & L.C. Limper. 1994. JOURNAL OF THE SOUTH AFRICAN VETERINARY ASSOCIATION, 65(1):20 -22.

STOMACH CONTENTS OF *CAIMAN CROCODILUS* FROM THE ORINOCO DELTA OF VENEZUELA. The Ministry of the Environment and Renewable Natural Resources, through the Autonomous Fauna Service and financed partly by CITES is developing a study of "Evaluation of populations of Baba in the Orinoco Delta" with the objective of determining the abundance, structure and capacity for harvest of the population. Preliminary estimates of harvest based on experimental exploitation suggest that 3% of the individuals in this region are Class IV harvestable animals.

In 1994, the second year of operation of the experimental harvest, 915 caiman were collected and 38 of these were carefully measured and stomach contents preserved for later analysis. The sample was collected at night in La Travesía lagoon, Selva de Mareas region of the Alto Delta, between 23 April and 11 May 1994. The caiman sampled had an average total length of 208.03 cm and average weight of 52.92 kg.

Prey was present in 22 (57.89%) of the specimens, including 5 which contained whole prey items (1 iguana and 4 fish) and 17 containing pieces of prey. Prey items identified, were fish (18 stomachs), guaras (apple snails--*Pomacea* sp.) (9 stomachs), insects (5 stomachs), reptile (iguana) (1 stomach). Sixteen of the stomachs were empty. The insects are those associated with aquatic vegetation and are assumed to be accidently ingested. Even though the sample consists exclusively of adult males over 1.6 m and therefore the dietary sample is biased, the results do allow us to infer that Class IV adult male caiman in the Orinoco Delta eat principally fish and apple snails. This result is different to that reported from other areas by Staton and Dixon 1975, Gorzula 1978, Seijas & Ramos 1980, Ayarzaguena 1983, and

Thorbjarnarson 1993. -- Alvaro Velasco, Victor Trejo & Ivan Zapata, *PROFAUNA, Edif. Camejo, Entrada Oeste, Mezzanina, CSB Caracas 1010, Venezuela.*

ALLIGATOR DIETS. Alligators are sometimes represented as ferocious carnivores that prey on wild animals such as otters, birds, occasionally dogs and sometimes even humans. Biologists have historically reported that the diet of these animals consists mainly of smaller prey, particularly snails, based on the large quantities of snail remains found in alligator stomachs. However, a University of Miami study of live alligators from southern Florida indicates that the animals may eat relatively few snails relative to fish and crayfish. Studies conducted by Brady Barr, a graduate student in Biology suggest that the indigestible shells of snails accumulate over time while more common prey, such as fish, are digested within hours and therefore appear to be only a minor part of the diet. Most studies of alligator diet are from stomachs of alligators killed during licensed hunts and research activities. Barr has conducted his work on live alligators, pumping their stomachs, and recording digestion rates o f different prey over a 15 day period. He has studied more than 150 alligators, which are released alive after the studies. Because alligators play an important role in the Everglades ecosystem it is important to understand their feeding habits. Barr's study, which is supported by Everglades National Park and Florida Game and Fresh Water Fish Commission, may influence alligator and prey management in the Everglades. -- *From* MIAMI MAGAZINE, *University of Miami, Florida, USA, Summer 1994 :7.*

PUBLICATIONS

PROCEEDINGS OF THE SECOND REGIONAL MEETING OF THE CSG, DARWIN, AUSTRALIA, MARCH 1993. A number of the Proceedings of the Darwin Meeting have been made available by the kind generosity of the Conservation Commission of the Northern Territory for distribution to interested CSG members. A donation of $20.00 is requested to offset the cost of air mail and to allow distribution of this important volume to members who cannot pay for it. Orders should be accompanied by checks, drawn on a US bank made out to "Crocodile Specialist Group" and addressed to Dr. P. Ross, *CSG Executive Officer, Florida Museum of Natural History, Gainesville, Florida 32611, USA.*

COLOR ATLAS OF DISEASE OF CROCODILES, 1994. P. Youngprapakorn (Ed.), L. Ousavaplangchai & S. Kanchanapangka. This volume was published on the occasion of the 12th Working Meeting of the CSG in Pattaya, Thailand, and copies were distributed to participants. The volume is a collaboration of Samutprakan Crocodile Farm and Chulalongkorn University. The hard bound volume provides diagnosis and treatment for a wide variety of crocodilian diseases and conditions and is profusely illustrated with color photographs. Copies may be obtained for a cost of $45.00 US directly from the editor. -- Dr. Panya Youngprapakorn, *Samutprakan Crocodile Farm and Zoo, Taiban Road, Samutprakan, Thailand.*

NEWSLETTER BACK ISSUES. Selected numbers available. Send requests to: Dr. P. Ross, *Executive Officer CSG, Florida Museum of Natural History, Gainesville, Florida 32611, USA.*

TRADE

CROCODILIAN SKIN PRODUCTION 1991-1992. The following estimates of crocodilian skin production are extracted from CITES export figures analyzed by the World Conservation Monitoring Centre. The figures are the latest available and represent revised figures for 1991 and available data for 1992. The estimates are for recorded exports of whole skins or equivalents and include some re-exports and possibly skins collected or slaughtered in one year but exported in a later year. These estimates may be considered as an update of production figures quoted in DIRECTORY OF CROCODILIAN FARMING OPERATIONS 2nd Ed 1992. R. Luxmoore Ed. Table 3, page 54.

Table. Crocodilian Skin Production

SPECIES	1991 Country revised	1992 estimates
Caiman crocodilus		
	Colombia	113,607 161,955
	Venezuela	100,996 70,208
	Nicaragua	16,967 18,072
	Guyana	9,088 -
	Taiwan	2,000
Crocodylus johnsoni		
	Australia	807 1,658
C. porosus		
	PNG	6,239 2,589
	Australia	2,532 3,392
	Indonesia	2,435 -
	Singapore	635 862
	Malaysia	* 116 -
	Thailand	* 200 -
C. novaeguineae		
	PNG	28,455 * 8,550
	Indonesia	8,051 -
	Singapore	601 -
C. siamensis		
	Thailand	2,800 -
C. niloticus		
	Zimbabwe	22,752 36,476
	Mozambique	* 4,000 -
	South Africa	1,903 -
	Ethiopia	* 2,109 -
	Kenya	1,606 -
	Malawi	1,587 -
	Madagascar	989 994
	Tanzania	982 -
	Israel	* 800 -
	Botswana	718 -

```
        Sudan           700     -
        Zambia          640     -
        Uganda          0       * 2,500

C. rhombifer
        Cuba            500     -

* Estimated from known farm/ranch stock.

-  No data available.
```

-- R. Luxmoore, *World Conservation Monitoring Center, 181 Huntingdon Rd., Cambridge CB3 0DJ, UK.*

PRODUCT LABELLING IN JAPAN. The All Japan Association of Reptile Skins and Leather Industries has introduced a product label on manufactured products of crocodilian leather. The label is a printed paper label suitable for insertion in small goods (bags and wallets) or presentation at point of sale. The label introduces a logo and has the following text in English and Japanese addressed to the retail purchaser:

`This sign proves that this products is manufactured in JAPAN of genuine high quality leather and that the material was imported legitimately under regulations of CITES (Convention in International Trade in Endangered Species of Wild Flora and Fauna).

Your purchase of this product indirectly promotes "SUSTAINABLE USE" of wildlife which was the main theme of the earth summit of 1992 and assists conservation.

A portion of the sales price will be used to finance CITES projects for wildlife conservation through its legal sustainable use.

Sustainable use can be explained briefly as the use of various natural resources within the limit of their ability to renew themselves indefinitely.

Why is conservation through sustainable use preferable to stopping its use completely?

If its use is completely stopped, the resource will be worthless for the country and its people. It usually leads to the poaching of wildlife and the destruction of its habitat.

On the other hand, if legal sustainable use is promoted, people will pay serious attention to the conservation and management of wildlife and its habitat.'

-- A. Saikyo, *Executive Director, All Japan Association of Reptile Skins and Leather Industries, 2F Meiyu Bldg. No. 4-9, 2-Chome, Kaminarimon, Taito-ku, Tokyo 111, Japan.*

ZOOS

FRESHIES IN FRANKFURT. Zoo Frankfurt announced on 20 May 1994 that Australian freshwater crocodiles had bred for the first time in Germany, and possibly Europe. Six juveniles were provided by Grahame Webb in 1990 and had

grown in the `Exotarium' of Frankfurt Zoo to about 1.5 m total length. One of the females constructed a nest, and on 7 May 1994 three of the seven eggs laid, hatched after a 78 day incubation. The freshies are part of an exhibit of tropical reptiles at Frankfurt and are considered particularly suitable for the exhibit because of their small adult size. -- *From a press release,* R. Wicker, *Kurator, Zoologischer Garten, Alfred-Brehm Platz 16, Frankfurt am Main, Germany.*

BUENOS AIRES ZOO. The Buenos Aires Zoo has developed a crocodile captive breeding program which began in 1986. Since then several clutches of Broad-nosed caiman have been successfully raised at the zoo. We also had three baby alligators (*A. mississippiensis*) from our captive breeding stock (1:1) in 1989, but unfortunately they did not survive as they refused to feed on beef supplemented with vitamins and calcium. This year, on 19 March, 4 alligator hatchlings were born, but these have turned out be voracious feeders and at the age of 2 months measure 42 cm total length and 250 g weight. This is an increase of 500% of their newborn weight. -- Lic. Nadia Boscarol, *Reptile Curator, Jardin Zoologico de Buenos Aires, Republica de la India 2900, Buenos Aires 1425, Argentina.*

SURPLUS CROCODILIANS. The following zoo crocs were advertised as surplus and available to qualified institutions (1.3 = 1 male and 3 females). Enquiries should be directed to the institution listed.

- *A. mississippiensis*, 0.3, Thrigby Hall Wildlife Gardens, Yarmouth, UK. Tel: (44) 493 369477.
- *Caiman sclerops* (*crocodilus*) 1.0, born 1977, Zoologicka a Botanicka Zahrada Mesta Plzne, Plznen, Czech Republic. Fax: (42) 19 533 764.
- *Caiman sclerops* (*crocodilus*), 6 born 1992, Ouwehands Dierenpark, Rhenen, The Netherlands. Fax: (31) 8376 13727.
- *C. niloticus*. 1.0, 260 cm, Zoologicka Zahrada Bojnice, Boinice, Czeck Republic. Fax: (42) 862 34852.
- *C. niloticus*. 4 born 1992-93, Zoologica Zahrada Mesta Brna, Brno-Bystrec, Czeck Republic (Jan Filip). Fax: (42) 5 462 10000.
- *C. niloticus*. 3.2 captive born 1965, Zoologischer Garten Koln Ag., Koln 60 Germany (Harald Jes). Fax: (49) 221 887 7111.
- *C. niloticus*. 8 born 1987/1992. Copenhagen Zoo, Fredericksberg, Denmark. Fax: (45) 36 44 2455.
- *C. niloticus*. 1. Slaski Ogrod Zoologiczny, Katowice, Poland. Fax: (48) 32 599 472.
- *C. rhombifer*. Male born 1991, Miejski Park I Ogrod Zoologiczny, Krakow, Poland. Fax: (48) 12 36 6277.
- *C. rhombifer*. 0.1, 3 m, Zoologicka Zaharada Usti Nad Labem, Usti nad Labem, Czeck Republic (Dr. J. Zima). Fax: (42) 47 25723.
- *C. siamensis*. 1 male born 1991. Miejski Park I Ogrod Zoologiczny, Krakow, Poland. Fax: (48) 12 36 6277.
- *Tomistoma schlegelii*. Born 1992. Aalborg Zoologiske Have, Aalborg, Denmark (Jens Lilleor). Fax: (45) 98 131 933.

-- *Submitted by* Rene Honegger, *Zoo Zurich, Zurichbergstrasse 221, CH-8044, Switzerland.*

REQUESTS

***MELANOSUCHUS* SEX.** Dale Bakken writes that it has come to his attention that all Black Caiman currently held in North American Zoos are supposedly females. He has also heard that they are practically impossible to sex before they reach maturity as no ossification of the penis takes place until the animals reach approximately 7 feet total length. Dale would be interested to receive comments and additional information on this phenomenon [So would we, please copy comments to the Newsletter -- *Eds.*] -- Dale Bakken, *P.O. Box 264, Strasbourg, Saskatchewan, S0G 4V0, Canada.*

EXCHANGE RESEARCH SPECIMENS OF SIAMESE CROCODILE. Samutprakan Crocodile Farm and Zoo is breeding large numbers of *C. siamensis* and some other species, including recently, *C. novaeguineae*. To assist further research Dr. Panya Youngprapakorn would like to exchange specimens of siamensis for specimens of other species. Live specimens, breeding stock, skulls and skeletons of all species are needed for study and research. For information please contact -- Dr. P. Youngprapakorn, *Director of Crocodile Breeding and Wildlife Research Center, Samutprakan Crocodile Farm and Zoo, 555 Taiban Road, Samutprakan, 10280, Thailand.*

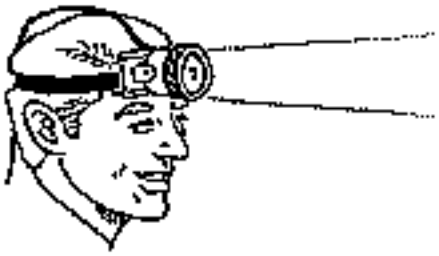
GIANT (EXTINCT) DWARF CROCODILE. Chris Brochu has begun a phylogenetic survey of crocodilians and their closest extinct relatives. His broad scale results are too preliminary to report but some interesting details have surfaced including the presence of a giant dwarf crocodile in the fossil record. `*Crocodylus*' *robustus* and *C. madagascariensis*, both fossils from the Quartenary of the Malagasy Republic, are generally synonymised with *C. niloticus* in the literature. He agrees that *C. madagascariensis* is synonymous with *C. niloticus*, but `*C.* ' *robustus* actually shares several derived character states with *Osteolaemus tetraspis*. The largest specimens he has seen suggest four or five meter individuals - not "giant" in the literal sense (several extinct forms reached lengths of approximately 15 m) but considerably larger than mature *O. tetraspis*. Unfortunately, he has been unable to locate the holotype - even the original descriptio n did not specify one. If anyone knows of its whereabouts please contact -- Christopher Brochu, *Dept. Geological Sciences, University of Texas at Austin, Austin TX 78712, USA (E-mail: gator@mail.*

utexas.edu).

NEWSLETTER ENTERS CYBERSPACE. We are pleased to publish for the first time as part of an address, an E-mail address. While we appreciate that many readers are still restricted to "Snail mail", (and one of the editors actually prefers short faxes to long E-mails), we will be pleased in future to include E-mail addresses of contributors. We are also investigating the possibility of making the CSG NEWSLETTER available through the INTERNET and making ACTION PLAN information available through an IUCN or SSC network. Watch the NEWSLETTER (and your E-mail) for details. All readers should be reassured that conventional means of communication will continue to be fully acceptable for all purposes. We can reached at: *kaiman@flmnh.ufl.edu or Florida Museum of Natural History, Gainesville, FL 32611, USA. Fax: (1) 904 392 9367.*

[Since reporting this in the printed edition, we finally got the WWW Edition on line.--*Eds.*]

PERSONALS



Dr. Stefan Gorzula, 614 West Main Street, Newbern, Tennessee 38059, USA, tel: (1) 904 627 2337, announces his new address effective October 1994.

Dr. Miguel A. Rodriguez Melo, Director Recursos Naturales, Pizano S.A., Carrera 9A, No. 99-02 Piso 10, Santa Fe de Bogotá, D.C., Colombia, tel: (571) 616 1088, fax (571) 618 3095, announces his new position and address.

Ted Joanen, Route 2, Box 339-G, Lake Charles, LA 70605, USA, tel: 318 598 3236, fax: 318 598 4498, has officially retired from the Louisiana Department of Fisheries and Wildlife to pursue his interests in training retrievers and quarter horses. Ted has once again taken on the responsibility of Vice Chairman for North America and is conducting CSG business from his address above. However, about 50% of the time he seems to be away from home-- at the Rockerfeller Refuge!

NEWSLETTER SUBSCRIPTIONS

DID YOU FORGET? A subscription form was sent out with the last hardcopy edition NEWSLETTER and at press time responses have been received from 147 subscribers. The donation is voluntary, but communicating with the NEWSLETTER is not. If we do not hear from you one way or another we will assume that you are no longer interested and we will send your hardcopy NEWSLETTER to someone else. Send in your subscription form, news items, personal notes and photo's right now.

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.

[STEERING COMMITTEE MEMBERS]----[TOP OF THIS PAGE]----[TABLE OF CONTENTS]