CROCODILE SPECIALIST GROUP

NEWSLETTER

VOLUME 18 No. 2 ■ APRIL 1999 – JUNE 1999

IUCN - World Conservation Union ■ Species Survival Commission

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IUCN--The World Conservation Union
Species Survival Commission

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COVER PHOTO. Adult female *Crocodylus acutus* carrying young from the nest to the water, Monte Calbaniguan Fauna Reserve, Cuba. J. Thorbjarnarson photo.

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. Fax 1 352 392 9367, E-mail prossesg@flmnh.ufl.edu

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Keith Cook and Alicia Darbonne, Australian Crocodile Traders Pty. Ltd., Cairns, Australia.
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American Alligator Council, Tallahassee, FL, USA.

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Peter Freeman, Hartley's Creek Crocodile Farm, Queensland, Australia.
Paul H. Slade, Nell and Hermon Slade Trust, Mona Vale, Australia.
Terry Cullen, Cullen Vivarium, Milwaukee, WI, USA.
Mauri USA, Inc., New York, NY, USA.
Antonio Quero Alba, Eurosuchus SA, Malaga, Spain.
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National Geographic Society TV, Washington DC, USA.
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THIS ISSUE. FULL REGISTRATION INFORMATION, 15TH WORKING MEETING, VARADERO CUBA 17-20 JANUARY 2000 SEE PAGES 21-25

EDITORIAL

CSG FINANCES . At the beginning of the year I issued a warning that the CSG faced a deficit in funding that might require drastic curtailment of activities. Those of you on the Steering Committee, and some Patrons, are aware of the very serious discussions we engaged in through the early months of the year to both attempt to raise the funds that CSG needs to continue, and to prepare ourselves with contingencies to meet any funding shortfall. Discontinuing the Newsletter, putting the Executive Officer on leave of absence (without pay) and redistributing the CSG office functions among different member's institutions were all discussed. In preparation for any drastic action needed, the Executive Officer took all his accumulated leave and supported a portion of his salary with funds outside CSG, the Newsletter was produced on a greatly reduced basis and all absolutely non-vital expenses were deferred. Up until very recently it appeared that these efforts would not be sufficient to avoid another period when core expenses exceeded revenues.

I am pleased to announce that thanks to a flurry of recent donations and pledges totaling more than $30,000, the financial nightmare has receded into the background - for the time being. The financial report shown below indicates that the combination of continued generosity of our Patrons, many of whom are themselves suffering serious financial strain, and our frugal management have successfully brought our expenses and revenues into balance. There are sufficient funds in hand to meet the anticipated expenses for the remainder of the year and maintain a reserve to support cash flow needs in the new year. I wish to express, on behalf of all the CSG, our very sincere thanks to all our supporters, several of whom responded to our appeals with additional donations. I am also please to welcome several new Patrons to our family of supporters.

I wish that it were possible to say that our financial crisis is over, but of course, that would be a delusion. Our reality is that we survive from month to month, balancing the bills that arrive with funds on hand and donations expected in a hand-to-mouth juggling act of considerable delicacy. I would like to commend the Executive Officer for his adroit handling of

the situation and his personal contributions to our success.

HALF YEAR FINANCIAL REPORT JAN – JUNE 1999
30 June 1999

Summary

Balance at 1 Jan 1999	21,921.21
General Revenues	49,851.76
General operating expenses.	–32,268.73
Special project revenue (1)	4,000.00
Special project expenses	–104.94
Balance at 30 Jun 1999	43,399.30

Detail

General revenue	
Donations (unrestricted) (2)	42,283.00
Sales (Publications)	3,712.50
Misc.& News subs	3,856.26
General Expenses	
Staff (3)	18,245.00
Fees for Services (4)	1,280.00
Printing and Copying	5,629.04
Other publication	280.00
Repair	82.00
Supplies	476.97
Phone & Fax	289.00
Mail & Newsletter	3,577.54
	0
travel expenses	630.52
	30,490.07
	1,163.82
	614.84
Operations expense	32,268.73

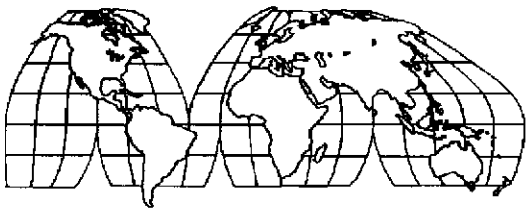
Notes

1. $4000 for Singapore Proceedings printing and distribution. Expenses of printing and mailing approximately $4,800 accounted under general expense. Note that 'Sales' includes revenues of approx $1,240 for Proceedings.
2. Additional $10,200 in donations pledged and in transit not received by 30 June.
3. $7,384 For Executive Officers salary paid from other grant sources does not appear on CSG accounts.
4. Payments to temporary assistants to free Exec. Officer to do other grant supported activities.

We anticipate the next year will require a number of extraordinary expenses. Our 15th Working Meeting (January 2000), the CITES Conference of Parties (April) and the IUCN World Conservation Congress (October) will all require our presence and some expenditures above our core expense. To prepare for this, it is vital that we build our reserves during the next fund raising cycle. I have instructed the Executive Officer to solicit funds from all our donors toward the end of this year in order to have an early indication of our financial scope for the year 2000. Again I ask each of you to consider the value of CSG's activities and to consider joining our Patrons list. I also strongly encourage any of you to bring the Executive Officer's attention to any potential new donors or sources of support. I reiterate my thanks to those of you who support us regularly. Our continued success is entirely dependent upon all of your efforts and support. – Professor H. Messel, *Chairman*.

NEWSLETTER RENEWALS UPDATE. As this Newsletter goes to press, 815 individuals and institutions will receive this issue. Continued strong response to the renewal request has resulted in 93 renewals offering a subscription donation, six additional renewals accompanied by Patron level donations, 154 ordinary renewals and two courteous cancellations for a total of 253 respondents, more than double our usual response. – Perran Ross, *Executive Officer*.

AREA REPORTS



AFRICA

Ghana

ATTACK A THREAT TO CROCODILE CONSERVATION. For the first time in the history

of Grupela village in Tamale, Northern Region of Ghana, West Africa, a crocodile has attacked three children and a dog. The entire community is gripped with fear and panic. The problem is that this event can generate a climate of insecurity, fear and hatred of crocodiles and ecologists are concerned about the adverse consequences of this attack for the crocodiles. The question is "Can religious beliefs and taboos continue to resist attack by these crocodiles?"

Traditional conservation of biodiversity through taboos and religious beliefs is common in Ghana. Crocodiles in the Grupela pond are regarded as sacred and have lived harmoniously with the villagers for over 100 years. As example, the largest crocodile in the population seems to be completely used to human presence and could be touched by hands. Children swim, fish, wash, and fetch water from these crocodiles denizens without any attack. What is the cause?

Casual observation indicates that the town has expanded due to population increase and has encroached upon the crocodile's habitat. The crocodiles were identified to be the Nile crocodile (*Crocodilus niloticus*) and the population is estimated to be 30 individuals.

The Ghana wildlife department has advised the villagers to control the level of disturbance by children when they are in the water and at shore in order to minimize direct conflict with the crocodiles. Opinions of villagers indicate preference for eco-tourism development in the village as added solution to the problem. – William Oduro, *Institute of Renewable Natural Resources, University of Science & Technology, Kumasi, Ghana. Fax: 233-51-60137; Tel: 233-51-60381/2; e-mail: Ustlib@libr.ust.gn.apc.org*

South Africa

THE PAN AFRICAN ASSOCIATION OF ZOOLOGICAL GARDENS AQUARIA AND BOTANIC GARDENS (PAAZAB) is the regional Zoo Association for Africa and has as one of its sub-committees, the African Preservation Program (APP) which co-ordinates the captive management of various earmarked species. One of these is the dwarf crocodile (*Osteolaemus tetraspis tetraspis / O. tetraspis osborni*). This means that from now on all captive animals of this species will be recorded in a stud book and that the captive population will be managed in a way which is most beneficial to it.

I am at present Vice-Chairman of PAAZAB and have encouraged those crocodile farms which are open to the public to join PAAZAB. I believe it is able to provide an important umbrella association to these institutions, such as a link between the show farms and the national authorities, CITES, CBSG and CSG. Whilst these were the ideals of the Nile Crocodile Farmers Association (NCFA) it unfortunately did not have the financial ability to carry itself. PAAZAB obviously includes all Zoological Institutions throughout Africa.

At present I publish the PAAZAB bulletin and will in future send you a copy of this as from time to time you may be able to extrapolate information for your newsletter and likewise I hope to be able to do the same.

On the commercial crocodile side, at present as can be appreciated, the industry is in a bit of a hiatus and although skins continue to be sold to Asia, some of the commercial farmers are turning their sights to America and Europe.

Local crocodile meat prices are as follows:

BODY MEAT	$5.00P.kg
RIBS	$4.20P.kg
STEAKS	$7.50P.kg

As a point you may be interested in the following: I recently traveled to Mauritius and found large quantities of crocodile skin products in the shops and market places there. All were Nile crocodile skins and most of the items made included the back skin. The processing was obviously not done in a tannery. I established from the La Vanille Crocodile farm on the Island, that these skins were arriving in Mauritius illegally from Madagascar. Items were selling for ridiculously low prices such as a croc skin briefcase for $90.00. – Andrew Eriksen. *Cango Crocodile Ranch, P.O. Box 559, Oudtschoorn, 6620, South Africa.*

Togo.

CROCODILES THREATEN DEVELOPMENT PROJECT. Geneve Tiers-Monde is a Geneva based development NGO which for many years has assisted the community development in an area of Togo (zone Amoussoukope, prefectures Agou and Ave). Among the activities financed and supported, some water retention areas have been built with compressed earth. The

impoundments have a capacity of 10,000 – 40,000 m^3, ensuring the permanent direct access to water for seven villages.

In the three years since their construction, crocodiles have settled in the ponds. Our partner in Togo thinks that they have migrated from the Todje river in the Ghana - Togo border area, 20 kms away. With assistance from the CSG we have tentatively identified these crocodiles as *Crocodylus cataphractus*. Since their first appearance, they have prospered into a scary community of over 30, enjoying immunity by an international treaty to which Togo is signatory, forbidding the killing of crocs.

Initially they were not such a big problem. However, recently, as if knowing about their immunity, the croc community started abusing our hospitality and dug holes into the retention wall. Jokes aside, I am sure these are natural crocodile behaviors, but unfortunately, they are to the detriment of the local human population which is struggling itself to survive and to prosper. It goes without saying, the local community is starting to feel the absence of water. It is important to fix the dam before September, when water should be at its highest point.

So, we are faced with two problems, one immediately to fix the damages and one to find a solution for the medium and long term what to do with the crocs and how to co-habit with them, taking into account the needs of the local farmer population as well as tackling the ecological side.

To repair and protect the dam we have been advised to fence the crocodiles away from the dam with a fence or palisade and we are developing some simple and low cost possibilities with local materials for this solution. We are also seeking funding from international sources for this work.

We have approached CSG for advice and general information about the problem, particularly what the legal restrictions to action might be and also what practical solutions can be proposed. We are interested in the potential for sustainable use of the crocodiles and also in experiences from other countries with cohabitation with dangerous animals. We are interested in the possibility that the local population could negotiate a deal with the government for controlled preservation, but in return could use excess crocodiles for income generation (for example, that they would guarantee the preservation of 30 crocs, but use excess for leather, meat etc). Unknown factors for such a project include what the local cultural perspectives and taboos on crocodiles as food might be, as well as the practical considerations of providing conditions where the crocodiles can prosper without damaging the dam. – Ali Saeed Boss, *Programme officer, Genève Tiers-Monde, Geneva, Switzerland. <getm@fgc.ch>*

Uganda

PLANNING FOR A CROCODILE WORKSHOP IN UGANDA. A grant from the Captive Breeding Committee of the British Herpetological Society is being used to promote the health, welfare and conservation of crocodiles (*Crocodylus niloticus*) in Uganda. A visit to East Africa in May 1999, primarily to lecture on Makerere University's new postgraduate course in Wildlife Health and Management, permitted a visit to Uganda's (only) crocodile farm which is located on the edge of Lake Victoria, about an hour's drive from Kampala. Accompanied by Gladys Kalema MRCVS, Head of the Veterinary Department of the Uganda Wildlife Authority (UWA), we met the Director, Manager and staff of the farm and put in motion plans for a "Crocodile Workshop" in September of this year.

The Workshop will be open to others in East Africa and elsewhere. It will provide an opportunity for people from different disciplines to come together, to participate in lectures and practical sessions and (in addition to developing and refining techniques for the management of crocodiles in captivity) to formulate codes of practice which will enhance their conservation and status in the wild. Further details of the Workshop and a report on other herpetological activities in East Africa will be produced at a later date.– John E Cooper, & Margaret E. Cooper, *Wildlife Health Services, PO Box 153, Wellingborough, Northants NN8 2ZA, UK.*

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East Asia, Oceania & Australia

Australia

MORE SURFING CROCS. A 10- to 13-foot saltwater crocodile terrorized surfers on a remote Northern Territory beach for about 30 minutes recently. Jamie Dentith, 18, said he was surfing near Yirrkala, 1,700 miles northwest of Sydney, when a crocodile's head "popped up" about five feet in front of his friend's surfboard. "He was lucky because a wave was just there and he caught it back to the beach and he just stood there waving his arms and yelling: 'Croc! croc! Get out of the water!'" Dentith said. "When I heard him I just paddled in as quickly as I could. It was like that movie 'Jaws' but with a croc." But unlike sharks, crocodiles don't stop at the water's edge. "When we got out of the water we just watched as this croc kind of surfed in and he came right up on the beach," he said.

"I just couldn't believe it. I have lived here all my life and seen lots of crocs but I have never seen one come up on the beach like that." Dentith said, adding that a dog was killed by a crocodile on the same beach. Dentith said the crocodile retreated into the water when beachgoers threw stones and charged at it. But then the croc returned four times over the next 30 minutes.

Northern Territory Parks and Wildlife Commission had been notified. The Northern Territory's saltwater crocodile population has risen to about 70,000 from about 5,000 when they were declared a protected species in 1971. Since then, eight people have been killed by crocodiles in the territory, one more than in the rest of Australia. – *The Associated Press DARWIN, Australia (AP)*

Malaysia

KILLER CROCODILE CAUGHT BY VILLAGERS. A crocodile that killed a man near Kuching, Sarawak, was caught and killed by villagers in June. The 23 year old victim is reported to have been bathing in the river and stepped on the crococile's head and it retaliated by snapping its jaws on the man's leg and dragging him into the river. The crocodile was caught with the help of a 'bomoh' or crocodile wizard engaged by the villagers, who laid a trap using dog meat as bait. When the predator was caught and immobilized, the victim's father, who was visibly shaken, rushed forward, cut a slice of the reptile's flesh and swallowed it raw to avenge his dead son, reported China Press daily. The crocodile measured 5.5 m length. – *adapted from STRAITS TIMES, 21 June 1999, submitted by* C. H. Koh, *Heng Long Leather Co., 50 Defu Lane 7, Singapore.*

Vietnam

SIAMESE CROCODILE SURVEYS IN VIETNAM. The Siamese crocodile, *Crocodylus siamensis* occurs or formerly occurred in Thailand, Cambodia, Laos, Vietnam, and possibly Indonesia and Malaysia, and is currently regarded as one of the most endangered crocodilians in the world. The status of *C. siamensis* in Vietnam remains largely unknown. Cao and Jenkins (1998. Crocodile conservation and development in Vietnam. Proceedings of the 14th Working Meeting of the Crocodile Specialist Group, pp. 135-140) identified five localities where remnant populations were believed to occur. These include Lac Lake, Upper and Lower Krong Pach Lake, and the Sere Pok River (Dak Lak Province), Crocodile Swamp (Dông Nai Province), and Tay Son Lake (Phu Yen Province).

An investigation into the status of *C. siamensis* in Vietnam was conducted from 14 April to 10 May 1999. The results of our survey strongly suggest that viable wild populations no longer occur in Vietnam. Spotlight surveys failed to locate crocodiles in Crocodile Swamp (Nam Cat Tien National Park) or Lac Lake (Dac Lak Province). Crocodiles no longer occur in Upper or Lower Krong Pach Reservoirs, and these sites no longer constitute suitable habitat. A remnant population of *C. siamensis* may occur in the Sere Pok River where it flows through Yok Don National Park. We were denied permission to enter Tay Son Lake by local authorities; however, crocodiles are now rare and subject to continuing exploitation, according to the Chief of Phu Yen Provincial Forestry Control Department.

Population declines throughout Vietnam are attributed to a combination of hunting, habitat destruction, drowning in monofilament fishing nets, and collecting for sale to crocodile farms. With the demise of wild stocks in Vietnam, farmers now obtain animals through purchase from other farms or in markets of the Mekong Delta. A considerable cross-border trade in crocodiles exists between Vietnam and Cambodia. Crocodiles from Cambodia are transported down the Mekong River and sold in delta towns near Ho Chi Minh City. The effect on wild populations in Cambodia remains unknown.

Reintroduction of *C. siamensis* to Nam Cat Tien National Park is strongly recommended. Crocodile Swamp offers excellent habitat and is wholly encompassed within the park. Captive *C. siamensis* from crocodile farms within Vietnam could be used for reintroduction, but should be genetically screened to determine that pure *C. siamensis* rather than hybrids are released.

We are grateful for the assistance of Dr. Cao Van Sung in Hanoi for organizing the survey and securing the necessary permits, and officials in Dong Nai and Dak Lak Provinces for allowing us to conduct fieldwork. – Steven G. Platt, *Wildlife Conservation Society, 185th St. and Southern Blvd., Bronx, NY, 10460-1099, USA and* Ngo Van Tri, *Institute of Ecology, Resources, and Environmental Studies, 85 Tran Quoc Toan St., District 3, Ho Chi Minh City, Vietnam.*

WEST ASIA

India

STATUS OF MUGGER IN GUJARAT STATE. Between March 1995 and August 1996, eighteen districts of Gujarat State in western India were surveyed to understand the present distribution and population status of the mugger, *Crocodylus palustris*. The Fauna and Flora Preservation Society, UK, supported this study. Reports of mugger were obtained from 14 districts of the State. However, direct sightings of wild mugger were only made in six districts, Amreli, Junagadh (Saurashta region), Kachch (Kachch region), Kheda, Panchmahal and Vadodara (South Gudjarat region). Although there were no direct sightings, indirect evidence confirmed the existence of mugger in Bharuch and Surendrangar districts. The existence of mugger is highly doubtful in the remainder of the State and local information and reports confirmed the local extinction of mugger from the Dangs district.

During the study period a total of 149 water bodies were surveyed, including 14 major dams, 69 medium dams and 66 minor dams, lakes and village tanks. Fortytwo additional surveys of 5-10 km length were conducted in 21 rivers. Reports of the presence of mugger were reported from 52 water bodies and 10 rivers and confirmed by direct sightings in 25 water bodies and 6 rivers. The total number of muggers recorded during the survey was 429 consisting of 368 adults (above 6 feet TL), 44 subadults, 6 juveniles (1.5 – 4 feet) and 11 hatchlings. 1,013 muggers from the Sasan rearing center in Gir Forest wild caught in south Gudjarat have been released into various loclaities of the State and we estimate the total population in the wild to be in excess of 1,600.

Deatiled information in the Katchch district was assembled. This largely desert region of 45,652 km^2 receives only an average of 326 mm rain/year. Nevertheless we recorded a total of 94 mugger in 12 water bodies and two rivers. The largest population occurs in Pragsar Lake located on the private land of the ex-Maharaj of Katchch and is completely protected from human activities. This population is the major breeding population in the region and is thought to be the source of muggers reported in several nearby (3-20 km) locations where they may have been carried during floods or migrated overland. Other populations are found in Rudramata dam on the river Khari and Nirona dam on the river Bhurud and single individuals and small numbers occur in six other small tanks and lakes.

Severe droughts were experienced in 1985-1987 and heavy flooding in 1994 and these are thought to have influenced the present distribution of muggers, causing emigration to surviving water bodies in the drought or dislocation during floods.

Although mugger are generally reported as friendly and peaceful to both humans and cattle, today human and livestock conflicts with crocodiles are escalating due to increased pressure on mugger habitats. A total of 10 incidents of attacks by muggers were reported

between 1991 and 1996, of which 9 occurred between May and July when water levels were very low. Adult male crocodiles are usually involved in these attacks. – from a report by V. Vijayar Kumar, *Gujarat Institute of Desert Ecology, Bhuj-Kachch,* Raju Vayas, *Savaji Baug Zoo, Vadodara, Gudjarat* and B. C. Choudhury, *Wildlife Institute of India, Dehra Dun, India.*

OBSERVATIONS ON THE CROCODILES IN THE GIR FOREST. With the kind permission of Shri. G. A. Patel, CCF (Wildlife), I visited the Gir Forest with two colleagues from April 20 – April 22 1999. This was an opportunity to revisit the Gir Forest, which I hadn't seen since 1975, and to document the existence of healthy mugger populations remaining in three of the major reservoirs. Vijay Kumar reports on detailed surveys in this region between 1995 and 1996.

My colleagues and I spent two days covering part of the perimeters of three main reservoirs, (Kamleshwar, Singodia and Macchundri) on foot. Observations were made of basking crocodiles, tunnels, nest sites and a random sampling of crocodile scats was made. One evening 7 pm – 10 pm was spent surveying part of Hiran lake.

On Kamleshwar Lake a total of 27 crocodiles, mainly adults and subadults, were counted during daylight, about 80% basking between the hours of 9 am and 11 am. The lake was about half its fullest level. Several tunnels were observed but most of the tunnels regularly used by muggers to escape drought will only be visible in late May and June as the water goes down. Crocodile scats, which are distinctly white and dense, were seen all around the edge of the reservoir. Examination revealed the presence of mammal hair, feathers, snake and fish scales, insect remains (which could be from frog stomachs) and bone fragments indicating a very varied diet. A three hour night survey around about one tenth of the lake perimeter counted 37 crocodiles. Extrapolation to possible total numbers was not attempted but this is a fair number of mugger to be seen in a short evening's work and there are few places in India where such numbers can still be seen.

A total of 14 crocodiles were seen at Singodia Lake by day. A number scats observed indicated a diet similar to Kamleshwar Lake. At Macchundri Lake we counted seven crocodiles during the day. Domestic stock (water buffalo, cows, goats) were observed around all three lakes as well as many spotted deer at Singodia.

During my visit to Gir in May 1975, I counted 20 crocodiles by day and 51 by night at Kamleshwar Lake. Since then nearly 1,000 crocodiles have been released from captive breeding and relocation programs into the protected reservoirs of the Gir, including 148 into Kamleshwar.

A consistent feature of these reservoir populations of mugger is that very few young crocodiles were observed. The tremendous fluctuation of water levels in these artificial lakes as water is drawn off for irrigation and by evaporation, prevents the females from staying near their nests and protecting them from predators including jackals, wild boars, hyenas and monitor lizards. In addition, when young crocodiles emerge there is no vegetative shelter at the water's edge. Without suitable habitat the large majority of baby crocodiles die in their first few weeks due to predation and possibly starvation. The other factor threatening these crocodile populations is drought. Those with tunnels or that successfully move overland may survive, but many crocodiles (especially smaller ones) perish.

I recommend that the survival of nests and hatchlings and the threat of drought to the survival of these important mugger populations be carefully studied and a management strategy evolved to improve conditions. The actual carrying capacity of these crocodile habitats in the Gir should be studied and the survival of released animals evaluated. I would also recommend that the Forest Department staff at Gir receive training in crocodile population monitoring. Gudjarat has one of the best mugger crocodile populations left in the entire country and these aquatic predators and scavengers are as important in their watery realm as the famed lions of the Gir are in their forest. – Rom Whitaker, *Vice Chairman for Western Asia, CSG* . *<dracofilms@hotmail.com>*

NEWS UPDATE FROM MADRAS CROCODILE BANK. Harry Andrews has recently received a two year blanket permit from Tamil Nadu State Forest Department to conduct a statewide survey of *C. palustris.* A preliminary survey has been initiated by student researcher Mr. Ravi Kailas,

a Croc Bank team member. Ravi will visit captive rearing centers in Tamil Nadu to assess their present status. Under supervision of Harry Andrews, he is also surveying habitats close to these state government crocodile centers. By July intensive surveys will be carried out in other parts of the State with the assistance of other Crocodile Bank personnel.

D. Basu at Kukrail Crocodile Center, Uttar Pradesh, recently advised that 18 gharial were released in March at Pinahat Ghat and the West Bengal Forest Department acquired 10 gharial in April for release in Gorumara National Park. All these animals are from the Kukrail Center 1994 captive bred stock.

Dr. S. K. Mukerjee. Director of the Wildlife Institute of India, is coordinating the current issue of ENVIS, a biannual environmental bulletin, that will be a special feature on crocodilians and comprise contributions from many Indian crocodile biologists. Publication is expected in July.

Between December 1998 and March 1999, Harry Andrews conducted surveys in the Middle, South and Little Andaman Islands. These surveys indicate a steady decline of populations of *C. porosus* over the past two years. During the survey, Harry stumbled upon poachers involved in a major crocodile skin trade from the Andamans. An investigation is underway to identify the source and final destination of the skins. The Indian Army, Navy and Intelligence Department are closely assisting and coordination on anti-poaching measures, patrolling and flushing out these activities in areas beyond the scope of the Police and Forest Department. – Harry Andrews, *Deputy Vice Chairman Western Asia, Madras Crocodile Bank, Post Bag No. 4, Mamallapuram 603 104 Tamil Nadu, India*

FUNDS CRUNCH HITS GHARIAL PROJECT. Fund shortages have slowed down the progress of the Gharial Rehabilitation Project in Kukrail, one of the two such projects in the country. While the project has, since its inception in 1975, helped increase the population of the reptile, it still continues to be on the list of endangered species.

Only Rs 6.4 lakh is given to it annually which is far short of the required Rs 15 lakh. District forest officer (endangered species) A.K. Singh said the expenditure on fish, which is the main diet of the reptile, was Rs 60,000 per month. The project initially had made much headway as it used to get grants from the Union government. However, these were stopped in 1987.

The World Bank recently came to the aid of the project. With its money, cages of the gharial have been upgraded thus preventing birds from picking up fish in the ponds. A pump has been installed to further augment the water supply and a separated drain besides the Kukrail Nullah has been constructed.

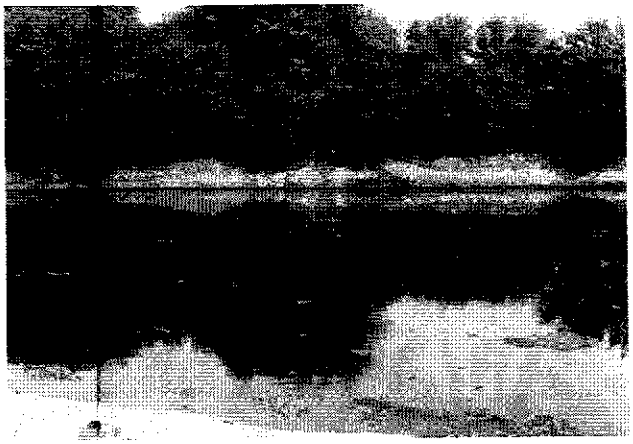
The gharial population in the country is about 4,000, of which 2,700 have been released in various rivers from this project alone. The reptiles nurtured in Kukrail have been released either in the Chambal, the Ghagra or its tributary Girwa. Though ideally these reptiles should not be released before five >years, as they are not fit to face the odds, they are finding their way at the age of four or earlier on account of the lack of funds for their upkeep. With the disproportionate sex ratio among the gharial population and the temperature of river waters changing, the reptile continues to be an endangered species. – Archana Srivastava *The Times of India News Service, 15 June 1999 submitted by* Charles Woods, *Florida Museum of Natural History, Gainesville FL 32611, USA.*

Iran

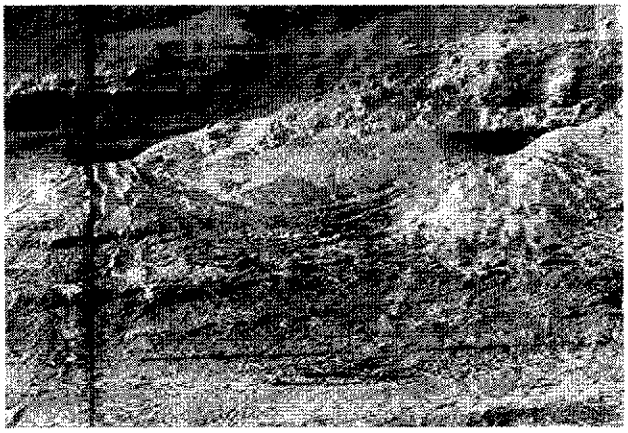
BURROWING BEHAVIOR OF MUGGER IN IRAN. Burrowing is one of the most common behaviors of Mugger (*C. palustris*) in Iran. The behavior is observed in many different conditions and forms that seem to be related to habitat. In natural or artificial ponds the burrow entrance is commonly observed within 0.5 m of the water edge. In contrast, muggers living along rivers are observed to dig burrows further from the water's edge, possibly because of the periodic flooding of rivers.

In the dry season in Iran, when some parts of the rivers and ponds dry out, muggers use their burrows to avoid heat during the day but at night they come out and wander the area in search of food. In places where there are trees at the river edge the burrows are dug under the root systems of the trees, but if there are no trees the burrow is dug directly into the river bank. Sometimes the burrow entrances are behind

emergent vegetation such as *Typha* and *Phragmites*. In one unusual case we followed a mugger track to a burrow about 500 m from the water, located there possibly because of a lack of suitable conditions near the river. – Asghar Mobaraki, *P.O. Box 5181, Tehran 15875, Islamic Republic of Iran.*



Typical *C. palustris* burrow in an artificial pond near a village.



Burrows in the bank of the Kaju River. A Mobaraki photos.

Sri Lanka

CROCODILE SURVEY REPORT. With the kind permission of the Director of Wildlife Conservation we made a brief visit to crocodile habitats in the Yala area of southern Sri Lanka last surveyed in 1977. This was a preliminary visit to pinpoint the best crocodile populations with a view to carry out a study on the ecology of the mugger (*C. palustris*) in collaboration with the Wildlife Department.

A total of 33 ponds, lakes, streams and river sites were visited by day for direct observation of crocodiles and evidence in the form of scats and tracks. Ninety-seven mugger were seen and positive evidence of their presence was recorded in all the sites visited.

The dynamics of crocodile populations in Yala, and indeed in all of the dry zone habitats in Sri Lanka, is most interesting. There are few natural lakes in Sri Lanka and the thousands of small and large lakes are part of ancient two millenium old irrigation systems. Freshwater swamps too, are mainly silted up, man made lakes, the only natural swamps being mangrove areas. Since the mangroves are traditionally habitats of the aggressively territorial saltwater crocodile *C. porosus*, it is unlikely that the mangroves here contain many muggers. So the mugger is basically a riverine species with broad tolerance of conditions (even a large stream with deep pools will suffice) that colonized the irrigation systems of the early settlers of Sri Lanka. Here is a rare example of how human habitat alteration has actually benefited a large predator.

The majority of the dry zone lakes and ponds dry up annually and from June onwards there is a feast of fish, frogs and other aquatic life for the crocodiles, snakes, monitor lizards and birds as the pools shrink. At this time, crocodiles engage in two additional activities (beside gorging themselves) to survive the dry season. Muggers start to leave the drying ponds once there is not sufficient water for them to submerge. It is remarkable that they wait this long as elsewhere crocodiles are quite particular about staying near the security of deep water. In Yala there are several more or less permanent water bodies (Buttawawewa, Palatupanawewa, Gonagalawewa, Wilapalawewa, Katagamuwa) and some pools along the Menik Ganga. These are where the crocodiles head to, travelling several km to get there. One might think of the crocodile paths as traditional migratory routes, for these reptiles are at least as long lived as elephants and humans and have been making these journeys for as long as the lakes have existed, 2000 years. Such dry season migration has been recorded for muggers in the literature and also for other crocodilians such as the common caiman of South America and Nile crocodile in Africa.

The second dry season survival strategy is tunneling. Crocs are great burrowers and will

excavate tunnels up to 5m deep, sometimes with separate entry and exit. These tunnels, if deep enough, remain cool and damp, even at the height of the dry season. In a study in Gudjarat, India, an arid area similar to the Sri Lanka dry zone, croc burrows remained at a steady 19°C while outside ambient temperature fluctuated from 12°C to 43°C (Reported in Vijay Kumar 1996). While the dynamics of annual pond drying favors adults and subadults with a guaranteed big fish meal once a year it is probably disastrous for most young of the season. Further study will probably confirm a very low survival rate for hatchling mugger in these habitats since they are unable to migrate or to dig deep burrows.

Dried crocodile scats were easy to see all around the lakes and ponds. The approximate size of the crocodile can be estimated from the scat diameter and diet deduced from the contents. A selection of scats we examined by crushing and straining them indicated fish and reptile scales, feathers, mammal hair and insect remains.

As concluded in our earlier surveys (Whitaker and Whitaker 1977) Sri Lanka still has the healthiest population of mugger crocodiles. The success of this species is due to the protection afforded by wildlife laws and parks, the tolerant attitude of the general public and the mugger's resilience in the face of extreme conditions. As a major predator/scavenger of considerable economic and ecological value the mugger needs conservation and long term management. Although there is a considerable body of information about the species in captivity we still know very little about its ecology in the wild. Basic studies are recommended for selected annual and perennial lakes in southern Sri Lanka and should include census and population monitoring, breeding biology and the survival of nests and young, feeding strategies and further study of migration and dispersal as a dry season survival strategy. – Rom Whitaker, *Madras Crocodile Bank, Post Bag 4, Mammallapuram, 603104 TN, India.*

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Caribbean and Central America

Costa Rica

DISCUSSIONS AND PROGRESS IN CROCODILE CONSERVATION. In mid-June there was a meeting with Dr. Carlos Manuel Rodriguez, Vice Minister of the Wildlife, Environment and Energy Department (MINAE), concerning recent problems with American crocodile conservation in Costa Rica (CSG Newsletter 18(1): 11-12). After a little talking about the problem, together we proposed the following steps to take in order to address the situation:

1. A small training seminar will be given to wildlife rangers, and some local judges if possible, with the hope to enhance their knowledge and prospective attitude to crocodiles; and the correct use of the Law 7317 that protects them.

2. It is very important to take some effective action against at least two individuals who are harming the crocodile population in Tarcoles. One of them shoots crocodiles to sell heads and hides. The other likes to teach tourists how to fish crocodiles from the bridge. Along with them, there is a restaurant in Jaco where croc meat is sold daily.

3. A letter will be sent to the two people operating tours in the river, in order to tell them they must not feed crocodiles, nor allow anybody during their tours to do so.

4. A letter will be sent to the national fisheries agency INCOPESCA, asking them to apply the most effort they can to avoid fishing within two miles from the mouth of the river.

5. One wildlife ranger will be kept in the bridge, in order to avoid future incidents.

6. Periodical raids will be made in the mouth of the river, to catch nets and hopefully fishermen who illegally fish in that place.

7. A program of environmental education will be supported in Tarcoles for the local community and children to inform them about crocodiles and crocodile safety.

8. A program of removal and relocation of dangerous crocodiles will be established.

We will have a field trip to Tarcoles in order to more or less settle the whole problem, and develop the most feasible way of fixing it.

These useful beginnings for a solution were greatly aided by CSG's intervention with the Minsister as well as the local support from the IUCN Regional Office. Thanks to all of you. – Juan R. Bolanos, *Asociación Costarricense de Investigadores en Crocodilidos (ACIC), Heredia, Costa Rica.*

SPECIALIST VISIT TO COSTA RICA. During 29-31 May 1999 the Costarican Association of Crocodile Investigators (ACIC) had the pleasure to receive Dr. John Thorbjarnarson, Steering Committee member of the CSG. During his visit he was able to conduct a daytime inspection of approximately 8 km of the River Tarcoles in Puntarenas Province on the central Pacific coast of the country. John was accompanied by Juan Bolanos, President of ACIC, Juan Sanchez, (Secretary ACIC and ACIC member Victor Pineda. There has been recent interest in the population of crocodiles (*C. acutus*) in this river due to the illegal hunting that has drastically increased to provide products for the tourist market, as well as the fears of local people for attacks on the lives and livestock, or worse, the accidental killing in fish nets.

During the inspection about 40 crocodiles of all sizes were observed, both in the water and on the muddy river bank. However, the number of adults seen has been considerably reduced by recent problems. We also observed the hatching of a nest of 40 eggs, of which 12.5% suffered prenatal mortality. Twenty-three specimens were collected alive for transfer to the ACIC Experimental Station at La Rambla de Sarapiqui, Heredia. We are very grateful to Dr. Thornjarnarson for coming to appreciate the problems experienced by one of the most important crocodile populations in the country and for sharing his experience with us. – Juan Sanchez Ramirez, *Proyecto Caimanes y Cocodrilos, Escuela de Ciencias Biologicas, Universidad Nacional, Apdo. 86-3000, Heredia, Costa Rica <jsanchez@ns.medvet.una.ac.cr>*

Cuba

In June, I visited Cuba for a national workshop on the crocodile program run by the Empresa Nacional para la Conservación de Flora y Fauna, organized by Roberto Rodriguez Soberón, the head of the crocodile program, José Manuel Rodriguez Vasquez (Subdirector Técnico) and the Director of the Empresa Lic. Tito Jorge Montes de Oca. The meetings were held in Sabanalamar, Piñar del Rio province, and offered us the opportunity to visit one of the Empresa's farms for *C. acutus*.

Following these meetings, we returned to La Havana and the next day visited Roberto Ramos Targarona (Toby) and his *C. rhombifer* installations in the Zapata Swamp, then continued east to Las Tunas province to spend a few days in the Monte Cabaniguan wildlife refuge with Manuel Alonso Tabet. As it was the beginning of the rainy season, the eggs of the early *acutus* nests were beginning to hatch, and, based at the new Don Miguel Alvarez del Toro biological station, we visited the major nesting beaches. Using a camera-trap at the largest nest beach, Jobabito, we were able to document a female *acutus* visiting her nest several times during the night, and took photos of her walking past the camera with her gular pouch distended, carrying groups of neonates (cover photo). We had an enjoyable and productive visit to the region, made even more so by the additional presence of Rafael Quiñones, an ichthyologist whose gill net fed us and whose rum bottle kept us supplied with the necessary "Cuba Libres" to make the mosquitoes and sand flies less bothersome. Aside from crocodiles, the refuge is rich in other fauna including a very good population of *Cyclura* iguanas.

Since 1992, Roberto and Manuel have developed a noteworthy research program on what is probably the largest population of *C. acutus* anywhere. With the new biological station, and the presence of such a wonderful population of crocodiles, the site offers real potential as a regional center for research and training with *C. acutus*. Participants at the 15th Working Meeting of the CSG in January 2000 will have an opportunity to visit this wonderful site in one of the post meeting field trips. – John Thorbjarnarrson, *The Wildlife Conservation Society, 185th St. and Southern Blvd. Bronx, New York, 10460-1099 , USA.*

FIRST CAPTIVE BREEDING *C. ACUTUS* IN MANZANILLO. The Manzanillo crocodile farm began operations in June 1991 with a group of 500 juvenile crocodiles. These were young of the year collected from the Birama Swamp, the largest coastal swamp in eastern Cuba. In

January 1996, a selection of 248 females and 70 males from this first group, with lengths greater than 180 cm TL, were moved to a newly constructed 5,000 m^2 corral (15.7 m^2 /crocodile and a ratio of 3.5 females: 1 male). This corral has a central rectangular pool of 1.5 m depth surrounded by 8 m of dry land. At each end 1 m of river sand was deposited and trees and shrubs are regularly distributed over the area.

This breeding group began courting and pairing in 1997 but no nesting resulted. Between March and April 1998 for the first time 21 females (8.5%) constructed nests and laid eggs. By this time these adults were around 2.25 m TL and were receiving a diet of 2 – 3 kg/ week of fresh ocean fish and beef viscera in two meals each week. Four of the nests were laid in mounds of sand and remainder in typical hole nests.

Within 24 hours, nineteen of these nests were removed to an area of fine calcereous sand outside the crocodile corral, while 3 nests were left in-situ as a test. Air and nest temperatures were monitored at 4 hour intervals using soil thermometers. Nest dimensions (altitude above the soil, horizontal dimensions and the depth of the incubation chamber) were measured with a metric tape. Polar and equatorial dimensions, and the weight of the eggs were recorded.

From the 21 nests the average clutch size was 17.2 (range 3-31). Of these only 24 hatched, 234 (66%) appeared to be infertile and the great majority (77) of the remainder failed early in development. Mean incubation period was 82 days. We compared egg and nest dimensions and hatch success of our sample with data available from 13 clutches laid in 1997 at the same locality where the captive stock was obtained and additional data available from studies of Roberto Soberon, Alonso Tabet and A. Berovides at the same locality between 1992 and 1996.

	Manzanillo	Natural
Clutch size	17.2	24.6
Avg eggs hatch/nest	0.9	15.3
Avg infertile eggs /nest	11.1	2.5
Avg prehatch mortality	4.2	6.2
Egg length cm	6.5	7.4
Egg width cm	3.8	4.8
Hatchling length cm	22.5	28.3
Hatchling weight g	32.3	64.0

The eggs from the nests left in the original substrate of river sand in the enclosure showed no signs of chemical decomposition of the egg shell at the time of hatching and it was necessary to assist their hatching by breaking the shells. Eggs in the natural habitat undergo a strong process of corrosion of the eggshell that develops numerous cracks in surface. This year, the month of April was unusually cold and the nests with best hatch rates were those that were laid a little late that benefited from stable incubation temperatures around 32°C. The earlier nests spent more time at around 28°C. Coincidentally the 87.5% of eggs suffering early embryonic mortality were from the early, cooler nests. The time of laying coincides with that of the wild population from which the captive stock is derived. – Norberto Fonseca Sans & Rodrigo Benavides Calvo, *Empressa Nacional para la Conservacion de la Flora y la Fauna, Criadero de Cocodrilos Manzanillo, Gran Ma, Cuba.*

Guatemala

REGIONAL ORGANIZATIONAL MEETING. On 8 July 1999 a group of 14 crocodile workers gathered to discuss current issues and needs for organization in the Meso-American region. The meeting was held in conjunction with the Congress of the Mesoamerican Society for Biology and Conservation (SMBC) in Guatemala City and was convened by Fabian Buitrago of Nicaragua in conjunction with several other crocodilian biologists. Investigators from Guatemala, Nicaragua, Costa Rica and Mexico were present and CSG was represented by Deputy Vice Chairman for Latin America, Alvaro Velasco, from Venezuela. The meeting was organized in consultation with the CSG Executive Office who provided some suggested topics for discussion.

After introducing the participants, the group heard brief presentations on the current status of crocodilian work in several countries of the region. In Mexico, it was reported that numerous initiatives are underway, coordinated between federal and state government authorities and the Mexican Association for Caiman and Crocodile Studies. Research on crocodilians is well advanced in Mexico.

In Nicaragua, activities of the government

agency in charge of crocodilian exports is restricted by lack of funds. The annual approved export quota of wild harvested caiman skins is nominally 10,000, but it is not know how many skins are really exported and control of the quota is largely regulated by the tanneries themselves.

In Costa Rica, it was reported that two farms for *Caiman crocodilus* and *Crocodylus acutus* are established. The situation in the Rio Tarcoles (see this Newsletter) was described. The development of a cooperative program between government agencies, the Costa Rican Association of Crocodilian Investigators and private and academic groups was reported.

In Guatemala, the situation of three species present is poorly known. The guerrilla war and the exclusion of researchers from petroleum company development areas have inhibited field work. Illegal harvest, principally of *Caiman crocodilus* is reported and there is only very limited development of ranches and captive breeding farms. The absence of a legal and regulatory structure and poor coordination between different government ministries further complicated the problems.

The group then discussed the formation of a Mesoamerican Association of Crocodilian Investigators to better coordinate the various individuals and groups interested in these issues. Such an association was thought to provide a flexible method for information exchange, understanding who was working where and on what projects and a platform to approach regional governments with recommendations for conservation and management of crocodilians. An association would also provide a channel for putting regional issues before the CSG, and to CITES through the Animals Committee, Regional Representatives and National Authorities. In the case of the CSG, it was indicated that inputs could be directed via existing regional representatives and CSG members to the Steering Committee and the Vice Chairman of the region. Several participants suggested that the Association should become a section of the regional structure of CSG, however, to clarify this it was suggested that further discussion be directed to the Regional Vice Chair, Executive Officer and eventually to the CSG Steering Committee. However, it was clear that all those actively involved in crocodilian activities could count upon the support of the CSG regional structure.

The possibility of forming an association within the structure of the Mesoamerican Society for Biology and Conservation was proposed. There are some precedents in the existence within this Society of subgroupings addressing Birds and Wetlands. Understanding that CSG had also proposed developing a regional subgroup for the region, it was agreed to proceed in close communication with the CSG to identify possible participants that would serve both groups. The geographical scope was proposed to include Mexico, Central America and Cuba with addition of other Caribbean Islands at a later time. After agreement to present this proposal for approval to SMBC and to attend the 15th Working Meeting of the CSG in January 2000 the meeting closed. – Alvaro Velasco, *Deputy Vice Chairman, Latin America PROFAUNA, Torre Sur, Piso 6, CSB Caracas 1010, Venezuela.*

Latin America

Venezuela

UPDATE ON *C. ACUTUS* IN COASTAL VENEZUELA. The population of *C. acutus* in the Tacarigua Lagoon National Park has consolidated in recent years. As reported last year (CSG Newsletter 17(1):10-11) this population is the most important in the mangrove coastal zone of Venezuela. The abundance of crocodiles in some sections of the mouth of San Nicolas and St. Ignacio Creeks show an increase with 45 'caimanes' (as they are locally known) in the first and 20 in the second.

These are the most important sectors of the mangrove habitat. Among the interior fresh water creeks Cano Pirital is also important, where we have counted around 10 adult individuals in a 2 km section that cohabit with a population of *Caiman crocodilus*, but separate by habitat type. In November and December of 1998, we recorded extensive activity by crocodiles, particularly in Boca de Cano San Nicolas due to pairing and breeding. In March 1999, the concentration of crocodiles in San Nicolas reduced and about 25 females moved to a nesting beach about 1 km distant called Puerto Escondido.

Earlier, Park Guards has cleaned a section of this beach to improve the amount of breeding habitat. Twenty one nests were deposited at this

nesting area, beginning on 21 March. Of these, twelve remain active. Seven were presumed to be raided by people, one was predated by *Tupinambis* sp. lizards and one was flooded by heavy rains in mid March. In 1998, only five females laid at this location, from which we conclude that this group of females probably also laid in 1997, although this assumes that these females synchronize their nesting every two years.

The average clutch size was 22 eggs/nest, with the majority with 20 eggs and a few with 25. From a sample of eggs, the mean egg mass was 100g. We observed females as small as 2.2 m TL laying and believe that these are young females, which accounts for the small clutch size and egg mass.

One initiative that we have developed to raise the consciousness of the local community and reduce the incidence of egg collection by people is to establish a voluntary Park Guard Group. This voluntary group of local youngsters of 12 –15 years age have adopted surviving nests and, beginning in June, observed the hatching of the crocodiles and are participating in a program to mark the neonates. This program, conducted in conjunction with Alvaro Velasco of the Directorate of Fauna, will estimate survival of the young crocodiles. In additional action, INPARQUES (the institute in charge of administering the park) has begun to improve the efficiency of controls on illegal fishing and this has resulted in a substantial benefit to the crocodile population, with only two adult crocs reported killed in 1998. – Alfredo Arteaga, *Caracas, Venezuela* <*aarteaga@telcel.net.ve*> and Francisco Gomez, *Park Guard, Environmental Monitoring Program, PN Laguna de Tacarigua, Estado Miranda, Venezuela.*

NORTH AMERICA

USA

BRAZOS BEND ALLIGATOR RESEARCH. It has been 15 years since Brazos Bend State Park (formerly Hale Ranch) opened to the public. Fourteen years ago, Louise Hayes-Odum began research on the alligator population at Brazos Bend, and a short time later Dennis Jones became an employee there. In 1989, Dennis began collaborating with Louise on research activities. Through the years we have seen how alligators in specific areas of the park have responded to extremes in water levels and temperature.

We also have noted changes in the behavior of alligators as they become habituated to park visitors. We continue to amass a large database on alligator nesting in the park. Last year, a drought afforded us the opportunity to locate, measure, and photograph over 25 dens. We are starting to focus on survival of juveniles and the usage of Big Creek and the prairie pothole area by resident and transient alligators.

This is the second year that university undergraduate students have served as interns at Brazos Bend and have assisted in data collection for the nesting research. Last year we had one intern from Texas A&M University, College Station, Texas, USA. This year we have two interns from Texas A&M and two interns from Fachhochschule Eberswalde, Eberswalde, Germany. Internships are becoming more common in the U.S. for undergraduates in order to increase marketability for jobs and to give students "hands-on" research experience that they may not get from applied coursework. These students have a lot of biological knowledge and are capable field assistants. We highly recommend the use of such undergraduates as it is an arrangement that greatly benefits all involved.

We are searching for a method of tagging/marking alligators on the head so that we can identify individuals during the summer and winter when only the head is exposed to view. We tried drilling holes in nuchal plates and inserting metal bolts or nylon and metal ties to attach plastic hog ear tags. The alligators actively scratched and rubbed the tags off within a period of days. We would really like to get some suggestions from all you crocodile experts out there. – Louise Hayes-Odum, *Living Resource Center, 11833 Chimney Rock Rd., Houston, Texas 77035, USA, Email: hayesodumgator@Compuserve.com* and Dennis Jones, *Brazos Bend State Park, 21901 FM 762, Needville, Texas, 77461 USA, Email:* cjjones@fbtc.net

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VETERINARY SCIENCE

[We are pleased to welcome our nascent new section for crocodilian veterinarians under the guidance of Fritz Huchzermayer and Parntep Ratanakorn. We hope that someone will devise a suitable logo for this section. – *Eds.*]

GENERAL CROCODILE PATHOLOGY: FIBRISCESS. Reptiles and birds do not have lymph nodes for filtering pathogens out of the lymph which drains from an inflamed area or organ. Instead, they exudate fibrin into the inflamed area, thereby immobilizing the pathogens. This accounts for the remarkable fact that reptiles and birds rarely contract a septicaemia from apparently septic wounds. However, if the inflammatory cells invading the area are not able to suppress the infection, the exudation process continues and this can lead to large, ever growing swellings.

Such a swelling differs essentially from an abscess: No necrosis and no pus are involved and attempts at encapsulation remain incomplete at best. The "caseous matter" filling it is neither dried (inspissated) pus nor necrotic debris, but simply fibrin. To differentiate this product of chronic inflammation from an abscess it should be called a fibriscess.

In crocodiles, fibriscesses often develop from infected bite wounds. Because of their continuing growth the swellings are sometimes suspected to be neoplasms. The treatment of a fibriscess requires a deep incision and the complete removal of all fibrin. If a fibriscess does not interfere with normal functions, it is best left alone. – F W Huchzermeyer. *P O Box 12499, 0110 Onderstepoort, South Africa* fritz@moon.ovi.ac.za

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INTESTINAL INJURY IN AN ALLIGATOR. An American alligator was captured by researchers on Lake Apopka, FL, USA. The animal was bloated and could not submerge. The abdomen was enlarged, particularly on the left. The specimen was transported to the veterinary laboratory in Gainesville, FL and held over several days. The gator had a large, very firm palpable abdominal mass, as well as obvious gaseous distention.

At necropsy The gator was 274 cm (9') long, wt 84 kg, and a female. Externally, a few old scars, but otherwise normal. All organs and tissues grossly normal except gastrointestinal tract and oviducts. The animal had very little fat in comparison with the others we have looked at over the last 18 months. However, the animal did not appear emaciated, since muscle mass appeared normal. In the coelomic cavity containing the stomach and intestines, the viscera were adherent to one another by fibrin. There was a mass about 60 cm in greatest dimension adherent to the stomach and intestine. The mass was a thin-walled multilocular cystic structure filled with gas and several kg of firm, dry, friable, green material somewhat resembling sandy soil in consistency and texture. The lumen of this structure communicated with that of the small intestine about 30 cm proximal to the juncture of the small and large intestines. Although the wall was firmly adherent to that of the stomach, there was no communication between the cystic structure and the stomach. Scattered about the viscera throughout the abdominal cavity were numerous similar masses from a few mm in diameter up to about 5 or 6 cm, containing similar dry, firm, green material.

I interpret these findings to indicate that at some time in the past the animal suffered a penetrating injury to the wall of the small intestine. Since there was no indication of penetrating injury to the abdominal wall itself, this probably occurred via a sharp object the animal swallowed and that was the right size to pass the pyloric opening of the stomach into the intestine but still large enough to penetrate the wall of gator intestine. Probably an initial episode seeded lots of injesta all over the coelomic cavity. The material that leaked out of the gut became walled off, resulting in the many various sized lesions that were present. Unfortunately, the hole in the gut did not close up and material continued to leak out, gradually expanding the cystic space it had created. Over time, the material dried out as fluid was absorbed and bacterial action and/or swallowed air resulted in further dilation of the cavity with gas. I expect there were multiple episodes of leakage and peritonitis, to judge from the extent of the adhesions and from the fact that the animal had active peritonitis at the time of euthanasia. The gastrointestinal tract was patent all the way through and there was a tiny

amount of feces in the colon, so probably it was physically possible for the animal to eat. The relatively tiny amount of fat present suggests that it wasn't eating much, however, and probably hadn't been for some time. In people and domestic animals, peritonitis is extremely painful. If the abdominal serosa of gators is similarly innervated, she must have been in terrible pain for a very long time.

Each oviduct contained a retained egg, one with shell, one not. The wall of one oviduct was paper thin and appeared totally inactive. Distal segment of the other oviduct was thickened more like a gravid oviduct; this is where the egg with the shell was located. Ovaries both contained uniformly tiny follicles. – Trenton R. Schoeb, *Division of Comparative Medicine, University of Florida, Gainesville Fl 32611, USA, trs@nersp.nerdc.ufl.edu*

A CASE OF SUSPECTED VITAMIN D POISONING. When I treated a visiting postgrad student to crocodile stew with meat from a nearby crocodile farm, the visitor afterwards asked for the bones. He cleaned them and they were all found to have extensive exostoses (Fig. 1). There had been no report of disease or mortality on the farm.

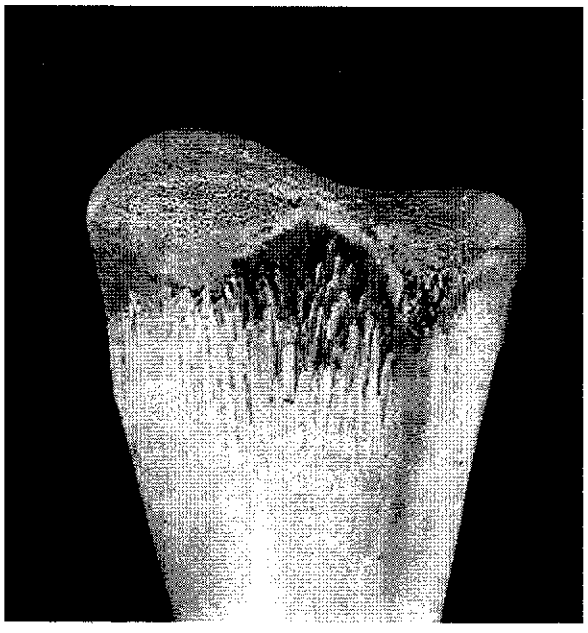

Fig. 1 Exostoses on the femur of a farmed Nile crocodile

North Pole explorers on diets of livers of polar bears have died from vitamin D toxicity which does cause exostoses and abnormal bone formation on some soft organs. Vitamin D is also used to poison warfarin resistant rats.

Mixing of rations on crocodile farms often in done in a haphazard way and as vitamins "are good" they may be given in excessive amounts. It is likely that the crocodiles on this farm had been exposed to high doses of vitamin premix for a prolonged period. Unfortunately it was not possible to get a clear indication of this, as the meat had been stored frozen for quite a time and no records of premix use were kept on the farm. – F W Huchzermeyer, *P O Box 12499, 0110 Onderstepoort, South Africa* fritz@moon.ovi.ac.za

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ECTROMELIA (MISSING LIMB) IN MORELET'S CROCODILE FROM BELIZE. Two *Crocodylus moreletii* captured on 21 March 1997 and 20 April 1998 in the New River System, Belize, exhibited ectromelia of one forelimb. These specimens were a juvenile 37 cm TL and a female 103.7 cm TL. External and radiograph examination suggest that the limb failed to develop during development as there is no apparent scarring or skeletal trauma. These two individuals were the only cases of missing limbs observed among 642 individuals captured in our study and to our knowledge, the first cases reported for this species.

Several factors including age and diet of the reproducing female, extremes of nest temperature and humidity and exposure to environmental contaminants can cause developmental abnormalities in crocodilians. Survival rates for hatchling crocodilians are generally low and embryonic malformations such as these may be an added disadvantage to survival. However, both individuals examined were vigorous and appeared in good condition. – *From Rainwater, T., S. T. McMurry & S. G. Platt 1999. J. Wildlife Diseases 35(1) submitted by* T. Rainwater. *The Institute of Environmental and Human Health, Dept. Biological Sciences, Texas Tech University, Lubbock, TX 79416, USA.*

THIS ISSUE. FULL REGISTRATION INFORMATION, 15TH WORKING MEETING, VARADERO CUBA 17-20 JANUARY 2000 SEE PAGES 21-25

PUBLICATIONS

ALLIGATOR PHYLOGENY AND CRANIAL MORPHOLOGY. Society of Vertebrate Paleontology Memoir 6, contains two remarkable new publications that will be of great value to crocodilian taxonomists and structural morphologists. The memoir uses modern technology in the form of a Compact Disc (CD) provided in a folder inside the cover that contains both the *'Digital Atlas of the Alligator Skull'* and the full text and illustrations of the accompanying paper.

The *'Atlas'* is a joint production of Timothy Rowe at University of Texas, Memorial Museum and Chris Brochu, Field Museum, Chicago, and a group of information technology colleagues and students. The CD contains 1,391 digital high resolution X-Ray Computed Tomographic (CT) sections of an alligator skull. These can be viewed on most desk top computers to provide a fascinating three dimensional perspective on the internal anatomy of the alligator skull. The images are taken every 0.25 mm through the skull and fully labelled every 5th slice. The software provided on the CD allows the viewer to travel slice by slice through transverse, sagittal and coronal axes, identify structures, measure parts and relationships and generally examine in great detail the internal architecture of the skull that is only slightly visible or understandable from the outside.. I am still scanning through my copy trying to visualize the complexities of the palate and associated sinuses. The disc also has some nifty animated 3-D visualizations and a mass of technical and anatomical information

The stated aim of the presentation is twofold; first to provide a basic reference on alligator morphology for researchers and educators, and second to introduce and test this digital technology that seems potentially useful to a wide audience of researchers.

The remainder and bulk of the issue is an extended monograph by Chris Brochu on 'Phylogenetics, Taxonomy and Historical Biogeography of Alligatoroidea'. Chris outlines the current state of knowledge on the ancestors and relationships of extant alligators and caimans and poses a series of issues in their evolution. There is a detailed analysis of nearly all the known extant and fossil taxa in this lineage. The text provides an exhaustive phylogenetic analysis using 164 characters that result in a tree of cladistic relationships involving fossil and extant forms. The work is extremely well illustrated with numerous black and white photographs clearly depicting characters and character states.

The outcome of this extensive analysis contains only a few surprises, but provides a very firm basis for understanding the evolutionary history of the group. The gigantic (9 - 15m) North American crocodilian *Deinosuchus* is reinterpreted to be not the worlds largest crocodile, but instead one of several very large alligatoroids. The position of the short snouted, blunt toothed alligators of North America and Europe (*Allognathosuchus* and allies) is clarified and some bizarre forms like the horned *Ceratosuchus* examined. Some emergent general themes that characterize alligators and their relatives are clarified such as the occlusal pattern of upper and lower jaw and the significance a notch versus a pit to accommodate the fourth maxillary tooth.

Among the extant taxa, the grouping of the two alligator species into a robust clade and all the caimans into another is strongly supported. The discussion contains an interesting and plausible story about evolutionary history of the group with a North American origin, a dispersal to connected European and Asian ranges and an origin of the caimans in North America with a single dispersal and subsequent radiation in South America. Several biographic anomalies remain to be explained by the discovery of additional fossil material. The timing of the *Caiman* dispersion south is at variance with the current understanding of Panamanian land bridges and the fairly recent dispersal of *Alligator* into Asia via Beringia requires a degree of cold tolerance that seems difficult to explain. However, crocodilian fossils at present day Ellesmere Island (76°N), the movement of continents and variations in the global climate may reduce this conceptual difficulty.

The volume is dedicated to Wann Langston for his many contributions to crocodilian evolutionary thought. This paper will provide

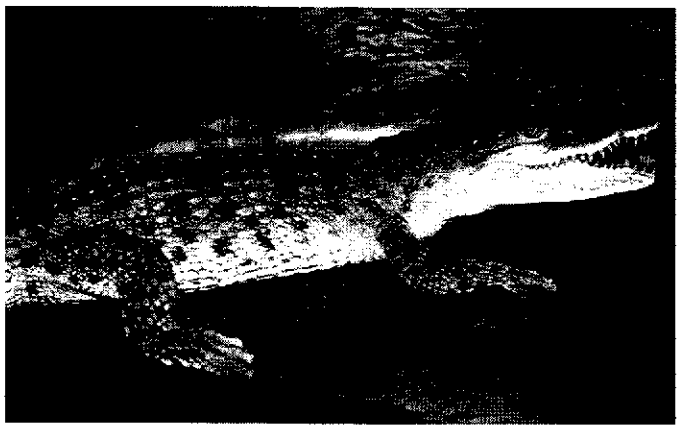
the framework for any discussion of alligatoroid evolution and with its companion CD Atlas of morphology, provides a volume that will enhance the library of any serious thinker on crocodilian evolution. Inquiries about copies can be addressed to SVP business office, 401 N. Michigan Avenue, Chicago, IL60611-4267, 312-321-3708, svp@sba.com)– Rowe, T., C. A. Brochu and K. Kishi *1999. Journal of Vertebrate Paleontology Vol. 19, Supplement to Number 2.:100 Pp. Reviewed by* J. P. Ross.

EXPEDITION FIELD TECHNIQUES–REPTILES AND AMPHIBIANS. The Royal Geographic Society, UK, field techniques guide for expeditions. prepared by Daniel Bennett, is handy reference with a short but complete section describing survey techniques for crocodilians, referring to and relying heavily upon the guide prepared by CSG at the Darwin Regional Meeting. The book is intended as a guide for student groups who penetrate remote areas to carry out short term biological survey work. The book has directions for the survey, capture, recording and preservation of everything from crocodiles to chameleons (including snakes, frogs, tadpoles, turtles etc.). Additional sections list UK field equipment suppliers and a bibliography. While strongly oriented toward its mostly English student audience, this useful volume combines sensible and practical information with descriptions of many standard herpetological field techniques. It will keep young English expeditioneers out of trouble and oriented toward useful fieldwork and might be useful reference for other field technical training exercises. It is available from – Expedition Advisory Center, *RGS-IBG, 1 Kensington Gore, London SW7 2AR UK*

PROCEEDINGS OF THE 14TH WORKING MEETING OF THE CSG (Singapore 1998) and 10th Meeting (Gainesville, 1990) can now be ordered from Zoo Book Sales, 403 Parkway Ave.N., P.O. Box 405, Lanesboro, MN 55949-0405. Ph. 1 507 467 8733, fax 1 507 467 8735, Email <zoobooks@means.net>. Zoobooks will promote and distribute the Proceedings for CSG at the CSG price of $40.00. CSG retains its small profits from Proceedings sales and is relieved of the marketing and distribution burdens in a mutually advantageous arrangement that should make the Proceedings more readily available to a wide audience. If this experiment proves satisfactory, additional Proceedings will be reprinted and made available through this outlet.

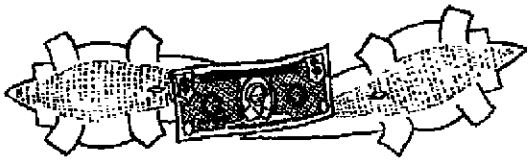
ZOOS

PHILIPPINE CROCODILES ARRIVE IN WASHINGTON, DC. Two *Crocodylus mindorensis* were delivered to the National Zoological Park on 1 March 1999. The two crocodiles were hatched by Colette Hairston Adams at the Gladys Porter Zoo in Brownsville, Texas on 27 August 1994. They have been reared by Crocodile Conservation Services since January 1996. The National Zoological Park will participate in the international effort to preserve this critically endangered crocodilian. The crocodiles remain the property of the Government of the Philippines. – Bruce Shwedick *Crocodile Conservation Services, P.O. Box 3176, Plant City, Florida 33564. E-mail: shwedick@aol.com*



C. mindorensis from Gladys Porter Zoo, raised at Crocodile Conservation Services and now housed at National Zoo. B. Shwedick photo.

TRADE



CROCODILE CHAIRS. An unusual offering of crocodile leather for furnishings was recently displayed in the USA. Upmarket Louis Shanks Furniture Store in Austin, Texas, USA, is stocking a new feature line of full size wing back chairs covered in crocodile skin. The chairs, constructed and finished by furniture manufacturer William Alan Ltd. of Greensboro, SC, are covered with single skins of 'monster crocs' legally harvested from the wild in Australia. Each chair carries a certificate of authenticity and brass plate attesting that the skins are registered and legally harvested. The prototype chairs retail for about $70,000 US each, but future models covered in farm raised crocodile skins will be a more modest $10,000 - $30,000 each.

"Crocodile skin is the most valuable exotic leather and the chairs will be very limited because of the size of the skins needed. Crocodile skins are already used for a variety of luxury goods and everything I've read points to a strong luxury market," noted manufacturer Price. The skins are tanned and finished at Hermes in France and will be available in either glove-tanned or glaze finish. William Alan will also incorporate crocodile leather accents into complimentary furniture to utilize waste pieces.– *from Furniture Today 12 April 1999. Submitted by* Ana Maria Trelancia, *c/o L. Alcazar, Av. Pardo y Aliaga 695, Lima Peru.*

PERSONALS

Eric Fernandez, Apt. postal 2734 San Pedro Sula, Honduras, tels:(504)553-2379/566-2109, tel/fax:(504)552-1629, e-mail: biotech@netsys.hn; co-founder and general manager of Cocodrilos CLAL Continental S.A. de C.V. has left his position after over ten years of service to the company. Eric is continuing his work with crocodiles and in the areas of biological diversity and sustainable use of natural resources and with a special focus in Latin America and the Caribbean. He is also available for consulting in these areas.

Professor Rohtash Gupta, *Department of Zoology, Kurukshretra Univserity, Kurukshretra 136 119, India*, has been carrying out research on the ecology and behavior of mugger crocodiles at Bhor Sainda Crocodile Sanctuary in Haryana State since 1982. This long term project has produced numerous reports and research papers and thesis topics for P. Sri Hari MSc. And Dr. C. Shekhar Bhardwaj. The Bhor Sainda Sanctuary is a compact research site where conditions allow study of burrowing behavior, basking, daily activity patterns and post breeding activities. The Sanctuary supports a population of about 20 crocodiles.

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.

15th Working Meeting of the Crocodile Specialist Group
Varadero, Cuba

CSG Steering Committee Meeting, 15-16 January 2000
15th Working Meeting, 17 – 20 January 2000

GENERAL INFORMATION.

The 15th Working Meeting of the Crocodile Specialist Group will be held at the international beach resort of Varadero, Republic of Cuba. The meeting is hosted by a consortium of the Cuban Ministry of Environment and Technology, Ministry of Agriculture and Ministry of Industrial Fisheries.

Varadero Convention Center
Plaza America, Autopista de las Americas km11
Varadero, Matanzas, Cuba

Varadero beach, located approximately 100 km East of Havana, the Cuban capital, is a distinguished destination, world famous for its beauty and the quality of its beaches of fine white sand bounded by the warm clear waters of the Antillean sea. The Varadero Convention Center is one of the largest and most modern facilities of this kind in Cuba and Latin America. Located on a beautiful arm of the sea and green area, the Center has comfortable air-conditioned working areas for meetings containing all the necessary facilities including simultaneous translation, audiovisual services, computers and telecommunications. It is situated on Plaza America, an area of exhibits, boutiques, restaurants, bars and cafes, banks and medical services. The downtown commercial district of Varadero, tourist facilities, meeting hotels and the Varadero International airport are within a 25 minute trip.

Weather in Cuba at this season should be warm (15-25 C) and pleasant with occasional cold fronts bringing cloudy and rainy conditions. Light casual clothing, swimming trunks, and a light sweater or jacket are recommended. Cuban and CSG dress code for the meeting is informal. All expenses for visitors in Cuba are denominated and payable in US dollars. Prices are generally comparable to other international tourist centers. Transport around Varadero can be by taxi; rented automobile, van or jeep; horse drawn carriages and bicycle 'rickshaws'.

No special medical advisories or vaccinations are required for Cuba, however, participants should bring any special or routine medications they require.

The call for papers will be issued with the next Newsletter. Some major themes of the meeting are anticipated to be:

Crocodilian Conservation and Management in Cuba.
Crocodilian Conservation and Management in the Wider Caribbean and Latin Region.
Problems of success; crocodile population recovery and Crocodile – Human interactions.
Re-evaluation of crocodilian species status and IUCN Red Listings.
Crocodile disease and veterinary treatment.
Crocodile Trade controls and CITES developments.
Current developments in crocodilian DNA studies and their application to conservation.

REGISTRATION

Participants are asked to submit a Registration Form as soon as possible, however, registration payments can be paid on arrival at the Meeting. For this purpose registration will be available before the meeting in the Convention Center, Central Area lobby on 15-16 January, 9 am – 11 am and 2 pm – 5 pm. All materials except the Proceedings will be distributed at registration. Registration and all other tourist charges in Cuba are payable in US currency. We can accept US cash, Traveler's Checks and credit cards **not originating from US banks**. Most major credit cards such as VISA, Mastercard, Eurocard, Diners Club not originating from banks in the USA are fully acceptable. Payments by Traveler's Check will incur a surcharge of 3%.

The Registration Fee for the meeting is $150.00 US. This charge covers credentials and admission to all sessions of the meeting, opening ceremony, welcome cocktails, coffee breaks, a mid-week informal beach barbecue, and closing dinner. Programs and notes, daily hotel transport and the Meeting Proceedings are also included. Lunch and other meals are not included.

Companions
A modified registration fee of $80.00 US is charged to companions, (spouses, children etc.) who wish to attend the meeting and social events. This covers the welcome cocktails, barbecue, closing dinner. Companions attending should be indicated on the registration form and can complete their registration at the same time as other delegates. There will also be an optional program of cultural and recreational activities available for companions.

Draft Meeting Program

Monday, 17 January. 9.00 am Opening ceremony
pm working sessions
8.00 pm Welcome cocktails
Tuesday, 18 January. 9.00 am – 12.00 pm and 2.00 pm – 6.00pm Working sessions
Wednesday, 19 January. 9.00 am- 12.00 pm Working sessions
1.30 PM – 8.00 pm field trip and informal beach barbecue, Varadero Marina
Thursday, 20 January. 9.00 am – 12.00 pm Working sessions
4.00 pmClosing ceremony
8.30 pm Closing dinner.

Simultaneous translation Spanish - English will available for all plenary and working sessions. A separate call for papers will be issued in the CSG Newsletter.

For additional information and to initiate Registration and allow the orderly planning of meeting facilities, please complete and return the enclosed Registration application to:

Lic. Roberto Rodriguez Soberon
Programa Nacional de Cocodrilos
Minsiterio de la Agriculturas piso 14
Conill y Ave. Independencia, Plaza,
Cuidad de la Habana, Cuba
Phone 537 84 5396, fax 537 84 5443 or 537 24 9227
e-mail ffauna@minag.gov.cu

TRAVEL

The principle points of entry and exit to Cuba are international airports at Havana and Varadero. The Varadero International Airport is connected by regular and charter flights to the principle capitals of Europe, Latin America and Canada. Airlines with scheduled flights into Varadero include Cubana de Aviacion, Air Europe, Balair, Condor, LTU, Canair, Royal, Lavda Air, AOM, Monarch, Airtransat, Finair, Sky Service, Aerocancun and Panair. The Havana International Airport has direct flights and connections to the five continents. Flights directly from the USA (Miami) are often heavily booked and more expensive than other routes. Participants are advised to plan their route directly from non-US destinations or from the USA via Cancun, Mexico, or Nassau, Bahamas.

Visas and Passports

Visitors to Cuba require a valid passport. Tourist visas (tourist cards) can be obtained from Cuban Embassies, your airlines or travel agent, or upon arrival, HOWEVER, participants intending to join the post meeting field trips to "The Crocodile Week" workshop and festival on Isla de Juventud or to the Monte Cabaniguan Fauna Refuge will require a 'working visa'. This will be arranged by the meeting organizers and be available on your arrival in Cuba. To request a working visa please complete this section of the Registration Form.

Participants resident in the USA or proceeding directly from the USA should check the special US regulations affecting their travel (contact CSG Executive Officer, fax 1 352 392 9367 or Email <prosscsg@flmnh.ufl.edu> Current US regulations allow travel for the purposes of attending a scientific meeting without additional or special permits or applications.

Local transfers

For the CSG meeting, a special transport service has been arranged for a modest price between international entry points and the respective hotels in Varadero. This service will also be available to delegates who will overnight in Havana and for their onward travel and travel to various post meeting events.

The tariffs for these services are:

Havana Airport - Havana Hotels $3.00 US
Havana Hotels - Varadero Hotels $18.00 US
Havana Airport - Varadero Hotels $20.00 US
Varadero Airport - Varadero Hotels $5.00 US

To efficiently organize transfer of arriving participants to their hotels, please provide your flight information on the Registration Form.

IMPORTANT: Please keep us advised of changes in your flight and arrival schedule.

HOTELS

The following Hotels are contracted to provide services to CSG Working Meeting participants at preferential reduced prices. Prices are per person/night and include the specified services and all taxes. Please note that these prices are subject to change.

Hotel	Room only	Room and breakfast	Room, breakfast and supper	Distance to Convention center
Hotel Villa del Mar (Economy **)	$29.00 US	$33.00 US	$39.00US	6 km *
Hotel Bellamar (***)	$47.00US	$51.00US	$61.00 US	8 km *
Hotel Varadero Internacional ****	$76.00US	$82.00 US	$ 95.00 US	3.5 km *
Hotel Arenas las Blancas *****	$94.00 US	$102.00 US	$121.00US	4 km *

Most rooms can be obtained with two single beds or one double bed. A reduction in per person tariff of approximately 15% - 20% can be obtained by two persons sharing one room. A list of persons seeking roomates will be available. To be on this list check the box on the registration form.

* A twice daily free bus service to the Convention Center will be provided.

Reservations should be made through the official meeting tour agency ECOTUR at the address, phone and fax noted below. Participants are strongly urged to make their hotel reservations before 31 October 1999 in order to guarantee these prices and ensure that the space we have block reserved for the meeting remains available. Reservations made after this date will be subject to a surcharge of 15%. The usual practice is to prepay one night's accommodation and the remainder at the time of hotel registration. Prepayment is required of all participants except permanent residents of the USA, who may pay upon arrival/registration.

Registration and additional information concerning Hotels should be addressed to:

Mr Ricardo Martinez
ECOTUR S.A., Avenida 5ta. Esq. 98 Miramar
Cuidad de Habana, Cuba
Telephones 537 24 5195, 537 29 3910, Fax 537 24 7520 or 537 24 9227
Email <alconasa@ceniai.inf.cu> or <ffauna@minag.gov.cu>

Reservation charges can be sent by mail or courier to the above address or by bank transfer to:
Banco International de Comercio S.A, Havana
Cuenta Bancaria No. 321 01204300, Account name: ECOTUR S.A.
Payments in Non-US currency will credited at the exchange rate applicable in Cuba on the day of receipt.

POST EVENT EXCURSIONS

There are a wide variety of excursions and trips available to participants. ECOTUR will be pleased to advise on many options for tours and events in Havana, duck hunting, fishing for trophy large mouth bass and bonefish, and visits to the crocodile farm and natural habitats of the Zapata Swamp. Inquiries about post meeting trips should be addressed to ECOTUR and arrangements and payments made during the meeting.

Two options are limited in the number of participants they can accommodate and for these we will distribute an application form on your request (see registration form) and accept applications in the order in which they are received. These excursions are:

1. Isla de Juventud Crocodile Festival and International Workshops. 21 – 25 January. Limited to 20 participants. This excursion will include air transport from Havana to Isla de Juventud, accommodations and meals, participation in the International Workshop on 'Interactions of people and crocodiles' exploring environmental education, management and rational use of crocodilians; participation in a Population and Habitat Viability Analysis (PHVA) for the Cuban crocodile; a visit to the Cayo Potrero crocodile farm and Lanier swamp, natural habitat of the cuban crocodile and site of the recent introduction program. These activities will take place against the background of 'Crocodile Week' a local festival celebrating crocodiles in Cuba and involving exhibits, displays, parades, student competitions and many community events and celebrations. This will be a unique opportunity to assist with 'grassroots' community level crocodile conservation in the field.

2. Monte Cabaniguan Fauna Refuge. 21 –24 January. Limited to 10 participants. This excursion will involve field activities in the largest protected estuarine and mangrove habitat in the Antillean region and one of the largest populations of American crocodile in its range. The trip will include air transport from Havana to Las Tunas (1.5 hours flight); transport by motor launch and 2 days at the rustic 'Miguel Alvarez del Toro' Biological Station and the opportunity to observe the largest breeding sites of *C. acutus* recorded and assist Cuban researchers in their field work. The area also boasts large flamingo nesting rookeries, manatees, bird watching and a varied herp fauna including Cuban boas and iguanas.

To request details and applications for these trips please check the box on the registration form or directly contact:

Lic. Roberto Rodriguez Soberon, Programa Nacional de Cocodrilos
Minsiterio de la Agriculturas piso 14
Conill y Ave. Independencia, Plaza,
Cuidad de la Habana, Cuba
Phone 537 84 5396, fax 537 84 5443 or 537 24 9227
Email <ffauna@minag.gov.cu>

Steering Committee of the Crocodile Specialist Group

Chairman: Professor Harry Messel, School of Physics, University of Sydney, 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:

Deputy Chairmen (New World): Prof. F. Wayne King, Florida Museum of Natural History, Gainesville, FL 32611, USA. Tel: (1) 352 392 1721 Fax: (1) 352 392 9367. <kaiman@flmnh.ufl.edu> **(Old World) Dr. Dietrich Jelden**, Bundesamt für Naturschutz, Konstantin Str. 110, D-53179 Bonn, Federal Republic of Germany. Tel: (49) 228 954 3435 Fax: (49) 228 954 3470 E-mail <JeldenD@bfn.de>

Africa: Vice Chairman: Dr. Richard Fergusson CFAZ, P.O. Box 11 G 11, Highlands, Harare, Zimbabwe. Tel:(263) 473 9163 Fax: (263) 473 1719. Deputy Vice Chairman: Olivier Behra, Lot I BG, 24 Isoraka, Antananarivo, Madagascar. Tel: 261 20 22 29503 Fax: 261 20 22 29519. E-mail <univers.tropical@simicro.mg>

Eastern Asia, Australia and Oceania: Vice Chairman: Dr. Grahame J.W. Webb, P.O. Box 530, Sanderson, NT 0812, Australia. Tel: (618) 8 992 4500 Fax: (618) 8 947 0678. E-mail <gwebb@wmi.com.au>. Dr. Robert Jenkins, Australian National Parks & Wildlife, Australia. Mr. Paul Stobbs, Mainland Holdings, Papua New Guinea. Koh Chon Tong, Heng Long Leather Co., Singapore. Dr. Yono C. Raharjo, Research Institute Animal Production, Indonesia. Dr. Parntep Ratanakorn, Faculty of Veterinary Science, Mahidol University, Thailand. Dr. Choo Hoo Giam, Singapore.

Western Asia: Vice Chairman: Romulus Whitaker, Madras Crocodile Bank, Post Bag No. 4, Mamallapuram 603 104 Tamil Nadu, India. Fax: (91) 44 491 0910. Deputy Vice Chairman: Dr. Lala A.K. Singh, Project Tiger, Similipal Tiger Reserve, Khairi-Jashipur, Orissa, India 757091. Harry Andrews, Madras Crocodile Bank, India. E-mail <sthiru@giasmd01.vsnl.net.in>

Europe: Vice Chairman: Dr. Dietrich Jelden, Bundesamt für Naturschutz, Federal Republic of Germany. Dr. Jon Hutton, Africa Resources Trust, 219 Huntingdon Rd., Cambridge CB3 0DL, UK E-mail <hutton@artint.force9.co.uk>.

Latin America and the Caribbean: Vice Chairman: Alejandro Larriera, Bv. Pellegrini 3100, (3000) Santa Fe, Argentina. Tel: (544) 262 352 Fax: (544) 255 8955. <yacare@unl.edu.ar>, Deputy Vice Chairman: A. Velasco B. PROFAUNA, Torre Sur, Piso 6 CSB, Caracas 1010, Venezuela. Fax: (582) 44 9946. <avelasco@marnr.gov.ve> Aida Luz Aquino, Oficina de CITES-Paraguay, Paraguay. <laquino-cites@sce.cnc.una.py>. Dr. Miguel Rodrigues M. Pizano S.A., Colombia, Dr. Obdulio Menghi, Argentina. Luciano Verdade, Depto. Zootechnia, ESALQ, University of Sao Paulo, Brazil.

North America: Vice Chairman: **Ted Joanen**, Route 2, Box 339-G, Lake Charles, LA 70605, USA. Tel: (1) 318 598 3236 Fax: (1) 318 598 4498. Deputy Vice Chairman: : Dr. Ruth Elsey, Louisiana Wildlife and Fisheries Commission, 5476 Grand Chenier Way, Grand Chenier, LA 70643, USA. Tel: (1) 318 538 2165 Fax: (1) 318 491 2595. Deputy Vice Chairman Alan Woodward, Florida Game & Fresh Water Fish Commission, 4005 S. Main Street, Gainesville, FL 32611, USA. Tel: (1) 352 955 2230 Fax: (1) 352 376 5359.

Science: Vice Chairman: Dr. Valentine A. Lance, San Diego Zoo, P.O. Box 551, San Diego, CA 92112, USA. Tel: (1) 619 557 3944 Fax: (1) 619 557 3959. Deputy Vice Chairman: Dr. John Thorbjarnarson, Wildlife Conservation Society, 185 Street & Southern Blvd. Bronx, NY 10460, USA. Tel: (1) 718 220 5155 Fax: (1) 718 364 4275. <Jcaiman@aol.com>. Deputy Vice Chairman: Prof. I. Lehr Brisbin, Savannah River Ecology Lab, Aiken, SC 29802 USA. Tel: (1) 803 725 2475 Fax: (1) 803 725 3309.

Trade: Vice Chairman: Kevin van Jaarsveldt, P.O. Box 129, Chiredzi, Zimbabwe. Tel: (263) 31 2751 Fax: (263) 31 2928. Deputy Vice Chairman: Mr. Y. Takehara, Japan Leather & Leather Goods Industries Association, Kaminarimon, 2-4-9, Taito-Ku, Tokyo 111, Japan. Tel: (813) 3 865 0966 Fax: (813) 3 865 6446. Deputy Vice Chairman: Don Ashley, Ashley Associates, P.O. Box 13679, Tallahassee, FL 32317, USA. Tel: (1) 850 893 6869 Fax: (1) 805 893 9376.

Trade Monitoring: Vice Chairman: Stephen Broad, TRAFFIC International, 219 Huntingdon Rd Cambridge CB3 0DJ. UK. Tel: 44 122 327 7427 Fax: 44 122 327 7237. Lorraine Collins, CITES Secretariat, P.O. Box 456, CH-1219, La Chateleine, Geneva, Switzerland, Tel. 4122 979 9139.

Ex Officio: Mr. **David** Brackett, IUCN: Species Survival Commission Chairman. Bernardo Ortiz von Halle, IUCN-America del Sur, Ecuador. CITES Observer: Dr. James Armstrong, Asst. Secretary General, CITES Secretariat CH-1219, Chateleine, Geneva, Switzerland.