CROCODILE SPECIALIST GROUP NEWSLETTER

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IUCN - The World Conservation Union
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COVER PHOTO. With a face that only a mother would love, Eric, a 4.7 m long Saltwater crocodile (*Crocodylus porosus*), was removed from the East Alligator River, Kakadu National Park, Northern Territory of Australia, after he posed a risk to public safety. Eric is of cultural significance to traditional owners (Murrwan and Manilaga clans) of the area. At capture, he was very thin, had many teeth missing; had lost around 50 cm of tail, and had fresh scars on his tail and belly, caused through fighting with other crocodiles. Photograph: Judy Arlington.

CSG Newsletter Subscription

The CSG Newsletter is produced and distributed by the Crocodile Specialist Group of the Species Survival Commission of the IUCN-The World Conservation Union.

The 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 to other interested individuals and organizations. All Newsletter recipients are asked to contribute news and other materials.

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Editorial

Held every 2-3 years, the meetings of the Parties to CITES are important events on the CSG calendar, and 14th meeting (CoP14) was no exception. CSG members participated in various capacities at CoP14, and ensured that the CSG played a significant role with regard to crocodilian issues that were discussed by the Parties (see pages 4-7 for detailed summary). Of particular significance, Brazil's proposal for the transfer of its *Melanosuchus niger* population from Appendix I to Appendix II was successful (page 4), and reporting requirements of Resolution Conf. 11.16 on ranching were simplified following recommendations made by the CSG (page 5).

On some issues, CSG involvement will not end at CoP14, and CSG members remain on the working group on personal and household effects, that will continue its work up to CoP15. It is also likely that the CSG will be involved in a review of the universal tagging system for crocodilian skins and consideration of possible ways to reduce the administrative burden associated with trade in small crocodilian leather goods (pages 4-5).

CITES meetings also offer an opportunity to meet with the Management Authorities of most crocodilian range States. Madagascar has been previously identified as a priority area for the CSG, and its non-compliance with Resolution Conf. 11.16 was the subject for discussion at the meeting of the CITES Standing Committee held the day before CoP14 began (page 6). Discussions with the Malagasy delegation at CoP14 confirmed its desire to improve crocodile management, and paved the way for close collaboration with the CSG. The CSG has engaged Christine Lippai to undertake Stage 1 of a project entitled "Assistance to Madagascar for the Improvement of Conservation, Management and Sustainable Use of Crocodiles", and an action plan is now being developed to guide work over the next 2-3 years.

It was encouraging to see that progress is being made in Colombia with regard to a marking system for *Caiman crocodilus* and *Crocodylus acutus* production on farms, through a government Resolution (page 6). Concerns on trade between Cambodia, Viet Nam and China were also discussed in depth with relevant delegations, and a CSG review has been proposed to address these concerns and facilitate closer collaboration between these neighbouring countries (page 6).

Further to the Forum on Crocodiles in the Philippines [CSG Newsletter 26(1): 12-16] the first exchange between Philippine researchers at the University of Southern Mindanao and the Mabuwaya Foundation (Luzon) took place in May (pages 13-14). The visit was very successful, and plans are now underway for researchers from the Mabuwaya Foundation to visit Mindanao (Liguasan Marsh) in the near future. It is hoped that the experiences of the Mabuwaya Foundation can be adapted and applied in Mindanao.

A successful workshop on "Crocodylian Genetics, Molecular Biology and Evolution" was held in Panama in April (pages 23-24). Organisers are to be congratulated for their efforts that brought together researchers from many countries, and set the stage for future crocodilian genetic research efforts.

The proposed CSG West Africa sub-regional meeting will take place in Niger, 13-15 November 2007. Details on this important meeting are available at <www.lafermeauxcrocodiles.com/article.php3?id_article=158>. Unfortunately the African regional meeting, proposed to be held in South Africa in late 2007, is likely to be postponed until 2008, as organizers felt there was insufficient time to ensure good participation from around the region. Details will be announced in the Newsletter as they come to hand.

Prof. Grahame Webb, *CSG Chairman*.

CITES COP14

The 55th meeting of the CITES Standing Committee (SC55) and the 14th Conference of the Parties to CITES (CoP14) were recently held in The Hague, Netherlands, on 2 June and 3-25 June respectively. A number of important crocodilian-related issues were on the agendas of these meetings, some of which were specifically instigated by the CSG.

The CSG was well represented at both meetings, with members participating in their capacity as NGOs (including the IUCN), as members of Government delegations or on behalf of the CITES Secretariat (eg as rappateurs). Participants included; Grahame Webb (Chairman), Dietrich Jelden (Deputy Chairman), Tom Dacey (Executive Officer), Jon Hutton (Regional Chairman Europe), Charlie Manolis (Regional Chairman Australia and Oceania), Don Ashley (Vice-Chairman Industry), Yoichi Takehara (Deputy Vice-Chairman Industry), Hank Jenkins (Vice Chairman CITES), Yoshio Kaneko (Deputy Vice-Chairman CITES), John Caldwell (Vice-Chairman Trade Monitoring), Steve Broad (Deputy Vice-Chairman Trade Monitoring), James MacGregor (Deputy Vice-Chairman Trade Monitoring), Giam Choo Hoo (Regional Vice-Chairman East and Southeast Asia), Olivier Behra (Regional Vice-Chairman Madagascar), Bernado Ortiz (Regional Trade Latin America and the Caribbean), Hideki Sakamoto (Japan) and Norie Shimaoka (Japan).

Standing Committee

SC55 Doc. 13 dealt with Madagascar's crocodile program which consists of ranching of *C. niloticus* eggs and wild harvest of problem animals to an annual maximum of 750 per year. The CITES Secretariat's review mission to Madagascar (November-December 2006) confirmed that Madagascar was not complying with certain provisions of Resolution Conf. 11.16 *Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II*, and that the controls on the ranching operations and problem animal harvests were insufficient to counter obvious abuses taking place.

The recommendations in SC55 Doc. 13 aim to foster improvement of Madagascar's ranching program in compliance with Resolution Conf. 11.16. Revision and implementation of its crocodile management program (Stratégie et Plan de Gestion des crocodiles de Madagascar) was a key recommendation, along with review and regulation of the two current ranching operations and monitoring of the wild population (no surveys have been undertaken since the late 1990s).

The Standing Committee was unable to get through its entire agenda, and SC55 Doc. 13 was not formally considered. However, the Malagasy delegation indicated its support for the proposed recommendations. The Secretariat's recommendations include the involvement of outside experts, including the CSG, in a review of the crocodile management program, capacity building, etc. The CSG has initiated a project under the direction of Christine Lippai to assist Madagascar with the management and sustainable use of *C. niloticus*, and a work plan is now being developed in collaboration with the Malagasy Government (see Editorial, page 3).

CITES CoP14

1. Brazil's amendment proposal was to transfer the Brazilian population of black caiman (*Melanosuchus niger*) from Appendix I to Appendix II. It was adopted by consensus in Committee I. Early drafts of the Brazilian proposal were reviewed by the CSG [see CSG Newsletter 25(4): 3], and concerns on the extrapolation of limited data from one area (Mamiraua Reserve) to derive a total population estimate were addressed by Brazilian authorities through amendment of the proposal (CoP14 Prop. 13 Rev. 1; www.cites.org/eng/cop/14/prop/index.shtml).

   There is little doubt that the *M. niger* population in Brazil is large, and there is no biological reason why the population cannot be used sustainably. The member States of the European Union (27 Parties) stressed the importance of monitoring the initial harvesting trials in Mamiraua Reserve and addressing any difficulties that may arise from split-listing of the species. Range States indicated their support, and Bolivia referred to the need for cooperation to control illegal hunting and trade over shared borders with Brazil. TRAFFIC indicated that it would be willing, in collaboration with the CSG, to assist Brazil as it developed its program if such assistance was requested.

2. Amendments were proposed through CoP14 Doc. 45 to Resolution Conf. 13.7 on control in trade of personal and household effects. A working group was established, which included the CSG (Don Ashley, Tom Dacey), to work on the proposed amendments, particularly "Guidelines for Amending the List of Personal and Household Effects of Appendix-II Species with Quantitative Limits".

   The final document recommends that Parties wishing to amend the list follow the Guidelines contained in the Annex to the Resolution. The list currently includes "specimens of crocodilian species - up to four specimens per person". That is, export permits or re-export certificates for up to "four crocodilian specimens" (= products) carried as personal effects are not required, except where advised through a Notification from the Secretariat or on the CITES website that the other Party involved in the trade requires such documents (or if the limit is exceeded).

The adopted decision (CoP14 Comm.II. 34; www.cites.org/eng/cop/14/com/index.shtml) also directs the Standing Committee to extend the operation of its working group on personal and household effects until CoP15, with the following terms of reference:

a) Clarify the relationship between 'tourist souvenirs' and 'personal and household effects'; and,
b) Report at each regular meeting of the Standing Committee until CoP15 and at CoP15.

3. CoP14 Doc. 43 proposed a review of the implementation and effectiveness of the universal tagging system for crocodilian skins (Resolution Conf. 11.12). The tagging system has been in place since 1992 (CoP8), and since that time has been refined, simplified and made more practical to implement and report.

   During the debate, a number of South American countries requested it be considered together with CoP14 Doc. 46 (submitted by France), which proposed consideration of possible ways to exempt small crocodilian leather goods from the provisions of CITES. The two documents were subsequently merged, and following some minor amendments, the final document was adopted (CoP14 Comm.II. 28; www.cites.org/eng/cop/14/com/index.shtml).

   Decisions direct the Standing Committee to "initiate a process to review the implementation and effectiveness of the Universal Tagging System and the trade in small crocodilian leather goods, including their impact on the effectiveness of the Convention". A working group with representatives from exporting and importing countries, the Animals Committee, the Secretariat and other interested parties will be established to undertake the following tasks:

   a) To examine the implementation and effectiveness of the Universal Tagging System;
   b) To examine the implementation and effectiveness of issuing CITES documents for small crocodilian leather goods and related trade controls;
   c) To consider possible ways and conditions to alleviate the administrative burden related to trade in small crocodilian leather goods and to guarantee the legal origin of the specimens; and,
   d) To report to the Standing Committee on the results of its work at its 58th meeting (2009).

   The report of the working group would be considered at SC58, and recommendations, if appropriate, submitted to CoP15.

4. CoP14 Doc. 21, submitted by the CITES Animals Committee, proposed amendments to Resolution Conf. 11.16 *Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II*.

   These amendments resulted from a detailed review of crocodilian ranching programs undertaken by the CSG. The CSG review concluded that although no Party with a crocodilian ranching program complied fully with the reporting requirements of Resolution Conf. 11.16, the programs had proven to be a safe and sustainable form of use.

   The working group established for this issue included the CSG (Tom Dacey, Hank Jenkins). The final amendments adopted by the Parties will simplify reporting and will require Parties with ranching programs operating under Resolution Conf. 11.16 to report annually to the Secretariat, with information required to monitor and assess the conservation impact of the program on the wild population/s:

   "a) annual reports on all relevant aspects of each approved ranching operation be submitted to the Secretariat by the Party concerned, including the following:
      i) the status of the wild population concerned established by monitoring at an appropriate frequency and with sufficient precision to allow recognition of changes in population size and structure owing to ranching;
      ii) the number of specimens (eggs, young or adults) taken annually from the wild and the percentage of this offtake used to supply ranching operations; and
      iii) details of the annual production levels, and product types and quantity produced for export."

   Other information relating to the ranching operation should be made available to the Secretariat when requested.

   "b) the following information should be maintained by the Party and made available to the Secretariat upon request:
      i) an estimate of the percentage of the annual wild production of eggs, neonates or other life stages taken for the ranching operation;
      ii) the number of animals released and their survival rates estimated on the basis of surveys and tagging programmes, if any;
      iii) the mortality rate in captivity and causes of such mortality;
      iv) conservation programmes and scientific experiments carried out in relation to the ranching operation or the wild population concerned; and
      v) an estimation of the percentage of the distribution area of the species where the ranching is operating".

   A decision also directs the Secretariat, "in consultation

with the Animals Committee, examine Resolution Conf. 11.16 *Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II* with a view of proposing revisions to the Resolution to make its structure more logical, clarify certain recommendations, edit text and reduce overlap between sections for consideration at the 15th meeting of the Conference of the Parties."

The amended resolution (CoP14 Comm.II. 24) is available at: cites.org/eng/cop/14/com/index.shtml.

5. CoP14 Doc. 14 summarised the recommendations of a "CITES and Livelihoods Workshop" held in South Africa in 2006, and proposed draft decisions to implement those recommendations. Following extensive discussion in Committee II, a working group was established to amend the document in light of concerns raised by some Parties that consideration of livelihoods when amending the CITES Appendices could undermine the scientific credibility of CITES.

   The final adopted decision (CoP14.Comm.II 12; www.cites.org/eng/cop/14/com/index.shtml) directs the Standing Committee to initiate and supervise a process to develop, by CoP15:

   "a) tools for voluntary use by the Parties for the rapid assessment at the national level of the positive and negative impacts of implementing CITES listing decisions on the livelihoods of the poor, in conformity with Resolution Conf. 8.3 (Rev CoP13).
   b) voluntary draft guidelines for Parties to address these impacts, particularly in developing countries. The guidelines should, where possible, assist Parties to develop local, national and regional initiatives that take account of the impacts of implementing CITES listing decisions on the livelihoods of the poor. This process may benefit from taking account of the deliberations and recommendations of the CITES and Livelihoods Workshop (5-7 September 2006) and should draw on the technical contributions of Parties, the Secretariat, NGOs and other national and international agencies, such as IUCN.

   For further clarification, the process shall not include consideration of the criteria for amendment of the Appendices, the requirement for making of non-detriment findings, [or the conduct of the review of significant trade]."

6. The opportunity was taken during CoP14 to liaise with various CITES Management Authorities about crocodilian issues in their respective countries. These included:

- Colombia: Efforts by industry and Government have resulted in a Resolution on the implementation of a marking (scute-clipping) system for captive hatchling production of *Caiman crocodilus* and *Crocodylus acutus*.

- Vietnam, Cambodia, China: The possibility of a CSG review of crocodile management and conservation in Vietnam was discussed with Vietnamese officials, including the responsible Vice-Minister. In recent years there has been significant trade in hatchlings, between Cambodia and Vietnam, and in raised stock between Vietnam and China [see CSG Newsletter 25(4): 3]. Concerns have been raised on the legality of some of this trade, and with the increased development of farming in Vietnam, a review is considered opportune: a CSG review of crocodile management in Cambodia was undertaken in 2005 [see CSG Newsletter 24(1)]. More important, the remaining wild *Crocodylus siamensis* population in Cambodia still appears to be under threat from illegal harvesting for crocodile farms, despite low prices for hatchlings.

  Given the significant trade relationships between these three countries (and Thailand), it is important for them to liaise more closely. A hatchling marking system that can help to identify legally-acquired stocks entering farms in each country may help, and needs to be discussed with Cambodia, Vietnam and China.

- Venezuela: The Orinoco crocodile population in Venezuela has recovered substantially from the low levels of some 30 years ago. The largest population exists in the Cojedes River, but there is significant degradation of the habitat and some illegal hunting of crocodiles and taking of eggs [CSG Newsletter 26(1): 9-10]. Wild eggs are currently collected, incubated and the headstarted young reintroduced into the wild. The reintroduction program will continue, but the importance of involvement in the program by local communities has been recognised as vital to the long-term recovery of the *C. intermedius* population. A ranching program could allow tangible benefits to be derived by local people, and also provide financial support for facilities involved in the reintroduction program. The Venezuelan Government is currently investigating the potential for the establishment of a limited ranching program.

- Brunei: There has been an increase in human-crocodile conflicts recently, but there is a lack of information on the status of *C. porosus* throughout the country. Recent spotlight surveys in Brunei

Bay indicated low densities (0.31 non-hatchlings sighted per km) in that area [CSG Newsletter 26(1): 10-12]. Options to manage the species on a sustainable basis are being considered.

- Philippines: Based on experience with other crocodilian species, there is reason to expect that the proposed *C. mindorensis* headstarting program at Isabela should not be successful. The CSG offered technical advice to the Philippines, should it be required.

- Cuba: A proposed review of crocodile management (*C. rhombifer* and *C. acutus*) was discussed with the Cuban Management Authority.

- Tanzania. Information was sought on the crocodilie program and status of the survey program.

- Egypt: Increasing human-crocodile conflict has been reported in Lake Nasser. Authorities are keen to assess the *C. niloticus* population and investigate options for sustainable use that can benefit local fishermen living and working in the area.

Overall, the CSG played a significant role in consideration of crocodilian issues discussed by the Parties at CoP14.

Tom Dacey, *CSG Executive Officer, csg@wmi.com.au.*

INDIAN GHARIAL LISTED AS "CRITICALLY ENDANGERED" IN IUCN RED LIST. The current status of the Indian Gharial (*Gavialis gangeticus*) was reviewed by a CSG working group led by Dr. John Thorbjarnarson (CSG Red List Authority) and Dr. Perran Ross (CSG Vice-Chairman IUCN) in late 2006.

Information was gathered for each country within the species range from relevant authorities (India - B.C. Choudhury, L.A.K. Singh, R.J. Rao, Dhruvajyoti Basu, R.K. Sharma, S.A. Hussain, Harry V. Andrews, Nikhil Whitaker, Romulus Whitaker, Janaki Lenin; Nepal - Tirtha Maskey, Antoine Cadi; Bangladesh - S.M.A. Rashid; Pakistan - Abdul Aleem Choudhury; Bhutan - Benu Dahal; Myanmar - U Win Ko Ko).

The review concluded that *G. gangeticus* qualified for inclusion in the IUCN Red List of Threatened Species as "Critically Endangered" (CR) under Criteria C1 and A2bc. This updated status will be included in the 2007 Red List which is expected to be released in mid-September.

Criterion C1 - "Population size estimated to number fewer than 250 mature individuals and an estimated continuing decline of at least 25% within 3 years or one generation". Latest estimates of adult population size indicate a 58% decline across the species' range over a 9-year period (well within one generation), from 436 adult gharials in 1997 to 182 in 2006. The rationale for Criterion C was:

- The adult gharial population was estimated by using nest counts, as nests are easily visible and can be counted at well-known locations that have been monitored for decades. This is also a more accurate assessment for numbers of adults as the unknown number of immature males that are routinely counted as 'adults' are not included. Using the only published data on ratios of males in the mature gharial population (Hussain 1999), it can be inferred that 14% of all 'adults' reported in gharial censuses are sub-adult males.

- The Chambal River holds the largest breeding sub-population, estimated at 48% of the total population. Sixty-eight (68) nests were found in the Chambal Sanctuary in 2006. The only other large breeding population of gharial in India is in the Katerniaghat Wildlife Sanctuary, where 20 nests were located in 2006. The one other known breeding population in India is the Son River Sanctuary, with 2 nests (Andrews 2006).

- Since most female gharial nest every year in captivity, it is reasonable to assume that the recorded nest counts indicate the presence of 90 reproducing female gharial in India. Assuming that the sex ratio (14% males) reported in the Chambal by Hussain (1999) is the same in Katerniaghat and Son Sanctuaries, there would be an inferred total of 13 mature male gharials throughout India. Considering the reported paucity of mature males (conspicuous with their gharas) on the Chambal surveys of 2005 and 2006, it is likely that there are very few mature males in that river (Andrews 2006; Rao, pers. comm.). Along with a total of 20 nesting females, 6 mature male gharial were counted by independent observers in 2006 (B.C. Choudhury, H.V. Andrews, R. Whitaker, pers. obs.). The total estimated number of mature gharial in the three remaining wild breeding sub-populations in India is thus estimated as 107 individuals.

- Other species of crocodilians are reported to nest less frequently than every year. Estimates of reproductive frequency (% females nesting per year) range from 10% to 90% with a median value of 63% (Thorbjarnarson 1996). Although it was assumed that most gharials nest annually, some females may have migrated downriver away from where the few males still exist. Applying this median crocodilian value to the estimate and adding the estimates for all Indian and Nepali sub-populations would only increase it to 220, still below the numerical threshold for CR using Criterion C.

- There are two other small, non-reproducing populations of gharial in India (Ken River in Madhya Pradesh and Mahanadi River in Orissa) and three in Nepal (Kosi, Karnali and Babai Rivers), all of which

have been supplemented by the reintroduction of captive-bred stock (as in all present gharial locations). There may also still be a few scattered gharial in the Brahmaputra River of northeast India but there have been no confirmed sightings since 1993 (Choudhury 1997). These other sub-populations in India contain an estimated 40 mature animals (no mature males reported). The species is extinct in the Indus (Pakistan/ India) and Irrawaddy (Myanmar) River systems.

- In Nepal, 6 nests were counted in 2006 and the total number of mature gharial in all sub-populations in that country is estimated at 35 animals (Maskey 1999; pers. comm.).

- Based on these estimates the number of wild, mature gharials across the species' range (presently only India and Nepal) is 182 in about 8 non-contiguous, fragmented habitats (note that 14% of these 'adults' can be inferred to actually be sub-adult males, bringing the total down to 157).

- The peak year with the highest number of wild mature gharials and nests recorded in the last 30 years was 1997 (226 mature animals and 81 nests recorded in the Chambal; Sharma and Basu 2004). There were no nests in the Son, where there were about 10 adults, and no nest data for Katerniaghat where an estimated 30 adults were present. No nesting data from Nepal exist for this period, but Maskey (1999) estimated 36 adults present.

Table 1. Estimated population sizes and reductions over one generation (*) for *Gavialis gangeticus* at different locations in India and Nepal. Sex ratios (females: males) are shown for some population estimates.

Sub-population	Past (Year)	Present (Year)	Estimated Reduction*
India			
Chambal	226 (1997)	78 (2006) 68F:10M	65%
Katerniaghat	30 (1997)	26 (2006) 20F:6M	13%
Son	10 (1997)	3 (2006)	66%
Other	50 (1997)	40 (2006)	20%
Nepal			
Chitawan	20 (1999)	8 (2006)	80%
Other	100 (1994)	27 (2006)	73%
Overall	**436**	**182**	**58%**

- Based on available data (Sharma and Basu 2004; Maskey 1999), and adding the 1997 estimated numbers of mature, non-breeding animals (in small sub-populations outside of the three Indian and one Nepali breeding subpopulations - a total of 50 animals), the estimated total mature gharial population throughout its present range (India and Nepal) in 1997 was 436.

- The decline from an estimated 436 adult gharials in 1997 to 182 in 2006 represents a 58% decline. This drastic decline has happened with a period of 9 years, well within the span of one generation, qualifying the gharial, under Criterion C1, to be listed as Critically Endangered. Using the highly conservative estimate of 220 (based on only 63% of the adult females nesting annually) this would represent a 36% decline, still well within the 25% decline criteria for a CR listing. Estimated declines in the number of adult gharials, by sub-population, are summarised in Table 1.

Criterion A2 - "Reduction in population size based on an observed, estimated, inferred or suspected population size reduction of ≥80% over the last 10 years or 3 generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (b) an index of abundance appropriate to the taxon and (c) a decline in area of occupancy, extent of occurrence and/ or quality of habitat)". Very conservative estimates of population decline over a 3-generation period (from 1946 to present) indicate there has been a 96-98% population decline, and the once widespread population has been reduced to a very small number of widely spaced sub-populations. The rationale for Criterion A are:

- The generation length for the species is 20 years (the age at which 50% of total reproductive output is achieved). The Red List criteria requires "declines measured over the longer of 10 years or 3 generations", in this case the population decline since 1946.

Literature

Andrews, H. (2006). Status of the Indian Gharial (*Gavialis gangeticus*), Conservation Action and Assessment of Key Locations in North India. Report to the Madras Crocodile Bank Trust.

Choudhury, A. (1997). Status of gharial in Arunachal Pradesh. CSG Newsletter 16(3): 8.

Hussain, S.A. (1999). Reproductive success, hatchling survival and rate of increase of gharial *Gavialis gangeticus* in National Chambal Sanctuary, India. Biological Conservation 87: 261-268.

Maskey, T.M. (1999). Status and conservation of gharial in Nepal. Pp. 95-99 *in* ENVIS (Wildlife & Protected Areas) Vol. 2(1). Wildlife Institute of India: Dehra Dun.

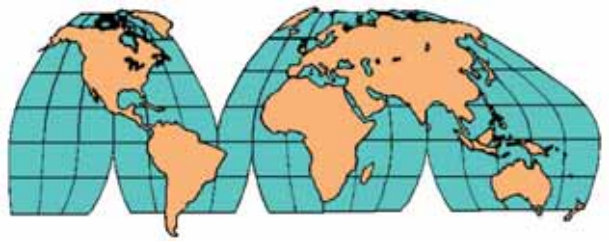
Sharma, R. and Basu, D. (2004). Recent reversals in the population trends in the population of gharial in the National Chambal Sanctuary in North India;

implications and a suggested strategy for the conservation of one of the world's most endangered crocodilians. Pp. 180-186 *in* Crocodiles. Proceedings of the 17th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.

Thorbjarnarson, J.B. (1996). Reproductive characteristics of the Crocodylia. Herpetologica 52(1): 8-24.

Report based on Red List Summary compiled by the CSG working group (see text).

Regional Reports



West Asia

India

RESULTS OF 2007 CENSUS OF SALTWATER CROCODILES. A census of Saltwater crocodiles (*Crocodylus porosus*) was conducted in the river systems inside and outside of the Bhitarkanika Wildlife Sanctuary in Orissa, India, from 7-10 January 2007. The objectives were to assess population size and trends, recruitment, migration, survival, etc.

Crocodiles were counted through both day and night surveys. Basking crocodiles >2.0 m TL (sub-adults, adults) are mostly sighted during the day, and crocodiles <2.0 m TL (hatchlings, yearlings, juveniles) are sighted during spotlight surveys.

A total 1497 crocodiles were counted in the river systems, comprising 1413 from Bhitarkanika Sanctuary and 84 from outside the sanctuary. Notwithstanding the different types of survey (see above), the 2007 results indicates a 23.5% increase in numbers of non-hatchlings since 2006 (see Table 1).

The estimated population in the Sanctuary in 1976/77, prior to the 'rear and release' program, was 95 crocodiles (61 hatchlings/juveniles, 6 sub-adults and 28 adults). More than 2275 captive-reared crocodiles (approximately 1 m total length) from the Dangmal Crocodile Research Centre have been released into the river systems of Bhitarkanika Wildlife Sanctuary in phases since 1977. In addition there has been natural recruitment (Table 1).

Table 1. Numbers of *C. porosus* in different size classes counted, 2000-2007. H= hatchlings; Y= yearlings; J= juveniles (sighted during night surveys); SA= sub-adults; A= adults (sighted during day surveys).

Year	H	Y	J	SA	A	Total
2000	319	181	123	145	146	914
2001	341	277	237	36	107	1098
2002	441	340	187	145	217	1330
2003	484	370	180	82	192	1308
2004	525	303	210	100	220	1358
2005	681	290	169	107	207	1454
2006	657	283	197	122	203	1462
2007	503	368	259	135	232	1497

Results can be summarised as:

1. The *C. porosus* population has increased markedly, with relative density increasing from 0.87 ind./km in 1976-77 to 12.0 ind./km in 2006-07.

2. Regression analysis indicates the mean rate of increase in hatchling *C. porosus* sighted during night surveys is significant (r^2= 0.70; p= 0.01), at 9.7% p.a. (2000-2007).

3. Regression analysis indicates the mean rate of increase in "small" *C. porosus* (yearlings, juveniles) sighted during night surveys is not significant (r^2= 0.34; p= 0.13), albeit the rate is positive at 5.1% p.a. (2000-2007).

4. Regression analysis indicates the mean rate of increase in large *C. porosus* (sub-adults, adults) sighted during day surveys is not significant (r^2= 0.28; p= 0.18), albeit the rate is positive at 6.7% p.a. (2000-2007).

5. Notwithstanding the different survey methodologies (night and day counts), data indicate the non-hatchling *C. porosus* population increased markedly between 1976/77 and 2000, continued to increase in 2000-2001, remained somewhat stable between 2002 and 2006, and then increased markedly in 2007.

6. The Saltwater Crocodile 'Rear and Rehabilitation' Program in Bhitarkanika Sanctuary/National Park has been succesfully implemented since 1975.

7. Captive-reared *C. porosus* released into the wild have successfully bred (about 60 nests were located in different forest blocks of the sanctuary during the 2006 nesting season).

8. Kanika Range holds 75.8% of the current crocodile population.

9. The areas with the highest crocodile populations

(main Bhitarkanika River from Khola to Pathasala, Thanapati, Mahinsamada, Suajore and Baunsagada Creeks, Kalibhanjadia, etc.) have:

a. Good mangrove cover and fringing mangrove vegetation;
b. a network of creeks and creeklets;
c. stretches of undisturbed mud banks as favoured basking sites, less human disturbance (little or no illegal fishing activities); and,
d. hypo-saline condition of water in the creeks.

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"CROCODILE FEARS". A recent article in "Down to Earth" explores human-crocodile conflicts in Bhitarakanika National Park. Bhitarakanika National Park is a 145 km^2 area within the 672 km^2 Bhitarakanika Wildlife Sanctuary. There are about 50 villages around the national park, and about 407 villages within the sanctuary. Habitat for saltwater crocodiles (*Crocodylus porosus*) lies within the core national park, which is expected to be free of human interference.

Official records indicate 14 fatal attacks between 1996/97 and 2002/03. The article also describes recent fatal and non-fatal attacks on villagers, who refute official claims that crocodiles are only attacking people who enter crocodile habitat. Although authorities assist villagers through their employment as guards, boatmen and contract workers, the villagers claim that such activities are rare. In addition, villagers also claim that official compensation in the case of death by a crocodile attack, Rs 100,000 (up from Rs 10,000 two years ago), is not always paid.

Regardless of the conflicting claims from both sides, the long-term conservation of *Crocodylus porosus* may ultimately depend on the creation of economic incentives through sustainable use. This option has been rejected by authorities at this time, as the population continues to recover from low levels 30 years ago (see previous Newsletter article).

Source: *Ashutosh Mishra (2007). Crocodile fears. Bhitarakanika too small for reptiles and people. Down to Earth 15(23): 46-48.*

CROCODILES LET LOOSE TO SAVE MANGROVE. The Kalinga Times (Orissa) reports a "novel experiment", where forest department personnel have released groups of captive-bred Saltwater crocodiles (*Crocodylus porosus*) into Bhitarkanika Wildlife Sanctuary to reduce human activities in the fast-depleting mangrove forest.

Forest officials said that as many as 48 crocodiles had been released last week into the Kharinasi and Jamboo areas, in the southernmost part of the sanctuary. "We are pressing into service these reptiles for forest conversation. Once crocodiles are firmly ensconced in the water inlets, human intrusion would be greatly curtailed. Fear of croc attack would keep the human trespassers away from the water sources. As the people here take the water route to sneak into the forest, we feel the crocs may come in handy to protect the forest," observed Golakh Rout, Additional Conservator of Forest, Rajnagar Mangrove (Wildlife) Forest Division.

Previously, captive-bred crocodiles were released in the core areas of the sanctuary surrounded by thick mangrove vegetation (see previous articles in this Newsletter), but it seems that release sites have now been extended to other parts of the Sanctuary.

Source: *Manoj Kar, Kalinda Times, 18 June 2007 (www.kalingatimes.com/orissa_news/news/20070618_Crocodiles_let_loose_to_save_mangrove.htm).*

North America

United States of America

RECOVERING AMERICAN CROCODILE RECLASSIFIED FROM "ENDANGERED" TO "THREATENED". The US Fish and Wildlife Service has reclassified the American crocodile (*Crocodylus acutus*) in Florida from "Endangered" to "Threatened" under the Endangered Species Act. The final reclassification decision comes after completion of a 5-year review, and reflects recovery efforts that have allowed the population to increase.

When the American crocodile in Florida was listed as endangered in 1975, the population was estimated to be 200-300 individuals. The current population is estimated to be 1400-2000 non-hatchlings. About 95% of the remaining crocodile habitat in southern Florida has been acquired by Federal, State and County agencies, which should allow the population to continue to expand.

Potential threats such as habitat degradation, nest predation and increased encounters between crocodiles and people will continue to be monitores and managed.

A copy of the final rule and other information is available at "www.fws.gov/verobeach".

Source: *US Fish and Wildlife Service (Southeast Region) press release, 20 March 2007 (www.fws.gov/southeast/news/2007/r07-051.html)*

This photograph shows a 3.8 m (12’ 6”) alligator that was removed from a crawfish pond in Lydia, Louisiana, by trapper Russell Bourgeois. The landowner, driving the tractor, was keen to give the alligator a “helping hand” off his property. Photograph: Russell Bourgeois.

FLORIDA DROUGHT. Florida has experienced a 16-month drought, which threatens to impact on alligator nesting in 2007. An index of the drought are the growing numbers of alligators heading to any remaining pools of water in the Everglades.

Source: *HerpDigest Volume 1, Issue 35, 14 April 2007*.

East and Southeast Asia

TWO ATTACKS BY CAPTIVE CROCODILES**.** One fatal and one serious non-fatal attack by captive crocodilians attracted considerable media attention recently (April 2007).

The first incident occurred in Taiwan, and involved a a 200-kg Nile crocodile (*Crocodylus niloticus*) at the Shaoshan Zoo in the southern city of Kaohsiung. A veterinarian was reaching through a fence to retrieve a tranquiliser dart from the crocodile’s skin, when the animal grabbed his forearm and completely severed it. The forearm was recovered intact, and re-attached after 7 hours of surgery.

The second incident involved four children who entered a crocodile enclosure at the Yintan Holiday Resort, Beihei City, South China, and started shooting at the 11 resident crocodiles with slingshots and hitting them with sticks. One of the crocodiles grabbed a 9-year-old boy and dragged him into the water, where he was devoured by the crocodiles. Parts of the boy’s body were later recovered from inside one of the crocodiles. The crocodile pool had been temporarily closed, and the crocodile keeper was cooking a meal and did not notice the children enter. An investigation is underway into the incident. The three children who witnessed the attack are receiving psychological counseling.

Sources: *www.smh.com.au/articles/2007/04/12/1175971189283.html; www.china.org.cn/english/China/211055.htm*.

Thailand

Thai scientists have successfully produced false teeth and dental transplants using crocodile eggshells and bones as raw material. Upsorn Boonyang of the Kasetsart University team responsible for the breakthough, said the new technology would mean that hydroxyapatite, the main ingredient used in false teeth, would not need to be imported as much, thus reducing costs. Hydroxyapatite is usually derived from chicken egg shells in developed countries. The scientists decided to try crocodile eggshells and bones, as these were abundant from Thailand's many crocodile farms.

Source:*www.news24.com/News24/Technology/News/0,,2-13-1443_2102428,00.html*.

Lao PDR

UPDATEONSIAMESECROCODILECONSERVATION IN SAVANNAKHET PROVINCE, LAO PDR. From 14-16 May 2007, 21 representatives, including village heads, from 7 villages in Champhon District, Savannakhet Province (southern Lao PDR) traveled 90 km to Xaibouli District, to discuss community use and management of wetlands which support *Crocodylus siamensis* (Siamese crocodile). The aim of this visit was for district communities to exchange local knowledge about community-based approaches to wetland management, and cultural beliefs and conservation of *C. siamensis*. The visit was organized by the Champhon District Agricultural and Forestry Office and sponsored by the WWF Laos "Community Fisheries" Project (ComFish), and was based upon the recommendations of a 3-day PAFO/WWF ComFish "Crocodile Conservation Workshop" held in Champhon District in October 2006 [see CSG Newsletter 25(4): 10-11; IUCN Species 46: 17-18)].

This was the first time that community members from Champhon District have had the opportunity to observe wetlands and crocodiles outside of their village areas, and to discuss the approaches to wetland management and crocodile conservation in Xaibouli District. The village representatives from Champhon District were welcomed by their counterparts at Ban Boua Thong village, which is located next to the Beung Boua Thong wetland which supports a single resident *C. siamensis* (Fig. 1). Activities over the three days included group discussions and observation of the wetland, which is regarded as sacred by local communities who believe that wetland spirits reside within crocodiles in the area [first reported by I. Baird (2001) in CSG Newsletter 20(2): 22-24)].

During group discussions villagers identified that different opportunities and constraints for wetland management exist for each specific village, and that agricultural development and land conversion near wetlands are the main threats to *C. siamensis*. The visit clearly identified community willingness to conserve *C. siamensis*, but villagers also noted the problems and challenges of conserving crocodiles against increasing local needs to use wetlands for agricultural development. Participants also noted they did not understand enough about crocodile habitat requirements to enable them to develop wetland conservation measures that would benefit crocodiles. Beung Boua Thong wetland was discussed as an example of these challenges: despite strong local belief in wetland spirits and strict community regulations that prohibit fishing, hunting or logging in the proximity of the sacred wetlands, villagers reported they have not observed signs of successful breeding for many years, and only occasionally see other crocodiles migrating through this wetland complex during the seasonal flood pulse.

Figure 1. Lone, mature *Crocodylus siamensis* in the Beung Boua Thong Wetland, Xaibouli District, Lao PDR. Photograph: WWF ComFish.

In Lao PDR most documented populations of *C. siamensis* occur outside of national protected areas and community-based wetland management is critical to *C. siamensis* conservation. Exchange visits appear to be a relatively effective first step toward increasing local awareness and support for crocodile conservation. However, the visit also identified that without technical support for integrated wetland management, community protection of sacred wetlands and prohibition of hunting appears insufficient to conserve crocodiles. WWF ComFish is currently analyzing potential approaches to incorporate agricultural and biodiversity values into wetland management in Lao PDR.

The crocodile conservation activities described here were supported with minimal funding from a community fisheries project. No further exchange visits are currently planned due to a lack of funds designated for crocodile conservation. It is hoped that future opportunities will become available to conduct further exchange visits and develop a conservation plan for *C. siamensis* in Lao PDR.

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SIAMESE CROCODILE REPORT NOW AVAILABLE. The 2005 report on status of the Siamese Crocodile (*Crocodylus siamensis*) in Lao PDR (see citation below) is now available, and can be downloaded from www.wmi.com.au/csgarticles.

Bezuijen, M.R., Phothitay, C., Hedemark, M. and Chanrya, S. (2006). Preliminary status review of the Siamese Crocodile (*Crocodylus siamensis* Schneider, 1801) (Reptilia: Crocodylia) in the Lao People's Democratic Republic. Mekong Wetlands Biodiversity Conservation and Sustainable Use Programme: Vientiane, Lao PDR. 114 pp.

Malaysia

A mature, male False Gharial (*Tomistoma schlegelii*) will soon be meeting prospective breeding partners. The 4.7 m crocodile, named "Jantan", was moved from the Malacca Zoo to the Perhilitan Wildlife Breeding Centre in Sungai Dusun, Selangor, where he will be introduced to four females. Jantan was originally brought to the Malacca Zoo from Tanjung Karang in 1995, and is believed to be about 25 years old.

Unlike the other 22 species of crocodilian *T. schlegelii* do not readily breed in captivity, although there has been considerable success in recent years at one farm in Thailand and limited success at a farm in Sarawak.

Source: *A. Malex Yahaya, The Star, 25 April 2007*.

Philippines

VISIT BY "USM WILD CROCODILE RESEARCH TEAM" TO MABUWAYA FOUNDATION INC., SAN MARIANO, ISABELA. At the "Forum on Crocodiles in the Philippines" (January-February 2007), a resolution (No. 1.3) was adopted that called for the establishment of systematic cooperation between the University of Southern Mindanao (USM; Kabacan, Cotabato) and the Mabuwaya Foundation (San Mariano, Isabela Province, Northern Luzon) [CSG Newsletter 26(1): 12-16]. The goal of this project of cooperation is to ensure that the hard-learned lessons of the successful Mabuwaya Foundation program in Isabela, based on *Crocodylus mindorensis*, can be adapted and applied in Mindanao [see CSG Newsletter 26(1): 3].

The CSG contributed $US5000 to the project, to enable the exchange of researchers between the Mabuwaya Foundation and USM and vice versa. These funds are managed through Crocodylus Porosus Philippines Inc.

In May 2007, the first exchange took place, with 6 members of the USM Wild Crocodile Research Team travelling to Luzon. Dr. Cayetano C. Pomares (project leader), Dr. Carlito B. Sanchez, Dr. Jonald L. Pimentel, Prof. Aries John Tabora, Prof. Milagrina P. Pomares and Prof. Cyra Mae Escalera comprised the USM team. Primary points of contact at the Mabuwaya Foundation were Jan van der Ploeg and Merlijn van Weerd, and Sam [Mabuaya Foundation and Isabela State University (Cabagan Campus)] served as tour guide.

The USM team was housed at the Isabela State University on the first day, and on succeeding days they were camped near the two crocodile sanctuaries at Disulap River and Dunoy Lake. Before embarking into the field, the group was given a tour of the town by Mr. Jerome Miranda, a town municipal councillor.

The Foundation's headquarters also serves as a temporary shelter for hatchlings collected from the sanctuaries. These were raised in side-opened drums (donated by the nearby airport) with little water and fed with meat pieces, insects, etc. The headquarters also exhibited information about the Mabuwaya Foundation and its work around the sanctuaries. The USM team was able to observe the strategies for a massive campaign on the conservation of *C. mindorensis*, such as paintings on walls and even on the town's water tank. Slogans in local dialect were painted on the sides of the hired service truck.

The Disulap River site comprises an 11 km stretch, the boundary of which has concrete landmarks, and which is protected by a municipal ordinance. The team met local volunteers in the area who were equipped with a radio receiver for determining locations of "tagged" crocodiles, and was shown a man-made lake (around 200 m^2; Fig. 1) where 3 *C. mindorensis* hatchlings had been released previously. Tilapia fingerlings had also been released into the pond to serve as food for the crocodiles. One juvenile crocodile was observed floating in the pond during the day, and three were sighted at night using a spotlight.

The Disulap River is a shallow and rocky river with fringing vegetation on the sides. A *C. mindorensis* nest constructed with sticks, grass, and sand was located about 20 m from the river (Fig. 2). It was estimated to contain more than 20 eggs.

The team also visited the Narra Project of the Isabela State University, where they observed a 200 m^2 pool into which a crocodile had been released.

Figure 1. Small man-made pond near Disulap River, where 3 *C. mindorensis* have been released.

Figure 2. Local volunteer at *C. mindorensis* nest at Disulap River.

Figure 3. Dunoy Lake as seen from the observation tower.

Dunoy Lake is about 1000 m^2 in area, shallow (approximately 30 cm) and fringed with hard woods, palms, bamboos and grasses. Inside the lake were swamp cabbages (kangkong) and mudfish. Three small, juvenile *C. mindorensis* were observed in the lake from the observation tower (Fig. 3). A man-made lake intended for future hatchling releases is being constructed nearby.

On returning to the ISU Cabagan campus the team were able to visit the Mabuwaya Foundation's environmental center, where materials such as posters, leaflets and comics were obtained for future use. Discussions were held about *C. mindorensis* in northern Luzon compared to those in Ligawasan Marsh in Mindanao. The USM team noted that there may be differences in the tail and snout between the two areas.

The visit provided an important learning experience for the USM team, which can assist future activities in Mindanao. Of particular interest was the role that local people play in the conservation of habitat and other activities. Signs posted in the crocodile sanctuaries in vernacular and English languages remind locals about the importance of crocodiles that they should be proud of. A reciprocal visit by Mabuwaya Foundation staff to Mindanao will allow further exchange of information and clarification of strategies employed in Isabela.

The exchange visit could not have been possible without the financial support of the CSG, the hospitality and camaraderie of the Mabuwaya Foundation and its staff, and ongoing support of Dr. Charles Ross, Vic Mercado, William Belo and others.

USM Wild Crocodile Research Team, <*cayetanop@yahoo.com*>.

Africa

Ethiopia

THE NILE CROCODILES OF LAKE CHAMO. I visited Lake Chamo in the southern Rift Valley of Ethiopia between 13 and 17 June 2006. The purpose of the trip was filming and there was little time for detailed observations of the crocodile population, however there were a number of interesting observations that could be useful in the future conservation and management of *Crocodylus niloticus* there.

Lake Chamo is located 1108 m asl, with a shoreline of approximately 116 km and area of about 350 km^2. About 41 km of shoreline and 30 km^2 of water area lie within the 750 km^2 Nechisar National Park. Average lake depth is 14 m (Wakjira *et al*. 1995, 2004). Parts of the northern and western shore are cultivated with maize, bananas and cotton with a belt of reeds of varying density separating the cultivation from the lakeshore. The rest of the lake is fairly "wild", some of it bordered with dense reed beds, some is steep rocky shore, the southern end has dense Acacia forest and there are a few small beaches. Other

features include several small islands and two small bays in the southwestern end.

Anthropogenic pressures on the lake and lakeshore include graziers who regularly camp at certain points along the lake with their cattle, and fishermen, using log rafts, who set gill nets primarily for Nile perch, catfish and tilapia. Rift Valley Safaris has a hunting concession in the southern part of the lake and is allowed to take 5 crocodiles over 4.5 m long per year. There is limited tourism on the lake with about 6 motor boats operating to show visitors crocodiles, hippopotamus and water birds.

Nechisar National Park is managed by a private concern, African Parks (Ethiopia), under an MoU with the Ethiopian Wildlife Conservation Department of the Ministry of Agriculture and Rural Development, for a period of 25 years. The rest of the lake is under government and local Zonal Authority which represents the interests of the local communities. African Parks, the Zonal Authority and the safari company have agreed to work closely to sustainably manage the fish and crocodile resources of Lake Chamo.

Apparently 47,000 crocodiles were killed for skins in Ethiopia in the 1960s and crocodile hunting was banned around 1976, which resulted in increasing populations in some areas including Lake Chamo (Kumara Wakjira and Assegid Gebre, pers. comm.).

Surveys

Bolton (1983) made various recommendations 'for an ecologically sound (crocodile) management plan to be implemented', and divided the lake into 8 zones, roughly based on habitat differentiation (see map). He refers to an aerial survey of Lake Chamo in April 1977, in which 148 crocodiles (sizes not recorded) were counted. In July 1983 102 breeding size crocodiles were counted in 'not more than 15% of suitable habitat on Lake Chamo'. Bolton had visited the area previously and stated that 10 years earlier (1973) there would have not been more than 20-30 adult crocodiles there. He recommended the establishment of a crocodile rearing station which resulted in the establishment of the Arba Minch Crocodile Ranch, set up by and now managed by the Ethiopian Wildlife Department. Subsequent surveys at Lake Chamo yielded the following numbers of crocodiles (all sizes, but not including hatchlings/yearlings) sighted during daylight counts (Table 1).

The continuing survey program by Wildlife Department staff in collaboration with regional rural resource agencies is excellent. Acknowledging the efficacy of night spotlight counts, Gebre and Wakjira (1996) carried out sample night and day surveys in Zone 2 and derived a correction factor of about 1.8. The last complete count was done in 2004. The total of 1183 sightings (Table 1) equates to a total crocodile population estimate (not including hatchlings/ yearlings) of 2129.

Table 1. Crocodile counts (day) in Lake Chamo.

Surveyed by:	Day Counts	Notes
Bolton, 1984	360	
Tadesse, 1985	533	
Tadesse, 1986	1321	
Tadesse, 1987	1228	
Gebre and Wakjira, 1995	683	
Graham and Gebre, 1997	476	Aerial survey
Wakjira *et al*. 2004	1183	
Wakjira *et al*. 2005	313	Zones 6,7 and 8; hunting concession
Whitaker, 2006	173	Zone 1; in 2 hours

Observed size structure in the surveys and my own observations indicate that over 50% of the crocodiles sighted in the lake are adults. Small crocodiles (50 cm to 1.5 m) are hardly seen, perhaps because they tend to spend their time in the extensive reed beds, or perhaps because there really is a highly skewed size structure (as opined by locally knowledgeable people) typically seen in a recovered population where recruitment has slowed.

Arba Minch Crocodile Ranch

Established in 1984, the Arba Minch Crocodile Ranch, located just outside of the town, collects 6000 to 8000 hatchlings from marked and protected nests (by wildlife staff) around Lake Chamo. There are several communal nesting sites (suitable banks of sand or softer soil seem to be few) and two nesting sites observed by me had the remains of 29 nests (Daroda Kam Beach near Mio River, Zone 4) and 51 nests (Bolle Bay, Zone 7 which is part of the hunting concession) respectively.

The ranch now contains 7000 crocodiles, including this year's hatchlings, yearlings and 3-4 year-olds. Crocodiles are mainly fed horse meat which is available for about $US0.35/kg. Several culls were made over the years for skins but there is no sustained, profitable harvest from the ranch. Some of the skins were purchased by a tanner in Addis Ababa and we saw the fine results of the tanning done in-country, indicating the potential for an indigenous, value-added crocodile skin industry. In general it was observed that with some technical and developmental input the ranch could be the basis for such an industry, along with ancillary activities such as tourism and cottage industry level artifacts made from crocodile teeth, skulls and skin trimmings. Involvement of fishermen and other lakeside dwellers in the program could help mitigate the current conflict which results in valuable adult breeders being caught and drowned in nets and people's livelihoods being compromised.

Several skulls of large crocodiles drowned in fishnets at the lake were measured and appear to be among the largest skulls on record for the Nile crocodile. The longest had a dorsal cranial length of 68.6 cm (measured from nose-tip to back of occipital platform with a steel tape) for a possible total length of 5.5 m (18')! This is the size of some of the largest of all the saltwater crocodiles (*Crocodylus porosus*) on record. I would appreciate hearing from anyone who knows of any Nile crocodile skulls larger than this.

As if to verify this, in early June 2006 a safari client shot a 5.48 m crocodile in the hunting concession area of the lake. It appears that the Lake Chamo crocodiles are amongst the largest Nile crocodiles (or any crocodiles) ever recorded. It is important for their long-term survival that the Lake Chamo crocodiles' value as a sustainable local resource is recognized and exploited. But at the same time (and after talking with colleagues working with crocodiles in other parts of Africa where even a 4.5 m crocodile is rare), it would be a worthwhile exercise for the Ethiopian authorities to pragmatically analyse whether these giant crocodiles might be worth more alive for tourism than as breeders or as trophies. Interestingly, this is the same question that the authorities in the southeastern USA should perhaps be addressing vis-à-vis the annual American alligator hunts.

Conclusions

The potential for a stepped up, community-based fishery and crocodile project here is considerable. Many of the elements and key people and agencies are already in place. A study of the population dynamics and breeding biology of the Lake Chamo crocodiles and continued regular population monitoring will form a solid scientific basis for the continued sustainable use of the resource. Adjacent Lake Abaya needs to be examined to ascertain why the crocodile population there is so low.

Development of the crocodile skin and ancillary products industry, along with appropriate lake-wildlife tourism (I know of no other such spectacular concentrations of big, approachable crocodiles in the world) can bring considerably more benefits to the local farming, pastoral and fishing communities living around the lake. Instead of conservation being at odds with the fishermen, a community-based project should make it possible to foster crocodile-friendly fishing methods to replace the deadly gill nets used now, protect crocodile nesting banks (scarce along the lakeshore) from trampling by livestock and tampering, and change the generally negative attitude toward crocodiles to one of recognition of a valuable resource with considerable benefits for local communities.

Acknowledgements

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Literature

Bolton, M. (1983). Assistance to Crocodile Management, Ethiopia. FAO, FO:TCP/ETH/2307 Consultant Report. 23 pp.

Gebre, A. and Wakjira, K. (1996). Survey of the crocodile population of Lake Chamo. In litt. 13 pp.

Graham, A. and Gebre, A. (1997). Numbers and Distribution of Crocodiles and Hippopotamus on Lakes Chamo and Abaya. EU Project No.7 ACP ET 068, Technical Report No. 13. 4 pp.

Wakjira, K., Zewde, C., Gebre, A. and Chogo, B. (2004). Crocodile Survey at Lake Chamo. Census Report. 11 pp.

Wakjira, K. *et al*. (2005). Crocodile Survey at Lake Chamo. Census Report. 7 pp.

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Latin America & the Caribbean

Bolivia

FIRST *CAIMAN YACARE* FARM IN BOLIVIA. Through Article 1 of Ministerial Resolution No. 178 (8 September 2006), an experimental environmental management plan was approved for the first crocodile farm in Bolivia (Crocoland Farm) for a period of two years. The farm is located in Santa Cruz, and is based on *Caiman yacare*. Article 2 of the Resolution permits the collection of eggs and adults, which should be collected from indigenous lands of the Guarayos and Cirpas involved in the commercial harvest program for *C. yacare*.

The farm operates on both captive breeding and ranching. For captive breeding, the farm has an adult population of 1600 females and 400 males. In the first year, 204 nests were produced, yielding 7526 eggs (10.9% infertile) and 5042 hatchlings (75.2% hatching success on viable eggs; 67.0% of all eggs). Through ranching, 700 nests (26,250 eggs; 7.8% infertile) were collected, which yielded

21,227 hatchlings (87.7% hatching success on viable eggs; 80.9% of all eggs).

The principal goal of the farm is the production of *C. yacare* skins, although trade in meat for human consumption is being considered in the future. The farm employs a professional to attend to daily activities, and biology students are undertaking some studies. As the first farm in Bolivia, it is looking to increase numbers of *C. yacare* skins being offer on the international market, through ranching and captive breeding. To date, *C. yacare* skins from Bolivia have been produced through the wild harvest program.

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Australia and Oceania

Australia

In May 2007, the Queensland Government sought public comment on its draft "Management Program for *Crocodylus porosus* in Queensland 2007-2017". It is proposed that the plan will replace the existing "Nature Conservation (Problem Crocodiles) Conservation Plan 1995".

Utilisation of wild *C. porosus* in Queensland is currently restricted to the removal of problem animals, and farming is based on captive breeding. Although the Environmental Protection Agency (state wildlife authority) states that it has adopted the principle that sustainable use of wildlife can have positive conservation outcomes, there is no serious attempt to implement sustainable use for crocodiles in Queensland. This is particularly disappointing given the interest in ranching (eggs) that has been shown by the crocodile industry and rural indigenous communities over a long period of time.

The draft management program states that "a research project to investigate the viability of a commercial harvest of wild crocodile eggs may be proposed within the life of this management program". It is unclear why "the wheel has to be re-invented", when there is extensive experience in neighbouring Western Australia and the Northern Territory with *C. porosus*, and in many countries with other species, that ranching has proven to be a safe form of use. The CSG's review of 24 ranching programs involving 8 species concluded that "Ranching crocodilians is now a widespread activity and nowhere is it associated with or alleged to be the cause of detrimental effects on wild populations of crocodilians". (Based on the recommendations of this report, CITES recently amended Resolution Conf. 11.16 *Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II* with regard to reporting; see page 5).

The proposed life of the management program, 10 years, appears to be excessively long, and suggests a degree of inflexibility. If the sustainable use of wild *C. porosus* is looked at seriously by Queensland, then there will be a need to review the program on a regular basis and modify it accordingly. Industry has also raised concerns about the program's proposed consideration of areas of high density nesting for "conservation tenure".

Figure 1. Saltwater crocodile (*Crocodyus porosus*). Photograph: Max Davidson.

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Science

Recent Publications

M.H. Schweitzer, R.M. Elsey, C.G. Dacke, J.R. Horner and E.-T. Lamm (2007). Do egg-laying crocodilian (*Alligator mississippiensis*) archosaurs form medullary bone? Bone 40: 1152–1158.

Abstract: It is beyond question that Mesozoic dinosaurs, like Aves and Crocodylia, are archosaurs. However, within the archosaurian clade, the origin and distribution of some major features are less clear, particularly with respect to reproductive physiology. Medullary bone, a highly mineralized, bony reproductive tissue present in the endosteal cavities of all extant egg-laying birds thus far examined, has recently been reported in *Tyrannosaurus rex*. Its presence or absence in extant crocodilians, therefore, may shed light on the timing of its evolutionary appearance. If medullary bone is present in all three taxa, it arose before the three lineages diverged. However, if medullary bone arose after this divergence, it may be present in both extinct dinosaurs and birds, or

in birds only. If present in extinct dinosaurs and birds, but not crocodilians, it would indicate that it arose in the common ancestor of this clade, thus adding support to the closer phylogenetic relationship of dinosaurs and birds relative to crocodilians. Thus, the question of whether the crocodilian *Alligator mississippiensis* forms medullary bone during the production of eggs has important evolutionary significance. Our examination of long bones from several alligators (two alligators with eggs in the oviducts, one that had produced eggs in the past but was not currently in reproductive phase, an immature female and an adult male) shows no differences on the endosteal surfaces of the long bones, and no evidence of medullary bone, supporting the hypothesis that medullary bone first evolved in the dinosaur-bird line, after the divergence of crocodilians from this lineage.

Ray E. Willis, L. Rex McAliley, Erika D. Neeley and Llewellyn D. Densmore III (2007). Evidence for placing the False Gharial (*Tomistoma schlegelii*) into the Family Gavialidae; inferences from nuclear gene sequences. Molecular Phylogenetics and Evolution doi: 10.1016/j.ympev.2007.02.005.

Abstract: The extant crocodylians comprise 23 species divided among three families, Alligatoridae, Crocodylidae, and Gavialidae. Currently, based on morphological data sets, *Tomistoma schlegelii* (False Gharial) is placed within the family Crocodylidae. Molecular data sets consistently support a sister-taxon relationship of *T. schlegelii* with *Gavialis gangeticus* (Indian Gharial), which is the sole species in Gavialidae. To elucidate the placement of *T. schlegelii* within the extant crocodylians, we have sequenced 352 bp of the dentin matrix protein 1 (DMP1) nuclear gene in thirty individuals and 424 bp of the nuclear gene C-mos in seventy-four individuals. Molecular analysis of the DMP1 data set indicates that it is highly conserved within the Crocodylia. Of special note is a seven base pair indel (GTGCTTT) shared by *T. schlegelii* and *G. gangeticus*, that is absent in the genus *Crocodylus*, *Osteolaemus*, and *Mecistops*. To date, C-mos is the largest molecular data set analyzed for any crocodylian study including multiple samples from all representatives of the eight extant genera. Analysis of these molecular data sets, both as individual gene sequences and concatenated sequences, support the hypothesis that *Tomistoma schlegelii* should be placed within the family Gavialidae.

John Thorbjarnarson, Frank Mazzotti, Eric Sanderson, Fabio Buitrago, Marco Lazcano, Karen Minkowski, Manuel Muniz, Paulino Ponce, Luis Sigler, Roberto Soberon, Ana Maria Trelancia and Alvaro Velasco (2006). Regional habitat conservation priorities for the American crocodile. Biological Conservation 128: 25-36.

The American crocodile is widely distributed in coastal and lowland wetlands in the northern Neotropics. As a result of commercial skin hunting in the 20th century, populations were greatly diminished, but in many areas have initiated a period of recovery since hunting and trade controls were enacted in the 1980s and 1990s. While a great deal of attention has been devoted to regulated commercial use as a management strategy for recovering crocodilian populations, these approaches are limited in their efficacy to deal with issues of habitat loss and fragmentation. Because habitat limitations are expected to be the most critical issue for crocodile conservation in the 21st century, there is an unfulfilled need for alternative strategies that prioritize habitat conservation. Here, we present results of an international effort to identify and prioritize the most critical habitats for this wide ranging species. We quantified information of a group of American crocodile experts and classified 69 areas in eight distinct crocodile bioregions as Crocodile Conservation Units (CCU), the most important areas for the conservation of this species. The relative importance of the CCUs in each bioregion was quantified using an algorithm that weighted factors that the experts considered to be most important for the long term conservation of viable populations of crocodiles. This effort is the initial step in the development of a regional conservation plan for the American crocodile. We identified two bioregions in particular where the creation of protected areas should be given a high priority, the Dry Pacific South America (northern Peru and southern Ecuador) and the Northwest and Central Pacific Mexico.

García-Grajales, J., Aguirre-León, G. and Contreras-Hernandez, A. (2007). Tamaño y estructura poblacional de *Crocodylus acutus* (Cuvier 1807) en el estero La Ventanilla, Oaxaca, México. Acta Zoológica Mexicana (n.s.) 23(1): 53-71.

Abstract: A population of the American crocodile (*Crocodylus acutus*) protected through local participation was studied at La Ventanilla estuary in the coast of Oaxaca, during 8 months (October 2003-May 2004). Size, structure and sex ratio of this population were evaluated in order to provide demographic information of the American crocodile using two capturerecapture methods. A total of 21 adults (8 females, 13 males), 11 subadults (5 females, 6 males), 88 juveniles (14 females, 62 males) and 23 neonates were captured, measured and individually marked. Goodness-of-fit tests for the Jolly-Seber model showed that our population data violated the assumption of equal probability of capture and resulted in a skewed estimate of population size. However, goodness-of- fit tests for the geometric estimator of the capture frequency model applied to the same capture-recapture data showed recapture frequencies conform to it. Population size estimates for this model were 29.6 ± 9.1 adults, 37.1 ± 6.6 subadults, and 682.5 ± 39.2 juveniles. Population structure does not fit the normal distribution (d=39.5, P>0.05), most individuals belonging to lower

size classes (16.2% in class I, 61.5% in class II), with few subadults (9.1% in class III) and adults (13.3% in class IV). Overall sex ratio was significantly skewed towards males (3 males: 1 female). This analysis provides information for future management strategies for the *C. acutus* population at La Ventanilla estuary.

Yusuke Fukuda, Peter Whitehead and Guy Boggs (2007). Broad-scale environmental influences on the abundance of saltwater crocodiles (*Crocodylus porosus*) in Australia. Wildlife Research 34: 167-176.

Abstract: Saltwater crocodile (*Crocodylus porosus*) populations have recovered strongly across northern Australia over the 30 years since the species was protected from hunting. However, monitoring studies show large geographical variations in abundance across the Northern Territory, Queensland and Western Australia. The Northern Territory has considerably higher densities, raising questions about constraints on recovery in the other states. We examined broad-scale environmental influences on population abundance by modelling the species-environment relationships across northern Australia. The hypothesis-based models showed strong support for the linkage to (1) the ratio of total area of favourable wetland vegetation types (Melaleuca, grass and sedge to total catchment area, (2) a measure of rainfall seasonality, namely the ratio of total precipitation in the coldest quarter to total precipitation in the warmest quarter of a year, and (3) the mean temperature in the coldest quarter of a year. On the other hand, we were unable to show any clear negative association with landscape modification, as indicated by the extent of high-impact land uses or human population density in catchments. We conclude that geographical variations in crocodile density are mostly attributable to differences in habitat quality rather than the management regimes adopted in the respective jurisdictions.

Montini, J.P., Piña, C.I., Larriera, A., Siroski, P. and Verdade, L.M. (2006). The relationship between nesting habitat and hatching success in *Caiman latirotris* (Crocodylia, Alligatoridae). Phyllomedusa 5(2): 91-96.

Abstract: The Broad-snouted Caiman uses different habitats for nesting; it has temperature-dependent sex determination (TSD) and nesting habitat selection by females could affect sex and other hatchlings characteristics. Here we evaluated reproductive parameters in three nesting habitats: forest, savanna, and floating vegetation. We collected 154 caiman nests during the summer of 2001-2002. Since natural incubation could mask possible clutch-effects, eggs were collected soon after oviposition and artificially incubated. We found that eggs laid in the forest were wider than those laid in savanna, hatching success varied, decreasing from floating vegetation to forest. As egg width is positively correlated to female body size, the present results suggest that female body size could be related to nesting habitat use in *Caiman latirostris*. However, there were no differences in hatchling size among nesting habitats.

Carlos I. Piña, Pablo Siroski, Alejandro Larriera, Valentine Lance and Luciano M. Verdade (2007). The temperature-sensitive period (TSP) during incubation of broad-snouted caiman (*Caiman latirostris*) eggs. Amphibia-Reptilia 28: 123-128.

Abstract: All crocodiles studied to date exhibit temperature-dependent sex determination. During the many weeks from egg laying to hatch there is a period of 10 to 15 d in the middle third of incubation (in the American alligator) during which the sex of the embryo is irreversibly fixed, referred to as the temperature-sensitive period or TSP. In this work we investigated the TSP in *Caiman latirostris* eggs incubated at female-inducing and male-inducing temperatures (29°C and 33°C respectively) by switching eggs from 29°C to 33°C and vice versa at timed interval throughout incubation. Compared to *Alligator mississippiensis* the duration of TSP was longer, and the onset of TSP was at an earlier stage of incubation.

Carlos I. Piña, Alejandro Larriera, Pablo Siroski and Luciano M. Verdade (2007). Cranial sexual discrimination in hatchling broad-snouted caiman (*Caiman latirostris*). Iheringia Serie Zoologica 97(1): 17-20.

Abstract: Broad-snouted caiman (*Caiman latirostris*) hatchlings present a consistent sexual dimorphism in their cranium shape and size. Male hatchlings have smaller crania than females. Using multivariate statistical analyses it is possible to discriminate sex in broadsnouted caiman hatchlings by their cranial shape with a reasonable efficiency. The understanding of sexual dimorphism of crocodilian hatchlings might be possibly improved by experimental approach considering, genetic and phenotypic variables such as incubation temperature and clutch of origin.

Carlos I. Piña, Alejandro Larriera, Marlin Medina and Grahame J.W. Webb (2007). Effects of incubation temperature on the size of *Caiman latirostris* (Crocodylia: Alligatoridae) at hatching and after one year. J. Herp. 41(2): 205-210.

Abstract: We investigated the effects of incubation temperature (29C, 31C, and 33C) on total length (TL) and body mass (BM) of *Caiman latirostris*, a crocodilian with temperature-dependent sex determination (TSD), at hatching (N = 180) and in a sample of hatchlings (N

= 40) after one year of raising. Size at hatching was strongly clutch-specific. Animals incubated at 31C (100% females) were larger than at 29C (100% female) and 33C (100% males). Absolute growth to one year was higher for females (eggs incubated at 29C and 31C) than for males (eggs incubated at 33C). The possibility that constant 33C incubation temperature had compromised embryological development cannot be rejected. If so, it confirms that high incubation temperatures can have long-lasting effects on posthatching growth. If not, possible advantages of females growing more rapidly than males are discussed.

Francisco Cabrera A., Gisela C. García C., María A. González-Vera and Mario Rossini. (2007). Histological characteristic of the masculine genital system of the Spectacled Caiman (*Caiman crocodilus crocodilus*). Revista Científica, FCV-LUZ 17(2): 123-130.

Abstract: An histological description of the male genital apparatus of 9 mature wild spectacled caimans (*Caiman crocodilus crocodilus*) from Apure Plains, Venezuela, was carried out; the samples obtained by necropsy were fixed in formalin to 10% buffered to pH 7.0 processed by means of the paraffin inclusion technique and stained with the routine Haematoxylin-Eosin and Mallory's Tricromic stains. The most important discoveries were: great spermatogenic activity, evidence of granules of secretion whit acid-stain affinity in some cases, and without stain affinity in others, in different segments of the epididymis, presence of glands of mucous secretion in the ejaculatory groove, and great quantity of erectile tissue at level of this groove and along the penis.

Alejandro Larriera, Pablo Siroski, Carlos I. Piña, and Alba Imhof (2006). Sexual maturity of farm-released *Caiman latirostris* (Crocodylia: Alligatoridae) in the wild. Herpetological Review 37(1): 26–28.

Luciano M. Verdade and Carlos I. Piña (2006). *Caiman latirostris*. Catalog of the American Society of Amphibians and Reptiles 833: 1-21.

Piña, C.I., P. Siroski, L.M. Verdade (2007). Caça de crocodilos. Um exemplo de ferramenta para conservação. Revista Açao Ambiental. 35: 32-35.

Ruth Elsey (2007). Re-introduction of American alligators in Louisiana, USA. Re-Introduction News 26: 57-58.

Yosapong Temsiripong (2007). Re-introduction of captive-raised Siamese crocodiles in Thailand. Re-Introduction News 26: 55-57.

Yi-Quan Wang, Wei-Quan Zhu, Lei Huang, Kai-Ya Zhou and Ren-Ping Wang (2006). Genetic diversity of Chinese alligator (*Alligator sinensis*) revealed by AFLP analysis: an implication on the management of captive conservation. Biodiversity and Conservation 15: 2945-2955.

Abstract. Chinese alligator (*Alligator sinensis*) is one of the most critically endangered species among 23 extant crocodiles in the world. To prevent the extinction of the species, a captive propagation started at early 1980s, and the total number of alligator was brought up to 10 thousands from dozens of founder in 2000. But several genetic investigations showed those alligators were under an extremely low genetic diversity status with few detectible polymorphic loci. To get more insight into its genetic diversity for the management of captive Chinese alligator, AFLP was adopted to characterize variations in the population. Total of 347 bands were generated from 47 individuals using 3 primer combinations, of which 203 (58.50%) were polymorphic, and 35 AFLP phenotypes were revealed from those individuals. Comparing the results between RAPD and AFLP analysis on almost same sample set clearly indicated that AFLP is more efficient in revealing polymorphic loci, especially in those populations with extremely low genetic diversity. In present three assays, electrophoresis profile also displayed 3 individuals possessing very highly polymorphic AFLP phenotypes that were never been found by RAPD and mtDNA D-loop sequencing, implicating that we should offer these individuals more breeding opportunities to maintain the genetic diversity in the population and restrict those carrying few polymorphic loci from reproduction.

Mohammed A. Rab, Hap Navy, Mahfuzuddin Ahmed, Keang Seng and Katherine Viner (2006). Socioeconomics and Values of Resources in Great Lake-Tonle Sap and Mekong-Bassac Area: Results from a Sample Survey in Kampong Chhnang, Siem Reap and Kandal Provinces, Cambodia. WorldFish Center Discussion Series No. 4. The WorldFish Center: Penang, Malaysia.

The main goal of this project was to "describe demographic and socioeconomic backgrounds of households and their livelihood strategies in general and related to aquatic resources" in the Great Lake area of Cambodia. Although focussing on traditional fishing activities, the report does provide some information on the economic value of crocodile "farming" in a sample of 410 villages. Three types of village were identified ("fishing, fishing cum farming and farming villages"), where the people generally do have land, and where most live in floating houses.

Philip L. Reno, Walter E. Horton Jr, Ruth M. Elsey and C. Owen Lovejoy (2007). Growth plate formation and development in alligator and mouse metapodials:

evolutionary and functional implications. Journal of Experimental Zoology (Mol Dev Evol) 308B:283-296.

Abstract: Mammalian metapodials (metacarpals and metatarsals), unlike most long bones, form a single growth plate, and undergo longitudinal growth at only one end. The growth dynamics of non-mammalian tetrapod metapodials have not been systematically examined in order to determine if unidirectional growth is unique to mammals. Here we compare murine metapodial ossification in growth stages that parallel those of embryonic, juvenile and subadult American alligators (*Alligator mississippiensis*). Safranin O staining was used for qualitative histology, and chondrocyte differentiation and proliferation were assessed via immunohistochemistry for type X collagen and proliferative cell nuclear antigen (PCNA). We establish that growth plates form at both ends of alligator metapodials and are maintained in the subadult. PCNA results show that alligators and mice share common patterns of chondrocyte proliferation during growth plate formation. In addition, while alligators and mice differ initially in the degree of organization and pace of chondrocyte differentiation, these parameters are largely similar in established growth plates. However, the replacement of cartilage by bone is highly irregular throughout growth in the alligator, in contrast to the more uniform process in the mouse. These results indicate that while alligators and mammals share common mechanisms of chondrocyte regulation, they differ substantially in their processes of ossification. Phylogenetic analysis indicates that the direct ossification of one epiphysis and reliance on a single growth plate is a derived character (synapomorphy) in therian mammals and likely indicates an adaptation for erect quadrupedal gait.

Submitted Articles

CROCODYLUS NILOTICUS VULGARIS CUVIER RETRACTED. In 2005 (CSG Newsletter 24(2): 15-21), my idea that *Crocodylus niloticus vulgaris* Cuvier 1807 might apply to the pedomorphic Nile crocodiles in Mauritania was probably unwise, and I now wish to retract it as much as possible, because the old Senegambie region records for today's *C. niloticus* Laurenti were probably Senegal River or Gambia River animals, and thus could not be the special "pedomorph" (or "paedomorph") small reproductive Nile crocodiles living in isolated and interior habitats.

The Wermuth and Mertens (1955) type locality restriction of *C. vulgaris* Cuvier to Egypt is acceptable for the species including Senegal and Mauritania riverine animals, because the syntype series of *C. vulgaris* was dominated by Egyptian specimens, and the Nile River crocodile population was in Cuvier's mind when he created *C. vulgaris* as a taxon. The 1955 type locality restriction of *C. vulgaris* Cuvier to Egypt stabilizes the scientific name of the Nile crocodile, because *C. vulgaris* is today universally listed as an early junior synonym of *C. niloticus* Laurenti, and the syntypes of *C. vulgaris* Cuvier are the first museum basis for the species. The type locality of *C. niloticus* Laurenti was restricted to Egypt by Loveridge (1957), and thus *C. niloticus* and *C. vulgaris* are defined as meaning the same thing, and because Stejneger and Barbour (1917) designated *C. niloticus* as the type species of the genus *Crocodylus* Laurenti, the series of Nile crocodiles from Egypt (and also Senegal) in the natural history museum in Paris, France, is today the scientific standard for the genus of true crocodiles.

Literature

Loveridge, A. (1957): Check list of the reptiles and amphibians of East Africa (Uganda; Kenya; Tanganyika; Zanzibar). Bulletin Mus. Comp. Zool. (Harvard University) 117(2): 151-362.

Fuchs, K., Mertens, R. and Wermuth, H. (1974). Die Unterarten des Nilkrokodils, *Crocodylus niloticus*. Salamandra (Frankfurt am Main) 10(3-4): 107-114.

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NILEKROKO MAP FOR HYPOTHESIS TESTING. In the commercial leather tanning and processing industry in Germany in the early 1970s, belly skins of *Crocodylus niloticus* were sorted into three kinds: "Croco Afrique" (East African, distributed from Sudan and Ethiopia in north to Zimbabwe and Mozambique in south); "Croco Mada" (Madagascar endemic); and, "Croco Nigeric non corré" or "Nigeric Non Corré" (from Nigeria (Fuchs 1973, 1974a). Croco Mada skins were sometimes added to the Croco Afrique pile (Fuchs 1974a).

None of the taxonomic innovations in Fuchs (1974b) and Fuchs *et al*. (1974) were even hinted in Fuchs (1974a) and Fuchs (1973), which recognized *C. niloticus* as a monotypic species with a continental distribution including Madagascar. The three kinds of Nile crocodile skin were merely common names, and the German leather industry had several other African crocodilian kinds, such as "Gavial Afrique" and "Nigeric corré" or "Nigeric Corré" for different *C. cataphractus* skins and "Croco Benin" or "Cabindas" for *Osteolaemus* leather (Fuchs 1973, 1974a).

The three kinds of Nile crocodile skins were suddenly expanded into seven formal subspecies by Fuchs (1974b) and Fuchs *et al*. (1974), each with a scientific name and synonymy, a distribution map for the seven names and a key to the taxa. In Figure 1, the map from Fuchs *et al*. (1974) has had the original seven scientific names

removed from it, and replaced with acronyms for my seven common names (see below). Otherwise, the 1974 map is unchanged, and the geographic units are not mine.

Figure 1. Commercial Nilekroko map of Africa.

My suggested names are:

1. Nilekroko-Vulgar (NK-V) - the population that put the Nile in Nilekroko.
2. Nilekroko-Eastafrica-North (NK-EA-N).
3. Nilekroko-Eastafrica-South (NK-EA-S).
4. Nilekroko-Malagasy (NK-M).
5. Nilekroko-Zambezi (NK-Z) - south bank to Natal, and the Okovango Delta, meaning everything south of Zambia.
6. Nilekroko-Westafrica-South (NK-WA-S) - with the headwaters of the Zambezi River and all of the Congo Basin in it.
7. Nilekroko-Westafrica-North (NK-WA-N) - Niger River drainage and all the way to Senegal in the west, and including Chad in the east, but different from the population in the Nile River in Egypt and Sudan.

On the original 1974 map, each of the seven blocks was a subspecies, but in Fuchs (2006) the NK-WA-N population was excluded and taxonomically elevated to become a full species. That is, the Nile Crocodile Laurenti was composed of six regions (NK-V, NK-EA-N, NK-EA-S, NK-M, NK-Z and NK-WA-S). The new NK-WA-N species has the same range as the 1974 NK-WA-N subspecies, meaning that the NK-WA-S part was not annexed into the new species in 2006.

However, Schmitz *et al*. (2003) said the NK-WA-N and NK-WA-S populations had similar DNA, and therefore expanded the geographic range of their West African species (NK-WA) to combine the Senegal, Niger and Congo Rivers drainages into one unfortunately inappropriate species-group name ("*suchus*") from Fuchs *et al*. (1974). The Schmitz *et al*. (2003) molecular evidence suggested that *C. niloticus* is composed of NK-V, NK-EA-N, NK-EA-S, NK-M and NK-Z combined as a group. Thus, the "*suchus* Geoffroy" error for NK-WA-N in Fuchs (2006) now has two different distributions in the literature, because the molecular evidence taxon ("*suchus*" as NK-WA) includes NK-WA-S (the "*chamses* Bory" error) in it.

In 2005 (CSG Newsletter 24(2): 15-21) I submitted details on why "*Crocodylus niloticus suchus* Geoffroy" (sic) as a subspecies in Fuchs (1974b) and Fuchs *et al*. (1974), and also "*Crocodylus suchus* Geoffroy" as a species in Schmitz *et al*. (2003) and now Fuchs (2006), are all nomenclatural errors. In 2006 (CSG Newsletter 25(1): 19) I argued about why "*Crocodylus niloticus chamses* Bory" (sic) as a subspecies in Fuchs (1974b) and Fuchs *et al*. (1974) is similarly nomenclaturally impossible, mentioning the availability of *C. niloticus binuensis* Baikie (if in the future it is needed).

Also of interest is "Extremely old names can be dangerous" (CSG Newsletter 25(1): 18), about NK-EA-S being called "*Croc. niloticus africanus* Laurenti" (sic) by Karlheinz Fuchs and CITES, and my suggestion that *C. niloticus pauciscutatus* Deraniyagala is available and safer, though premature in my opinion, for NK-EA-N and NK-EA-S as a combined NK-EA hypothetical kind. If CITES wants to await more evidence before recognizing any division within *C. niloticus* Laurenti, return to the taxonomy in Fuchs (1973).

Literature

Fuchs, K. (1973). Die afrikanischen Reptilhäute. Das Leder 24(2): 29-40.

Fuchs, K. (1974a). The chemistry and technology of novelty leathers. United Nations, FAO: Rome.

Fuchs, K. (1974b). Die Krokodilhaut: Ein wichtiger Merkmalträger bei der Identifizierung von Krokodil-Arten. E. Roether: Darmstadt. 183 pp.

Fuchs, K. (2006). The Crocodile Skin. Edition Chimaira: Frankfurt am Main. 175 pp.

Fuchs, K., Mertens, R. and Wermuth, H. (1974). Die Unterarten des Nilkrokodils, *Crocodylus niloticus*. Salamandra 10(3-4): 107-114.

Schmitz, A., Mansfeld, P., Hekkala, E., Shine, T., Nickel, H., Amato, G. and Böhme, W. (2003). Molecular evidence for species level divergence in African Nile Crocodiles *Crocodylus niloticus* (Laurenti, 1786). Comptes Rendus Palevol. 2: 703-712.

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NILEKROKO-PEDOMORPH-CHAD AND NK-P-MAURITANIA. Adults are small, and their habitat is always remote, and thus the scattered and relict "pedomorphic" Nile crocodiles living in central and western North Africa were never important to the international leather industry. However, the vast distances between individual Nile crocodile pedomorph populations, and the uniqueness of their local ecologies, makes their geographic variation and their genetic affinities especially interesting. For avoiding the "*suchus*" (sic) scientific name problem, I recommend the common name "Nilekroko-Pedomorph" (NK-P) for the Saharan relicts group, with NK-P-Chad and NK-P-Mauritania sections that in turn can be subdivided as needed.

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Third International Workshop on Crocodylian Genetics and Genomics

The CSG-sanctioned "Third International Workshop on Crocodylian Genetics and Genomics" was held in Panama City, Panama, April 13-15, at the Smithsonian Tropical Research Institute (STRI). More than 50 participants attended the workshop, mostly from the Americas (including 7 colleagues from Cuba), but with scientists from as far away as Australia (Fig. 1). The workshop was held in honor of Dr. James Perran Ross, for his many contributions to crocodilian research. A previous commitment prevented Perran from being in Panama, and he asked that any funds that had been allocated to support his attendance be used to fund a student who could not otherwise attend. Paulino Ponce-Campos was thus able to present his work because of this gesture. All participants signed the back of the official meeting banner, which was later presented to Perran.

The welcome address was given by Sra. Elena Lombardo (External Relations advisor of STRI), followed by Sr. Ricardo Sánchez (Regional Director, UNEP), Lic. Oscar Vallarino (Department Chief, Environment Department of the Interinstitutional Commission of Panama Canal) and Dr. Guillermo Castro (Director of Programs and Institutional Relations in Ciudad del Conocimiento (City of Knowledge), who delivered a keynote presentation on the "International Centre for Sustainable Development".

Papers and posters documenting primary research projects ranging from crocodilian molecular systematics and its interface with paleontology, population genetics of several species, quantitative trait loci (QTL) analysis in Saltwater crocodiles (*Crocodylus porosus*), and to new approaches for studying crocodilian immunology were presented. The Journal of Experimental Zoology has again agreed to publish a special volume of peer-reviewed, original contributions (similar to what was done after the 2nd International Workshop in San Diego). Submitted manuscripts are due to Travis Glenn or Llewllyn Densmore by 15 July 2007.

Most of the sessions were held at the beautiful lecture hall at STRI headquarters in Panama City, but one session was held at the Barro Colorado Island (BCI) research station,

Figure 1. Participants at the Third International Workshop on Crocodylian Genetics and Genomics. Photograph: Manuel Muñiz.

where participants were treated to guided walking tours of the facilities and surrounding jungle. Wild *C. acutus* and other wildlife (primates, agouti, crested guan, poisonous frogs, beetles, etc.) were able to be seen in the area. Several Latin American scientists stayed on at the STRI labs for a 2-week training course in molecular techniques.

Finally, the current state of molecular research in crocodylian biology was reviewed and assessed with several critical initiatives identified for concentrated research efforts over the next 4-5 years. These include generation of a complete American alligator (*Alligator mississippiensis*) genomic sequence, a re-dedicated effort to resolve Dwarf African crocodile (*Osteolaemus tetraspis*) systematics and genetics, and the formation of an international group to acquire funds and to coordinate efforts to study the genetics of New World *Crocodylus* species. Presentations on heavy metals in American alligators (Val Lance), immunology (Mark Merchant), sperm storage in *Alligator mississippiensis* (April Bagwill) and effect of climate on sex ratio of *C. crocodilus* (Armando H. Escobedo Galván) were also dealt with in the workshop.

A number of new researchers that appear likely to make important contributions in the future were introduced to the crocodylian molecular community, including Lee Miles (Australia), Maria Cristina Ardila, Sonia Mahecha and Wellington Martinez (Colombia), Maria Elena Ibarra, Georgina Espinosa, Roberto Frias and Ubaldo Becquer (Cuba), Mario Espinal (Honduras), Rogelio Cedeño-Vázquez, Armando Escobedo and Paulino Ponce-Campos (Mexico), and Lisa Controneo, Mitch Eaton, John McVay, David Rodriguez, Matt Shirley and Jeremy Weaver (USA).

We sincerely appreciate Dr. Eldredge Bermingham, Acting Director of STRI, and his staff for offering to host this meeting. However, special recognition must go to two of his associates, Miryam Venegas-Anaya and Oris Sanjur for their untiring and exceptional efforts to deal with the many logistical issues involved in setting up and coordinating a meeting that brought people from around the world to Panama City. In addition, Steve Paton, who directs the Bioinformatics section at STRI, gave an informative talk and offered to help with setting up the crocodylian genetics and genomics website which being maintained by the Smithsonian.

We believe that this meeting represents a critical step in setting the stage for crocodylian genetic and genomic research efforts for the next decade.

Abstracts and participant's names and e-mail addresses are available at the following website: http://biogeodb.stri.si.edu/bioinformatics/crocodile/index.html.

This summary was compiled from reports provided by workshop coordinators Llewellyn D. Densmore (Lou.Densmore@ttu.edu) and Travis C. Glenn (glennt@biol.sc.edu) workshop coordinators), and Manuel Muñiz (CSG Regional Vice-Chairman for Central America; moreletii@prodigy.net.mx).

IACTS Report (1980-2005)

The 14th UNEP-WCMC report for the International Alligator and Crocodile Trade Study (IACTS) is now available (May 2007). The report examines international trade in crocodilian skins between 1980 and 2005, and updates earlier IACTS reports. It also includes information on levels of trade in live animals, meat and other products since 2001.

The skin market diversified in 2001 with the entry of captive-bred *Crocodylus acutus* from Colombia and subsequently Honduras, and *Caiman latirostris* from Argentina. Overal skin trade in 2005 is estimated at over 1,348,000 skins, comprising a slightly higher proportion of *Caiman* skins (54%) (Table 1). Exports of *Alligator mississippiensis* from the USA have remained high since 2003, and exports of *C. niloticus* have remained steady at 140,000 to 160,000 skins annually since 2000, with Madagascar, South Africa, Zambia and Zimbabwe being the main suppliers. *Crocodylus novaeguineae* exports from PNG increased in 2004, and *C. porosus* trade continued to be stable, possibly increasing in 2005. Exports of *C. siamensis* from Thailand increased to over 28,000 between 2003 and 2005, and Viet Nam has also begun exporting significant numbers of *C. siamensis* skins.

Table 1. World trade (in 1000s of skins) in classic crocodilian and caiman skins, 2001-2005. * = 2005 figures may need to be adjusted as more annual report data are received.

Species	2001	2002	2003	2004	2005
A. mississippiensis	343.1	237.8	341.7	368.4	356.4
C. acutus	0.1	0.6	0.8	0.2	0.2
C. johnstoni	-	-	-	-	0.1
C. moreletii	2.4	1.6	1.0	0.5	0.9
C. niloticus	150.8	160.0	148.6	140.5	152.4
C. novaeguineae	30.6	30.7	27.3	39.8	34.1 *
C. porosus	28.2	24.3	26.6	30.7	38.8 *
C. rhombifer	-	-	-	-	-
C. siamensis	4.4	3.6	11.0	20.9	31.5
Subtotal	**560.0**	**458.6**	**557.0**	**601.1**	**614.2 ***
C. c. crocodilus	25.5	22.7	34.6	70.7	72.6 *
C. c. fuscus	710.1	552.1	572.0	621.7	605.1 *
C. latirostris	0.1	0.1	0.2	0.2	2.8
C. yacare	32.1	78.8	60.3	41.9	53.2 *
Subtotal	**767.8**	**653.7**	**667.1**	**734.5**	**733.8 ***
Total	**1327.5**	**1112.3**	**1224.1**	**1335.6**	**1348.0 ***

Recommendations made in previous IACTS reports are still considered to be valid:

- Recommendation 1: CITES Secretariat and Chairman of Standing Committee should contact Parties in June of each year to remind them of their reporting obligations under Article XIII of the Convention.
- Recommendation 2: Parties adopt the recommendations of Resolution Conf. 12.3 (Rev. CoP13) concerning the format of permit numbers as soon as possible.
- Recommendation 3: Wherever possible, Parties report the actual quantities of skins being traded.

John Caldwell *(CSG Vice-Chairman Trade Monitoring; john.caldwell@unep-wcmc.org)* and Don Ashley *(CSG Vice-Chairman Industry; Jdalligator@aol.com).*

"Night for the Crocs" Benefit Dinner for Tomistoma Conservation

About 170 guests, including event VIP's, Miami Metro Zoo staff and members of the Zoological Society of Florida came together on Saturday, 24 February, in Miami for "A Night for the Crocs". It was a very nice mix of crocodilian researchers, zoo professionals, private crocodilian keepers, enthusiasts and the general public (Fig. 1). Many guests came early and took advantage of the free admission to the zoo that was included with every ticket donation. The weather was delightful and so was the atmosphere.

Figure 1. The evening's guests included scientists, zoo professionals, private crocodilian keepers and the general public. Photograph: Stephanie Wasilewski.

We had the feeling that this was going to be a special evening when early in the afternoon, Bekky Muscher (Fig. 2), keeper from the San Antonio Zoo's herpetology department arrived with a very large box.

Inside the box were many items from the zoo's gift shop. San Antonio Zoo's director had allowed her to select the items herself. She then handed us an envelope and said, "We work with Tomistoma at the San Antonio Zoo and we want to support your efforts for this species". Inside the envelope was a cheque from the zoo for $500.

Figure 2. Bruce Shwedick and Bekky Muscher hold Pip, a captive-born Tomistoma. Photograph: Meghan Gavagni.

Another unexpected donation came in when Steve Conners, driving a golf cart and rushing from place to place organizing last minute details, was flagged down by an elderly group of zoo visitors. They were exhausted from their visit and needed a ride to the exit. In spite of many other things to attend to, Steve obliged their request. As he dropped them off they handed him $40. He attempted to decline the tip, but they announced "This is a donation for the fundraiser!"

We had some setbacks. The professional photographer who was arranged to take souvenir photos for guests (in return for additional donations) was unable to be located in the days preceding the event. As a result we could not offer souvenir photos printed on site, so Joe Wasilewski's daughter-in-law Stephanie offered to be our event photographer. She arranged with each guest to send their photos via email. When her camera battery was exhausted, several other guests, including Flavio Morrissiey volunteered to fill in with their own cameras and we kept the photo shoot and Meet N Greet going for almost two hours.

We also neglected to place a donation bowl at the bar, so our cash bar became an open bar, but this may have made it easier for guests to open their wallets at the TTF donation table and during the auctions, since they did not have to pay for their drinks. And after all, Akira's event poster did say the event would be "joyful". After hearing about the oversight, the St. Augustine Alligator Farm and Zoological Park made a post-event donation of $500 to become our beverage sponsor. Special thanks go out to David Drysdale and John Brueggen for their institution's generosity!

Figure 3. Colin Stevenson, Bruce Shwedick and Ralf Sommerlad prepare to greet guests. Photograph: Stephanie Wasilewski.

Though most of the CSG-TTF members barely had a chance to eat (Ralf did not stop working to eat at all; Fig. 3), the food was very good. We ordered enough meals for 175 guests and the caterer informed us that there was not much food leftover.

In the zoo's amphitheater, surrounded by giant tiki torches, Ralf Sommerlad delivered a very serious and passionate speech and thanked many individuals, institutions and organizations by name for their assistance and generosity.

Our event's headliner, Brady Barr's almost hour long presentation, included both slides and video. He really hit home for us when he spoke of the habitat loss that is affecting Tomistoma and the need for supporting its conservation. He reinforced what we have been telling people for some years now and he really may have galvanized the audience toward greater concern for this species and for supporting conservation action. It was also a fun show for the audience and concluded when another famous reptilian TV personality, Metro Zoo's PR Director Ron McGill, came out on stage with a live 7-foot (2.1 m) Komodo Dragon named "Chaos" (Fig. 4).

Figure 4. Guests meet Ron McGill and "Chaos", one of Miami Metro Zoo's captive-born Komodo Dragons. Photograph: Stephanie Wasilewski.

Figure 5. From left to right; Bruce Shwedick, Uthen Youngprapakorn, Ralf Sommerlad, Joe Wasilewski, Brady Barr, Colin Stevenson, Steve Conners. Photograph: Stephanie Wasilewski.

We could not have asked for more and guests were actually allowed to touch the dragon and then meet Brady in a friendly and casual way during the rest of the evening. Uthen Youngprapakorn videotaped Ralf's speech and the entire show for our archives.

Our good friend Meredith Whitney, from the Maryland Zoo in Baltimore, not only volunteered to assist Colin Stevenson run the TTF table, but she also placed the highest bid for a trip to the Tarcoles River in Costa Rica with Brady Barr and his wife Mei Len, who had donated their services for this auction item.

We have all received very positive feedback from many of the guests, and Woody Woodward informed Perran Ross that the event had the feeling of a CSG meeting. This was of course, the best compliment we could have hoped for.

Special thanks go to Ralf, Colin and Uthen who traveled so far to be a part of this event. Also, they did not come to the event empty handed. Colin donated four large cibachrome prints that he had received in return for his previous donations to the Chinese Alligator fund. Ralf donated two copies of his new book "Crocodilians, Their Natural History and Conservation", co-authored with Ludwig Trutnau. Uthen donated shirts and many color posters and prints. Special thanks also go to Akira Matsuda, for the many late night hours he spent preparing and updating the website, and making it possible for guests to make their ticket donations online at the TTF website.

After paying all event related expenses, $US7418.03 had been raised for direct action for Tomistoma conservation as a result of this event! The success of this event was the result of the generosity of many individuals and institutions, especially the Miami Metro Zoo and the Zoological Society of Florida for hosting in a most professional manner, to the event caterer SSA (Services Systems Associates) and Navas Party Rentals (Navas donated the use of the dining tables for the event) and of course to Brady Barr and Ron McGill for providing such an entertaining presentation for our guests.

A final note of appreciation goes to a special donation arranged by Joe Wasilewski. This donor (who prefers to remain anonymous) made a donation large enough to cover most of the costs related to the evening's meals.

We believe that "A Night for the Crocs! MIAMI" was a big success on many levels. Most importantly because it has focused public attention on this unique and previously little-known crocodilian. Look for "A Night for the Crocs! CHICAGO" coming in 2009.

Bruce Shwedick <shwedick@aol.com>, Steve Conners <sconner@miamidade.gov> and Joe Wasilewski <jawnatsel@bellsouth.net> .

Meeting Announcements

2007 Comparative Physiology and Toxicology - Diversity in a Changing Environment

Joint Meeting of "6th Chinese Comparative Animal Physiology Conference" and "International Symposium on Comparative Environment Physiology, Biochemistry and Toxicology"

Venue: Zhejiang University, Hangzhou, Zhejiang, China
Dates: 9-13 October 2007
Contact: SICB Headquarters <SICB@BurkInc.com>

6th International Zoo and Wildlife Research Conference on Behaviour, Physiology and Genetics

Venue: Berlin, Germany
Dates: 7-10 October 2007
Website: www.izw-berlin.de
Registration: www.bayceer.uni-bayreuth.de/izw6

IUCN-SSC Crocodile Specialist Group West Africa Sub-Regional Workshop

Venue: Parc "W", Niger
Dates: 13-15 November 2007
Website: See <www.lafermeauxcrocodiles.com/article.php3?id_article=158> for details

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1st International Wildlife Re-Introduction Conference "Re-Introduction programs: Applying science to conservation"

Venue: Lincoln Park Zoo, Chicago, USA
Dates: 14-16 April 2008
Co-Hosted by: IUCN-SSC Reintroduction Specialist Group and Lincoln Park Zoo
Coordinators: Joanne Earnhardt (JEarnhardt@lpzoo.org), Devra Kleiman (Dgkleiman@aol.com), Frederic Launay (FLaunay@ead.ae)

19th Working Meeting of the IUCN-SSC Crocodile Specialist Group

Venue: Santa Cruz, Bolivia
Dates: 3-8 June 2008

Steering Committee of the Crocodile Specialist Group

Chairman: Professor Grahame Webb, P.O. Box 530, Sanderson, NT 0813, Australia
For further information on the CSG and its programs, on crocodile conservation, biology, management, farming, ranching, or trade, contact the Executive Office (csg@wmi.com.au) or Regional Chairmen

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