

# **CROCODILE SPECIALIST GROUP**

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## **NEWSLETTER**

VOLUME 12 No. 4 ■ OCTOBER 1993 - DECEMBER 1993



IUCN World Conservation Union ■ Species Survival Commission

# CROCODILE SPECIALIST GROUP

## NEWSLETTER

VOLUME 12 Number 4  
OCTOBER 1993 - DECEMBER 1993

IUCN--The World Conservation Union  
Species Survival Commission

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COVER PHOTO: *Crocodylus palustris*,  
approx 2.5 m, called 'Gando' in Iran,  
photographed in the wild at Pir Sorab pond  
on the Kajou river, in the Bahukalat Gando  
Protected Region, Iran. See page 4. M.  
Saghari photo.

## 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:

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Ltda., Bogotá, Colombia.

## EDITORIAL

CHINESE ALLIGATOR ACTION. Every now and again the NEWSLETTER receives, by coincidence, a series of comments on the same issue that draw our attention to both immediate crocodile conservation issues, and to broader questions about our conservation stance. In this issue there are several comments on recent events concerning the Chinese alligator (pages 6, 7 and 17-20), and in particular expressing concerns that commercial trade will not help conservation of this species. I thought these concerns were of sufficient merit to invite Dr. Grahame Webb, Vice Chairman of the CSG for Eastern Asia, Australia and Oceania, to respond. Dr. Webb, with Brian Vernon, conducted the CSG review of the Chinese situation in early 1992 (published in the CSG CONSERVATION ACTION 1992: 1-27.) and has remained in close contact with this issue since. His response appears on page 18.

It is particularly important that the NEWSLETTER can serve as a forum for discussing this and similar issues. The CSG has a remarkably broad and diverse membership and it would be unusual, in fact downright suspicious, if we did not disagree on some things. What is

important is that we can discuss them in an open manner, tolerate and even encourage dissent, and continue to keep our view on the bigger picture while vigorously debating particular details. We are all interested in crocodilian conservation. I think Dr. Webb's point is very well taken. In the confusion and rapid change of the modern world we need to keep a pragmatic and flexible view and recognize the multiple contributions to successful conservation. The only true test is- does it work? -- Perran Ross.  
*Editor & Executive Officer CSG.*

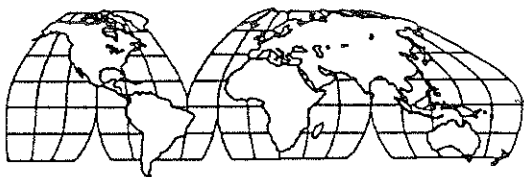
## RESPONSES

MORE ON SUSTAINABLE USE FOR CONSERVATION. Sustainable Use and its criticism have been the topic of much discussion in this NEWSLETTER. Sustainable Use is a powerful conservation tool for some commercially fashionable crocodilian species. Ranching seems to be a solution from Solomon, where all the concerns of rational parties are addressed. The success or failure of ranching as a model will rise or fall contingent upon energetic law enforcement and unbiased systematic surveys for the populations being ranching. Australia, PNG, South Africa, USA and Zimbabwe have demonstrated an ability to do this with 4 of the worlds 23 crocodilian species. The public relations problem with Sustainable Use is not so much that the public can't or won't understand or accept the concept, it is that of some 1.5 - 2 million crocodilian skins processed annually only about 360,000 come from legal sources (CSG NEWSLETTER 10(2): 21-22). This means that roughly three out of every four skins in commercial trade are illegal, thus undermining public confidence in the industry. Tanneries that continue to purchase and manufacture skins from illegally harvested crocodilians, in defiance of world conservation laws, are directly responsible for tarnishing the image of Sustainable Use.

At the retail level it is unrealistic to expect John and Mary Q. Public to be knowledgeable enough to sort through articles made from illegal *Melanosuchus* and *Caiman* in order to buy legal *Crocodylus* and *Alligator*. [We guess that few CSG members could either, Eds]. For more than two decades affluent customers have heard that it is illegal to purchase items made from

crocodilian skin. In the last decade or so they have heard that some of these articles are legal and some are not. Store clerks (who often haven't the foggiest notion themselves) try to assure clients that their products are all legal and those of competitors are dubious. Prospective clients are left confused and not really knowing whether their purchase might aid laudable conservation efforts or is actually responsible for the depletion of an endangered species. With such continuing uncertainty many potential customers simply forgo purchase of crocodilian products. Legally its the wisest thing to do. Sales of crocodilian products will never achieve their full market potential as long as public perception is cognizant that a large percentage of crocodile products are from illegal sources. Unfortunately, honest and legitimate ranchers, farmers and tanners continue to suffer from the perception that the industry just can't get its act together and thereby lose many potential retail customers. The problem is not so much convincing the public of the value of Sustainable Use- it is stopping the output from the illegal portion of the industry. This requires the vigilance of everyone interested in crocodile conservation and particularly those associated with exotic skin and meat industries, after all this is not someone else's problem. -- William McMahan, Louisville Zoo, 1100 Trevilian Way, Louisville KY 40213.

## AREA REPORTS



### AFRICA

#### Kenya.

**TANYA RIVER UPDATE.** Kenyan President Arap Moi recently ended an intense two and a half year land use battle over the Tanya River delta by reconfirming his July 1993 announcement to protect the 200 km<sup>2</sup> area. Conservationists and entrepreneurs had clashed over plans to develop a fish and prawn farm in the area which is a

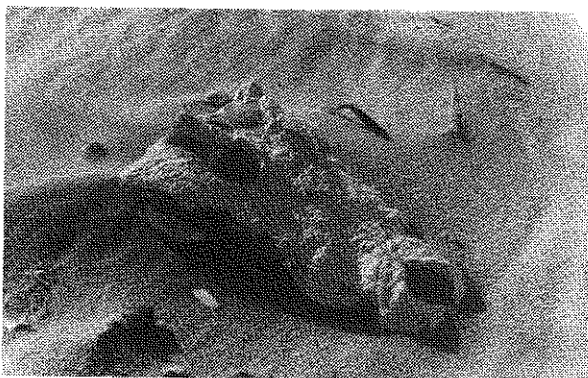
significant wetland and wildlife habitat (NEWSLETTER Vol. 12 (1): 16-17). Moi concurred with environmental groups who said that the planned development would threaten the areas biologically rich mangrove forests which are important fish spawning grounds. This could cripple commercial fishing. The groups are now asking the government to carryout an impact assessment of the area and develop a management plan that includes ecologically sustainable income generating projects.

But many Tanya River Delta residents are incensed by Moi's decision and more than 5,000 people of the areas 25,000 inhabitants petitioned Moi in an open letter to, "Stop taking our lands to create a Wetlands Game Reserve". State agencies and environmental groups have responded that, "The objective is to meet local peoples development needs while taking care of national and international interests". Two task forces have been formed to create a management plan and to educate and inform the local community. The area is expected to be gazetted under Kenya's Wildlife Act as a protected area. - Extracted from *WWF NEWS* No. 86. November /December 1993 and *AFRICAN WILDLIFE UPDATE* Vol. 2, No. 5, Sept. Oct. 1993.

#### Namibia.

**SKELETON CROC FROM THE SKELETON COAST.** The photo below shows a *C. niloticus* skull found on the Skeleton Coast 8 km south of the Cunene River mouth, Namibia. This species breeds at the river mouth and we know that adults occasionally wander into the sand dunes to the south. Spoor (tracks) have been seen 3 km into the adjacent sand sea. They also wander the beaches both north (into Angola) and south of the mouth.

The Benguela current flows strongly along the shore towards the north, suggesting that this croc made a concerted effort to oppose the current and swim 8 km south. For those who doubt a croc would work that hard, there is also the possibility that the croc was washed out to sea then moved by the seasonal Angola current, which moves southward, and despite the longshore current, was able to land 8km south. In either case crocodiles on Skeleton coast are an interesting, and little reported phenomenon. -- M. Griffin. *Biodiversity Inventory, Wildlife Conservation and Research, Private Bag 13306, Windhoek, Namibia.*



Skull of *Crocodylus niloticus* found 8 km south of the Cunene River mouth, Namibia. Dirk Heinrich photo.

## WESTERN ASIA

### **India:**

MUGGER MANAGEMENT IN SIMILIPAL TIGER RESERVE, ORISSA. Although the mugger (*Crocodylus palustris*) occurs in most Indian States, its management in Orissa is of historical significance because Orissa is the only Indian State where all three species of Indian crocodilian occur and are being managed. As with other Indian management programs, the cost is borne entirely by the State Government. There has been a perfect amalgamation of two national projects - Project Tiger and the Crocodile Project. The administration of the mugger project is handled by the field director of the Similipal Tiger Reserve and all releases are done into the rivers of Similipal.

At the beginning of 1993 a total of 996 eggs, 667 hatchlings and 390 released individuals have been handled through the Mugger Research and Conservation Unit at Ramatirtha. During the 1993 breeding season three of four breeding females laid eggs. Clutch sizes were 36, 30 and 34, an improving trend since Vitamin E therapy was given. Two of the females were allowed to hatch their own nests and excellent video documentation was made of one of them mouth carrying her hatchlings from the nest to the water about 50 m away. Eggs of the third female were moved to a hatchery after 73 days incubation in situ. Incubation for the nests were 83, 74 and 85 days. Thirty six of the naturally hatched young are growing in the breeding pen providing additional data on parental care, growth, survival and behavior. Thirty five hatchlings are being raised in captivity.

Even though the State Government has borne all the costs, it has a proven commitment to keep alive the indigenously developed techniques of crocodile rearing, which is highly laudable. -- Lala A.K. Singh, *Deputy Vice Chairman, CSG, Similipal Tiger Reserve,, Khairi-Jashipur, Orissa, India.*

### **Iran:**

IRANIAN CROCODILE: GANDO. The local name of the marsh crocodile or snub nosed crocodile (*Crocodylus palustris*) of the Iran-Pakistan border in southeastern Baluchistan is 'Gando' (cover photo). The Bahukalat Protected Region was created in 1971 in order to preserve the crocodile and its ecosystem. This reserve is about 39,475 hectares comprising arid mountains, foothills, plains and much of the Sarbaz river and its tributaries. The river runs from the vicinity of Firouz abad in Sistan and Baluchistan to the Gulf of Oman and seems to be the western most extent of the range of Gando.

The name of this region was changed to The Gando Protected Region by the Department of the Environment (DOE) of Iran in 1982. The timely establishment of the Gando (Bahukalat) Protected Region may have laid the foundation for saving representatives of this species from extinction.

Gando have been protected in this region by both DOE and the folklore of the local people. Native people of Baluchistan believe that Gando is holy and auspicious. They believe that Gando lives where there is enough water and if people hurt or kill them, rains will stop and the rivers will get dry. These beliefs are a great help to the survival of Gando and as a result Gando and people have lived together peacefully for centuries.

The main suitable habitats for Gando in Iran are two rivers:

1) Sarbaz (= Dashtiari) river which runs from heights to the south of Irarshahr city to the Gowatar Bay and Gulf of Oman,

2) the Kajou (= Koja) river which flows from north of Ghasr-e-Chesme to the the Dash -e Yari region.

Rivers and marshy areas near the border of southeastern Pakistan harbor colonies of Gando, but since there are no passable roads to reach

but since there are no passable roads to reach there we have insufficient data and getting accurate information is difficult.

The Gando are found at pools, marshes and tributaries associated with these rivers especially at bends, near the bases of 10 m to 20 m high banks and cliffs. The pools are generally 1.5 m deep with mud or sand bottoms and are up to 1 km long. They are generally surrounded by Tamarisk trees. The most suitable habitats along the Sarbaz river are Geriban pond, Jougeri pond and Shakar jangakle pond. Along the Kajou river Gando are found at Ney bakhesh pond, Pir sohrab pond and Karap pond. These rivers are dry for much of the year and during summer some of the ponds become dry. In such dry periods the Gando in the Nahang and Nahrdasht rivers migrate to rivers that flow on the border with Pakistan. Therefore the Gando of Iran and the muggers of Pakistan, which are seriously endangered, have the opportunity to gather together in Pakistan during the dry period. -- Haji Gholi Kami, *Herpetology Section, National Natural History Museum, Ghaem magham Ave. No. 9, Tehran, Iran* & Mohammad Saghari, *Dept. of Environment, P.O. Box 15875-5181, Tehran, Iran.*

## Nepal:

**IUCN CROCODILE PROJECT.** A crocodile conservation project was recently initiated in Nepal under the auspices of the local IUCN office in consultation with CSG member Dr. Tirtha Maskey. Some members of the CSG read the proposal, which was accepted by USAID in May. Funding is small but it has allowed us to initiate the program and engage Harry Andrews (of the Madras Crocodile Bank) as a consultant to move the project forward. Communication channels are open to the government and the outlook is hopeful for integration of a full scale conservation effort with the Department of National Parks and Wildlife Conservation.

The objectives of the project are:

- Creation of a crocodile technical committee as part of the existing Wetlands Group.
- Initiation of a country wide survey to determine present status of restocked crocodiles, to locate additional habitat for restocking and to survey areas previously not quantified.
- Creation of gharial and mugger sanctuaries, perhaps on the Kali Ghandaki and the western Rapti with monitoring by local people.

■ Continue restocking of both species for two years and then an assessment will be necessary to determine carrying capacities and release success.

■ Maintenance of a captive breeding stock of both species as an insurance measure.

■ Training and involvement to maintain the interest and supply of crocodile researchers and managers in Nepal.

■ Initiation of international cooperation with India for crocodile management.

■ Formulate a proposal for a conservation area with an NGO run crocodile ranch and tourist attraction.

■ Feasibility study for commercial captive breeding programs wherein a portion of the revenue benefits crocodile habitat conservation. This would include evaluation of opportunities for industry development under eco-development programs and a study of a marking system for crocodile products.

■ Creation of a data base to centralize crocodile information, possibly as part of the existing Wetland database. -- Preston McEachern, *Wetlands Conservation Program, IUCN Nepal, P.O. Box 3923, Kathmandu, Nepal.*

## EASTERN ASIA & OCEANIA

### Australia:

**PHILIPPINE CROCODILES ARRIVE IN AUSTRALIA.** After almost two years of negotiation, two Philippine crocodiles (*Crocodylus mindorensis*) arrived in Australia on 29 August 1993. The crocodiles are housed and exhibited at the Melbourne Zoo and are subject of a memorandum of agreement between Melbourne Zoo, Silliman University (Dumaguete City, Philippines) and the Department of Environment and Natural Resources (DENR Philippines). Melbourne Zoo's role is two fold:

- 1) Establish a captive-breeding group and return offspring to the Philippines for eventual release in secure sites.
- 2) Provide advice and other support to benefit husbandry and reproduction at Silliman University.

The two crocodiles, a female hatched in July 1986 and a male hatched in June 1987 are

offspring of 'Andy' and 'Braulio', the single adult breeding pair at the Silliman University Marine Laboratory facilities at Dumaguete City on the island of Negros. 'Andy' the male was donated to the facility in 1980 by the late mayor of Zamboanga City on Mindanao via Andy (Charles A.) Ross. The female, 'Braulio' was donated as one year old hatchling in 1971 from the Bagatban River, Basay in Negros Oriental (she was raised by the caretaker of the SU Botanical Garden, Braulio Gargar). These are the same two crocodiles referred to in Alcala et al. 1987 (Silliman Journal 34(1-4):18-28).

The Melbourne specimens are displayed in a 60 m<sup>2</sup> exhibit, the same facility in which *C. porosus* have reproduced in the zoo on four occasions from 1979-1986. Prior to leaving the Philippines they were members of a group of 5-7 year olds in which early courtship activity had been observed. The male is now 1.25 m long and weighs 12.1 kg while the female is 1.44 m long and weighs 12.4 kg. The crocodiles were accompanied back to Australia by the Zoo's senior curator, Animal Collection, Chris Banks, who visited Silliman University facilities and the protected Areas and Wildlife Bureau in Manila.

US \$2,000 donated by Melbourne Zoo to Silliman will be allocated to building a second secure breeding enclosure for crocodiles at the SU Marine Laboratory and paying the Mini Zoo caretaker for 12 months. The arrival of the two crocodiles at Melbourne Zoo was recently publicized on national television and in the press. Comments and enquiries on this Melbourne Zoo program should be directed to -- Chris Banks, Melbourne Zoo, P.O. Box 74 Parkerville Victoria 3052, Australia (or by fax to 613 285 9330).

## China:

THAI GROUP TO RUN ARCCAR. The Anhui Research Center of Chinese Alligator Reproduction (ARCCAR) has become part of Cheng Tai Chinese Alligator Protection Exploitation Co. Ltd. which is a China-Thailand collaborative operation. ARCCAR, which is the main breeding operation of the Chinese alligator, and which was recently registered by CITES to produce and export captive bred Chinese alligators, will be run by the Shi La Cha financial group of Thailand, beginning in May, 1993. Zhang Zheng-Dong, Anhui Research Center of Chinese Alligator Reproduction, Xuancheng, Anhui, Peoples Republic of China.

CHINA DEVELOPING WORLDS BIGGEST CROC FARM. Ever inventive tourism promoters hope travelers with exotic appetites will flock to a toothy new attraction - the worlds biggest crocodile farm. The 200 ha farm, costing about \$30 million US, will be built on tropical Hainan Island, China's southernmost province, according to the China's Xinhua news agency. "Crocodile farming is very profitable and is developing quickly throughout the tropical world," the official agency said. "The farm will combine crocodile raising with producing and processing products and tourism," Xinhua said, claiming, "It will be the biggest in the world". Crocodiles are raised for their meat as well as their hides. The Li'an Bay site is ideal for both tourists and crocodiles with temperatures that average 32.5° C and never fall below 15°C.

Hong Kong International Holdings announced that it is joining with Hainan China Travel Agency and Mr. John Bache, president of the International Crocodile Farming Association to build the crocodile farm in Hainan. A memorandum of agreement has been signed and total investment for the project is reported to be US\$ 30 million. The Australian partner operates a crocodile farm in the Northern Territory and will contribute technical assistance that is expected to be of great benefit to ensure the continued propagation of endangered species. Mr. Jose Yu of Hong Kong International Holdings indicated that the reason for inviting the Australian partner to take part was that the Australian farm is prominent internationally and has over 9,000 live crocodiles. The artificial incubation technique employed by the farm is expected to achieve success rates of up to 80%.

The big scale farming of crocodiles is expected to promote the development of local primary and secondary industries and provide a focal point for tourism. The farm will be built at two locations Haikou and Sanya and will collect crocodiles from all over the world. An inspection tour by the Australian managing director and general manager to Hainan has promoted great confidence that the project can proceed. -- Extracted from HONG KONG CHINA NEWS AGENCY, 16 June 1993. and CAIRNS POST 3 November 1993.

AND ANOTHER ONE! Shenzhen Wildlife Park was set up as a farm in September of this year. The crocodile farm of the park imported 150



*Crocodylus porosus* from Jong's Crocodile Farm, Sarawak, Malaysia, which is run by Mr. Jong Joon Soon who has visited China twice. The park has been opened to the public and welcomes visitors. -- Huang Chu-chien & Huang Dawai, *Institute of Zoology, Academia Sinica, 7 Zhongguancun Lu Haitien, Beijing, China.*

## Indonesia:

INDONESIA REVIEW. It was agreed by the CSG Review Committee for Indonesian Crocodile Management that a short review would be carried out by the Chairman, Professor Messel, in October 1993 and a full and thorough review would be made in 1994 prior to the CITES meeting. Dates for the full review of 3 - 10 July 1994 were proposed. Professor Messel met with the following representatives on 15 October 1993 at the PHPA offices in Bogor: Dr. G. Webb, V. Onions, Widodo S. Ramono, Boeadi, Soemaryoto Atmosoerirdjo, Leonardo Laloan, George Tatang Saputra, Anky Handoko, Tazir Saleh, Komar Soemarna, Billy Gan, Karyadi Ch, Rachmat Wiradinatga. Information was requested in relation to progress on each of the recommendations made in the 5-12 November 1992 review report. I am pleased to report that for the first time I feel that the Indonesians are making real progress, rather than just making excuses! I wish similar efforts were now being made in other countries, some of which already have their crocodile populations on Appendix II.

LIPI staff are being redeployed and a team of 6 people is being formed for quota determinations of all wildlife. Three of the LIPI staff attended the 6 week wildlife management course given in Darwin, Australia, March-April 1993. In total 10 staff from Indonesia attended this course and passed the final examination, 3 from LIPI, 4 from PHPA, Yono Rahrajo, Lewis and one other. This is a major step forward and ACSUG is helping fund needed equipment.

The establishment of general harvest levels has not been done as, we all know, the data necessary to determine a quota on biological grounds is simply not yet available and can't be for some time. The government is budgeting funds for 1994 monitoring. The Indonesians have no choice but to play it safe and maintain present quotas until further data are available, and to monitor harvest. The matter is academic at present with skin prices so low that it appears Indonesia will not use their quota for 1992 and

1993.

There appears to have been considerable activity and reorganization in the crocodile farmers association (ICFA) and the Crocodile Task Force (ICCTF), with new active leaders. The cooperation and integration of these two bodies with PHPA is going well and more importantly there is now a real flow of information between them. ICFA now actively chases up information from its members when it is not forthcoming. The head of ICCTF is the Director of Nature Conservation. I was pleased to see the log jam being cleared here and some real progress being made.

Following the course in Darwin a draft Crocodile Management Plan and a CITES proposal for ranching have been prepared. Both documents are valiant efforts but require much work to bring them up to scratch. Since the CITES proposal must be submitted by December 1993, I suggested that Dr. Webb be paid a small honorarium by ACSUG in order to knock the document into shape and this was agreed by the Indonesians, ACSUG and Dr. Webb.

Importantly, a new regulation for Act No. 5 of 1990 has been prepared, as suggested by the 1992 review, wherein the complete management protocol for crocodilians, including reporting procedures, would be made mandatory and legally enforceable. I was informed by Widodo and Komar that this regulation would be through within the next two months by Ministerial decree. Komar is already insisting on proper reporting and will withdraw permits if no response is made. Apparently the threat is yielding results.

The game farm, Bentang MAS, has computerized and analyzed their crocodile harvest data and is prepared to make their software available to help other farms do likewise through PHPA. It appears that some progress is being made.

The oversize skin problem no longer exists as so few animals are being taken from the wild.

Tagging - They have not yet complied with our recommendation as they have had difficulty getting new tags. This will be cleared up by the next review.

*Tomistoma* and *siamensis*- Collection of these is no longer allowed. I recommended that ACSUG make a grant of \$3,000 US immediately so that visits could be made to all farms which now hold these species. Data and information from them and hunters would be collected and



collated in preparation for field surveys. ACSUG and PHPA accepted the recommendations.

PHPA is liaising with the CITES Secretariat and sent 3 members to Brussels to meet with the Standing Committee.

The proposed Lorentz and Wasur reserves are now national parks.

The FAO crocodile proposal was amended along the lines suggested by the review group and resubmitted. A copy was given to me. FAO corresponded with me but nothing more has been heard.

The smuggling of crocodile skins from PNG to USA via Indonesia was apprehended.

All in all it was an intensive and worthwhile review. With continuing effort, Indonesia could end up with an excellent crocodile program covering a vast and difficult area. ACSUG is playing an important role in all of this which is good to see. -- Emeritus Professor H. Messel, *Chairman CSG, Report of 26 October 1993.*

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TRAFFIC INTERNATIONAL COMMENTS. I have been passed a copy of your brief summary report of your six-hour review of progress on crocodile management in Indonesia, which you conducted on 15 October 1993. A number of TRAFFIC Staff are members of the CSG and in most cases it would not be my role to intervene in addressing items under discussion within that forum. However, your assessment of the current situation raises a number of important issues which are of general concern to the TRAFFIC Network and our input to the SSC.

Overall, I must say that I am surprised by your conclusion that 'real progress' is now being achieved in Indonesian crocodile management. It is my understanding that the November 1992 Review Committee Mission to Indonesia concluded that progress was slow and that many important requirements had not been addressed. Now you seem convinced that the situation has changed for the better on the basis of a brief consultation meeting. What is still lacking is hard evidence of progress and the time remaining before the proposal deadlines for the next meeting of the Conference of the Parties is running out.

Before commenting on crocodile trade issues in more detail, I would like to make it quite clear that TRAFFIC is fully committed to assisting Indonesia in improving management of its

wildlife trade. You are aware, no doubt, of the PHPA/LIPI/IUCN/TRAFFIC consultative meeting held in Jakarta earlier this year which led to an action plan for the introduction of improved controls. You should also know that the CITES Standing Committee agreed at its meeting in September 1993, to a set of recommendations concerning Indonesian wildlife trade, in response to which Indonesia has been asked to prepare a report to the CITES Secretariat at the end of this year. The Secretariat must report its assessment of progress to the next Standing Committee meeting. It is essential that CITES-related crocodile management issues are approached with the attention to this wider context. There is a great deal of pressure on Indonesia from many quarters at present and, at last PHPA appears to be prepared to actually take some action.

Back to crocodiles, the situation as we see it is as follows: In reviewing the recommendations laid out by the CSG review mission team one year ago, the Review Committee felt that:

1. *-The aims, objectives and methods of establishing general harvests levels (quotas) and the analysis of harvest data with respect to those levels, should be reviewed and rationalized so that there is no confusion nationally or internationally about the scientific basis of them.*

One year later, the quota establishment process is (hopefully) being revised as result of instructions from the CITES Standing Committee, though the result remains to be seen. The Review Missions recommendation had no impact on the 1993 quotas, established after the Missions visit.

2. *-The development and implementation of a management program should be given the highest priority and must be undertaken prior to the next proposal to CITES.*

One year later, no management program is in place and the management plan and the ranching proposal will now be written together by the same person. No implementation will occur before the next COP, and the ranching proposal will of necessity be based on promises and wishful thinking.

3. *-Immediate steps should be taken to amend Act No. 5 of 1990 such that it allows the management of specific wildlife species to be controlled through an approved management program.*

One year later, promises are given that within

a few months the regulation will appear. PHPA has been promising regulations for implementing Act No. 5 since 1990.

4. The 1992 review document stated that no formal survey programs for *Tomistoma schlegelii* and *Crocodylus siamensis* existed, and that *C. porosus* surveys stopped in 1992. One year later, nothing has happened. It appears that most of the Review Mission recommendations concerning *T. schlegelii* and *C. siamensis* have been ignored. On your short visit you have again called for visits to all farms holding these species to collect data "in preparation for field surveys".

5. *Immediate steps should be taken to collect, collate and standardize and store in a readily retrievable system, all monitoring data on wild and captive stocks so far collected within Indonesia.*

*All monitoring programs be reviewed with a view to identifying the information needs that the monitoring programs are designed to answer, and ensuring appropriate analysis and reporting of results.*

One year later this has apparently not occurred (except apparently, for one trader who has been computerizing his operation since 1990).

Furthermore the head of the ICCTF has been transferred. Having yet another new person in charge of ICCTF will not help the log-jam. We understand that Drs. Sutisna and Widodo will be moving out of their posts before the July review, and totally new persons will be in their place.

We fail to see how the capture of large skins has stopped, unless capture of crocodiles in Irian Jaya by using hooks has completely stopped, which is unlikely. In any case without an ongoing field monitoring, we fail to see how PHPA is keeping track of what is going on out there.

Finally, Wasur National park is not a primarily significant area for crocodiles, and this area was declared a National Park by the Ministry of Forestry in March 1990. Lorentz is still a strict nature reserve, and has not to our knowledge been gazetted as a National Park (nor is WWF Indonesia aware of any changes). Far more critical for crocodiles are Bintuni Bay, The Mamberano-Foja river system and Kimaam Island. These are not actively protected and the former two areas are under considerable development pressure.

These facts do not provide cause for optimism and it is inevitable that they will be judged along with Indonesia's report on progress with the wildlife trade management action plan

mentioned above, during the CITES Secretariat's development of a response to the next Standing Committee meeting in March 1994. The July CSG review mission will be too late to either influence that assessment or form the basis for amendment of listing proposals. If the CSG review mission process set up at the last COP continues to be unable to objectively document hard evidence of progress, then Indonesia is very unlikely to gain support for crocodile proposals put forward in the November 1994 meeting.

I would be interested to hear your opinion on the issues raised above. We really need to find a way to assist Indonesia to make real progress on wildlife trade management issues, but the country's reputation in the CITES forum is unlikely to survive another critical examination based on promises alone. -- Jorgen B. Thomsen, letter of 6 December 1993. Director, TRAFFIC International, 219c Huntingdon Rd., Cambridge CB3 0DL, UK.

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PROFESSOR MESSEL RESPONDS. Thanks for your surprising fax. As a conservationist you should know better than trying to shoot the messenger.

It was agreed by the members of the CSG Review Committee on the Indonesian crocodile program, that there was no need for a full review to be carried out of the Indonesian program in 1993. Instead only a summary review was to be carried out. This I did and reported on what I found. You are entitled to disagree with it, but don't attack the messenger. You should know that over the years I have been and still am one of the severest critics of the Indonesian crocodile program, but I have also tried very hard to do this in a constructive manner and for CSG to provide guidance and help wherever it could.

The CSG has continually tried to assist Indonesia to improve its management and conservation of crocodilians. Very real advances have been made over the last 5 years as a consequence of our intervention, and we are the first to recognize them. The CSG will always encourage positive efforts, although they may appear of minor significance to some.

It may be decades before standards of wildlife management in Indonesia reach those expected by some people. We are talking here of a developing nation, with horrendous logistics. What may appear 'simple' to implement from a distance, sometimes proves impossible to

implement in reality, regardless of the will to change within PHPA, LIPI and the industry. Those who ignore the many cultural constraints, and assume a nation of 180 million will change its culture overnight to meet the approval of outside parties are simply foolish. Funding for crocodile management in Indonesia is very scarce indeed, and as our 1992 report mentioned, it is a very serious impediment to the rate at which management improves. You mention in your letter that TRAFFIC is committed to assisting Indonesia. To our knowledge, nothing has been committed since Stephen Nash allocated funds to Jack Cox. The Indonesian industry, rather than TRAFFIC, paid for Ginette Hemley's visit and for various other initiatives, as neither PHPA nor LIPI receive sufficient funding to fast track all recommendations.

With regard to your specific points.

1. Quotas remain the same as those set by CITES and the available monitoring data are insufficient to recommend changes. TRAFFIC could assist greatly by funding the development of a practical scientific monitoring program that matched available resources and skills.

2. PHPA wrote a proposal to CITES and a Management Program themselves. While both are fine efforts at a local level, they needed an injection of professionalism. I cajoled Dr. Webb into working on the CITES proposal with PHPA but he is unable to do the same for the Management Program. Traffic may consider funding him to work on it. The critical obligations for the ranching program are in the CITES proposal.

3. The CSG, PHPA and LIPI hope appropriate amendments to Act No. 5 of 1990 can be made by April. We shall wait and see--don't hold your breath.

4. Information on farm stocks is in the CITES proposal. No funds have been available for field work on *T. schlegelii* and *C. siamensis* and again support from TRAFFIC would be welcome. ACSUG has given \$3,000 US towards a series of farm visits to check reported holdings and I hear that this has now been done.

5. Survey data available to PHPA are summarized in the CITES proposal. The funds and skills needed to meet the recommendation have not been available and furthermore, the status and whereabouts of the data collected during the FAO program remains unclear. This would seem an obvious area for TRAFFIC to

assist with. The compilation and analysis of data from Indonesia's largest farm is considered to be a very positive step -- one gets the impression from your letter that you would rather nothing be done! That personnel within government departments get changed should not be surprising and is one of the constraints TRAFFIC must surely deal with in most countries.

6. I am unfamiliar with the latest status of Parks but Dr. Webb will check with Indonesia. We believe that an estimated 12,000 people in the Mamberano river system derive benefits from the crocodile use. Is TRAFFIC suggesting that this should cease and the area become a protected area or National Park?

As you saw in my brief report, full CSG review of the Indonesian program is scheduled for 3-10 July 1994. Ginette Hemley of TRAFFIC is on the Review Committee. We shall report what we find openly and honestly. You appear to have very strong views, hence I invite you (at your or WWF expense) to join the Review Committee for the July 1994 review. Remember we are reviewing the crocodile program and not all the other feathery, furry and slimy critters! Let me know if you can attend. -- Professor H. Messel, *Chairman CSG., letter of 9 December 1993.*

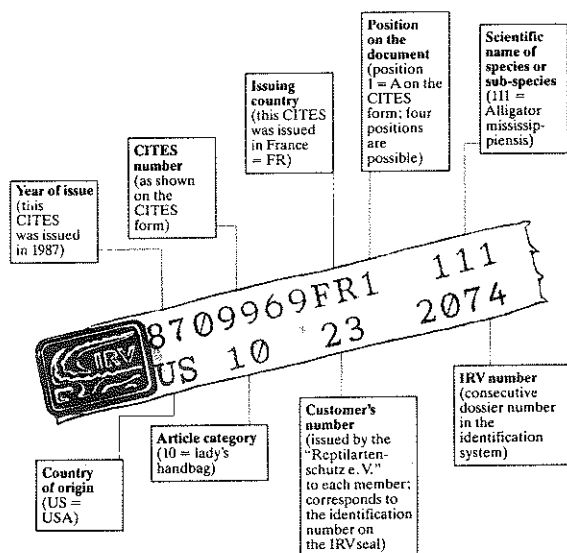
## EUROPE

### **Germany:**

SPECIES PROTECTION TAG. Internationaler Reptiler-Verband (IRV) and Reptilartenschutz e V. have developed a product marking tag for small leather items for use on their products. The tag is affixed to articles manufactured from reptile skins of all kinds for which the raw material has been purchased in conformity with international wildlife laws, in particular with CITES. The tag has printed a numerical and alphabetical code that contains all the information testifying to the legal origin of the goods and this information is also registered in a computer. With this information every single article can be traced through all its stages of processing. This enables the authorities to quickly check on goods and is a reliable purchasing guide for consumers. The identification system is administered by the non-profit association Reptilartenschutz e V. (Reptile

Species Protection Association) and is supervised by an advisory committee working closely with representatives of the authorities responsible for nature conservation in Germany.

**The species protection tag gives the following information in the form of a numerical and alphabetical code:**



Example of the species protection tag.

Before tags are issued the original CITES import documents are reviewed and a check is made to ensure compliance with any other applicable laws and regulations. The tag is small enough to be fixed to small watch straps or inconspicuously in the interior of small bags. Purchasers are advised to retain the tag as proof of purchase. Further details and a full listing of codes is available from -- Reptilartenschutz e.V., Kaiserstrasse 108, D-6050 Offenbach am Main, Germany.

## CENTRAL & SOUTH AMERICA

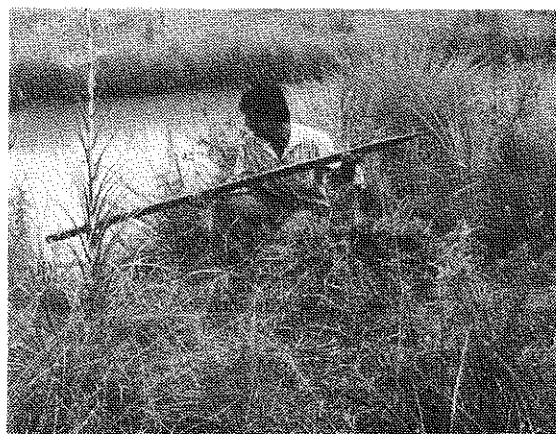
### Argentina:

**MICROCHIP MARKING AT EL BAGUAL.** Eggs from *Caiman latirostris* and *Caiman yacare* hatched successfully at El Bagual breeding program this year. Hatchlings were maintained in environmental chambers for approximately a month and then transferred to a specially

designed building for the first year of life. These hatchlings were injected with microchips donated by AVID (Dr. Hull). The microchips are being used for individual identification. After four months these microchips do not appear to affect growth or survival. A curly-tailed hatchling is being maintained alive in a special cage with shallow water as this individual cannot swim.

El Bagual Ecological reserve is usually characterized by a winter -spring dry season but this year winter has begun with habitats totally deficient in water. By August each year we usually have accumulated 1,000- 1,200 mm rainfall but this year only 600 mm fell. We usually have 4-6 frost days each year (in July) but this year 14 frosts were recorded. These unusually dry and cold conditions have lead to dramatic deaths of some wild *Caiman latirostris*.

We ask that everyone also notes our new address -- Lic. A. Alberto Yanosky c/o Claudia Mercolli, El Bagual Ecological Reserve, 3601 Presidente Yrigoyen, Formosa, Argentina.



Carmelo Cerdan, field technician at El Bagual, examines a nesting female *C. latirostris* at her nest. A.A. Yanosky photo.

### Belize:

**MORELET'S CROCODILE IN BELIZE.** This project continued a study begun in 1992 with the objective of gathering data on the nesting ecology of *Crocodylus moreletii* and assessing the population status of this species in northern Belize.

Fieldwork was conducted from May to September 1993. Study sites included those of the 1992 season and some additional sites. Nesting activity appears to be correlated with the wet season. Fifteen active nests and one inactive

nest were located. Average clutch size was 25.4 and an average of 4.5 infertile eggs per clutch were found. Small islands are the preferred nesting sites. Nests were monitored throughout the incubation period and only five nests produced hatchlings. The remainder were lost to flooding and predation by raccoons and grey foxes.

Spotlight surveys were conducted in wetlands throughout northern Belize. Crocodiles are often perceived by local people to be more abundant than they really are. In general large numbers of crocodiles were only found in remote or protected areas. The largest numbers were found in heavily vegetated wetlands and lesser numbers were found in rivers and coastal mangroves. Gold Button Ranch supports one of the largest and least disturbed crocodile populations in Belize. An average of 133 crocodiles were counted in 10 spotlight surveys of Gold Button Lagoon (ca. 120 ha) and lesser numbers were found in nearly all the wetlands on the property. Other large crocodile populations were found in Cox Lagoon, Mucklehenny Lagoon, Habanero Lagoon, Sapote Lagoon, the wetlands surrounding Gallon Jug and the New River, New River Lagoon system. Illegal killing of crocodiles seems to be occurring at low levels in Belize. Most individuals I interviewed had either participated in killings or knew others who had. Crocodile killing seems to most frequently be a result of concern over the presence of large crocodiles near livestock or swimming areas. Hunters may also kill crocodiles to protect their dogs.

Commercial poaching does not appear widespread. In 1992 I documented several cases of crocodiles being killed for skins or meat but saw no further evidence of this in 1993. However, an eco-tour operator on the New River reported finding three dead crocodiles. The teeth of one of these had been removed. In July I observed crocodile teeth jewelry for sale at a tourist shop in Corozal. Other than former commercial hunters, most people do not seem to realize that crocodiles are now fully protected under Belizian Law. -- Stephen Platt, *Dept. of Biological Sciences, Clemson University, 132 Long Hall, Clemson, SC 29634-1903, USA.*

## Colombia:

BLACK CAIMAN IN THE AMAZON REGION OF COLOMBIA. A study of local knowledge of the

black caiman *Melanosuchus niger*, was conducted in the Amazon region of Colombia near Leticia. Information was gathered from an average of 10 local informants in each of nine communities of indigenous people. Based on this information a series of surveys by foot and boat were conducted. Three adult black caiman were seen during 5 diurnal foot surveys although none were seen in 5 diurnal surveys by boat. In three nocturnal boat surveys we saw 13 black caiman, juveniles and subadults.

Local people are knowledgeable about the caimans and their nests but do not hunt the caiman for food and only consume some of the eggs in nests that they find. The black caiman share their habitat with *Caiman crocodilus* which are under great pressure from hunting for consumption.

We conclude that the black caiman is certainly not extinct in this area but is in a period of recuperation following the indiscriminate hunting that ended 20 years ago. The knowledge of the indigenous communities of this region was very detailed and a great assistance to this study in elaborating the basic biology of the species. These indigenous communities are proposing to initiate management plans for the lakes of the region and development of ecotourism. Recommendations are offered for the further development and conservation of this resource including additional studies with the participation of indigenous communities. -- Freely translated from DIAGNOSTICO PRELIMINAR DEL ESTADO DE LA POBLACION Y REPRODUCCION DEL CAIMAN NEGRO EN LA REGION AMAZONICA (COLOMBIA), *Practica Academica*, Andres Pachon & Jose M. Rios, Directora, Prof. Olga V. Castano. *Universidad Nacional de Colombia, Bogotá, Colombia.*

## Costa Rica:

SITUATION OF *CROCODYLUS ACUTUS* IN THE CENTRAL PACIFIC REGION. A study was conducted between October 1990 and April 1991 on the population of the 'cocodrillo amarillo' (*C. acutus*) of Estero Roto. The area is a small mangrove estuary on the central Pacific coast. Crocodiles were counted along a fixed route of 5 km travelled on foot at night. A 6-volt lamp was used to sight crocodiles and their length was estimated. Smaller individuals (less than 1 m) were captured by hand and examined for sex, ectoparasites and physical injuries. These

individuals were marked by cutting the scales of the caudal crest and by painting with yellow paint on the nuchal scales. During these surveys we also searched for crocodile nests. At each nest discovered we uncovered and counted the eggs and sacrificed one egg to determine the stage of development following the classification of Ferguson (1987).

We estimated a population of  $34.5 \pm 5.0$  or a density of 14.5 individuals per km. Most of the crocodiles, principally juveniles, were found grouped in the lagoon areas. The size structure indicated 66.3% juveniles (<80 cm) 18.4% subadults (80 -180 cm) and 15.3% adults (>180 cm). The sex ratio was 1.21 males to 1 female but this was not significantly different from 1:1. Three nesting sites were discovered in the area but only one nest had good eggs. We estimate the nesting season to have been between the end of January and the end of April but we are unable to discard the possibility of nesting in other months. The nests were hole types and we did not observe any parental care. Additional data are needed to clarify the trends of this population and the effects of human disturbance. These results have been published in *Repertorio Científico*, 1993, Vol 1, No. 2:16 - 20. Since then two more years of information have been collected. Unfortunately these results are not good information because the local inhabitants took vengeance on turtle conservation policies and destroyed the nests of crocodiles. Costa Ricans do not commonly eat crocodiles or use the skins. An environmental education program has been initiated and I hope these problems can be solved soon.

Based on this study and similar studies completed with Mahmood Sasa, we believe Costa Rica may have the most abundant population of American crocodiles in Latin America and we want to establish suitable management conservation and commercial policies. -- Gerardo A. Chaves Cordero, *Universidad Estatal a Distancia, Escuela de Ciencias Exacta y Naturales, Costa Rica*.

## Cuba:

**SURVEY OF THE ZAPATA SWAMP.** From 23 September to 27 October 1993, a survey of the Cuban crocodile *Crocodylus rhombifer*, was conducted in the Zapata swamp on the southern coast of Cuba. The survey was conducted under the auspices of CITES in coordination with the

Ministeria Pescaria Industrial (MIP), Cuba. The project leader was Lic. Elvirra Carrillo and the coordinator for CITES was Dr. J.P. Ross. Mr. Vivian de Buffrenil of the Paris Museum was associate coordinator and Lic. Sylvio Elizade of MIP and Lic. Roberto (Toby) Ramos, manager of the Laguna Tesoro Crocodile Farm, led the Cuban field team. Following a preliminary aerial reconnaissance we captured crocodiles from small boats in the swamp. This required an extensive logistic effort. We were transported by 20m fishing vessel 100 km around the coast (a 24 hr trip) to the vicinity of Zanja (Canal) 10 on the southern coast of the peninsular. We then progressed by small motorized boat approximately 12 km up the canal to the limit of navigation. Further progress into the swamp is only possible in small fiberglass dinghies of 3m length powered by a person pushing with a long pole. Eleven people and all our supplies and equipment were transported this way for the remainder of our field work encompassing 18 days and approximately 100 km of travel. Within the swamp, campsites are restricted to occasional areas of a few square meters of slightly higher ground amid the muck and water. Many of these were traditionally used by crocodile hunters and have been rediscovered and utilized by the MIP team.

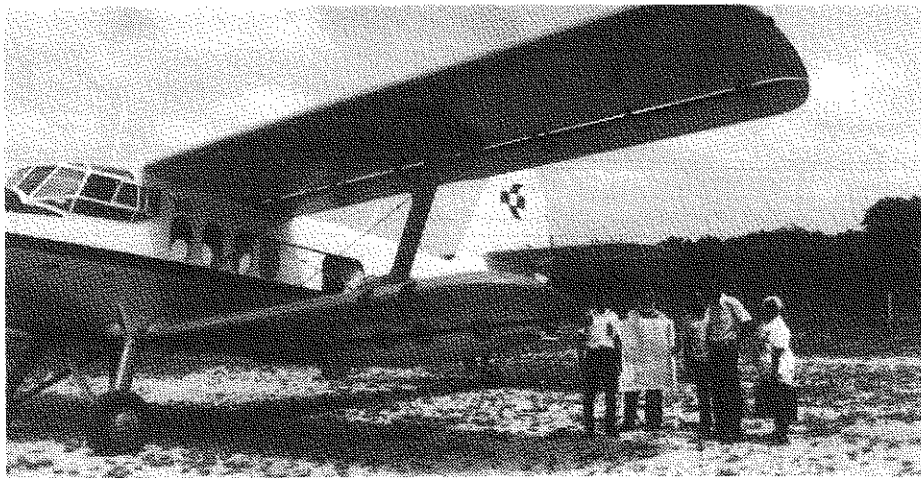
Three basic techniques were used to estimate crocodile densities; aerial surveys, night spotlight counts and mark and recapture studies. Information has also been collected by R. Ramos and the MIP field team during site visits to the Zapata swamp since 1988 is included.

Night spotlight surveys were of limited application in the very dense vegetation and difficult access of the swamp, however, these were conducted on two nights on Laguna Tesoro, the only open water body of the region. Mark and recapture work in the swamp resulted in the capture of 189 *C. rhombifer* and 44 *C. acutus* during 12 working days. Preliminary mark and re-capture calculations suggest that the population sampled numbers between 500 and 2,000 *C. rhombifer* and 50 - 500 *C. acutus*. Additional analysis is underway to calculate the area that was sampled and to refine the variance of these estimates. Preliminary analysis suggests the total area sampled was no greater than 26 km<sup>2</sup> and is probably much smaller. Aerial surveys were conducted from a helicopter following the ground work utilizing a modification of the Tandem Aerial Counts

described by Magnusson and Bayliss. The averaged result of six aerial surveys covering a total of 442 km gave an aerial sighting index density of 2.29 crocodiles per km<sup>2</sup> which is about one tenth of the actual density encountered during the ground work. Aerial survey results combined with additional ground work conducted by the MIP team in 1989 -1991 suggest that the *C. rhombifer* population occupies an area of about 300 km<sup>2</sup> in the southwestern portion of the Zapata swamp. Indications from nest observations, sex ratios and size distributions are that this is a vigorous and healthy population.

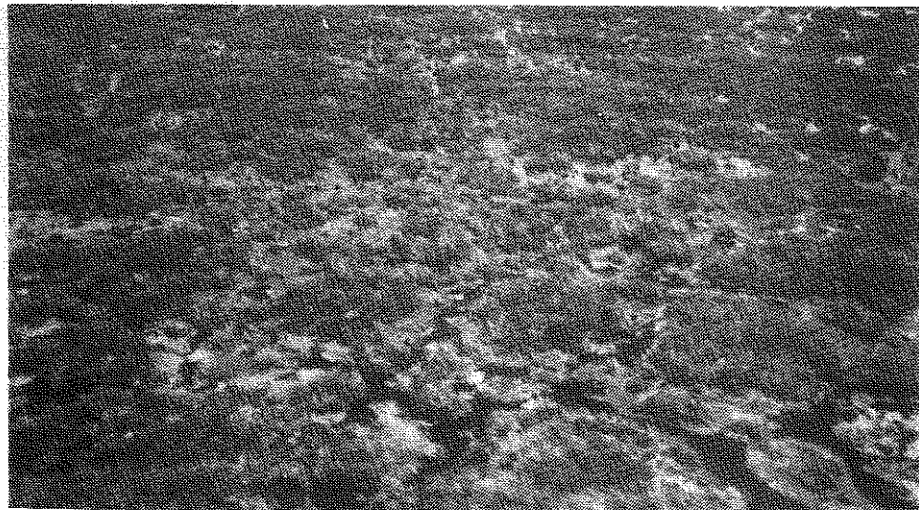
sympatric crocodilian. Toby Ramos has documented that the breeding and nesting season of the two species are offset by about two months so that there is only limited opportunity for crossbreeding under natural conditions.

The wild *C. rhombifer* population is currently well protected and has not been subject to human predation for 30 years. Proposals to extend the protection of the crocodile habitat in a faunal reserve have been made. The results of the survey are presently being analyzed in depth for CITES and will form the factual basis for a crocodilian management plan and a proposal to allow trade in products from crocodiles bred in



Preliminary aerial reconnaissance Zapata Swamp, Cuba, August 1993, l -- r. Capt. J. Mendoza, R. Ramos, L. Cotayo, J. Pons, E. Carrillo. P. Ross Photo.

Aerial view 100 m altitude, Zapata swamp, Cuba. Dominant vegetation is *Conocarpus erecta* & *Cladium jamaicensis*, 1 -3 m P. Ross photo.



*C. acutus* are commonly found with the *C. rhombifer* in the core area and become a majority of the crocodile population at the peripheral coastal areas of the Zapata swamp. The *C. rhombifer* population appears to have maintained its integrity despite the close proximity of a

captivity at the Laguna Tesoro farm. -- E. Carrillo, S. Elizade & R. Ramos MIP, Barlovento, Cuba; J.P. Ross, Florida Museum of Natural History, Gainesville, FL 32611 USA; & V de Buffrenil, Museum National d'Histoire Naturelle, 55 Rue Buffon, 75005 Paris, France.



## NORTH AMERICA

### **United States:**

STATUS OF NILE CROCODILE IMPORTS STILL CONFUSING. On 23 September 1993, The US Fish and Wildlife Service issued its final rule declaring that the Nile Crocodile (*Crocodylus niloticus*) throughout its range was downlisted from 'Endangered' to 'Threatened' status under the US Endangered Species Act. This action followed a thorough review of the species status begun in 1989 indicating that the species was numerous, widespread, threats were significantly reduced and the species was in no danger of extinction. Numerous comments and letters submitted from CSG members supported this sensible action which brings the status of *C. niloticus* in the US into line with the international classification for trade purposes under CITES. Under CITES, populations of *C. niloticus* in several countries where the species has either substantially recovered, or is under careful management, have been listed on Appendix II of CITES and international trade is permissible, particularly from farms and ranches.

It would be expected that imports to the US of legal skins and products of Nile crocodile from these countries would therefore now be permitted but this turns out not be the case.

In response to enquiries from the CSG and several members, the US Fish and Wildlife Service, Office of the Management Authority (OMA) has explained that imports to the US are governed by 'Special Rules' issued by the Service and that changes on the status from Endangered to Threatened have not affected the current rule in place. The current rule allows import of raw skins (but not products) of *C. niloticus* to the US from Zimbabwe and imports from all other countries remain prohibited. The OMA further explained that the Service has begun the process of drafting a new Special Rule that would update the import regulations for Nile crocodile, Salt water crocodile (in the special case of imports from Australia) and possibly also imports of Yacare caiman. However, the draft of this new rule was said to be at an early stage and no timetable could be offered for when such a rule might be issued or what it would contain.

In striking contrast to this information is news received from South Africa where, the NEWSLETTER has been informed, a US buyer was actively seeking Nile croc skins in South

Africa. The opinion was offered there by some South African producers that exports of their product to the US is now legal and it is alleged that the buyer took a set of skin samples back to the US with him.

In a strong letter to Dr. Charles Dane, head of the US Management Authority, Dr. Jon Hutton, CSG Vice Chairman for Africa, drew attention to the manifestly confusing and unfair situation of maintaining import bans on Nile crocs and suggesting that in fairness the Service should expedite action to revise the Special rule.

In related action the CSG has received information on communications transmitted through diplomatic channels from several foreign governments direct to the US State department concerned at the lamentably slow action on downlisting proposals for populations of *C. porosus* and the Yacare caiman. Questions on this issue addressed directly to the Secretary of the Interior have apparently been routed down the line to the Fish and Wildlife Service and response has been slow or absent. Frustrated by this unresponsiveness some crocodilian producer countries are prompting action at a direct government to government level through their diplomatic missions in the US. -- From *AFRICAN WILDLIFE UPDATE Vol 2(6) November - December 1993 & NILE CROCODILE FARMERS ASSOCIATION NEWSLETTER 8, August 1993* and correspondence.

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HIGH MERCURY LEVELS IN EVERGLADES ALLIGATORS. Wild alligators from the Everglades in south Florida, USA, have high concentrations of mercury in their systems, reports Terry Heaton-Jones. Widespread mercury contamination was recognized in the Everglades in 1989 and the gators may serve as indicators of this contamination problem. Alligators are non-migratory and at the top of the wetland food chain. They are also long lived and so accumulate high levels of contaminants. Preliminary results indicate that wild alligators accumulate higher concentrations of mercury than mammals and Terry is examining what level of mercury becomes toxic in alligators. While alligators appear to be resistant to the intoxicating effects of mercury, Terry is examining the presence of sublethal effects such as pathologies of the liver, kidney and brain and the impairment of neurological function. A promising development is the examination of

visual acuity which can be measured by electroretinography.

Part of the research design is a comparison of wild alligators, which accumulate mercury from their diet and alligators raised in captivity which have not been exposed to mercury and show low tissue levels. Terry is modifying several techniques for application in the field to allow widespread field testing of mercury effects in wild animals. Assessing the utility of alligators as long term indicators of this problem, and understanding the basis for their tolerance of mercury will provide public health benefits from this study while the examination of the effects on the gators themselves may offer important insights into their wild management and conservation in a contaminated environment. -- Adapted from *THE FRIDAY EVENING POST*, University of Florida Health Science Communications, submitted by Terry Heaton-Jones, College of Veterinary Medicine, University of Florida, Gainesville, FL 32611, USA.



*Tomistoma schlegelii* arrives at its new home in Gator Jungle, Plant City, from Reptile World in Maryland under the careful eye of general curator Bruce Shwedick.

AMERICAN CROCODILE THRIVES IN HURRICANE'S WAKE. The American crocodile occurs at the northern limit of its range in south Florida, USA, where a population of probably fewer than 500 persists in the Everglades, Key Largo and in the canal complex around the Turkey Point nuclear power plant. This area lay directly in path of Hurricane Andrew which devastated the region in October 1992. Concerns were expressed that the physical damage to the environment, vegetation damage, salt water intrusion and flooding might have affected the crocodile population negatively.

No direct crocodile mortality due to the storm was recorded and results of this years nesting suggest that if anything the hurricane stimulated reproduction. Frank Mazzotti, of the University of Florida, found 19 nests and 300 hatchlings at the Everglades National Park. At Turkey Point the number of nests (11) was not a record, but the number of hatchlings (180) was and at Key Largo 81 hatchlings from 4 nests is also a record.

This population has grown slowly since the 1970's when the total number of nests in Florida was around a dozen. Continuing tagging studies indicate high natural mortality of hatchlings and deaths of adults on highways remain a continuing source of concern. The species will remain 'Endangered' in the US until the annual nesting climbs to around 60 nests a year. -- from *Gainesville Herpetological Society Newsletter*, Vol X (4):15-16, & *Palm Beach Post*, 1 November 1993.

GATOR JUNGLE AT PLANT CITY, BREEDING REPORT. In 1993 the Crocodilian Breeding Center at Gator Jungle of Plant City successfully hatched 11 *Crocodylus niloticus* and 21 *C. moreletii*. These two species have reproduced here for a number of years. This year also saw our first breeding of *Caiman crocodilus* with 8 hatchlings.

In 1992 we received two large male New Guinea Crocodiles from the St Louis Zoo. We are very interested in pairing at least one of them with a suitable female. Please contact our center if anyone is able to help.

Bruce Shwedick has joined the staff

of Gator Jungle as General Curator. The crocs are growing well and we plan to replant and landscape the exhibits for spring of 1994.

In August we received one adult pair of *Tomistoma schlegelii* and one adult pair of *Osteolaemus tetraspis* on breeding loan from Reptile World in Maryland. Bruce Shwedick and his brother Michael raised these animals from juveniles and the dwarf crocs have produced two offspring in Maryland. We have also established a potential breeding group of *Crocodylus siamensis* from animals raised at Reptile World, the Bronx Zoo and Miami Metro Zoo. This facility will also provide habitats for *C. palustris*, *C. rhombifer*, *Osteolaemus tetraspis* and *Caiman latirostris*. While we hope to have captive breeding success with these species and others we do not plan to hatch large numbers unless requested to do so for conservation purposes or to stock other exhibits and zoos. In the future we would like to participate in the breeding programs currently underway in this country for *Crocodylus mindorensis* and *Alligator sinensis*. -- Tracy Howell & Bruce Shwedick, Gator Jungle of Plant City, 5145 Harvey Tew Rd., Plant City, FL 33564, USA.

**AMERICAN ALLIGATOR COUNCIL.** Through the encouragement and support of the Louisiana Fur and Alligator Council and with the assistance of Don Ashley, the first organizational meeting of the American Alligator Council was held in August 1993. Additional meetings were held in October and most recently in December. A temporary steering committee has been selected, officers elected and bylaws established. The purposes of the Council are as follows:

- Organize, unify and fairly represent the interests of all segments of the American alligator industry.
- Enhance and improve the conservation and the management of the American alligator and its habitat through sustainable use.
- Educate and inform the public about the value of sustained use of the American alligator as a renewable resource.
- Promote the sale and use of American alligator products as a benefit to both commerce and conservation.

The interim officers are Tommy Hines, Chairman; Kermit Coulan, Vice Chairman; and Darrel Dupont, Secretary Treasurer. The interim steering committee is comprised of 15

members representing the following industry segments: landowner/manager, trapper, farmer/rancher, processor/dealer, tanner/leather distributor, manufacturer/retailer, at large, Louisiana Fur and Alligator Advisory Council, Florida Alligator Advisory Committee, advisor (ex officio)

If you are in any of the categories you are eligible to become a member. There is an affiliate member category for government and academic persons interested in the activities of the Council. For further information contact -- Tommy Hines, Route 3, Box 509, Newberry, FL 32669, USA.

## ZOOS



**TOLEDO ZOO CROCODILE HATCHINGS.** The Toledo Zoo reports two significant crocodile hatchings in 1993 which represent the first successful reproduction of any crocodilians in the Zoo's 94 year history. On 12 April 1993, a female Cuban crocodile, *Crocodylus rhombifer*, laid 22 eggs in a mound nest on exhibit. The nest was approximately 1.25 m diameter and 0.70 m in height and was composed of sand and straw. Eleven eggs banded indicating fertility and four survived to full term. On 2 July, one neonate hatched successfully (TL = 26.1 cm, Weight = 62.8 g) and the three remaining eggs were opened. Two severely deformed babies and a one premature embryo were found which did not survive. The animal that successfully hatched is feeding well and has grown.

On 9 May 1993, a female slender snouted crocodile, *Crocodylus cataphractus*, laid 18 eggs in a mound nest in another exhibit. The nest was approximately 2 m in diameter and 0.5 m in height, and was composed of sand, cypress mulch and straw. All 18 eggs banded within two days of laying. Thirteen eggs survived to full term and successfully hatched on their own or were removed from the eggs manually between 26 July and 10 August (Avg. 5 August = 89 days incubation). The young weighed 84.2 -95.3 g (Avg. = 90.5 g) and measured 29.1 - 31.1 cm TL (Avg. = 30.2 cm). All 13 neonates are thriving. The Toledo Zoo is the second U.S. institution

(after Miami Metro Zoo) to reproduce this species and the only US zoo that has successfully bred the slender snouted crocodile in an indoor facility.

Eggs from both these clutches were divided into three groups and incubated at approximately 30°, 31° and 32° C respectively. All the animals are tagged and the sex of the hatchlings will be correlated with incubation temperature at a future date. -- R. A. Odum. *Toledo Zoo, 2700 Broadway, Box 4010, Toledo, Ohio 43609, USA.*

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**SPECIES SURVIVAL PLAN FOR CHINESE ALLIGATOR.** The Chinese alligator, *Alligator sinensis*, remains critically imperilled in nature. World stocks are considered Endangered by IUCN and US Fish and Wildlife Service and they are listed on Appendix I of CITES. Until recently authorities believed that no more than 200 - 400 wild adults remained. An CSG report is somewhat more optimistic. It reports Chinese claims that the population of gators in Anhui Province (which holds most of the species last remaining habitat) grew at 15 percent per year between 1982 and 1992 and now stands at 1,000. China declared a 907 km<sup>2</sup> National Chinese Alligator Conservation Refuge in southeastern Anhui Province which includes 26 protected areas where wild alligators occur.

The Anhui Research Center for Chinese Alligator Reproduction (ARCCAR) was established to prevent the extinction of Chinese alligators. Between 1981 and 1982, 212 adult alligators were brought to the Center and captive breeding has taken place since 1983, with a total of 6,040 hatchlings, of which 4,197 survived to 1992. Release of captive-bred stock is not taking place because of a lack of natural habitat and the land use conflict such a program would impose. Thus ARCCAR is facing a dilemma: The escalating costs of maintaining a burgeoning captive Chinese alligator population and developing their conservation program has become prohibitively expensive.

In March 1992, at the 8th CITES Conference of the Parties, China, supported by the CSG, submitted a proposal seeking registration for the first commercial captive breeding operation for an Appendix I species. The proposal was supported and a commercial utilization scheme is being developed with money from Thailand. It appears that captive bred live Chinese alligators will be sold to the pet trade and zoos and the

skins and meat ("dragon meat") will go to speciality markets. The AAZPA Crocodilian Advisory Group and the Species Coordinator have not championed this strategy; it is unlikely to enhance the species prospects for survival in nature, but rather fuel its demise.

There are 209 Chinese alligators outside China in 50 zoos worldwide, with 147 (70%) managed under the AAZPA Species Survival Plan (SSP) in 14 North American collections. The captive bred population is derived from seven wild caught founders. An additional four potential founders are in the SSP population and three are paired.

There are no specimens with and inbreeding coefficient of >0. When holding space is available, additional wild caught adults will be recruited into the SSP population from European and Asian zoos. Trade or purchase of juveniles from ARCCAR is envisioned. North American zoos offer limited resources and cannot likely meet SSP needs. Hopefully, cooperative zoo and private crocodilian centers programming will satisfy the space requirement.

During 1993, at a master plan session at St. Catherines Wildlife Survival Center, the studbook was transferred from SMS Houston program to SPARKS. Unsexed juveniles hatched at Rockefeller Wildlife refuge and St. Augustine Alligator Farm were sexed. The ratio was found to be strongly biased toward males, indicating that incubation techniques need to be refined. -- J. Behler, *Bronx Zoo, Wildlife Conservation Park, Bronx, NY 10406, USA.* reprinted from *REP-TALES, Vol 1, Number 3, Fall 1993*, with permission of the author.

## LETTERS



**TRADE AND CONSERVATION OF ALLIGATORS.** CITES has now included the Anhui Research Center of Chinese Alligator Reproduction (ARCCAR) in the Register of Operations which Breed Specimens of Appendix I Species in Captivity for Commercial purposes. (NEWSLETTER 12(3):p 8.). This will allow ARCCAR to begin legal trade in captive bred *Alligator sinensis* to help offset operational costs

of the facility. [See related articles page 6 & 18. *Eds*]. An aspect of this development that could have potentially adverse consequences is the sale of live surplus animals in the American pet trade. CSG members may not be aware of the huge cottage industry that now exists in the USA for the captive propagation of reptiles. Albinos, specimens with anomalous colors and patterns and even intergeneric hybrids, particularly of snakes, are among the thousands of "designer" reptiles intentionally produced annually.

Hundreds of thousands of live *Caiman crocodilus* have been imported into the USA since the early 1960's. Thousands of these have been liberated from New York's famous sewers to the Florida Everglades. *Caiman crocodilus* now nests annually in Florida.

No doubt most CSG members are aware of the ease with which *Crocodylus* species hybridize. Hybrids are known for *C. porosus* x *C. siamensis*, *C. acutus* x *C. rhombifer*, *C. niloticus* x *C. rhombifer*, *C. moreletii* x *C. niloticus*, *C. acutus* x *C. intermedius*, and this seems to be common for the genus. The F1's appear to be fertile. What if *Alligator* also hybridize readily?

The CSG has recommended that "Crocodile species should not be used for commercial farming operations outside their historical range where those operations are located within the range of other native species of crocodilians", (NEWSLETTER 9(4):p. 13) a laudable pronouncement designed to discourage the introduction of exotic crocodilian species. This CSG stance was prompted by the importation of 100 *C. niloticus* into Brazil in August 1989 for a commercial skin venture. Described as a biological time bomb by the press, the import drew concern from many in the world environmental community, including concerned crocodile biologists.

If *Alligator sinensis* is imported into the USA for the pet trade it will not be long before American herpetoculturists begin the propagation of this desirable cold tolerant crocodilian. It is virtually certain that some would be housed outdoors in the southern USA and if the past tells us anything about the future, we know that sooner or later some *A. sinensis* would escape. I am unaware of anyone who could say with certainty that this would not occur, or that both *Alligator* species might hybridize and produce fertile offspring. US alligator ranchers would probably find this prospect unacceptable. Until such questions can be satisfactorily

answered by science rather than conjecture, the importation of *A. sinensis* for the pet trade should be considered biologically imprudent. -- William McMahan, Louisville Zoo, 1100 Trevilian Way, Louisville, KY 40213, USA.

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CHINESE ALLIGATORS - CONSERVATION PHILOSOPHY UNDER TEST. Recent events concerning conservation of the Chinese Alligator (*Alligator sinensis*) within China and in the international zoo community have created a dilemma for some people. For others it indicates the need for flexibility in the conservation and management of endangered species. There is no single set of rules or philosophies that can ensure the conservation of all endangered species. That CITES and the IUCN Sustainable Use policy are "living documents", evolving with each meeting, gives great hope for the future. In contrast, conservation philosophy in some developing countries is becoming an inflexible dogma entwined with animal rights philosophies. There is a real danger that the achievement of tangible conservation goals in one country will become a secondary consideration to the maintenance of dogma in another.

The first priority of the CSG is to ensure that the Chinese alligator does not become extinct. Given the long isolation and the lack of reliable information from China, the work of the AAZPA, Crocodile Advisory Group and the Chinese alligator Species Survival Plan (SSP) led by John Behler has been very significant indeed. With this secure captive population the Chinese alligator cannot become totally extinct, regardless of what the future brings in China.

The second priority of the CSG with regard to the Chinese alligator is to ensure that some wild populations exist within their natural range. Thanks to the efforts of the Government of China there is one remaining wild population. It is a scattered one of perhaps 1,000 individuals that persist within the Chinese Alligator Reserve, some 907 km<sup>2</sup> of mostly farmland in Anhui Province. Areas of alligator habitat within the Reserve are small and isolated and usually adjoin farmland. But it is something, and encroachments to use this arable land for agriculture have been limited. Within the Reserve some rice fields have been abandoned to allow nature to rehabilitate habitat, which represents a serious commitment of resources to conservation in China, where arable land is at a

premium.

The Anhui Research Center of Chinese Alligator Reproduction (ARCCAR) lies centrally in the reserve on 1 km<sup>2</sup> of land donated by the Chinese government. The Center was established in 1979 with \$US 2 million of Chinese money as part of a Chinese Government initiative to prevent the alligator becoming extinct, prompted in part by the initiative of CSG member Dr. Myrna Watanabe of the Bronx Zoo. In a bold and pragmatic move matched only by the seriousness of decline of the alligator population, 212 wild alligators (perhaps 50% of the remaining wild population) were relocated to breeding ponds in ARCCAR.

Committed Chinese biologists then undertook years of research on the species both in the wild and in captivity. Annual surveys of the wild population were undertaken and a public education program initiated within the Reserve. Some of the people involved in surveys and public education are highly motivated and their survey results (spotlight counts and day counts) are a matter of great pride. These may not be the most precise survey data in the world and could no doubt be improved and standardized, but they are something, and the data indicate categorically that the wild population is increasing, rather than being stable or decreasing.

Today the ARCCAR maintains around 5,000 captive alligators and produces around 1,000 hatchlings annually. And herein lies the problem. The annual running costs of ARCCAR, including the Reserve, were around \$US 60,000 in 1991. But what can be done with exponentially increasing numbers of alligators when there is no wild habitat to release them? As John Behler has found, it is becoming increasingly difficult to place the small production from 147 Chinese alligators in the AAZPA/SSP. What should the Chinese do?

Brian Vernon and I agonized over these problems in China in early 1992 and agreed that the immediate conservation of the Chinese alligator in the wild depended upon:

- the maintenance of ARCCAR as the nucleus for conservation in the Chinese Alligator Reserve and
- the maintenance of a large captive breeding population in ARCCAR.

From a pragmatic viewpoint it was unlikely that one could persist without the other. The same conclusion was reached by the Chinese but

the biggest constraint to these priorities was the generation of funds to support both activities at ARCCAR. The conservation of Chinese alligators in China rests on cash. Helping ARCCAR support itself will help the alligator, preventing ARCCAR from supporting itself can only hurt.

Unfortunately ARCCAR is in an isolated location and tourism is of limited potential. The successful registration of ARCCAR with CITES as a commercial captive breeding operation opens the option of generating funds by commercial production of captive bred alligators and their products both nationally and internationally.

Sale of live animals to zoos is an option although demand seems low given the problems experienced by the SSP. However, demand from crocodile enthusiasts in Europe, Asia and the US is stronger. Through manipulation of incubation temperature it is possible to provide single sex animals for the live trade and limit the problems of extraterritorial breeding. The problem of escapes and hybridization suggested by William McMahan needs to be addressed but there is ample time for the US to do so. Changing US Endangered Species status of *C. porosus* from Australia and *C. niloticus* has taken over 4 years after CITES approved these species for international trade. God help China where the recovery of wild populations of alligators may never match that of salties or Nile crocs!

Although the quality of Chinese alligator skin is poor, the sale of products, particularly meat, may be the best option and may depend upon the internal Chinese market. Given the unique situation with ARCCAR and wild Chinese alligator conservation, purchase of such products is one tangible way of ensuring that the infrastructure to conserve Chinese alligators remains in place.

Any of these options will require management and marketing skills in addition to the alligator husbandry skills that the Chinese already have. This year ARCCAR took another unpredictable turn to acquire those skills. It entered into a joint venture with Thai-Chinese company (Srirachafarm-Asia) that operates a technically advanced crocodile farm in Thailand. Part of the motivation behind this joint venture, as with many others in China today, was the opportunity of overseas Chinese to regain links with China through the provision of capital and urgently needed skills.

I attended the opening ceremony of the joint venture and talked with government officials, ARCCAR staff and the principles of the Thai company. Everyone seemed very positive indeed about the continuation of ARCCAR'S conservation role. I was told that some ARCCAR staff are concerned about the potential conflict between conservation and commercialism, which is understandable, so am I. But I was assured that conservation would remain a priority -- Time will tell. In the meantime the immediate needs for operating expenses are being met by the Thai company and ARCCAR staff have received training in Thailand.

What for the future? I believe the priority should be the consolidation of the wild populations within the Chinese Alligator Reserve. This will be strongly influenced by the attitude of farmers in adjoining land who fear that alligators will eat their ducks and undermine dikes with their burrows, draining rice fields. These are serious concerns for these poor agrarian people. Perhaps restocking and ranching will be possible once ARCCAR establishes markets for excess alligators and successful management in the Reserve will be an incentive for farmers to re-establish alligators elsewhere. This would meet the most pressing need for more available wild habitat.

China represents the world's most challenging area for wildlife conservation with its immense population (1.2 billion), exponential economic growth (14%p.a.) and traditional beliefs quite different -- but just as firmly held -- as those of the west. It is foolhardy to expect that China will completely change its culture to accommodate western conservation ideas. To assist conservation in China we must tailor programs to the local situation. This may mean setting aside our assumptions and dogmas, accepting innovative and experimental management. If this means increased reliance on commercial activities to make conservation gains, so be it.

The SSP program has been a significant success within the confines of its charter, but it will clearly run into the same problems faced by ARCCAR-- producing more Chinese alligators than anyone wants. My view is that China would benefit immensely from the research, knowledge and dedication of those involved in the program. They should be at the forefront of efforts to develop and manage the population within the

Reserve. The fragmented nature of the wild population makes a the genetic management of numerous small groups of particular importance which the SSP program is uniquely experienced to address. The interchange of breeding stock and progeny for restocking can be considered. Perhaps funds raised from zoo exhibits could be channelled into training Chinese and initiating more sophisticated research on the wild population. These are all viable options. We have a common interest in ensuring the Chinese alligator does not become extinct and every contribution is of value. -- Grahame Webb, *Vice Chairman CSG for Eastern Asia, Australia and Oceania, P.O. Box 38151, Winnellie, N.T. 0821, Australia.*

## SCIENCE



ECOLOGY AND BEHAVIOR OF THE MUGGER IN WILD AND SCENIC RIVERS OF NEPAL. T.K. Shrestha 1993:pp 106-123. In: M.S.S. Rawat ed., *Himalaya: A Regional Perspective, Resources, Environment and Development*. Daya Publishing House. Delhi. Shrestha summarizes recent status and distributions the mugger (*C. palustris*.) and provides an extensive descriptive account of the biology and behavior of muggers, including habitat preferences, agonistic behavior, social structure and reproduction. -- T.K. Shrestha, *Central Dept. of Zoology, Kirtipur Campus, Tribhuvan University, Kathmandu, P.O. Box 6133, Nepal.*

COMPARISON OF GROWTH RATES OF IMMATURE FARM-RAISED ALLIGATORS RELEASED INTO THE WILD AND IMMATURE WILD ALLIGATORS. Dean C. Bossert, Masters thesis, School of Forestry, Wildlife and Fisheries, Louisiana State University. Growth rates of juvenile farm raised alligators released into a freshwater marsh in southeast Louisiana were compared to wild alligators of the same size during 1991 and 1992. For the size class 100.0 - 141.5 cm total length (TL) no difference in growth rates was found between sexes or sources (wild and farm raised).

Wild alligators were heavier per unit length in 1992 than in 1991. Newly released farm-raised



alligators were heavier per unit length than wild alligators in both years. Farm-raised alligators released in 1991 and recaptured in 1992 had a weight relationship intermediate between their weight-length relationship at release and that of wild alligators; and farm raised alligators released in 1989 and recaptured during this study had the same weight relationship as wild alligators.

Farm raised alligators wearing radio collars initially gained TL and lost weight but by summer 1992 no TL growth or weight gain were noted. No TL or weight gain was noted for collared wild alligators. This implies that farm raised alligators are initially metabolizing weight into length but eventually weight and growth become adjusted. -- R. H. Chabreck, *School of Forestry, Wildlife and Fisheries, Louisiana State University, Baton Rouge, LA 70803, USA.*

**SURVIVAL AND MOVEMENT OF FARM-RAISED ALLIGATORS RELEASED IN A FRESHWATER MARSH IN SOUTHEASTERN LOUISIANA.** Bray, G. Addison Jr. Masters thesis, School of Forestry, Wildlife and Fisheries, Louisiana State University. Survival and movements of juvenile farm-raised alligators released into a freshwater marsh in southeastern Louisiana in 1991 and 1992 were compared to that of wild alligators of the same size. Telemetry data indicated no difference between groups in either seasonal or annual survival rates. Annual survival estimates were 82% for wild alligators and 67% for farm raised alligators. Live capture data indicated that wild alligators were recaptured at a rate 1.77 times greater than that of farm raised alligators.

A greater proportion of tags from the stomachs of 874 harvested alligators were from farm-raised alligators (95.2%) than were from wild alligators (4.8%). Sixty tags were recovered in stomachs from 3,341 farm-raised alligators released between April 1989 and April 1992 and 3 of 2,166 wild alligators tagged between May 1991 and August 1992.

No differences in movement rates, dispersal rates or home ranges were detected between groups. Radio telemetry data indicated that 75 of 78 farm-raised, and 43 of 44 wild alligators monitored for dispersal, dispersed less than 5 km. Mean home ranges for both groups were less than 1 km<sup>2</sup> and no home range difference between seasons or groups was detected. -- R. H. Chabreck, *School of Forestry, Wildlife and*

*Fisheries, Louisiana State University, Baton Rouge LA 70803, USA.*

**LIPID AND FATTY ACID COMPOSITIONAL DIFFERENCES BETWEEN EGGS OF WILD AND CAPTIVE-BREEDING ALLIGATORS (*ALLIGATOR MISSISSIPPIENSIS*): AN ASSOCIATION WITH REDUCED HATCHABILITY.** Noble R.C., R. McCartney & M.W.J. Ferguson. *J. Zool. Lond.* 1993 230:639-649. Fertile eggs were obtained from the nests of wild and captive bred alligators in Louisiana, USA. Whereas embryo hatchability of the wild eggs was 94%, in the captive eggs it was only 50%. Analysis of the lipid and fatty acid compositions of the yolks showed extensive differences between the two sets of eggs. In particular, the lipids of the yolks from captive eggs displayed considerably lower levels of C20 and C22 polyunsaturated fatty acids and higher levels of C18 polyunsaturates than the wild eggs. More specifically, overall levels of n-6 polyunsaturates were increased at the expense of n-3 acids in the captive eggs. In view of the specific role of C20 and C22 polyunsaturated fatty acids in embryo development, it is proposed that the yolk fatty acid compositional differences and the difference in hatchability are associated. The fatty acid composition of captive alligator diets is implicated in the yolk composition and subsequent low hatchability. Fertility and hatchability in captive eggs may be increased by careful attention to the polyunsaturated fatty acid levels and their active protection against oxidation in the diets of reproductively active animals. -- M.W.J. Ferguson *Dept. of Cell and Structural Biology, The University of Manchester, Stopford Building, Oxford Road, Manchester M13 9PT, England.*

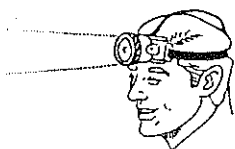
## PUBLICATIONS



**WILDLIFE MANGEMENT, CROCODILES AND ALLIGATORS** by Grahame J.W. Webb, S. Charlie Manolis and Peter J. Whitehead editors. 1987, Surrey Beatty & Sons of Australia. 552 pages. Is now available in cloth bound edition for \$74.95 plus \$3 shipping in the US, \$4 shipping

international, from University of Minnesota Press. This single volume brings together the technology for managing crocodile populations that has developed throughout the world over the last 20 years. To order call 1-800 388 3863 or contact -- University of Minnesota Press, 2037 University Ave. S.E., Minneapolis, MN 55455-3092, USA.

## PERSONALS



Bruce and Jo Shwedick are proud to announce the birth of their daughter Aubrey Rose on 5 November 1993. Their new address is Crocodile Conservation Services, P.O. Box 3176, Plant City Florida 33564 USA.

Dr. Dietrich Jelden, Vice Chairman for Europe, advises us that he is now based in Bonn and that his address is Bundesamt für Naturschutz, Konstantinstr. 110, D-53179 Bonn, Federal Republic of Germany. His phone remains unchanged at 49 228 9543 435 and fax 49 228 9543 470.

Bernardo Ortiz von Halle, IUCN, Regional Office for South America, Casilla 17-17-626 Quito, Ecuador, has accepted the job as the new Coordinator for Species Survival and National Parks and Protected Areas for South America and is now based in Quito. He anticipates a tremendous job coordinating and assisting the 65 Specialist Groups in the region and he hopes to promote national and regional discussion of conservation. He will be attending the IUCN General Assembly in Buenos Aires in January and looks forward to seeing his CSG friends there.

## CORRECTIONS

SYMPTOMS AND LABORATORY FINDINGS IN CAIMAN CROCODILUS FROM VENEZUELAN FARMS. E.O. Boede and A. Velasco, NEWSLETTER 12(3): Page 18. "Poor absorption of nutrients results from poor body condition in

which gastric, intestinal and pancreatics [not pulmonary and hepatic] atrophies are diagnosed. These gastric intestinal problems are an open door to secondary bacterial infections such as *Escherichia coli*, *Klebsiella sp.*, and *Salmonella sp.*" -- M.V. Ernesto O. Boede. *Apartado 1595, Valencia 2001, Venezuela.*

ELEPHANTS KILL CROCODILES. Newsletter 12(3):5, erroneously referred these observations to Kenya. In fact the work referred to, and these observations, took place in Uganda. The editors regret the error.

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

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



#### PRELIMINARY PROGRAM.

Papers submitted and solicited. Some papers/authors indicated by '\*' are still to be confirmed. Authors will receive written confirmation of their acceptance to the program and instructions for the submission of manuscripts. Persons wishing to submit additional late submissions may do so and these will be accepted on a space available basis. All communications regarding the program should be addressed to the CSG Executive Officer.

#### SESSION 1. CONSERVATION OF CROCODILES IN THAILAND AND SE ASIA.

- Survey of wild crocodiles in Thailand. P. Ratanakorn
- Crocodile management in Thailand. Royal Forest Department & Royal Fisheries Dept.
- Season changes in sperm morphology of *C. siamensis*. Y. Kitiyanant et al.
- Hematologic and serum chemistry of captive false gharial. Siruntawinetti J.
- Crocodile conservation in Cambodia. Nao Thouck
- Crocodile conservation in Laos. Kleub Sittiwong \*
- Crocodile conservation in Vietnam. Ho Thu Cuc

#### SESSION 2. TAXONOMY & SYSTEMATIC PROBLEMS IN SE ASIA.

- Classic identification of SE Asian crocodiles. C.A. Ross.
- Karyotype of 5 species of crocodiles. V. Chavanaikul et al.
- Differential morphology of crocodilian Leucocytes. S. Kanchanapangka & P. Youngprapakorn.
- Allozyme variation in Nile crocodile. A. Jurgens et al.
- Problems of taxonomy of insular crocodilians in the Indian Ocean. C.A. Ross

#### SESSION 3. CONSERVATION OF PRIORITY SPECIES

- Status and Conservation of the Cuban crocodile. P. Ross and R. Ramos.
- Status and Conservation of the Philippine crocodile. G. Ortega & C.A. Ross
- Status and Conservation of the Siamese crocodile in Indonesia. Y. Raharjo\*
- Status and Conservation of the gharial in Nepal. T. Maskey & J. Cox
- Status and Conservation of the gharial in India. R.J. Rao & H. Andrews
- Status and Conservation of *Tomistoma*. A. Sebastian.

#### SESSION 4. CAPTIVE BREEDING AND CONSERVATION

- Captive breeding and Conservation- a CITES perspective. R. Jenkins.
- Captive breeding and Conservation- Allies or Enemies. J. Lever.
- Conservation merits of closed cycle breeding in South Africa. H. Kelly and D. Blake.
- Experimental studies for sustained utilization of caiman in the Pantanal. Coutino M. et al.
- Ranching program in Santa Fe, Argentina. A. Larriera

Louisiana's alligator management program. T. Joanen & R. Elsey.  
Northern Territory crocodile management update. G. Webb.

#### SESSION 5. BIOLOGY OF STRESS

Stress and captivity. V. Lance.  
Season circulating hormone levels in alligator. K. Vliet.  
Pathology of stress in Nile crocodiles. G. Smith.  
Effects of stress in captive *C. porosus*. P. Ladds\*  
Blood collection, cholesterol and glucose levels in *C. latirostris*. A. Larriera et al.  
Viruses and mycoplasmas from the faeces of farmed Nile crocs. F.W. Huchzermeyer, G.H. Gerdes & J.F. Putterill.  
Organ morphometry and stomach pH in farmed Nile crocodiles. F.W. Huchzermeyer.  
A survey of parasites and pathology of African dwarf crocodiles in the Congo Republic. F.W. Huchzermeyer & M. Agnagna.

#### SESSION 6. MONITORING CROCODILIAN POPULATIONS.

Comparison of survey techniques for alligators in South Carolina. P. Wilkinson and W. Rhodes.  
Methods of monitoring crocodile populations in remote swamps of New Guinea. J. Cox, S. Frazier, J. Genolagani, R. Maturbongs & C. Sorondanya.  
Distribution and relative abundance of alligator nests in Louisiana coastal marshes. L. McNease N. Kinler & T. Joanen.  
Estimating caiman population size in forest lagoons. L. Pacheco.  
Design and inference considerations for estimation of population trend from single site and regional crocodile surveys. C. Moore.  
Seasonal variation of caiman densities in Pantanal, Brazil. M. Coutinho, Z. Campos & G. Mourao.  
Simulation model for optimum harvest of babas, Venezuela. A. Velaso, R. Molinet & E. Klein.  
Distribution, Abundance and nesting of caiman in Amazonia. R. de Siveira & W. Magnusson  
Assessment of Cox Lagoon, Belize. R.H. Hunt & J. Tamarack.  
Survey of the status of crocodilians in Nicaragua. F.W. King & J.P. Ross.  
Survey of the Status of crocodilians of Paraguay. F. W. King, A. L. Aquino, N.J. Scott & R. Palacio.

#### SESSION 7. RECENT RESEARCH RESULTS & GENERAL PAPERS.

Sex determination in crocodiles: Current status and future directions. J. Lang & H. Andrews  
Ecological studies of Indian crocodiles. R.J. Rao.  
Pattern of movement of *Caiman yacare* in the Pantanal. Z. Campos et al.  
Population ecology of Dwarf Caiman in the Serra do Amolar, Brazil. Size structure and sex ratio. Campos et al.  
Condition factor of caiman in different habitats of the Pantanal. Santos. et al.  
Composition and energy values of some food items ingested by *C. yacare* in the Brazilian Pantanal. Santos S.A. & M.S. Pinheiro.  
Model for the growth of male babas at Hato Cedral, Venezuela. A. Velasco et al.  
Assessment of crocodile resource potential in Bangladesh. J. Cox & M.M. Rahman.  
Aspects of the ecology of the Nile crocodile in the Lake St. Lucia estuary system. A. Leslie & D. Blake.  
Crocodile trade and conservation beyond the year 2000. H. Kelly.  
The St. Lucia Crocodile Center (Video). D. Blake & A. Leslie.

#### WORKSHOPS PROPOSED.

Revisions of the CITES criteria for crocodilian trade: part III.  
Practical egg incubation techniques. (H. Andrews & J. Lang)

## Steering Committee of the Crocodile Specialist Group

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

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

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