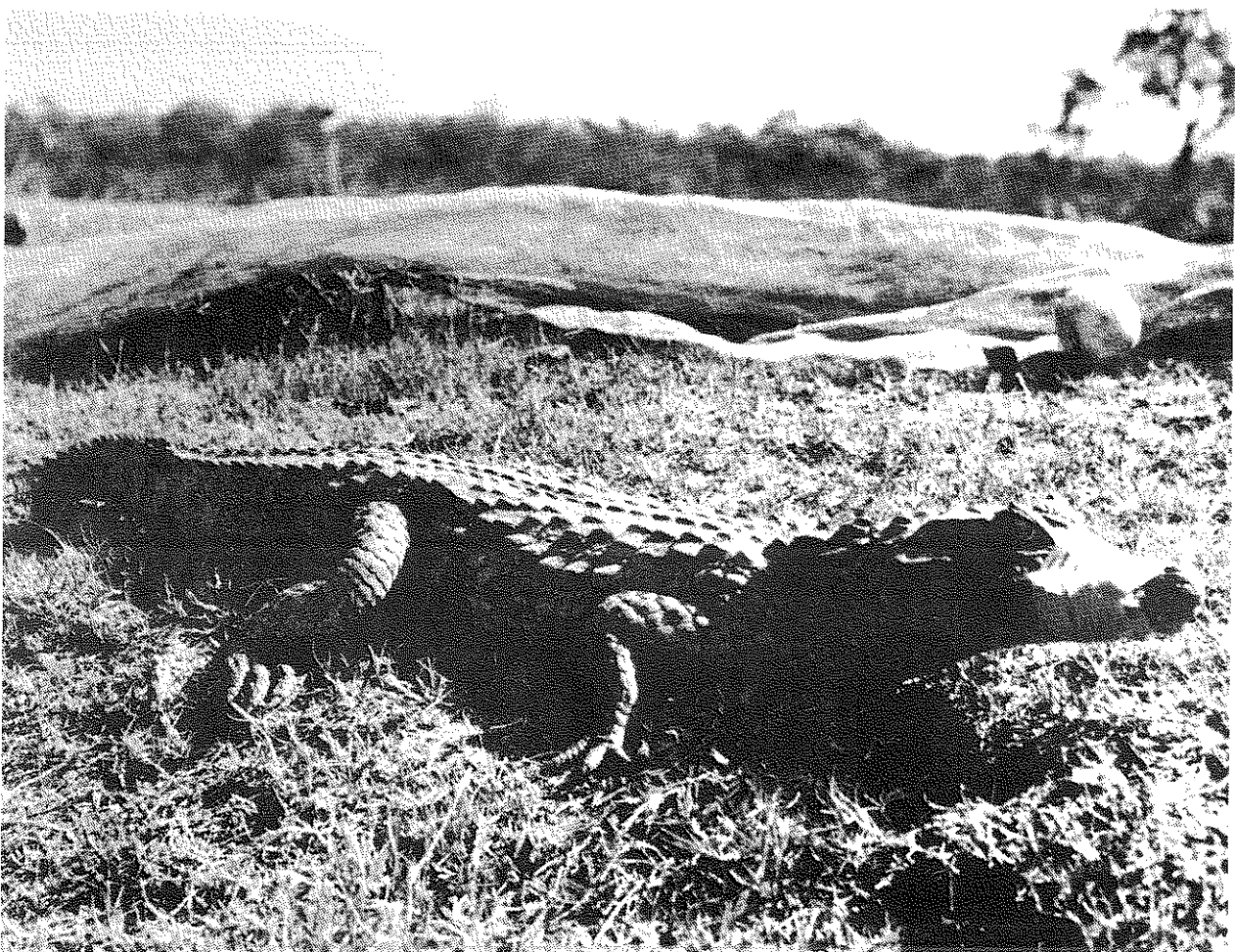


CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 9 ■ JANUARY 1990 - MARCH 1990



International Union for Conservation of Nature and Natural Resources ■ Species Survival Commission

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International Union for
Conservation of Nature and
Natural Resources

Species Survival Commission

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EDITORIAL OFFICE:
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COVER PHOTO: A freshly caught female
Caiman latirostris from the pool at Estancia
El Bagual (see p. 11).

PATRONS

The following individuals, companies, and organizations have become Patrons of the CSG by contributing more than U.S. \$200.00 funding during the past 12 months. The funds donated have been deposited in the University of Florida Foundation, Inc., and are being used to support the CSG program:

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Prof. F. Wayne King, Florida Museum of Natural History, Gainesville, Florida, U.S.A.
John Bache, Crocodile Farms (NT) Pty. Ltd., Winnellie, Northern Territory, Australia.
Harry Freeman, Hartleys Creek Crocodile Farm, Queensland, Australia.
John Hannon, Lagoon Crocodile Holdings Ltd., Darwin, Northern Territory, Australia.
Leo Venturin, Letaba Crocodile Farm, Darwin, Northern Territory, Australia.
IUCN-World Conservation Union, Gland, Switzerland.
Prof. Harry Messel, School of Physics, University of Sydney, Sydney, Australia.
Robert and Ellen Young, Classic Skins, Thonotosassa, Florida, U.S.A.

EDITORIAL

Travel expenses to attend CSG meetings. With another CSG Working Meeting at hand, an old but serious problem is being highlighted again -- the one of expenses associated with coming to the meeting. During the early 1970's, the

sponsors of the meetings were able to raise the finances necessary to cover airfares and living costs for those individuals needing help -- usually from Africa, Asia, and South America. However, in those days, the number of individuals involved was small; a mere handful. With the continued growth of the CSG, the problem of providing financial help for travel and living expenses soon became unmanageable. Thus at the third meeting it was decided that the sponsors would no longer be expected to shoulder the burden of travel costs associated with meeting attendance. Individuals attending were to be responsible for their own costs.

There were over 130 attendees at the 9th Working Meeting held at Lae, Papua New Guinea, in October 1988. It is expected that almost double this number will attend the 10th Working Meeting being held in Gainesville, Florida, 23-27 April 1990. It should be apparent that with the best will in the world, the Chairman of the CSG cannot get involved directly in raising travel funds for attendees.

The problem of raising funds for the central administration of the much changed CSG is great, to then try to do likewise for travel is completely out of the question. **SO PLEASE DO NOT WRITE TO ME ABOUT YOUR TRAVEL COST PROBLEMS.** Contact your Vice Chairman and Deputy Vice Chairman and various national and international NGO's and government and intergovernmental agencies. There has always been a mad scramble for travel funds and considerable ingenuity is required to obtain them. The pity is that it is usually most difficult for those individuals to obtain help who need it most. But this has always been the case. The old saying still holds, "Life was not meant to be easy." Sorry, and best of luck!

Charges for the CSG NEWSLETTER. A number of individuals have contacted me and proposed that we start charging for the CSG NEWSLETTER. They felt that perhaps this might be one way of supplementing CSG funds. The idea is both laudable and unworkable from a number of points of view. I have been involved in similar efforts with other groups in various fields. The matter of varying exchange rates, varying postal charges, and the sheer amount of administration involved, mitigate against such an idea. Think of the extra work involved solely in keeping track of when individual subscriptions expire.

The CSG will continue to provide the NEWSLETTER free of charge to those individuals who make an annual input to the editor. No input; no CSG NEWSLETTER for you. Some of the funds from CSG Patrons will be used for the continued provision of the NEWSLETTER free of charge.

Remember. Contact your Vice Chairman and Deputy Vice Chairman with or about crocodile matters in your area. Do not write rude letters to the Chairman about queries which should have been directed elsewhere.

I look forward to welcoming all of you to the Gainesville meeting. -- *Professor Harry Messel, Chairman.*

7th CITES CONFERENCE: A CORRECTION

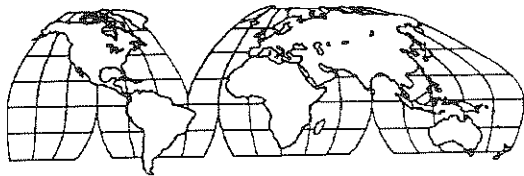
It has come to my attention that there are three errors in the table of croc quotas I supplied for the last CSG NEWSLETTER (Vol. 8, October-December 1989, pp. 12) with my article on the CITES meeting. The corrections and clarifications are:

	<u>1990</u>	<u>1991</u>	<u>1992</u>
Ethiopia	9,370	8,870	8,870
Kenya	skins and derivatives only for all years		
Tanzania	1,100	5,100	6,100
	including:		
trophies	100	100	100
wild	1000	1000	
ranchd	4000	4000	6000

The CITES Secretariat Notification concerning the list of amendments to the appendices which was circulated in late January provides verification. The changes with regard to Tanzania are especially important. -- Ginette Hemley, *TRAFFIC/USA, 1250 24th Street NW, Washington, D.C. 20037, U.S.A.*

[Subsequent to receiving the above correction from Ginette, Jacques Berney, Deputy Secretary General of CITES, Case postale 78, CH-1000 Lausanne 9, Switzerland, confirmed that the above quotas for Ethiopia are correct.]

AREA REPORTS



AFRICA

Ethiopia:

CROCODILE FARMING UPDATE. Arba Minch Crocodile Farm is in its 5th year of crocodile rearing operation. The farm now is ready to slaughter crocodiles of three different age groups, possibly in late December 1989. For the first time, 67 five-year old, 88 four-year old, and 2,181 three-year old crocodiles will be slaughtered. Raw skins will be sent to the local tannery and semi-processed; crust skins will then be sold to the European market. In the last conference of CITES, the Ethiopian Wildlife Conservation Organization was given an export quota for the export of 20 live adult crocodiles, 6,500 farmed skins, 2,500 hatchlings, 300 curios, and 50 hunting trophies for the year 1990. -- Tadesse Hailu, *Ethiopian Wildlife Conservation Organization*, P.O. Box 386, Addis Ababa, Ethiopia.

Ivory Coast:

Dr. W. Ekkehard Waitkuwait, Zoo National d'Abidjan, Abidjan 01, Ivory Coast, reports that he has left his position with the CITES Scientific Authority in the Federal Republic of Germany and is now working for the German Technical Cooperation agency as a consultant on conservation and rehabilitation projects for the rainforest in Ivory Coast. Ekke indicates that, ...a good part of my time I spend working on the crocodile project in the Abidjan Zoo. The breeding enclosure, originally constructed in 1981, has been improved and completed now. Since 1981 this enclosure has held 2 pairs of *C. niloticus* and *C. cataphractus*. The offspring they produced, as well as those augmented from the collection of wild nests have reached sexual maturity. In order to establish a large breeding colony of these young adults, we have removed the largest

adults from the breeding enclosure. During the recent visit of Bruce Swedick from the United States, we immobilized 2 large male *C. niloticus* for release in the Comoé National Park. The largest pair of *C. cataphractus* were captured for transfer to another natural enclosure at the zoo. The male that has been at the zoo for over 12 years measures 3.34 m. This animal may represent one of the largest *C. cataphractus* ever measured.

During this time Bruce and I observed what may have been an even larger *C. cataphractus* while flying over the Azagny National Park. We hope our photo will document this.

During his visit Bruce supervised the transfer of 18 young adult *C. niloticus* (6.12) from their rearing enclosures to the breeding area. From the rearing pens he also separated 12 adult *O. tetraspis* (8.4) for the establishment of a captive breeding colony here at the Abidjan Zoo. During the next 4 weeks I will establish a large breeding group from the 50 *C. cataphractus* that we have hatched and reared up from 1981. These animals are now 1.8-2.0 m in average length.

Since the beginning this conservation effort in Côte d'Ivoire [Ivory Coast] has been known as "Project Crocodile."

It continues in 1990 under the authority of the Ministry of Agriculture, Water and Forests. Its main administrative officials are Dr. Francis Lauginie, Director of the Abidjan Zoo, Dr. Fanny N'Golo, the Zoo's new veterinarian, and me. Our objectives are the continuing conservation of crocodiles in west Africa. We hope through our expanding breeding potential to provide crocodiles of all 3 west African species for restocking purposes and possibly for the development of crocodile farming operations in west Africa. (I hope that Côte d'Ivoire will soon become a member of the Washington Convention [CITES].) We plan to continue to disseminate information to researchers and the general public to promote conservation. Our goal is also to establish a network for continued research by crocodile specialists and at the same time to train Ivorians and other interested individuals from west and

central Africa. Bruce Swedick is now considered an official correspondent for the "Project Crocodile" in the U.S.A. He hopes to help raise funds for continued research and public awareness.

Ekke states that he and Dr. Fanny N'Golo hope to attend the 10th Working Meeting of the CSG in Gainesville in April, where they will report on the establishment of the first major crocodile breeding center in west Africa.

Kenya:

BAOBAB FARM LTD. Between December 1988 and January 1989, Baobab Farm Mombasa collected 170 eggs from its 13-year old farm-hatched and reared parent stock (1 male to 6 females); 72% of the eggs hatched. The mortality of the hatchlings in the first 10 months was 2.3%. One of the crocodiles originating from Lake Turkana has produced, for the second time, two eggs containing twins.

At present, Baobab Farm's integrated aquaculture system is holding 625 crocodiles of all sizes. The farm has applied for permission to export hides, but permission has not yet been granted. -- Rene D. Haller, *Baobab Farm Ltd., P.O. Box 90202, Mombasa, Kenya.*

Madagascar:

FARMING IN MADAGASCAR. Madagascar's first crocodile farm, part of Reptel Madagascar, managed by J. Christophe Peyre, has received CITES's agreement. Until now it has been relying on production from its captive breeding group, but starting in 1990, it will begin a ranching programme utilizing wild eggs. The farm is cooperating with the United Nations Food and Agriculture Organization crocodile program in Madagascar, headed up by Olivier Behra, CSG Deputy Vice Chairman for Africa. Annual production capacity is now set at 2,000 skins a year, and a second phase will double this number. Establishment of three other ranches is planned. -- Jean Christophe Peyre, *Director, Reptel Madagascar, B.P. 563, Antananarivo, Madagascar, tel. (261)(2)348-86; fax: (261)(2) 206-46.*

South Africa:

Johan Marais, P.O. Box 414, Botha's Hill 3660, South Africa, reports the formation of 'The Crocodilian Study Group of Southern Africa' (CSGSA). Johan and Prof. G.A. Smith, Department of Animal Science, University of Pretoria, Pretoria 0001, South Africa, are coordinators of the Group. The objectives of the CSGSA are:

- To create a forum through which participants can be kept informed of the latest research findings and developments pertaining to all aspects regarding crocodilians in the world and South Africa in particular; and
- To create a forum for producers and researchers to exchange ideas and identify information gaps which could either be followed up by liaising with producers abroad, literature studies or research projects, to benefit the industry.

To get information out to members, the CSGSA launched 'CROCODILIAN NEWS.' The first issue contained regional news from Botswana, Ivory Coast, Kenya, Zaire, and Zimbabwe; news from South Africa about surveys of wild crocodiles and the loss of crocodiles in a Natal farm as a result of blasting to clear rock from a road right-of-way; news from the U.S.A.; commercial production; conservation; research, including a list of 1988 publications; and clippings from various news reports. The newsletter has much to offer people interested in crocodiles.



CROCODILIAN NEWS



For information on joining the group, to send in news items, or for general information, contact The Crocodilian Study Group of Southern Africa, Department of Animal Science, University of Pretoria, Pretoria 0001, South Africa.

Tsachi Assa, Kwena Gardens Crocodile Farm, P.O. Box 234, Sun City, Bophuthatswana 0316, reports that this year the Nile crocodiles on the farm started laying on 19 September and continued through 26 October 1989. A total of 2,000 eggs were laid with an average clutch size of 53.7 eggs. Last year the laying started on 25 September and ended on 7 November 1988. This year the weather conditions were warmer and dryer than previous years. Last year, in the controlled incubator room, set at 32°C and utilizing sand as the incubation medium, the average incubation period was 84 days.

As reported in the last issue of the NEWSLETTER (p. 15, Vol. 8, Oct.-Dec. 1989), blasting associated with road construction apparently resulted in the death of crocodiles in Crocodile Creek, a tourist and commercial farm at Tongaat, north of Durban. Blasting experts in the U.S.A. contacted by the road construction company in turn consulted with CSG members for insight into the effects of blasting on crocodilians. The experts reported that the crocodiles started dying a day after the blasting occurred. Deaths continued until 119 crocodiles out of a total of 650 held in Crocodile Creek were lost. Autopsies reportedly revealed little more than that the digestive tract contained healing ulcers.

Sudan:

1,000,000 NILE CROCODILES? According to FAO estimates in 1975, there were one million crocodiles in the Sudan in the River Nile and its tributaries. There should be more than that number now. Still we have no biological data on the wild populations and the greatest number of crocodiles are found in the upper Nile region. -- Ahmed Mohamed Elobeid, *Wildlife Conservation Forces, Khartoum P.O. Box 336, Sudan.*

ASIA

India:

CROCODYLUS POROSUS IN ORISSA. 'Rearing and releasing' is a more successful conservation programme for saltwater crocodiles, *Crocodylus porosus*, than for the other two crocodilian species in the state as well as in the country. Released *C. porosus* have already started

breeding (two nests located) and have laid eggs during the May-June 1989 nesting season in the Bhitarkanika National Park, so the future of *C. porosus* seems very bright in the state and country. 'Rearing and releasing' has been taken up as a low key programme for all three crocodilian species. A few new locations/areas in the state have been selected for release of crocodiles. Captive breeding of the three species of crocodiles is being continued at the Nandankanan Biological Park, a leading zoo in the country. The Chief Wildlife Warden, Orissa, has proposed the release of *C. porosus* in suitable locations in the Kujang area, which is a deltaic portion of the Mahanadi river system with a depleted mangrove forest almost continuous with the Bhitarkanika National Park. A couple of months back this area came under the control of the Chief Wildlife Warden, Orissa. It will definitely take a couple of years to build up the *C. porosus* population in this former habitat.

At present I am involved in the study of aquatic fauna in the Chilika Lake, the largest brackish water wetland in the country, in addition to my work on conservation, research and management of crocodiles in Bhitarkanika National Park and Nandankanan Biological Park (mainly captive breeding programmes). -- Dr. Sudhakar Kar, *Research Officer, Office of the Chief Wildlife Warden, Orissa, 315-Kharavel Nagar, Unit III, Bhubaneswar - 751001, Orissa, India.*

GHARIAL IN ORISSA. During 1976, the Satkosia Gorge Sanctuary was declared with a view to rebuild the population of gharial in the River Mahanadi. The gorge is about 200 km downstream of the Hirakud Reservoir. Over 500 gharials were released here but only resulted in limited success because human use of the river made the habitat inhospitable for the gharial. During October, I visited Debrigad Sanctuary and the portion of the Hirakud Reservoir adjoining it, with the Chief Wildlife Warden and wildlife wardens of Debrigad and Satkosia. We have all agreed for the experimental release of gharial at a site we selected. There are a few other formalities which are being attended to. Additional release sites for gharial will be located in the Brahman River, where the species is now extinct.

Muggers released in Similipal have largely remained with the Tiger Reserve area. A

thorough monitoring is in progress by the Field Director, Similipal Tiger Reserve.

C. porosus have caused some anxiety because of frequent reports in the press and questions in the State Assembly, Orissa, regarding nuisance animals.

The State of Orissa needs an Action Plan of its own. It is the only state in India where all three species of Indian crocodylians occur in nature. It was the first state which started the crocodylian management programme of the Government. The saltwater crocodile programme has been very successful, save for some limitations in habitat management which are being sorted out now because of the October 1988 declaration of the state government to elevate Bhitarkanika from the status of a sanctuary to a National Park. The present Divisional Forest Officer in charge of Bhitarkanika is actively determined in the right direction.

The IUCN/SSC has formed an Indian Subcontinent Reptile and Amphibian Specialist Group which invited me to join as a member. I am looking forward to see the action plan of the group and find out how the CSG and the new group can help each other out. -- Dr. Lala A.K. Singh, *Project Tiger, Similipal Tiger Reserve, Khairi-Jashipur, Orissa, India 757 091.*

SUMMARY REPORT FROM THE WESTERN ASIA REGION. The major crocodile country within this region is India. With an active conservation programme since 1975, the three species of crocodylian have been brought from a point near total extermination to a relatively safe position.

The mugger is now being bred at more than 20 crocodile centres and zoos and there are in excess of 12,000 in captivity in the country. There are a number of protected habitats which contain breeding populations of mugger, and almost every Indian state has at least a small population. The states with the most mugger are Tamil Nadu, Gujarat, and Andhra Pradesh, though actual numbers in the wild are not known. The main problem now is that further restocking of suitable habitats is being stopped by fisheries interests and local people's feelings.

The gharial is breeding at Nandankanan Biological Park in Orissa, Gharial Rehabilitation Centre, Kukkrail in Uttar Pradesh, and in the south at Madras Crocodile Bank. Though its numbers have increased by more than ten times

(now there are thousands, while in 1975 there were only a few hundred left) the gharial still faces a bleak future because of the continuing manipulation of riverine habitat by dams, barrages, canals, pollution, overfishing, and riverside human settlement. At the present the only significantly large, viable population is in the Chambal River National Park (Rajasthan, Madhya Pradesh and Uttar Pradesh).

But the crocodile that needs special attention is *C. porosus*. There are only two habitats left on the mainland where they survive, the tiny (90 sq. km) Bhitarkanika Sanctuary in Orissa (in which is included what is probably the largest olive ridley sea turtle rookery in the world) and the Sunderbans of West Bengal and Bangladesh. There are no more than a few hundred crocodiles in these two areas and further restocking seems unlikely because of negative public pressure.

In the Andaman and Nicobar islands there are scattered small populations in the less populated areas, but increasing settlement (invariably illegal encroachment) is rapidly decreasing the chances for any crocodile population growth. Restocking was attempted but the public outcry became a political platform and has not been tried again.

In general, India's crocodylian rehabilitation efforts are winding down as the cost of keeping thousands of captive crocodiles alive keeps increasing. The only hope of renewing state and people's interest in crocodile conservation is by implementing management strategies. These have been suggested in the Work Plan drafted by Binod Choudhury, L.A.K. Singh, *et al*, but so far there has been no action taken.

We are awaiting communication from Iran, Nepal, Bangladesh, Pakistan, Burma, and Bhutan, to update our knowledge of the status of crocodiles and crocodile programmes in those countries within our region. Hopefully we will have something by the time of the Crocodile Specialist Group Working Meeting in April. -- Romulus Whitaker, *Madras Crocodile Bank, Vadanemmel Village, Mahabalipuram Road, Perur PO, Tamil Nadu, 603 104 India.*

SUMMARY STATUS REPORT OF THE MADRAS CROCODILE BANK TRUST. The Madras Crocodile Bank started in 1975 for the conservation of the three Indian species of crocodylians (*G. gangeticus*, *C. porosus*, and *C.*

Table 1. Madras Crocodile Bank 1990 stock.

Species	Total Number	Adults	Subadults	Juveniles
<i>Alligator mississippiensis</i>	1	1	-	-
<i>Caiman crocodilus crocodilus</i>	261	28	33	200
<i>Crocodylus moreletii</i>	10	-	10	-
<i>Crocodylus niloticus</i>	4	-	4	-
<i>Crocodylus palustris</i>	2,842	1,235	600	1,007
<i>Crocodylus porosus</i>	154	15	39	100
<i>Crocodylus siamensis</i>	4	4	-	-
<i>Gavialis gangeticus</i>	20	14	-	6
<i>Osteolaemus tetraspis tetraspis</i>	4	4	-	-
<i>Tomistoma schlegelii</i>	5	-	5	-

palustris), presently has 10 species of crocodylians and 3,285 animals (Table 1). The mugger crocodile (*C. palustris*) has been successfully breeding since 1975. With a breeding group of 30 crocodiles, the Crocodile Bank has since produced 3,825 mugger crocodiles alone (Figure 1) of which 800 were sent to various State Forest Departments for restocking the wild starting captive breeding groups, and 75 were sent to other zoos and parks in India.

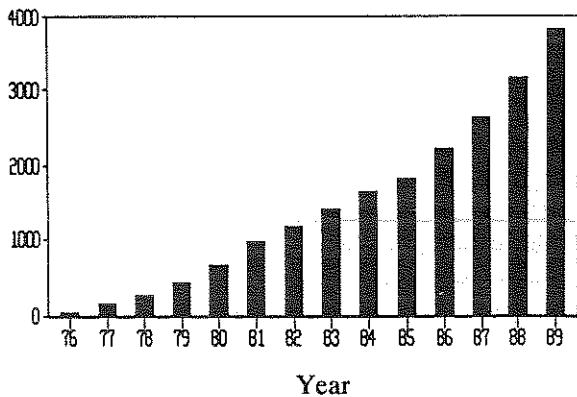


Figure 1. Madras Crocodile Bank increase in mugger crocodiles by captive breeding.

Last year 122 mugger nests were produced, and this year the season started with 61 nests totaling 1,600 eggs in just one month (February 1990). Projections for 1990 are 225 or more nests and 1,500 additional hatchlings.

The unique double clutching phenomenon of the mugger species at the Crocodile Bank (females laying two clutches per season) and the increase in breeding females, has now become an embarrassing success, with no outlet for these animals.

The other species that are successfully breeding at the Crocodile Bank are the saltwater crocodile, caiman, and gharial. Last year, 3-year old Morelet's crocodiles built mound nests and laid infertile eggs, and one of the female West African dwarf crocodiles built a trial nest. The false gharial and the Nile crocodiles are also showing signs of starting to breed.

With regard to the restocking programme, three states have asked the Crocodile Bank for 154 mugger crocodiles for release in lakes and river systems. A request from the Pakistan Government in 1985 for gharial and 500 mugger crocodiles from the Crocodile Bank is still pending for want of necessary Government and various department sanctions and permits.

Research

Research on the reproductive biology and conservation of the mugger crocodile is continuing at the Madras Crocodile Bank and was reported by Jeff Lang in the May 1987 issue of HAMADRYAD, vol. 12, no. 1, pp. 13-18. -- Harry Andrews, Curator, Madras Crocodile Bank Trust, Perur P.O., Mahabalipuram Rd, Vadanemmel Village, Tamil Nadu, 603 104 INDIA.

AUSTRALIA/OCEANIA

Australia:

BINOCULAR VISION IN CROCODILES. Work in The University of Queensland's Vision, Touch and Hearing Research Centre and the Department of Zoology, by Professor John D. Pettigrew in association with Gordon C. Grigg, has shown that *Crocodylus johnstoni* has visual

pathways consistent with an ability for binocular vision. Further, the work extended similarities between crocodilians and birds, because *C. johnstoni* shows visual pathways of the typical avian rather than typical reptilian pattern. -- Prof. Gordon C. Grigg, *Department of Zoology, The University of Queensland, Qld 4072, Australia.*

EDWARD RIVER. Edward River Crocodile Farm continues to develop and expand its operation, we are presently (January 1990) in our nesting season. The major change for us was the decision to split the farm and develop a crocodile raising facility on the East Coast to overcome 'wet' (monsoon) season food shortages. At Edward River on the Gulf of Carpentaria the farm can be cut-off by road for up to six months each year. A 15 hectare site was purchased at Redbank, on Trinity Inlet 12 km south of Cairns early in 1989. Since then we have been developing the site, finally transferring the first batch of crocodiles on 5 January this year. It is planned to transfer some 3,000 crocodiles in the next couple of months. The Redbank farm will be open to visitors by mid-1990 when some display ponds and tourist facilities are built on site. Anyone travelling via Cairns is now welcome to see some of our crocodiles as we are only 25 minutes by road from Cairns. -- Victor Onions, *Edward River Crocodile Farm Pty. Ltd., P.O. Box 669, Cairns, Qld 4870, Australia.*

CROCODILE FARMERS ASSOCIATION OF AUSTRALIA. I am please to announce that since



our last meeting held in Darwin on 28 November 1989, the Crocodile Farmers Association of Australia has increased its membership with the inclusion of crocodile keepers and farmers from both Western Australia and Queensland. It was agreed a broader representation of the industry was necessary on the committee and the following new Executive Committee was elected:

President: John Bache, Crocodile Farms (NT) Pty Ltd., P.O. Box 39745, Winnellie, NT 5789, Australia.

Senior Vice President: Harry Freeman, Hartleys Creek Crocodile Farm, G.P.O. Box 88, Cairns, Qld 4870, Australia.

Secretary: John Hannon, Lagoon Crocodile Holdings Ltd., P.O. Box 4694, Darwin, NT 0801, Australia.

Treasurer: Victor Onions, Edward River Crocodile Farm, P.O. Box 669, Cairns, Qld 4870, Australia.

Our new postal address is: Crocodile Farmers Association of Australia, G.P.O. Box 4694, Darwin, NT 0801, Australia.

The IUCN/SSC Crocodile Specialist Group has the full support of our Association and we aim to keep in regular contact through the Association's Secretary. We are pleased to learn that Dr. Graham Webb has been appointed to the position of Vice Chairman of the East Asia, Australia/Oceania Region and look forward to a good working relationship with him.

I have recently written to Federal Ministers and the National Parks and Wildlife Service, asking for an explanation as to how crocodile products (skins and meat) can be imported into Australia from Papua New Guinea without correct approval of the Papua New Guinea Wildlife Management Plan. Also, I have since learnt that Alligator meat is being imported into Australia. Crocodile/Alligator meat (for human consumption) entering Australia from overseas countries, that has not been processed to the same high standards practised here, must be considered a health risk and should be stopped before it destroys our local industry. -- John P. Hannon, *Lagoon Crocodile Holdings Ltd., P.O. Box 4694, Darwin, NT 0801, Australia.*

MIDDLE EAST

Israel:

Propaganda for crocodiles and their conservation was recently made at a national reptile symposium in Israel. Ever since 1982, the Israel Herpetological Information Center (of the Society for the Protection of Nature in Israel) in cooperation with the Nature Reserves Authority and the Hebrew University of Jerusalem, has been holding an annual reptile symposium day for the general public. On 16 April 1989, for the first time, crocodiles were included in the program: Prof. E. Tchernov (Hebrew University) lectured on "The evolution of the

crocodiles in Africa and their relationships to the Middle East," and Prof. Y. L. Werner (Hebrew University) spoke briefly on "The systematic status of the extinct Israeli crocodile." -- Yehudah L. Werner, *Dept. Zoology (Sturman Building), Hebrew University, 91904 Jerusalem, Israel.*

NORTH AMERICA

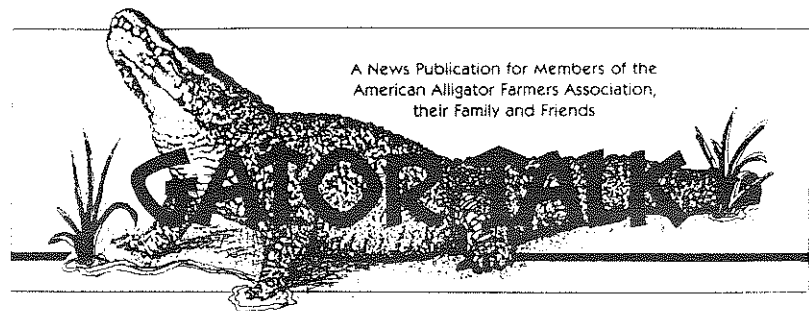
United States:

Members of the American Alligator Farmers Association (AAFA) have legally established the American Alligator Farmers Cooperative Association (AAFCA). Under U.S. law, businesses that pool their products for sale could be charged with conspiring to fix prices and other monopolistic practices. For example, competing automobile manufacturers cannot their sell vehicles for a common set price. However, U.S. law allows farmers to avoid these antitrust charges by establishing agricultural cooperatives, which are corporations owned by member-producers. The mission of a cooperative is to provide its members with services, such as obtaining production supplies, and processing and marketing members' products, or providing other functions related to production and marketing, for example, advertising and consultant services. The underlying function of the cooperative is to increase the income of the individual farmer. American Alligator Farmers Cooperative Association members can buy equipment and supplies at discounted volume rates rather than full retail prices, and can profit by pooling their hides, meat, and other products with the other members to produce a larger volume sale and attract more potential buyers.

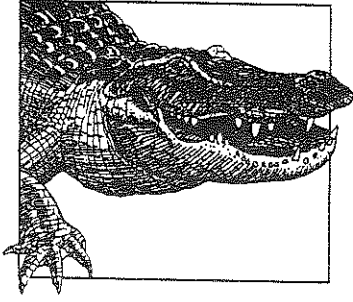
On 21 February 1990, prospective members of the AAFCA met in Orlando, Florida, with Mary Anne Lambert, Agricultural Marketing Specialist and Dick Seymour, Feasibility and Development Leader, of the U.S. Department of Agriculture, Agricultural Cooperative Service. Discussions covered legal and financial aspects of cooperatives. Strategic planning, including forecasting and long-range planning, were indicated to be the most important tasks involved

in organizing a cooperative. The lack of attention to these details is perhaps the greatest cause of failure not only in cooperatives, but also in all business endeavors.

The American Alligator Farmers Association (AAFA) also has launched GATOR TALK, a news publication for its members. GATOR TALK covers developments in farming husbandry and technology, trade and marketing, and governmental regulation. People wishing to enter a news item in GATOR TALK should send it to the Editor, Scott R. Anderson, P.O. Box 1071, Starke, FL 32091, U.S.A.



TEACHING ALLIGATOR ETIQUETTE IN TEXAS. A sheet on 'Alligator Etiquette' is given to all visitors upon entering the Brazos Bend State Park (see page opposite). Brazos Bend is operated by the State of Texas Parks and Wildlife Department and has been open to the public since 1984. Since it is less than an hour away from Houston, it receives close to 400,000 visitors annually. It is prime inland alligator habitat (we have nicknamed it 'Alligator State Park'), and from the footpaths that border the lakes visitors can easily observe alligators and other wildlife. The alligators occasionally steal fish from fishermen's stringers and lunge at dogs, but more commonly retreat to the water if humans get too close, or sun on the footpaths unaroused by people walking around them. On a seasonal basis some public trails are roped off if a nest or pod of babies is close to high visitor use areas, and nests built on footpaths are usually destroyed and the eggs incubated artificially. I have been using this approximately 2,000 ha area as one of my study sites since 1985, and hope to continue research here after my doctorate is completed. -- Louise Hayes-Odum, 6830 Heller Rd., Whitehouse, OH 43571, U.S.A.



ALLIGATOR ETIQUETTE

Please stop and read this
before leaving your vehicle!

Brazos Bend State Park is one of the best places in Texas to see alligators in their natural setting. A park is not a zoo and the animals are not tame or under any type of restraint. Respect these creatures; this is their home. Alligators can be watched easily and safely. Simply obey the following guidelines:

1. **Absolutely do not feed or annoy alligators.** Remember, these are wild animals. Though they normally avoid humans, the dangerous practice of feeding these reptiles has made some less cautious. People who feed alligators "train" them to associate humans with food. This can have potentially tragic consequences. If you notice other park visitors feeding alligators, please say something to them or contact a park ranger immediately.
2. **If you love your pet, keep it on a leash.** A dog is naturally curious about the seemingly "sluggish" alligator sunning on a bank. It may lower its head to smell the alligator. At that instant, the dog may learn alligators move very quickly when they have a reason—food! Do not throw objects in the water for your dog to retrieve. If you do so, you encourage your dog to enter the alligator's natural feeding zone. Alligators can swim much faster than a dog. Even large dogs have been lost this way.
3. **Do not assume alligators are slow-moving or sluggish.** Over short distances, they can move much faster than a person. That is why we ask you to keep a safe distance at all times—at least 30 feet from an alligator.
4. **Also, no one is allowed to swim or enter the water at Brazos Bend.** Near the water, it is wise to look around on all sides periodically to be sure an alligator is not approaching. Keep particularly vigilant if you are near a flat bank where it is easy for alligators to leave the water for sunning. If your children are near the water, position yourself so you can see all around them. The lake bottoms are of unpredictable depths which vary abruptly. Fishermen especially are warned not to enter the water.
5. **If you hook a fish, an alligator may go after your catch.** If this happens, retrieve your line rapidly; if the alligator still follows, cut the line. Alligators have been known to follow a hooked fish up on the bank and pursue a rapidly retreating fisherman. Never get between an alligator and its food! Bring an aerated container or ice chest to hold your catch. Alligators will take stringers of fish.
6. **Avoid any alligator sunning itself in the middle of the trail.** Either make a wide detour around it if you can see a clear route, or retrace your steps and contact a park ranger. Sunning alligators are more abundant during the spring basking season.
7. **If you see a pile of grasses, twigs and/or soil near the side of the trail, avoid it. It is a nest and the mother alligator is probably close by guarding it.** She is easily irritated by intruders during nesting season and will defend her territory aggressively. From a safe distance, observing mother alligators with babies can be interesting. She often swims near the little ones and sometimes you can hear the babies' almost birdlike chirps. Baby alligators stay with the mother throughout summer and into fall. Never approach a pod of baby alligators near the shore. Though to you they may seem "cute," to them you are a huge and hideous monster. They will increase their chirping in distress and their mother will soon come to the rescue. To prevent confrontations certain trails may be closed to visitors during the nesting season. Watch for notices at trailheads.
8. **When an alligator stands its ground, opens its mouth and hisses, you have come too close. If this happens, immediately do the following:**
 1. Plan a route of retreat
 2. Retreat slowly, make no quick moves, do not stumble or fall
 3. Keep your eyes on the alligator
 4. Retreat uphill where possible
 5. Keep retreating in this manner until the alligator no longer demonstrates aggressive behavior
 6. Above all, do not get close enough to threaten an alligator.

Violation of the above safety guidelines can result in a fine or even worse, serious injury to you or a loved one.

Alligators are remarkable links with the past. They are fascinating creatures that have lived on the earth since the age of dinosaurs. They have survived when many other animals have become extinct. People are relative newcomers, and at Brazos Bend you are guests in the alligator's environment. Please respect these animals and the way they live in the wild.

John L. Galloway, Owens Ranches, Box 590, Bruneau, ID, 83604, U.S.A., indicates that they are planning to start an alligator farm in Idaho. This is snow country, well north and west of the natural range of the alligator, but John states the ranch will use

...cement enclosures with roofs that will be heated with natural hot water. We have five tapped wells, just one of which, flows naturally at 2400 GPM at 112°F [44.4°C]. We have experimented with fresh water prawn and *Tilapia*, both of which have grown quite well. We are thinking of using *Tilapia* as the main food source.

Hot springs have allowed the Atagawa Tropical & Alligator Garden, Atagawa Higashi Izu, Shizuoka Prefecture, Japan, to breed a variety of crocodilians over the years, so the hot water wells on the Owens Ranches should solve the heating problems involved with alligator farming. Their experience will be worth watching.

SEX RATIOS OF AMERICAN ALLIGATORS LIVE-CAPTURED AND HARVESTED BY BAITED HOOKS. Sex ratios of American alligators (*Alligator mississippiensis*) that were live-captured and harvested by baited hooks from Lacassine National Wildlife Refuge in southwest Louisiana between 1981 and 1988 were compared. Females were more vulnerable to baited hook harvest than live capture ($\chi^2 = 6.59$, 1 df, $P = 0.011$). Sixty-four percent of 4,631 live-captured alligators, were males; 60% of 1,255 harvested alligators were males. Live-captured alligators were categorized into 3 groups: small juveniles (0.45-0.60 m total length [TL]), medium juveniles (0.61-1.21 m TL), and large juveniles and adults (> 1.21 m TL). No difference was found in the ratio of males and females among the three groups ($\chi^2 = 1.46$, 2 df, $P = 0.49$). This suggests that alligator sex ratios do not change with age and that smaller alligators (0.45-1.21 m TL) provide the same sex ratio estimate as larger animals, which are more time consuming and dangerous to handle. -- William L. Rootes and Robert H. Chabreck, *School of Forestry, Wildlife and Fisheries, Louisiana State University, Baton Rouge, LA 70803, U.S.A.*

COMPOSITION OF ALLIGATOR POPULATIONS IN RELATION TO HABITAT TYPES. Sex ratios, mean total lengths, and adult/large juvenile ratios (1.21-1.82 m total length) American alligators (*Alligator mississippiensis*) harvested by baited hooks from marsh (< 40% open water), lake (> 60% open water), and canal habitats on Lacassine National Wildlife Refuge in 1988 were compared. The mean total length of alligators harvested from lakes was less than that of alligators harvested from canals and the marsh. The difference was mainly related to the distribution of large juveniles (1.21-2.12 m TL) alligators. Proportionally more large juveniles were harvested from lakes ($\chi^2 = 5.20$, 1 df, $P = 0.02$). The sex ratio of alligators did not differ among habitat types ($\chi^2 = 0.062$, 2 df, $P = 0.74$). -- William L. Rootes and Robert H. Chabreck, *School of Forestry, Wildlife and Fisheries, Louisiana State University, Baton Rouge, LA 70803, U.S.A.*

SOUTH AMERICA

Argentina:

EL BAGUAL BREEDING PROGRAM. The aim of the Estancia El Bagual program is the captive breeding of the two Argentine species of caimans, and also the tegu lizard. This December 1989-January 1990, our captive animals are expected to lay some clutches of eggs. In the meantime, a *mangrullo*, a platform 5 m high from which to study behavior, was built overlooking the pens. We are particularly interested in the caimans' temporal and spatial use of the area in the hopes of understanding their habitat requirements. Observations on the two caiman species reveals markedly different behavior and spacing; *C. latirostris* is rarely seen and is very wary (see cover photo). Finally, a report on the work with the tegu is in press in a specialized journal, while data on the two species of caiman is being worked up for a modest paper on the topic.

On 2-3 November 1989, a Latin American Wildlife Studies Workshop on laws was held in Buenos Aires under the guidance of Dr. J. Rabinovich, Director of SPIDER (Special Program for the Improvement and Development of Ecological Research), and sponsored by the Argentine National Scientific and Technical

Research Council. Its purpose was to produce (through intensive workshops involving Argentine administrators and researchers interested in wildlife) a final version of the LAMPWICON (Latin American Master's Program in Wildlife Conservation) proposal. WWF helped financially so all the participants could meet in Buenos Aires. -- Lic. Angel Alberto Yanosky, *El Bagual Ecological Reserve, Salta 994, 3600-Formosa City, Formosa, Argentina.*

Since receiving the above report in late December 1989, Angel Alberto reported that the caimans in the Bagual reserve had not mated by 7 February 1990, which is well into the normal breeding season, so he thinks this will be a poor year for breeding. He is continuing his,

...behavioral observations and the study of habitat requirements to improve the captive management area. Animals feed normally and are tame...A manuscript entitled, "Natural history of the broad-nosed caiman (*Caiman latirostris*): a poorly known alligatorinae," has been submitted to the REVUE FRANÇAISE D'AQUARIOLOGIE ET HERPETOLOGIE at Nancy.

Brazil:

RESEARCH IN BRAZIL. Research in Brazil is in a critical status due to the economic collapse of the country. All the scientific institutions are suffering a cut off of funding.

In 1989 I participated in two projects:

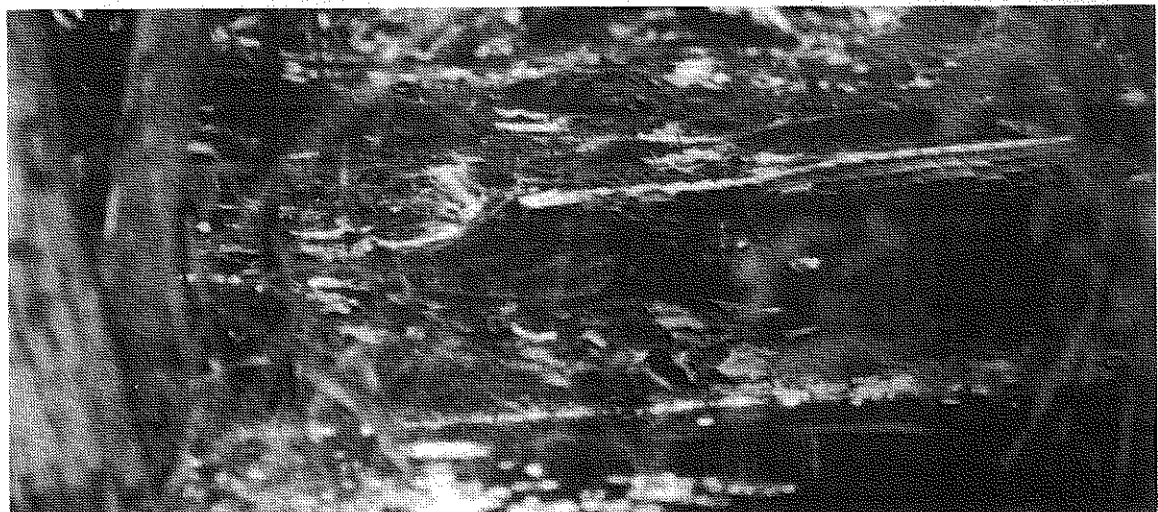
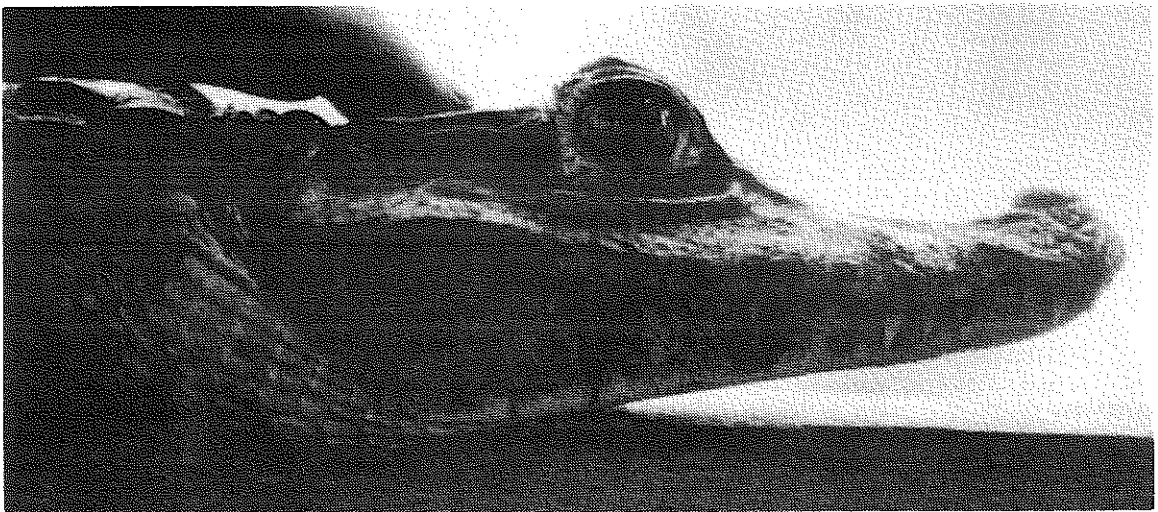
1. Population survey of *Caiman yacare* in Rio Paraguaizinho and fields of Santa Ines Pantanal, conducted with Guilherme Borges, Anacleto Arruda Filho (both of FEMA-State Environmental Agency of Mato Grosso) and Carlos Yamashita. Our study has now covered two years. We studied 83 nests in 1988 and 1989. The most important nesting habitat was small forest spots (around 100 m²) spread over the floodplains of Santa Ines and the riverine forest at Paraguaizinho. The majority of nests that hatched normally were watched by females (see photos overleaf). Fifty-five of those females were captured. Another 1,000 individuals of all sizes were marked and released. Illegal hunting occurs in the area; we located and studied 3 hunter's camps.

2. Development of the Conservation Program of the Genus *Caiman* in Southern South America--Amazonia, conducted with Peter Brazaitis and Carlos Yamashita. Now we are studying the systematics, distribution, and status of caimans in Amazonia (see photos overleaf). We have stayed at Maranhao and Piaui (eastern Amazonia) in 1988 and Roraima, northern Mato Grosso, Tocantins, southern Para, Tabatinga (western Amazonia), lower Rio Negro, lower Rio Branco and Amapa in 1989. It is easy to see that human occupation is related to the reduction of caiman populations. We located a population of *Melanosuchus niger* only at Amapa. -- George Henrique Rebelo, *Depto de Ecologia - INPA, Caixa Postal 478, 69.083 Manaus, Amazonas, Brazil.*

CROCODYLUS NILOTICUS IN BRAZIL. In 1989, IBAMA, the federal conservation agency, was created by fusion of IBDF, SEMA, SUDEPE, and SUBHEVEA. At the caiman conservation meeting in Campo Grande in March 1989 (see CSG NEWSLETTER, vol. 8, July-September 1989, pp. 10-12), the plenary session of scientists, conservationists, government officials, and farmers voted to ban the introduction of crocodylian species outside their natural distribution. Subsequently, a group of Nile crocodiles was imported into Brazil from Zimbabwe for stocking a farm. This prompted an outpouring of protests not only in Brazil but worldwide (see CSG NEWSLETTER, vol. 8, July-September 1989, p. 12). Five months after the Campo Grande meeting, IBAMA announced the release of the *Crocodylus niloticus* to Osorio's farm in southern Brazil. In response to the public outcries, IBAMA distributed a note three months later stating, "The protests do not contribute to the resolution of the problem." IBAMA guaranteed the operation of the farm, an action considered impertinent by scientists and conservationists.

Anyone wishing to contact IBAMA in an effort to push for more public debate on the commercial farming of Nile crocodiles in Brazil should write to:

Fernando Cesar Mesquita
Presidente do IBAMA
SAIN-Av. L4 Norte
70.000 Brasilia-DF, BRAZIL



The Rio Madeira flowing out of Bolivia and into Brazil is the critical contact zone between *Caiman crocodilus* of northern and central Brazil and *Caiman crocodilus yacare* to the south. *Caiman crocodilus crocodilus* (top photo) from Rio Abuna and Rio Madeira. *Caiman crocodilus* (middle) from Porto Velho on the Rio Madeira which shows jaw blotches more typical of *C. c. yacare*. *Caiman crocodilus yacare* male (bottom) more than 2 m long from Santa Inês basking on an island in a flooded field.

French Guiana:

KAW SWAMP BECOMES A BLACK CAIMAN SANCTUARY. The thing we have been waiting for so long has finally happened; the incredibly nice and interesting Kaw Swamp has been put under official legal protection since 4 September 1989. The 'ARRETE DE PROTECTION DU BIOTOPE N° 1-964 ID/4B' includes a large part of the black caiman, *Melanosuchus niger*, habitat in French Guyana. I've also found *Caiman crocodilus crocodilus* and *Paleosuchus palpebrosus* in the area, and I am quite sure that there are *Paleosuchus trigonatus* in the now protected part of the mountains along the swamp.

The black caiman was already strictly protected by French law but local people were allowed to hunt the other species for food. However, anyone who has been with a crocodile hunter knows the eye of a black caiman can be mistaken for one of the other species. For that reason, and of course for other reasons, the protection of the biotope really is worthwhile.

Some people in French Guyana really are interested in the protection of the black caiman and its habitat. I hope that I will be able to encourage and help them to improve the protection. -- Olivier Behra, *Chef de Project Crocodile, c/o FAO Representative, BP 3971, Antananarivo, Madagascar.*

Venezuela:

By order of the President of Venezuela, Carlos Andres Perez, a national committee was created, which includes representatives from every sector involved in the baba (*Caiman crocodilus*) management program. Ranch owners, technicians, military personnel, farmworkers, government officials, biologists, and industrial people are working together to guarantee the future of the species and the success of the management program.

On 6 December, Resolution No. 138, Official Magazine No. 34362, published a new act dealing with management of the baba (*C. crocodilus*). The resolution contains several important changes in the baba program, for instance, rather than issue new licenses before 1991, the 1989 licenses will be renewed. Also there is a considerable reduction of almost 40% in the 1991 harvest quota; approximately 90,000 hides.

Lastly, the wildlife department, PROFAUNA, is about to promulgate the first rules governing the farming of babas. -- Alejandro Carrillo Garcia, *Plaza Madariaga, Avenida Paez, Residencias Panorama, Torre A, Apartamento 162-A, El Paraiso, Caracas, Venezuela.*

PROFAUNA, the Autonomous Service for Wildlife of the Venezuelan Ministry of the Environment (MARNR) held a one-day public meeting on 8 February 1990 to discuss the second draft of the proposed regulations for ranching the spectacled caiman. Some 30 people attended, including MARNR officials, a representative of the National Guard, Biologists, cattle ranchers, and tanners. Copies of both the first and second drafts, together with the written comments of José Ayarzagüena, Stefan Gorzula, Santiago Ramos, Carlos Rivero-Blanco, and Eduardo Szeplaki, have been sent to Dr. Juan Villalba, CSG Vice Chairman for Latin America and the Caribbean. -- Dr. Stefan Gorzula, *Apartado 65260, Modulo de Chuao, Caracas 1065-A, Venezuela.*

MANAGEMENT OF BABAS (*CAIMAN CROCODILUS*) ON THE OASIS RANCH, BARINAS, VENEZUELA. Management on the ranch has the following chronology:

Jul-Sep	Location of nests
Aug-Oct	Collection and incubation of eggs
Sep-Dec	Hatching
Sep-Aug	Rearing of hatchlings and juveniles

Location of nests in the wild. At the end of July, the field personnel (llaneros) search for existing nests in the savannahs, and mark the exact location of them on the map of the ranch. After that, the technical staff makes a census of the number of nests found, in order to calculate the number of nests to be collected; 50% of the total is collected.

Collection and incubation. Once the number of nests to be collected is determined, collection takes place. The eggs are placed carefully one by one in wood crates along with some of the original nesting material. They then are transported by car to the incubation room, where

they stay until they hatch. The incubator room is equipped with a heater to assure constant heat, a thermometer and a hygrometer to measure the temperature and relative humidity required.

Hatching. Once the hatchlings have emerged, they are weighed and measured. The umbilicus is treated with a 5% iodine solution, and they are kept dry inside the incubator room for 24 hours.

Summary of collection and hatching.

	1988-89	1989-90
Nests located	95	90
Nests collected	16	45
Total eggs	345	980
Eggs per nest	21.56	21.78
Viable eggs	251	954
Damaged eggs	94	26
Non-viable eggs	26	197
Total hatchlings	225	757
Hatch rate	89.64%	79.35%

Rearing of hatchlings and juveniles: 1988-1989. We kept hatchlings in a round pen with a radius of 2.65 m, of which 0.9 m was a dry perimeter and the remaining 1.75 m was water. The water was changed every 2 days, and there was a light bulb left on during the night to attract insects as a complementary food. After two months in this pen, we transferred the 200 hatchlings into a pond with an area of approximately 32 m long and 18 m wide. This pond had a fence 48 cm high surrounding it and wire netting over it to protect the young babas from predators.

We observed that in the pond, the consumption of feed decreased, some animals escaped and others died. The final population recovered was 50 hatchlings.

Growth of 1988-1989 hatchlings.

	Length (cm)	Weight (gm)
30Sep88	21.8	36
15Oct88	23.7	44
15Nov88	26.0	57
15Dec88	26.4	60
15Jan89	27.4	62
15Feb89	33.2	110
Avg. monthly gain	1.62	10.57

Thirty percent of the hatchlings were weighed and measured in order to estimate the growth of the total population inside the pond. The diet

was solely red meat and a supplement of minerals (about 1% of the mixture). They were fed 6% of their body weight at 6:00 PM.

Rearing of hatchlings and juveniles: 1989-1990. Twenty-four hours after emerging from the eggs, up to 200 of the hatchlings were placed in 6 x 2 m pens (density = 16.6 hatchlings per m²). Once a month they were weighed, measured, and classified by size and placed in another similar pen in the following densities:

Hatchling length (cm)	Density/m ²	Total
26-35	16.6	200
45-50	11.6	140
76-90	5.8	70

The diet consisted of 75% fish, 24% red meat, 1% minerals (Ca:P ratio = 1:1) and vitamins, 300 mg DTC/kg of feed.

On 15 December 1989, approximately two months after they hatched, we added 84 mg Virginiamycin/kg of feed to the mixture.

The feed is given at 3:00 PM because the water temperature reaches 32°C at this time.

Marketing. To date we have not harvested any product to market; however, we are studying the following alternatives:

- a) Sell whole babas to dealers;
- b) slaughter babas at the ranch and sell the hide and salted meat locally; or
- c) slaughter at the ranch, refrigerate the hides and freeze the meat (including legs, tail steaks, ribs, and chops) and offer them to local and international markets.

Discussion. Since the percentage of hatchlings in the 1988-89 season (89.64%) and 1989-90 season (79.35%) was relatively high; we consider the results of collection and incubation of eggs to be satisfactory.

In the 1989-90 season we added a heater in the incubator room, in addition to the existing lightbulbs, to assure more uniform heat.

Management of 1988-89 hatchlings and juveniles:

1. The use of lightbulbs over the pen during the night was inconvenient since the water got dirty very easily.
2. Because of natural competition where bigger ones ate more than the smaller ones, moving them from the rearing pens to a pond had a marked effect on their growth and weight.

Growth of 1989-1990 hatchlings and 1988-1989 juveniles.

Pen	First measuring on 15 Nov 1989			Second measuring on 15 Dec 1989		
	Hatch	Size (cm)	Weight (gm)	Hatch	Size (cm)	Weight (gm)
1	33*	43.89	289.39	27*	46.02	325.92
2	17*	33.94	161.76	16*	36.15	157.81
Total	50*			43*		
Average		40.50	246.00		44.45	269.64
Average monthly gain = 3.94 cm + 23.64 gm.						
3	193	26.6	50.00	155	27.81	67.86
4	193	26.38	56.90	156	26.67	54.20
5	200	25.40	46.86	156	26.67	54.20
6	170	23.86	42.60	157	17.95	65.40
7				133	31.84	86.80
Total	756			736		
Average		25.55	49.26		28.36	68.25
Average monthly gain = 2.81 cm + 18.99 gm.						

* These are yearlings (= 1988-1989 hatchlings) that were recovered from the pond and included in the new management program.

- The time of feeding (6:00 PM) was inappropriate for the babas. Also the diet of only red meat and minerals was not balanced.
- The average monthly weight (10.57 gm) and length (1.62 cm) gain was lower than expected in theory.

Management of the 1989-90 hatchlings and juveniles:

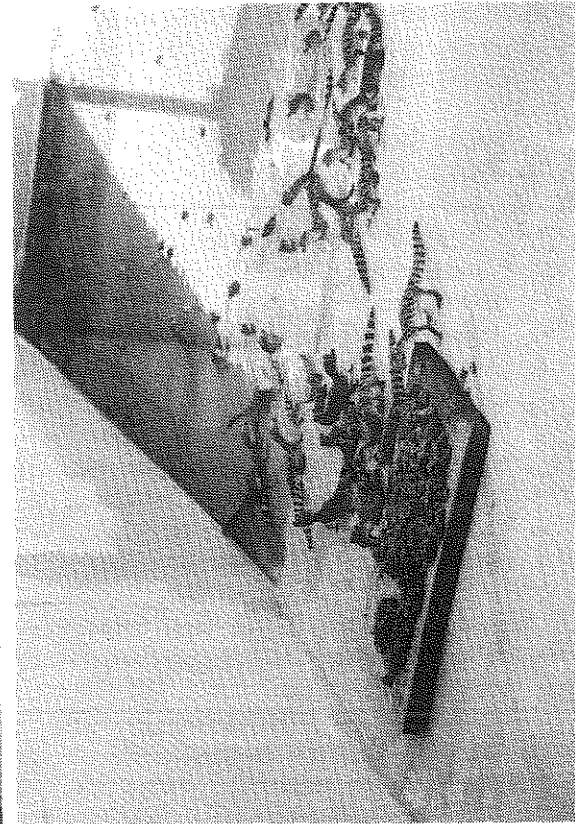
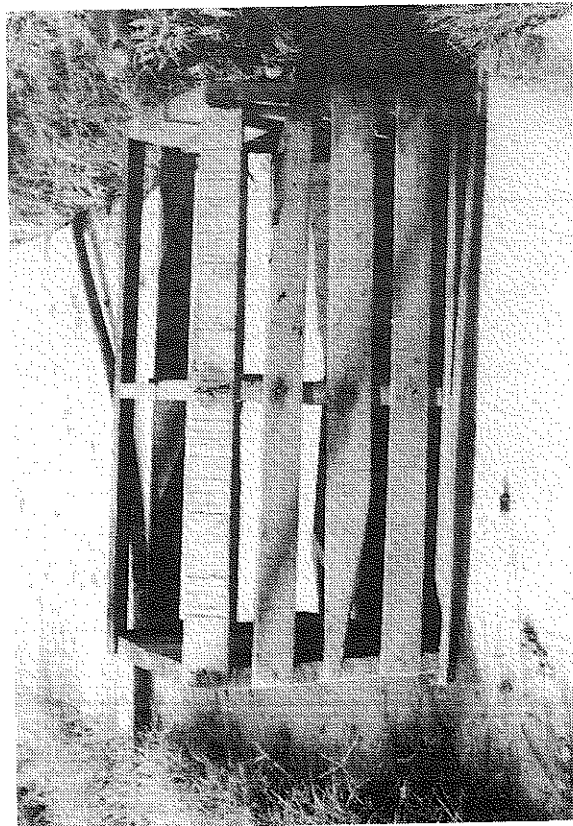
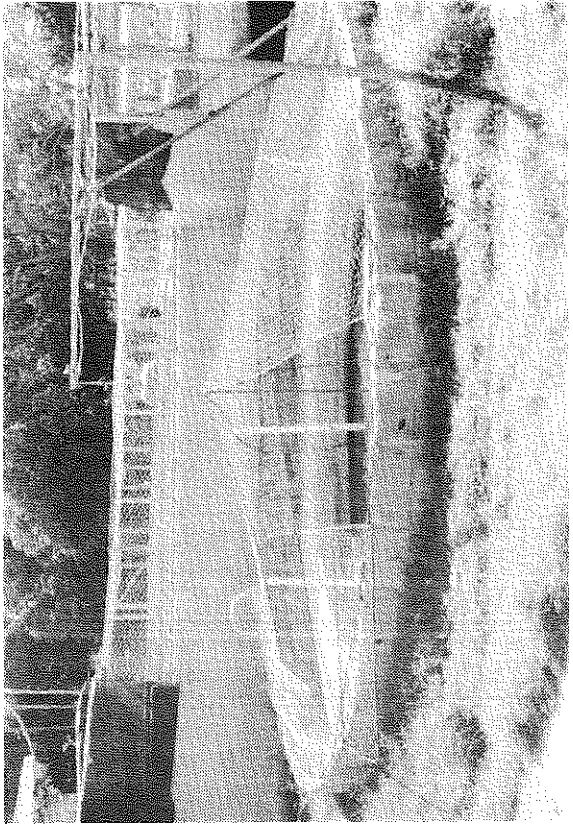
- Hourly temperature between October and November were plotted to determine the best time to feed. We chose 3:00 PM when the temperature of the water was 32°C.
- Considering that there are two local seasons: dry (December-May) and rainy (June-November), we will we plan to record hourly temperatures each month starting in January to provide year round temperature data.
- The diet provided this year has increased monthly weight (18.99 gm) and length (2.81 cm) gain. Hatchlings from the 1988-89 season included in the new management program increased their average monthly weight (23.64 gm) and length (3.9 cm) which makes us think they are compensating for their slower growth the first year. -- Leonor Baez de Azpúrua and Leonardo Michelangeli, *Agropecuaria el Pilon, C.A., Box 40343, Caracas 1040-A, Venezuela.*

ZOOS

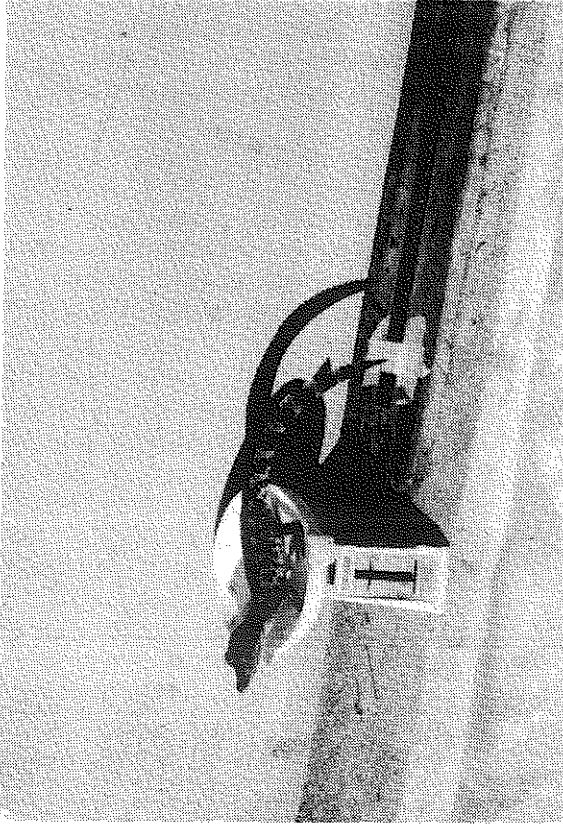


Zoos use an abbreviated code to indicate the sex of their animals: 1.2.3 would indicate 1 male, 2 females, and 3 unsexed individuals, usually juveniles.

St. Augustine Alligator Farm, P.O. Drawer E, St. Augustine, FL 32804, U.S.A. Mark Wise reports that at the St. Augustine Alligator Farm and its off-site breeding facility in Ocala, Florida, in 1989, nine species of crocodylians were successfully bred: American alligator, *Alligator mississippiensis*, Yacare caiman, *Caiman yacare*, Smooth-fronted caiman, *Paleosuchus trigonatus*, Morelet's crocodile, *Crocodylus moreletii*, Nile crocodile, *C. niloticus*, Saltwater crocodile, *C. porosus*, Cuban crocodile, *C. rhombifer*, Siamese crocodile, *C. siamensis*, and Dwarf crocodile, *Osteolaemus tetraspis*. St. Augustine currently houses 20 of the 22 living species of crocodylians, and in previous years has bred 13 of the species.



Clockwise from the upper left: The type of 70 cm long x 36 cm wide x 36 cm high wood crate used to collect eggs and nesting material and to keep them in the incubation room; round pen where the 1988-89 hatchlings were first kept; mixing the mineral supplement into the food in 1989-90; feeding time.



Clockwise from the upper left: Pond where the 1988-89 hatchlings were next placed when removed from the round pen; hatchlings were weighed and measured to record growth; natural habitat of the baba (*Caiman crocodilus*) on the ranch; the savanna near some of the nests.

Ellen Trout Zoo, P.O. Drawer 190, Lufkin, TX 75902-0190, U.S.A. Gordon B. Henley, Director, Ellen Trout Zoo, reports,

The Ellen Trout Zoo is sending 19 alligators to the Lowry Park Zoo in Tampa, Florida. This will enable us to bring in a pair of American crocodiles from San Antonio Zoo, Texas. We are currently proceeding with the construction of an indoor Siamese crocodile exhibit with a two-pool off exhibit holding area. The *C. siamensis* have copulated here in an outdoor pool on several occasions. However, only one clutch of eggs (which did not hatch) was produced. Interestingly, the female *C. siamensis* along with a female *A. mississippiensis* shared in the construction of a single nest. Each female deposited a clutch of eggs on opposite sides of the nest and defended her respective side.

Emperor Valley Zoo, c/o Royal Botanic Gardens, St. Clair, Port of Spain, Trinidad, John Seyjagat, Head Keeper, reports that the zoo, ...has undertaken a project to assess the population and determine the status of the species of the Tobago caiman (*Caiman crocodilus*). Presently the Emperor Valley Zoo houses in its collection 1.2 [=1 male, 2 female] Tobago caiman.

PUBLICATIONS

Mr. Terry N. Sexson, Editor of WILDLIFE REVIEW, U.S. Fish and Wildlife Service, Office of Information Transfer, 1025 Pennock Place, Suite 212, Fort Collins, CO 80524, U.S.A., has kindly offered to assist in keeping readers of the CSG NEWSLETTER aware of current literature by providing periodic literature searches on crocodylians. The publications received by the editorial office will be checked against the lists and any that are missing will be added. The list will then be published in the October-December issue each year. This extremely valuable service being provided by Mr. Sexson and WILDLIFE REVIEW will enable our readers to keep up with most of the recent literature.



TRADE



The following prices (in U.S. dollars) paid to hunters, farmers, or other producers were reported to the editor since the last issue of the NEWSLETTER appeared:

- Alligator mississippiensis* in Florida, U.S.A.:
September 1989 - wet salted belly hides from farm reared alligators, average 35.9 cm wide = \$5.50 per cm width; November 1989 - wet salted belly hides from farm reared alligators, average 35.7 cm wide = \$6.65 per cm width; December 1989 - wet salted belly hides from farm reared alligators, average 31.2 cm wide = \$6.07 per cm width; live adult, farm reared, breeders = \$100.00 to \$150.00 per foot of length; live, wild-caught hatchlings = approximately \$4.00 to \$10.00 field expenses and \$15.00 state collecting permit per hatchling; live, farm reared hatchlings = \$25.00 to \$50.00 each; alligator eggs = approximately \$3.00 field expenses and \$5.00 state permit per egg; no farm produced eggs sold; June 1989-February 1990 - alligator feces = \$281.00 per kg; February 1990 - wet salted belly hides from farm reared alligators, average 29.6 cm wide = \$6.00 per cm; frozen farm raised meat = \$13.20 to \$17.60 per kg; March - wet salted belly hides from farm reared alligators, average 35.5 cm wide = \$6.51 per cm.
- Alligator mississippiensis* in Texas, U.S.A.:
September 1989 - whole (unskinned) wild alligators = \$55.00 per foot of length.
- Caiman* sp. in Argentina: December 1989 - no legal trade permitted, but illegal dry salted hides = \$5.00 to \$15.00 per hide.
- Caiman yacare* in Bolivia: 1985-1986 - dry salted belly hides = \$10.00 to \$12.00 per hide; 1989 - no legal trade permitted; black market = \$4.00.
- Crocodylus acutus* in Honduras: December 1989 - live female breeders >2.0 m long = \$25.00 a foot in length.
- Crocodylus niloticus* in Ethiopia: November 1989 - farm reared hides have not yet been sold, the following offer has been tendered, 25-34

cm wide = \$7.00 per cm; 35-49 cm wide = \$7.50 per cm; 50-60 cm wide = \$8.50 per cm.
Crocodylus niloticus in Madagascar: in local market = \$1.00 per cm width.
Crocodylus niloticus in Sudan: hides in crust, 30 cm wide and up, average 40 cm = \$6.00 per cm width.
Crocodylus niloticus in the Republic of South Africa: December 1989 - frozen hatchlings = \$2.50; skulls = \$3.75; small feet = \$0.13; large feet = \$0.25; gallbladders = \$0.09; fat = \$0.45 per kg.
Crocodylus niloticus in Zimbabwe: January 1990 - wet salted belly hides from farm reared crocodiles, 15-24 cm wide, average 22 cm = \$5.50 per cm width; 25-29 cm wide, average 24 cm = \$6.75 per cm width; 25-29 cm wide, average 28 cm = \$7.00 per cm; 25 cm wide and up, average 30 cm = \$7.20 per cm; 40 cm wide and up = \$10.00 per cm; fresh tail meat on the bone = \$9.00 per kg.
Crocodylus novaeguineae in Papua New Guinea: May-December 1989 - wet salted belly hides, 25 cm wide and up, average 30 cm = \$6.24 per cm width.
Crocodylus porosus in Queensland, Australia: November 1989 - wet salted belly hides, \$9.00 to 9.50 per cm width; frozen tail, leg, and jaw muscle meat, \$20.00 per kg; frozen backstrap meat, \$25.00 per kg.
Crocodylus porosus in Papua New Guinea: December 1989 - wet salted belly hides, 28 cm wide and up, average 35 cm = \$8.00 per cm width.

in Madagascar. I'm in charge of trying to find out if it is possible, and how to develop ranching of crocodiles in the country.

There will surely be lots of problems like bad roads, food supply for the crocodiles, ease of egg collection, lack of heating energy, and local peoples' aversion to the crocs.

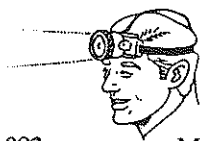
However, I've found real goodwill in the staff of the Water and Forest Department. They think that utilization of crocs could be a good tool for economic development and I think that it's the only way to give Malagasy people an interest in crocodile conservation.

So we'll try to do something, even if one year is incredibly short, specially when we know that eggs are already about to hatch in the wild.

Mark O. Bara, District Wildlife Biologist, South Carolina Wildlife & Marine Resources Dept., Star Rt. 1, Box 226, Georgetown, SC 29440, U.S.A., writes that he no longer is involved in alligator work other than to, ...investigate alligator complaints and when necessary issue permits to our contract nuisance alligator control agent.

Most of Mark's work today involves deer management, turkey restoration, and administration.

PERSONALS



George and Izildinha Rebelo, Depto de Ecologia - INPA Caixa Postal 478 69.083 Manaus, Amazonas Brazil, announce the successful hatching of a young yacare, Yuri Miranda Rebelo, on 3 August 1989 at Manaus. Congratulations!

Olivier Behra, Chef de Project Crocodile, c/o FAO Representative, BP 3971, Antananarivo, Madagascar, and CSG Deputy Vice Chairman for Africa, reports,

I've just signed a twelve month contract [3 January 1990] with F.A.O. and start work

Claudia Mercolli and Angel Alberto Yanosky, El Bagual Ecological Reserve, Salta 994, 3600-Formosa City, Formosa, Argentina, announce the successful eclosion of a second female hatchling, Tamara, on 10 July 1989. Congratulations! Angel Alberto states the high incubation temperature provided by Claudia should have produced a male, but something strange is going on in Formosa because their previous effort also produced a female, Déborah.

Ian Games, Box UA 296, Union Avenue, Harare, Zimbabwe, states,

I have recently been involved with estimating crocodile densities in the Selous Game Reserve in Tanzania. The rivers and swamps support a high number

of crocodiles which appear to have recovered from large scale cropping in the 1960's. Details of the survey are included in the CITES Nile Crocodile Project report.

Juan Villalba-Macias, CSG Vice Chairman for Latin America and the Caribbean, married the Senorita Dany M. Soler Lancieri, in Paysandú, Uruguay, on 16 February 1990. Congratulations and best wishes from the CSG and friends round the world!

Dr. Laurie E. Taplin has left his position with the Queensland National Parks and Wildlife Service. He also stepped down as CSG Deputy Vice Chairman for Eastern Asia, Australia and Oceania. Laurie's new address is P.O. Box 415, Civic Square, A.C.T. 2608, Australia.

Brian Vernon, Mainland Holdings Pty. Ltd., P.O. Box 196, Lae, Papua New Guinea, replaces Laurie Taplin as Deputy Vice Chairman. Brian is the new Group General Manager of Mainland Holdings Crocodile Farm. He succeeds Graham Goudie, who passed away on 16 October 1989. Before being promoted to his new position, Brian worked primarily in poultry company management, and he has strong interests in wildlife and conservation issues. He indicates that Mainland Holdings will continue its involvement in crocodile research, assistance to the Wildlife Department of P.N.G. government and support for the C.S.G.

R. Andrew Odum and Louise Hayes-Odum have left the Houston Zoological Gardens, Texas, and moved to Toledo, Ohio, U.S.A., where Andy has accepted the position of Curator of Herpetology at Toledo Zoo. Louise is finishing her doctoral dissertation on population dynamics of the American alligator in Texas.

At the Tropical Institute of Zoology of the Central University of Venezuela, on 31 January 1990, Maria del Carmen Muñoz Leon gave a public defense of her Bachelor of Science thesis, 'Utilizacion de Habitat por *Caiman crocodilus* en Una Region de los Llanos Altos Centrales de

Venezuela.' Her committee members were Dr. Gerardo Cordero, Dr. Stefan Gorzula, and Dr. Santiago Ramos (tutor). Ms. Muñoz used radiotelemetry to follow the movements of 20 spectacled caimans from May through December 1987. It is perhaps the first major study of the movements of spectacled caiman during the rainy season in the Venezuelan llanos. Congratulations!

Tommy Hines, Rt. 3, Box 509, Newberry, FL 32669, U.S.A., states that,

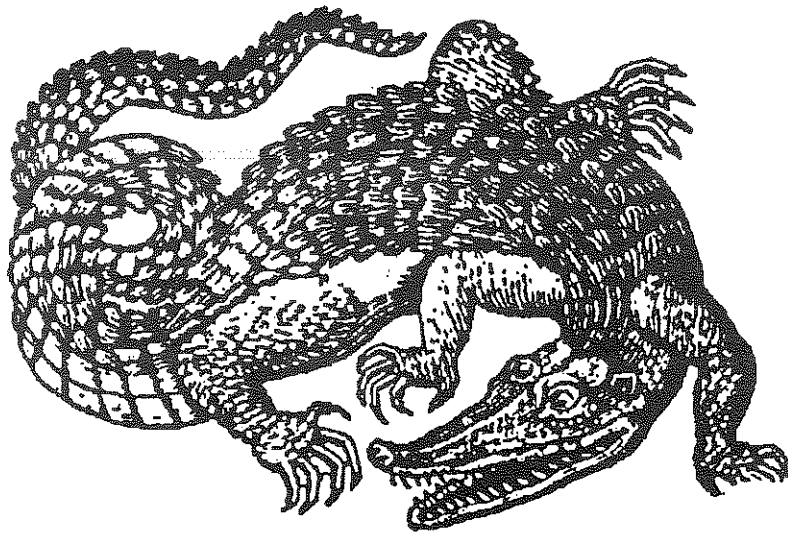
For the past year I have been involved in developing alligator management programs on private lands. Under a new Florida program a landowner may have the option to harvest alligators on his property if wetlands are assessed and alligator population surveys are run by a certified wildlife biologist. In addition to setting up management programs for other people in 1989, I entered into contracts with 5 landowners to carry out surveys and be responsible for harvesting, and marketing, on their lands. These lands include approximately 45,000 acres of alligator habitat. Various harvest regimes were implemented depending upon the alligator population and landowner desires. Approximately 180 alligators were harvested off of these properties. Plans are to expand and put these and other lands under a long term alligator management program.

Laura A. Brandt, County Extension Office, 3245 SW College Ave., Davie, FL 33314, U.S.A., writes that she has,

... recently (August 1989) completed a MS in Biology at Florida International University. My thesis is entitled "The Status and Ecology of the American alligator (*Alligator mississippiensis*) in Par Pond, Savannah River Site." If CSG members would like copies they can write to me at the above address...the population of alligators in Par Pond, South Carolina, is doing quite well, having nearly doubled over the last 15 years. I am looking forward to presenting the results of my research at the CSG meeting in April.

Alejandro Larriera, Bv. Pellegrini 3100, 3000 Santa Fe, Argentina, is presently working in an experimental breeding station for *Caiman latirostris*. He also is continuing his fieldwork and preparing a caiman management program for Argentina aimed at recovery of the wild populations. Alejandro is a 33-year old veterinarian, married, with two daughters, and is a long distance swimmer.

CORRECTION



~~American alligator~~

IT IS NOT AN ALLIGATOR, CAIMAN, CROCODILE, OR GHARIAL. The ancient and fantastic illustration on p. 45 of Vol. 8, the Oct.-Dec. 1989 issue of the Crocodile Specialist Group NEWSLETTER labelled "American alligator" is figure 1, plate 106, of Albertus Seba's, 1734, LOCUPLETISSIMI RERUM NATURALIUM THESAURI.

Seba's preLinnean illustration was cited in Laurenti's, 1768, SYNOPSIS REPTILIIUM, as *Crocodylus americanus*, following Seba's, 1734, claim that the creature depicted in figure 1 of plate 106 was from America. Laurenti noted that the picture showed five toes on the forefeet and back, and a complete absence of bony scales immediately behind the head, but no crocodile

from America has that dorsal scalation, and no crocodylian, living or fossil, has five toes on the hind feet. Clearly Laurenti was guessing.

Cuvier, in 1807, called Seba's, 1734, plate 106, figure 1 faulty; and because of it, and other problems caused by Laurenti's citation of Seba's plates, felt the necessity of renaming the crocodiles across the board, this time based on specimens, yet Laurenti's *americanus* persisted until Stejneger, in 1917, again raised the question of figure 1, in plate 106 of Seba's THESAURI, and rejected Laurenti's name *americanus* because it was based entirely on the illustration in question, which Stejneger said "is absolutely unidentifiable."

Stejneger and Barbour's, 1917, 1923, CHECKLISTS OF NORTH AMERICA AMPHIBIANS AND REPTILES used Cuvier's species *acutus* in Laurenti's genus *Crocodylus*, and Stejneger, in 1933, repeated his argument for sinking *americanus* saying "It is generally admitted that this celebrated picture is entirely unidentifiable."

So Cuvier and Stejneger have said that the picture is not a crocodile, and yet you call it an American alligator. An alligator with five toes, and a naked nape? I doubt it

makes a better alligator than a crocodile. It should be left as Stejneger and Cuvier called it, faulty, and absolutely and entirely unidentifiable. -- Franklin Ross, *Museum of Comparative Zoology, Harvard University, Oxford Street, Cambridge, MA -2138, U.S.A.*

[I agree entirely. The illustration has long been used by the Florida Museum of Natural History in its public-relations materials -- long before I arrived here. When the last issue of the NEWSLETTER was being put together, an illustration was needed to fill some white-space and in the rush I just grabbed the Florida Museum of Natural History copy of the Seba illustration without thinking about the

correctness of the identification. That was wrong, and I thank Franklin for calling the error to everyone's attention. -- Ed.]

REQUESTS



F. William Ziegler, General Curator, Miami Metrozoo, 12400 SW 152nd Street, Miami, FL 33177, U.S.A. reports that,

As a co-coordinator of the American Association of Zoological Parks and Aquariums (AAZPA), Crocodile Advisory Group (CAG), I have maintained a census of the North American crocodylian population in zoos and related institutions for three years. During 1990, the census will be placed on a computer program to provide an ongoing data bank for each species, population, breeding potential, breeding success, and housing institutions. It is hoped that by 1991, the census can be expanded to include European collections. The question that arises is, is there is any interest in developing the census to include all major collections globally? Any comments on this matter would be appreciated.

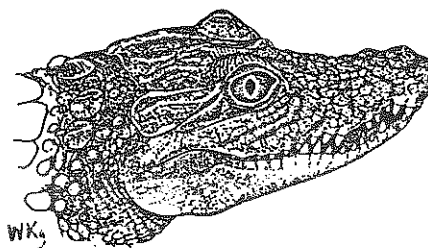
Please send responses to William Ziegler at the above address.

Toshio Yamanaka, President of Yamatoshi Hikaku Co. Ltd., 12-50, Ueno-Kouen, Taito-Ku, Tokyo, 110 Japan, and CSG Deputy Vice Chairman for Trade, notes that Yamatoshi Hikaku's experience indicates that American alligator skins from Florida region have many scratches, mainly on the tail, but also occasionally in the main part of the belly. Such defects are almost never seen in Louisiana hides. He would like comments from other people who might have made similar observations. He also would like information on whether these defects could be attributed to differences in the behavior of the Florida and Louisiana alligators, or to differences

in the habitat, or to differences in the captive management of the alligators on various farms.

ADDENDUM

The photo credits inadvertently were omitted in the last issue (Vol. 8 Oct.-Dec. 1989) of the NEWSLETTER. The photo on page 23 of that issue was supplied by Mario Espinal, and the one on page 26 was supplied by Scott Anderson.



WK₉
Mugger crocodile

EDITORIAL POLICY - The newsletter must contain interesting and timely, not outdated, information. All news on crocodylian conservation, research, management, captive propagation, trade, laws and regulations is welcome. If you wonder why news from your area is not reported, it is because you have not sent it in. Whenever possible, the information will be published as submitted over the author's name and mailing address. Even if the editor has to extract information bit by bit from correspondence or other works, the revised news items will be attributed to the source whenever possible. The information in the newsletter should be accurate, but time constraints prevent independent verification of every item. If inaccuracies do appear in the newsletter, please call them to the attention of the editor so 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.

CSG NEWSLETTER SUBSCRIPTION RENEWAL

The CSG NEWSLETTER is free provided you send in news about crocodilian programs in your area of concern: research, biology, behavior, status, conservation, management, hunting/trapping, captive propagation, farming/ranching, nutrition, disease, marketing, tanning, trade, manufacturing, laws and regulations, or law enforcement. If you do not send in information at least once before 31 December each and every year, your name will be dropped from the mailing list. We gladly accept news in any form, in letters, newsclippings, even notes scribbled on a scrap of paper, but to make your task easy, we have provided this 'subscription renewal' form. Please complete the form and return it to: Prof. F. Wayne King, Florida Museum of Natural History, Gainesville, FL 32611, U.S.A.

Name:

Mailing Address:

The following news and/or photographs are for inclusion in the CSG NEWSLETTER (attach additional pages if needed):

Prices paid in your country for crocodilian hides, meat, and other non-retail products, and the date that these prices were paid:

How can the NEWSLETTER be improved?

Signature:

Date:

Penny Ross. - /

Steering Committee of the Crocodile Specialist Group

For further information on the CSG and its programs, on crocodile conservation, biology, management, farming, ranching, or trade, contact the appropriate officer on the Steering Committee:

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Deputy Chairman: Prof. F. Wayne King, Florida Museum of Natural History, Gainesville, FL 32611, U.S.A. Tel: (1) (904) 392 1721 Fax: (1) (904) 392 9367.
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- IUCN Species Survival Commission:** Chairman: Dr. George Rabb, Chicago Zoological Society, Golf Road, Brookfield, IL 60513, U.S.A. Tel: (1) (312) 485 0263 Fax: (1) (312) 485 3532. Deputy Chairman: Grenville Lucas, The Herbarium, Royal Botanic Garden, Kew, Richmond, Surrey TW9 3AB, United Kingdom. Tel: (44) (1) 940 1171 Fax: (44) (1) 948 0819.
- CITES Observer:** Dr. Obdulio Menghi, Scientific Coordinator, CITES Secretariat, Case postale 78, CH-1000 Lausanne 9, Switzerland. Tel: (41) (21) 200 081 Fax: (41) (21) 200 084.