

# **CROCODILE SPECIALIST GROUP NEWSLETTER**

VOLUME 25 No. 3 • JULY 2006 - SEPTEMBER 2006



IUCN - World Conservation Union • Species Survival Commission

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Printed by: Uniprint NT  
Charles Darwin University, NT 0909, Australia

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**COVER PHOTO.** Captive False Gharial *Tomistoma schlegelii* at Utairatch Crocodile Farm, Thailand, defending her nest (August 2006). The eggs had been left in the nest to hatch “naturally”, which offered the opportunity to observe the response of the female, which was aggressive towards anyone approaching the nest, would not move more than 3-4 m from it. Photograph: Uthen Youngprapakorn.

## CSG Newsletter Subscriptions

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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, upon request, to other interested individuals and organizations. All subscribers are asked to contribute news and other materials.

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United Leather Product Co. Ltd., Thailand.

#### **Contributors** (\$250 - \$1000)

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Broome Crocodile Park, Broome, Western Australia,  
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South Africa Crocodile Association, Lynwood Ridge,  
South Africa.  
Dr. Nao Thuok, Phnom Penh, Cambodia.  
Rachmat Wiradinata, Jakarta, Java, Indonesia.

## **18th CSG Working Meeting**

The 18th CSG Working Meeting was convened on 20-23 June in Montélimar, France, and was preceded by a CSG Steering Committee meeting on 19 June. The meeting was the first one to be held in Europe, and provided an opportunity to focus on issues in West Africa and its francophone countries, and bring together European crocodilian leather traders with CSG members.

Hosted by La Ferme aux Crocodiles at Pierrelatte, the CSG is very extremely grateful to Mr. Luc Fougeirol and his family's considerable support for the meeting. Samuel Martin, Technical and Scientific Director at la Ferme aux Crocodiles, did a wonderful job in organising the meeting,

and he and his support staff deserve special thanks. Samuel has now been appointed as one of the Regional Chairs for Europe, and it is hoped that he will play an important role with the expansion of CSG activities into West Africa, particularly with francophone countries.

#### **Steering Committee Meeting (19 June) Minutes**

##### 1. Opening

The Chairman, Grahame Webb, opened the meeting at 0830 h. Agenda papers were available in advance on the website with some spare copies and late papers for members and observers.

Steering committee members present were: Grahame Webb, Dietrich Jelden, Alejandro Larriera, Tom Dacey, Perran Ross, Rich Fergusson, Olivier Behra, Jenny Daltry, Jiang Hongxing, Uthen Youngprapakorn, Toshinori Tsubouchi, Charlie Manolis, David Wilken, B.C. Choudhury, Tirtha Man Maskey, Alvaro Velasco, Manuel Muñiz, Roberto Soberón, Giovanni Ulloa, Luciano Verdade, Jon Hutton, Ralf Sommerlad, Allan Woodward, Don Ashley, Yoichi Takehara, Thomas Kralle, Enrico Chiesa, John Caldwell, Fritz Huchzermeyer, Val Lance, Tomme Young, James MacGregor. (Kent Vliet, John Thorbjarnarson and Rom Whitaker arrived on 20 July).

Observers present were: Akira Matsuda, Heng Sovannara, Jerome Caraguel, Alba Imhof, Carlos Piña, Pablo Siroski, Gisela Poletta, Terry Cullen, Ivan Palacios, Maria de la Paz Lopez, Howard Kelly, Sen Rith, Marcos Coutinho, Ricardo Soavinski, Clara Sierra, Mark Merchant, Boyd Simpson, Wu Xiaobing, Chea Somala Sam, Seng Nakheng, Lim Suysovatha, Hideki Sakamoto, Zhu Jialong, Vicente Mercado, Chona Mercado, Giovanna Webb, Robert Sine, Neil Pentolfe, William Belo, Mark Belo, Severino "Toy" Mercado, Wim Janssens, Marc Gansuana.

Apologies were received from: Professor Harry Messel, Phil Wilkinson, Ruth Elsey, Hank Jenkins, Ekke Waitkuwait, Dr. Giam, Nao Thuok, Steve Peucker, Harry Andrews, Jayantha Jayawardene, Bernardo Ortiz, Noel Kinler, Harry Dutton, Yoshio Kaneko, Kevin van Jaarsveldt, C.H. Koh, Philippe Roggwiler, Steve Broad, Chris Banks, Yosapong Temsiripong, Asghar Mobaraki, Julie Thomson.

##### 1.1. Chairman's Report

The Chairman, Grahame Webb, welcomed everyone, drew attention to the large agenda and reminded the meeting that although the Chairman was responsible for final decisions he was seeking and would heed guidance from Steering Committee. The Chairman highlighted: changes

in CSG operations since taking over Chairmanship in 2004; building up of CSG financial resources; Africa being a big challenge for the future; ongoing support provided by industry representatives; capacity of CSG members to respond to various CSG issues; the need for CSG members to be more active; and, adoption of the Addis Ababa Principles on sustainable utilization by the CBD, IUCN and CITES, with which the CSG was intimately involved.

## 1.2. Executive Officer's Report

Tom Dacey introduced his report, highlighting: composition of the Steering Committee; CSG membership (293 at June 2006); reviews, reports, proposals (eg Cambodia, Palau, Latin America, CITES ranching review, commercial live exports); CSG Newsletter (still mainly hard copy, few electronic subscriptions); communication; financial management; and, CSG involvement in updating and re-publishing of Karlheinz Fuch's book on the identification of crocodylian skins

## 1.3. Financial Report

The Treasurer, Perran Ross, presented the financial report, highlighting the current balance of around \$US171,000 [including funds (\$US6200) held by CSG Tomistoma Task Force]. The Chairman pointed out that this reflect in part significant savings because he was supporting many of the CSG's costs personally, but also that substantial funds would be required for ambitious CSG projects such as Africa.

## 1.4. Financial Arrangements

Perran Ross and Tom Dacey described the new financial arrangements. The primary bank account continues to be maintained at the University of Florida, with a working account in Darwin, Australia. One-off transfers of funds from the Florida account to the Darwin account would be made each year, enabling the more efficient operation of the CSG. The issue of the legal identity of the CSG was raised and the Chairman requested Tomme Young, Perran Ross, Tom Dacey and Charlie Manolis to review the matter and report back before the end of the working meeting (**Action Item 1**).

***Action Item 1:** The delegated group met on 21 June, and discussed issues associated with CSG becoming a legal entity, and the possible implications for CSG financial operations. The proposed actions (1.4) with an operating account*

*in Darwin were confirmed as the best way to proceed in the short-term, and transactions with the Florida account will be reduced markedly as a consequence. Tomme Young will prepare a draft document covering options for "legal status" by 30 September for further consideration.*

## 2. Regional Chair Reports

### 2.1. Africa

The Regional Chairman for Africa, Rich Fergusson, advised that he had been "out of action" for some time with personal issues, but was now active again. Rich briefly addressed the activities in: South Africa (studies at St Lucia, KwaZulu-Natal and Olifants River, Mpumalanga); Botswana (Okavango work being done by Dr. Alison Leslie); Mozambique (meeting scheduled with management authority mostly concerning surveys, captures and wild harvest at Cahora Bassa in response to HCC incidence there); Namibia (PhD study just started on crocodile ecology and community conservation of crocodiles in the Caprivi region); Zimbabwe (some erosion of the management due to changes in the management authority); Zambia (GEF funding has been obtained for surveys of Kafue ecosystem and WWF has a project including crocodiles and HCC at Bangweulu in northern Zambia); Malawi (survey work - RF completed crocodile and HCC surveys of the lower Shire River in December 2005).

Regional Vice Chair Olivier Behra addressed the meeting, highlighting the following issues: 10 French speaking African participants were attending the CSG meeting for the first time; he was establishing two sustainable use projects in Madagascar; the establishment/expansion of the CSG website for the French-speaking countries would be beneficial (Samuel Martin may be able to advise on this matter); possible development of a project proposal for EU funding for French-speaking countries; ongoing difficulties in Madagascar, with the laundering of wild crocodile skins through farms and the need for further action by the CSG.

The Chairman reiterated that the CSG was not an enforcement agency, but that it would equally not sit idly by and watch obvious and transparent illegal trade. In the case of Madagascar the CSG had already be in contact with the Enforcement Section of the CITES Secretariat with regard to Madagascar and that it would renew efforts to encourage action.



Jon Hutton indicated that there were a lot of good things happening with crocodiles in parts of Africa and that there was a lot of information available. There was a need to bring the information all together and UNEP-WCMC may be able to employ someone to do so.

Dietrich Jelden suggested holding a CSG Regional Meeting in Africa would help the CSG assess what is happening. Zambia was suggested as a possible venue.

Fritz Huchzermeyer said that through sustainable use much was known about the Nile crocodile. However, he expressed concern that little was known about the other African crocodilians (*Osteolaemus tetraspis*, *Crocodylus cataphractus*). Fritz suggested that Cameroon might also be a good venue for a CSG Regional meeting.

The Chairman requested Rich Fergusson, Jon Hutton and Olivier Behra to provide recommendations to the Steering Committee on what actions the CSG should prioritise in Africa (**Action Item 2**).

***Action Item 2:** Jon Hutton will start making arrangements for a postgraduate student to be based at WCMC for one year for a desktop study to compile existing information on the population status, distribution and threats to all three species in each country in Africa. Further documentation of the legal status and policy environment for crocodiles in each of these countries is also important. It is envisaged that this project will also form the basis of a proposed broad-scale crocodile “atlas” project, in which the known distribution of crocodiles of each species is mapped for each country at a resolution of quarter degree squares or similar. It is likely that this could be supported in part by either a Commonwealth Scholarship or a Cheavling Scholarship. Rich Fergusson, Jon Hutton and Olivier Behra to facilitate obtaining the documentation for this study, using all CSG contacts within Africa. Additionally, Rich Fergusson will visit the national wildlife authorities responsible for crocodile management in countries where information for this study is lacking, using the existing CSG Africa budget, prioritising those for which we know least and those where crocodile conservation issues are arising. These visits will also serve to introduce and disseminate CSG’s role to African authorities where there has been little or no contact in the past. CSG’s initiatives in documenting HCC and the bushmeat trade will also be facilitated through these visits.*

*The study will indicate more clearly the status of African populations of all three species and, as importantly, will identify gaps in our knowledge. In the next phase, efforts to undertake or promote surveys to cover these gaps will then be the priority. This will likely require additional fundraising and the collaboration of local stakeholders, principally the relevant national wildlife authority, local crocodile producers and any resident conservation organisations. Rich Fergusson, Jon Hutton and Olivier Behra agreed that further efforts should be made wherever possible to collaborate with existing conservation NGO activities (eg WCS and CI programs in central Africa).*

## 2.2. Australia and Oceania

The Regional Chairman for Australia and Oceania, Charlie Manolis, addressed his report, highlighting: the proposed safari hunting contained within the Northern Territory’s Crocodile Management Plan was rejected by the Federal Minister for the Environment; withdrawal of the much publicised permit for proposed safari hunting in Papua New Guinea; and, the CSG review mission to Palau undertaken by Charlie Manolis and Tom Dacey in March 2006. Palau is a recent signatory to CITES, but has reservations on crocodiles and other CITES-listed species. There is currently no legislation in place for the protection of crocodiles. The population appears to be increasing and there was no apparent trade in crocodile products. Palau is developing a management plan and the officer responsible, Joshua Eberdong, supports sustainable utilization. However, Palau requires help. [Rich Fergusson commented that there are no details available on the interaction between safari hunting and ranching.]

## 2.3. East and Southeast Asia

The joint Regional Chairs for East and South East Asia, Jenny Daltry and Jiang Hongxing, presented their Regional report, highlighting: ongoing status problems and conservation efforts with the Philippine crocodile, *Crocodylus mindorensis*, saltwater crocodile, *C. porosus*, and Siamese crocodile, *C. siamensis*. Some wild *C. siamensis* hatchlings were reported in Vietnam where reintroductions had taken place. There had also been re-introductions of *C. siamensis* in Thailand. Only 10 wild *C. siamensis* nests have been found in Cambodia, and loss of habitat has been significant there. The recent CSG review mission stimulated some action and an update on actions taken was provided separately. Progress had been made with the False gharial, *Tomistoma schlegelii*

(see Tomistoma Task Force report). With the Chinese alligator, research is continuing and 6 alligators have now been released into the wild, and are being monitored with VHF transmitters.

Heng Sovannara (Cambodia) provided an update on the implementation of the CSG's recommendations resulting from the Cambodia Review Mission: the new Cambodian Fisheries law has been signed by the King of Cambodia; the Department of Fisheries has established the Cambodian Crocodile Monitoring Unit (CCMU); Cambodia is proposing to register more captive breeding farms with CITES.

Fritz Huchzermeyer enquired whether there was any information on the farming of exotic crocodiles in China and he was advised that it was included in the report of the "Commercial Live Exports of Crocodilians" (Agenda Item 4.5).

#### 2.4. Europe

Deputy Chairman, Dietrich Jelden, presented the regional report for Europe, highlighting the support given towards the Tomistoma Task Force activities, with more in depth research in Borneo and general taxonomic research on crocodiles in Africa.

Dietrich warmly welcomed Luc Fougeirol and Samuel Martin to CSG Steering Committee and thanked them for their efforts in organizing the CSG meeting in Montélimar.

#### 2.5. Latin America and the Caribbean

The Regional Chairman for Latin America and the Caribbean, Alvaro Velasco, presented his report highlighting: review of the regional membership; Caribbean sub-regional membership (the Chairman suggested CITES Management Authorities be contacted to identify people working with crocodilians in the Caribbean); need for funding to conduct a mission to Jamaica; Formosa project in Argentina - *Caiman yacare* wild harvest program; workshop held in Brazil to identify new people working on crocodilians; proposed downlisting of the *Melanosuchus niger* population in Brazil; *C. yacare* program in Paraguay is still closed; Colombian government accepting the CSG review recommendations about closing off avenues through which wild skins can enter trade based on captive breeding; regional meeting held in Santa Fe, Argentina (May 2005); proposed book on Latin American studies on crocodilian hematology; difficulties with *Crocodylus acutus* trade from Colombia into Europe.

Mr. Takehara raised the issue of difficulty with trade in *Caiman latirostris* between Argentina and Japan, due to Japanese domestic legislation. Although the Argentinian population was downlisted to CITES Appendix II in 1997, other populations are still on Appendix I, and so the species remains listed as such in Japan's legislation. Due to this listing, imports of *C. latirostris* from Argentina into Japan attract a large fee, making imports uneconomical. It was proposed that the CSG write to the Japanese CITES Management Authority seeking a review of the domestic legislation (**Action Item 3**).

***Action Item 3:** Following a review of previous correspondence between Argentina and Japan, additional information was provided by the CSG to the Argentinian CITES Management Authority to allow it to submit a better case to the Japanese authorities for possible revision of the legislation.*

#### 2.6. North America

Allan Woodward, joint Regional Chair for North America, passed on an apology from Ruth Elsey who was unable to attend the meeting due to work commitments. He highlighted: alligator production figures; proposed downlisting of the Florida population of *Crocodylus acutus*; Mexico's proposed downlisting under the USA Endangered Species Act (ESA) of Morelet's crocodile (*Crocodylus moreletii*) [findings yet to be released]. In view of the CSG comments Mexico will present a revised proposal to the USA seeking a downlisting from "endangered" to "threatened"; Michael Kreger (USFWS) provided updates on the ESA proposals, and it was proposed that he be offered CSG membership (**Action Item 4**); findings about Argentina's *Caiman latirostris* downlisting proposal under the ESA expected in August.

Val Lance reported that alligator nesting in Louisiana is expected to be very low this year due to the hurricane damage last year and current drought conditions. Don Ashley also confirmed the problem of adult displacement from nesting areas and its possible impact for the next 1-2 years.

***Action Item 4:** CSG Membership was offered and accepted by Michael Kreger.*

#### 2.7. West Asia

The Regional Chairman, B.C. Choudhury, highlighted: gharial status in the wild is not good, but OK in captivity; \$30,000 grant to Madras Crocodile Bank to review human-crocodile

conflict in India; a massive Indian program to interlink major river systems will have a major impact on gharials; gharial may now meet the IUCN Red List criteria for “Critically Endangered”; Tirtha Maskey from Nepal was present at the meeting; Asghar Mobaraki was unable to attend the meeting but provided written comments on the situation in Iran; and, regional CSG members have not had an opportunity to meet, and are seeking external funding to hold a regional meeting.

The Chairman indicated that notwithstanding difficulties, the CSG West Asia region needed to get more active. Any proposed reclassification of the gharial on the IUCN Red List needed to be based strictly on the criteria and not be a criterion of convenience for advocacy within India.

### 3. Thematic Vice Chair Reports

#### 3.1. CITES

In the absence of the Vice-Chair for CITES, Hank Jenkins, the Chairman introduced the report, highlighting: the CSG Ranching Review to be considered at the 22nd CITES Animals Committee meeting (AC22) in Peru in early July, and the review of production systems and use of source codes, also being considered at AC22. Grahame Webb, Don Ashley, Rich Fergusson and Dietrich Jelden all provided briefings on the source code issue.

#### 3.2. IUCN

In his report, Vice Chair, Perran Ross, highlighted that Jon Hutton and himself were working closely with the SSC Chair, Dr. Holly Dublin, on proposed organizational changes within the IUCN-SSC. There may be some changes on how the Specialist Groups function under the umbrella of the IUCN-SSC. CSG will need to manage upwards in order to influence the IUCN decision-making process and policies.

#### 3.3. Industry

The Vice-Chair, Don Ashley, presented an update on the California Penal Code issue, with CSG involvement in Senate Committee hearing. There were two basic issues: how do you ensure stimulation of legal trade will not encourage illegal trade; and, how do you ensure all products are legal? Don agreed to provide a complete list of all the issues raised by the Senate Committee (**Action Item 5**).

***Action Item 5:** Issues raised by the Senate Committee, and to which Don Ashley responded, were: importance of the Bill and alligators to Louisiana; how to ensure that the trade in alligators products is from legal sources and not from an endangered species; whether world trade in crocodilians is monitored by CITES and USFWS; how illegal trade is reported and by whom; and, would increased legal trade in alligators stimulate illegal trade in other endangered crocodilians.*

Don Ashley also addressed the CITES Personnel effects issue. With Resolution Conf. 13.7, the Parties agreed to exempt from the requirement of CITES permits certain personal items (eg up to four crocodilian specimens) carried as personal effects. Interpretation of what constitutes “specimens” is causing problems. Dietrich Jelden indicated that the EU regulations would come into effect in early July 2006, allowing compliance with Resolution Conf. 13.7. Don Ashley and Tomme Young were requested to review the matter and report back to the Chairman (**Action Item 6**).

***Action Item 6:** The consensus CSG input is: not to reopen the personal effects resolution (Resolution Conf. 13.7) at CITES CoP14; restore the text of the Resolution as adopted during CoP12; and, limit the terms of reference for the Working Group to the requirements of Section 2 in CITES Notification 2006-041. Implementation is an important consideration, and improved awareness by Customs and Port Inspectors should be a priority. A listing/delisting timeframe should be considered as part of a “process for consideration”. At this stage it is recommended that the CITES Secretariat be informed of the CSG’s strong interest in this issue, and that we be kept “in the loop”.*

#### 3.4. Trade Monitoring

The Vice Chair, John Caldwell, highlighted: comprehensive trade data for 2004 is now available on the website; CITES have been requesting bi-annual reports from the Parties, yet many Parties are providing annual reports; the proposed electronic “Farming Directory” is now on hold due to lack of available funds. John was requested to come back with suggestions for the implementation of the electronic “Directory” (**Action Item 7**).

***Action Item 7:** John Caldwell advised that UNEP-WCMC does not have the funds to produce the “Directory” even if it is electronic. However*

*UNEP-WCMC will investigate the possibility of making a web-based system available so that farmers/ranchers could populate with their own details. Design of the web interface is currently under consideration. John proposes that this be worked through the CSG Regional Chairs in the first instance. Rich Fergusson is currently talking to South African farmers to see what pitfalls might be encountered.*

### 3.5. Veterinary Science

The Vice Chair, Fritz Huchzermeyer, presented his report. With regard to disease: typical and atypical poxviruses have been found; and, a Kenyan crocodile farm closed down, with all stock moved to South Africa where they all died. On organisational matters, veterinary help is needed all over the world to prevent the spread of diseases. "Non-disclosure" clauses regarding the disclosure of information gained is hindering the free exchange of important information.

### 3.6. Zoos and Community Education

The Vice Chair, Kent Vliet, was unavailable to attend due to a flight connection problem. The Chairman requested members with an interest in this area to contact him. Areas of particular interest were: misinformation at airport displays; and, the existence of an IUCN "Advertising and Communication" section which may be able to advise on how to best spread the "sustainable use" message with crocodiles and trade.

### 3.7. General Research

The Vice Chair, Val Lance, reported that crocodilian science is "alive and well". Articles are mentioned in the CSG newsletter and he is proposing to write further articles for the CSG Newsletter.

### 3.8. Red List Authority

The Vice-Chair, John Thorbjarnarson, was unavailable due to a flight connection problem and Perran Ross presented the report, together with the associated paper (Agenda Item 5.6), on the re-evaluation of crocodilian species using the Red Listing criteria.

The Chairman indicated that the current Red Listing criteria did not provide even a reasonable index for predicting the real risk of global extinction of widely distributed species such as *Crocodylus porosus*, which can be totally secure in some nations but extinct in others.

Perran Ross indicated that the Red Listing criteria work better with the new guidelines and suggested that select CSG members should undertake training in the interpretation of the criteria under the new guidelines. [Further discussions included in Agenda Item 5.6]

## 3.9. Legal Affairs

The Vice Chair, Tomme Young, presented her report, indicating that crocodile management and trade are basically functioning effectively and that relationships with government are operating on a pro-active and positive basis. There were relatively few legal matters to report. General comments were provided on: California Penal Code; CITES personal effects; and, potential future issues (trans-boundary trade; compliance with international and national laws; stricter domestic legislations; and, human-crocodile interactions).

## 4. Task Force/Working Group Reports

### 4.1. Gharial

A report was presented on behalf of a Gharial Multi-Task Force (GMTF), which was formed outside the CSG. Tom Dacey discussed further with Rom Whitaker and Janaki Lenin when they arrived. [Note: GMTF organized a workshop on the evening of 22 June to discuss the gharial situation and to stimulate action by the GMTF. A two-phase approach was considered: Phase I - urgent measures to reverse the decline of gharial populations; Phase II - urgent assessment to determine whether gharial meets the criteria for "Critically Endangered" (see Action Item 10). A summary of this workshop is included in the Proceedings of the CSG working meeting.]

### 4.2. Chinese Alligator

The Working Group Chairman, Jiang Hongxing, confirmed that conservation and research efforts were continuing on track. A detailed report will be presented at the working meeting.

### 4.3. Tomistoma

The Task Force Chairman, Ralf Sommerlad, presented the report. During 2004, two surveys were conducted in West Kalimantan by Mark Bezuijen and PRCF. It is proposed to distribute these reports in Indonesian. There was a rapid field assessment in Sarawak (2004) by Mark Bezuijen and Rob Stuebing for the Grand Perfect



Plantation Company and a 2005 survey in Central Kalimantan by Mark Auliya with proposed follow up work to be undertaken by a student (Rene Bonke) from Bonn University. Miami Metro Zoo fundraiser was re-scheduled for February 2007. Possible re-introduction program in southern Thailand was under discussion with the Thai Department of Fisheries. Successful breeding of Tomistoma by Uthen Youngprapakorn at the Utairatch Crocodile Farm. Transfer of Tomistoma to the Hong Kong Wetland Park. Discussion about a Tomistoma Husbandry Manual. DNA and veterinary research in Europe. Support for students from the Munich and Bonn Universities.

#### 4.4. Philippine Crocodile

The Task Force Chairman, Chris Banks, was unable to attend the meeting and the report was noted. Vic Mercado, President, Crocodylus Porosus Philippines, Inc. addressed the Steering Committee about their proposal regarding the Palawan Wildlife Rescue and Conservation Centre. The proposal is to be a research and conservation project to transfer *C. mindorsensis* to various farms in the Philippines and for the commercial farming of the *C. porosus* for financial gain. The Chairman suggested that CSG members should discuss these matters with Vic Mercado over the next few days. Terry Cullen advised that the DNA work on *C. mindorensis* has been re-activated.

#### 4.5. Commercial Live Exports of Crocodilians

The Task Force Chairman, Perran Ross, tabled the draft report and gave a detailed presentation on the recommendations. The Steering Committee accepted the report, subject to minor modifications, and, the Chairman thanked Perran and the Task Force for their efforts before dissolving the task force. The Chairman requested that the draft Best Management Practices and Guidelines (Report pp. 25-30) be circulated to select expert CSG members for further input while they were at the CSG working meeting (**Action Item 8**).

***Action Item 8:** No immediate comments on BMPs were received in France, other than general agreement in principle. Executive Officer to circulate the draft BMPs to select CSG members out of session for further input.*

#### 4.6. Human-Crocodile Conflict

The Working Group Chairman, Rich Fergusson, presented the report, highlighting: consolidated

guidelines on the prevention and management of HCC; database of attacks by crocodiles on humans and livestock; and, a proposed fact sheet on HCC. Rich Fergusson is to meet with the working group members and interested people during the working meeting.

#### 4.7. Review of Crocodilian Ranching Programs

Tom Dacey advised that the CSG report on ranching was to be considered at AC22 in Peru (July 2006). The AC22 document seeks to amend Resolution Conf. 11.16 so that the current reporting requirements on ranching operations, that constitute an annual report obligation on Parties, are reduced and simplified.

### 5. General Business

#### 5.1. CSG Website

The Chairman presented the paper and advised on the need to update the current CSG website, which is hosted through the University of Florida. It was generally agreed to proceed with the update of the website as outlined in the paper, particularly in regard to the publications section and other crocodilian sites linked to the CSG.

#### 5.2. Electronic Journal

This paper was introduced by Tom Dacey and Grahame Webb. It is envisaged that any electronic journal would be developed as part of the upgrade of the CSG website. Val Lance was asked to form a small working group to discuss options for an electronic journal (**Action Item 9**).

***Action Item 9:** A small group of members convened during the working meeting, and discussed advantages and disadvantages of the CSG developing an electronic journal. It was generally agreed that there was a need for a peer-reviewed electronic journal on crocodilians. It was also agreed that there were many reports and studies did not fit the criteria for peer-reviewed journals, but had useful, valuable information to offer. The CSG Newsletter could be an avenue for publication of such reports, but this would only be possible if the Newsletter were in electronic form only - the costs of producing a hard copy of an expanded Newsletter would be prohibitive. The group decided to look at publishing a special issue of an electronic journal, and Val Lance undertook to formulate guidelines for authors, etc.*

### 5.3. Training in Crocodile Husbandry and Conservation

A paper was introduced by Tom Dacey and subsequent discussions raised the following issues: is this a job for the CSG or for other organizations? There needs to be a database of what is available now; need to be careful how the CSG proceeds with this issue; there is already a lot of information available in the public arena. It was agreed "in principle" to clarify what is available and include it on the CSG website.

### 5.4. Non-reusable CITES Skin Tags

The paper and its origin were introduced by the Chairman, as some non-reusable tags are clearly not tamper proof. CSG needs to consult with the CITES Secretariat. Allan Woodward to check on the outcome of the USA review of reusable tags (**Action Item 10**).

***Action Item 10:** Allan Woodward reported that the USA had problems with CITES skin tags breaking and being susceptible to tampering during the 1990s when plastic tags were being used. They reviewed various materials and styles of tags and found that a nylon tag, the Poly-Lok III, made by the E.J. Brooks Co. (<http://www.ejbrooks.com/>) resisted breakage and was essentially tamper-proof. Attempts to boil one of these tags to see if it would unlock without damage indicated that it remained tightly sealed. Nor was the tag able to be detached from the locking end using conventional tools. These tags also perform well through the tanning process.*

*Louisiana has looked into bar-coding, but initially found that this was not compatible with the Poly-Lok III tag. Louisiana is still investigating bar-coding, and will be conducting an experiment with a sample of bar-coded tags during the 2006 harvest.*

*The Chairman alerted David Morgan of the CITES Secretariat to the potential for re-use of the current tags and sought advice on what should be done. The Secretariat undertook to review the situation and report back.*

### 5.5. Castillos Award

The paper was introduced by Tom Dacey. Steering Committee members with suggestions on a possible recipient were requested to discuss with the Chairman.

### 5.6. Critically Endangered Listing for the Indian Gharial

The paper was introduced by the Regional Chairman for West Asia, B.C. Choudhury. The issue had been discussed previously under Agenda Item 4.1, and B.C. Choudhury, Perran Ross, Rom Whitaker and John Thorbjarnarson were asked to review the status against the IUCN criteria and report back (**Action Item 11**).

***Action Item 11:** At the Gharial Multi-Task Force (GMTF) workshop, CSG members took the opportunity to undertake a preliminary evaluation of the Red List status of the Indian gharial and reached the conclusion was that it may qualify as "Critically Endangered" under the following criteria: C. Population size estimated to number fewer than 250 mature individuals; and, C1. An estimated continuing decline of at least 25% within three years or one generation, which ever is the longer, (up to a maximum of 100 years in the future).*

### 5.7. Brazilian Downlisting Proposal for *Melanosuchus niger*

The paper was introduced by the Regional Chairman for Latin America and the Caribbean, Alvaro Velasco. He outlined the background to the proposal, CSG involvement to date, and how he had been working closely with the Brazilian CITES Management Authority. A draft proposal had been reviewed by 10 CSG members and co-ordinated comments returned to Brazil. Marcos Couthino, on behalf of Brazil, tabled a revised draft of the proposal, which CSG agreed to consider and provide further comments before the end of the working meeting (**Action Item 12**).

***Action Item 12:** A meeting was held with the Brazilian officials during the working meeting and comments were provided by CSG reviewers for further consideration. These comments were provided in writing on 4 July 2006. The CSG indicated that it would be willing to review an updated proposal when it is prepared. The option of submitting a regional proposal for a regional downlisting of *M. niger* was discussed, but it was considered that despite obvious merit there was insufficient time to organize such a proposal by January 2007.*

### 5.8. Wild vs Farmed Skins

Deputy Chair, Alejandro Larriera, explained how the paper stemmed from the Regional Meeting in Santa Fe, Argentina (May 2005). Advice was

provided to Colombian government authorities on the system of scute-clipping of hatchlings to close loopholes through which wild-caught caimans can be laundered through captive breeding farms. The system was opposed by some Colombian farmers on the basis of issues such as loss of value of the marked skin and “why us”? The Chairman reiterated that the original request for an identification system came from Colombia itself, not the CSG. The CSG cannot demand implementation of any particular system, it can only advise Colombia on what systems are used in other countries to overcome the problem Colombia is concerned about. The Chairman dismissed the "loss of value" argument, because the clipped scutes are very posterior on the tail, and there is no loss of value in other countries that use this system. The Chairman requested that the Colombian representatives at the meeting get together and come back and advise what could be done to resolve this issue (**Action Item 13**).

***Action Item 13:** A meeting of Colombian representatives was convened. Colombian CSG members reaffirmed the strong commitment of industry (and Government) to ensure that only legal trade takes place, and the implementation of systems to prevent illegal trade. The results of discussions from the Steering Committee and working meetings will be conveyed back to Colombia for further discussion and evaluation by Government and industry.*

#### 5.9. *Caiman c. fuscus* Skins Seized in Uruguay and Sold to Mexican Tannery

The Deputy Chair, Alejandro Larriera, recently visited the Mexican tannery which had purchased the old confiscated skins from Uruguay, and provided a detailed report and photographs of the way in which they were being utilised successfully. He estimated that about 30% of the skins were in very poor condition. The Chairman stated that the CSG had learnt a lot from this exercise, because initial concerns by some CSG members were that the old skins were useless, and that the tags may be more valuable than the skins. This is clearly not the case, and it would appear that skins can be kept in a dry form, for many years, and still have economic value.

#### 5.10. CSG Communication, Publicity and Promotion

The Chairman provided this paper that raised the issue of where we should be heading in the future with communication, publicity and promotion.

#### 6. Next CSG Working Meeting (2008)

A formal application to host the next CSG Working Meeting was tabled by Bolivia, and verbal offers to host the meeting were received from South Africa and Brazil. Cambodia withdrew the offer made previously. The Chairman asked South Africa and Brazil to confirm their proposals in writing, based upon the criteria provided to them by the Executive Officer.

#### 7. Other Business

No other business was raised and the meeting closed at 1730 h.

**[Minutes of the CSG Steering Committee meeting will be available at <[www.wmi.com.au/csgarticles](http://www.wmi.com.au/csgarticles)> until 31 December 2006].**



From left (foreground), Steering Committee members Olivier Behra (Madagascar), Don Ashley (USA), John Caldwell (UK) and Enrico Chiesa (Italy). Photograph: Giovanna Webb.

#### Working Meeting (20-23 June)

The 4-day working meeting was organised into discrete sessions:

- Research stimulated by la Ferme aux Crocodiles;
- Crocodylian trade; Conservation of African crocodiles;
- Conservation of crocodylians in Francophone countries and territories;
- Crocodylians as key animal species for wetland conservation and sustainable development;
- Crocodiles in zoos - a contribution to their conservation;
- Conservation of crocodylians in other parts of the world;
- Poster session;
- What is new in crocodylian biology research?; and,
- Husbandry techniques and crocodylian health issues applied to conservation and commercial husbandry.



A series of workshops were also held during the course of the meeting (eg veterinary, skin quality, community participation, Tomistoma Task Force; Task Force Gharial; trade, Human-Crocodile Conflict Working Group).

Despite its location in Europe, outside the natural distribution of any of the world's crocodylians, la Ferme aux Crocodiles has clearly demonstrated the importance of operations like this with public education and research (Fig. 1). A number of presentations at the meeting related to research that was made possible due to support and assistance from la Ferme aux Crocodiles. The farm also supports *in situ* conservation programs (eg Indian Gharial).



Figure 1. La Ferme aux Crocodiles allows visitors to see crocodylians “up close”, and to learn about crocodylian conservation in other parts of the world.

Through support provided by la Ferme aux Crocodiles, participants from West Africa (Burkina Faso, Niger, Mali) were able to attend the CSG meeting. Recognising the general lack of information on crocodylians from West Africa, one objective was to establish a stronger relationship with West Africa and its francophone countries. In this regard, a major outcome was the decision to hold a sub-regional meeting in West Africa in October-November 2007. This meeting will aim to bring together information on the population status of the three crocodylian species (*C. niloticus*, *C. cataphractus*, *Osteolaemus tetraspis*) in the subregion, and to improve the technical capabilities of local personnel with regard to survey methodology, reporting, etc. Of particular interest is the taxonomy of crocodylians in West Africa, with the possibility that *C. niloticus* could comprise a separate species.

An African regional meeting in South Africa is also being considered, and is likely to take place after the West African meeting.

No CSG meeting would be complete without the social activities, which included a reception at la Ferme aux Crocodiles (Fig. 2), a North African dinner with traditional dancers, an African dinner with African percussionist, and a Provençale dinner with traditional dancing and markets.



Figure 2. From left, Yves Le Bellec (Mayor, Pierrelatte), Jean François Siaud (Vice Chairman of Drôme Department Council & Chairman of Tourism Department Committee, translator, Luc Fougerol (La Ferme aux Crocodiles), Grahame Webb (CSG Chairman), Marie Pierre Mouton (Departmental and Regional Councillor for the County of Pierrelatte), Bernard Breyton (Vice Prefect for the Department of the Drôme), at welcome reception held at La Ferme aux Crocodiles at Pierrelatte. Photograph: Tom Dacey.

Karlheinz Fuch's book “The Crocodile Skin” (“Die Krokodilhaut” in German), which was updated and translated into English with CSG support and encouragement, was launched at the meeting. The publishers, Edition Chimaira, had a wide range of books on crocodylians and other reptiles on display, which proved very popular with participants. Ludwig Trutnau and Ralf Sommerlad's “Crocodylians: Their Natural History & Captive Husbandry” was also recently published by Edition Chimaira.



Figure 3. George Saputra and Dietrich Jelden. Photograph: Tom Dacey.





Figure 4. Steering Committee members at Villadeprix, attending dinner kindly sponsored by Dietrich Jelden and Don Ashley.



Figure 5. The meeting was well-attended by Latin Americans. From left, Alvaro Velasco, Ivan Palacio, Sergio Medrano, Jhon Calderon-Mateus, Clara Sierra and Giovanni Ulloa. Photograph: Giovanna Webb.



Figure 7. From left, Roberto Soberón, Kathleen Durning and Kent Vliet. Photograph: Giovanna Webb.



Figure 6. From left, Val Lance, Joe Wasilewski, Grahame Webb and Allan “Woody” Woodward. Photograph: Giovanna Webb.

“Sirtrack’s” ([www.sirtrack.com](http://www.sirtrack.com)) display provided participants with detailed information on a wide range of satellite and VHF transmitters being used to track crocodylians and other species of wildlife.

#### Auction

An auction held after the farewell dinner proved to be a lively event, and special thanks are extended to everyone who kindly donated items, and to the auctioneer, Joe Wasilewski, who did a marvellous job of “extracting” \$US3536 from participants. These funds will be contributed towards the proposed sub-regional meeting in West Africa in October-November 2007.

## Castillos Award

Since 2002, the Castillos Award has been awarded to a CSG member who is considered to have made a significant contribution to the conservation of crocodylians. Previous recipients were John Thorbjarnarson (Gainesville, 2002) and Jenny Daltry (Darwin, 2004).

This year, the efforts of Merlijn Van Weerd with community-based conservation of the Philippine Crocodile (*C. mindorensis*) were recognised. Merlijn pointed out that the success of the program was the result of a team effort. Jan van der Ploeg and Dominic Rodriguez, who also participated in the CSG meeting, were on-hand to be part of the award-giving ceremony (Fig. 8).



Figure 8. From left, Dominic Rodriguez (holding the Castillos Award), Merlijn van Weerd and Jan van der Ploeg. Photograph: Charlie Manolis.

## Next CSG Meeting

The 19th CSG Working Meeting will be held in Bolivia, in mid-2008. Information on this meeting will be posted in the CSG Newsletter as it becomes available.

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

## **Sad News**

Dr. Tirtha Man Maskey (CSG Regional Vice Chair for West Asia) was tragically killed when the helicopter carrying him and 23 other people (including key WWF officials from Nepal, UK and USA), crashed 2 km southwest of Ghunsa (Tapeljung District) in Nepal on 23 September 2006. The helicopter was en route to Suketar to attend a function to mark the handing over of the Kanchanjunga Conservation Area to the local community. Dr. Maskey was a pioneer in wildlife conservation in Nepal and made a significant contribution to the conservation of the Gharial *Gavialis gangeticus* in Nepal. Our sincerest condolences are extended to Dr. Maskey's family.

## **Regional Reports**



### **Europe**

**BRINGING SOUVENIRS MADE OF CROCODILES INTO THE EUROPEAN UNION.** On 9 July 2006, new EU Regulation No. 865/2006 came into force. This regulation refers among other things to CITES Resolution Conf. 13.7, concerning exemptions for the importation of personal effects.

From 9 July 2006, the import of up to four (4) dead, worked specimens of *Crocodylia* spp. per person (excluding meat and hunting trophies) into the European Union will be possible without any import permits, if they are imported as personal effects (that is, not sent by mail or as a gift).

If more than four (4) items per person are involved, the products are not intended for personal use, or they are sent by mail to a member country of the European Union, an import permit is required from the CITES Management Authority of the European country into which the items are to be imported.

The new EU regulation can be found at: [http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l\\_166/l\\_16620060619en00010069.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/oj/2006/l_166/l_16620060619en00010069.pdf).

### **Latin America & the Caribbean**

#### **Mexico**

**MORELET'S CROCODILE (*CROCODYLUS MORELETII*) IN CENTRAL CAMPECHE, MEXICO.** Morelet's crocodile (*Crocodylus moreletii*) is widespread on the Yucatan Peninsula, and potentially may occur in most mainland water bodies (Lee 1996). The evaluation of conservation status of this species throughout its range is urgently needed to define its adequate status under CITES. Field surveys have been carried out recently in Mexico for this purpose (Domínguez-Laso *et al.* 2004; Domínguez-Laso 2005). Nevertheless, some areas still remain unexplored, due in part to the few local scientists to conduct surveys and the inaccessibility of remote sites.

As part of an expedition in a deciduous forest area to evaluate biological values for conservation, we conducted two spotlight count surveys in La Arrigueña (18° 53' 43" N, 90° 02' 45" W; Fig. 1) on 11 and 12 May 2005. La Arrigueña is a river-like lagoon, 3 km long and with an



average width of 40 m and average depth of 3.5 m.

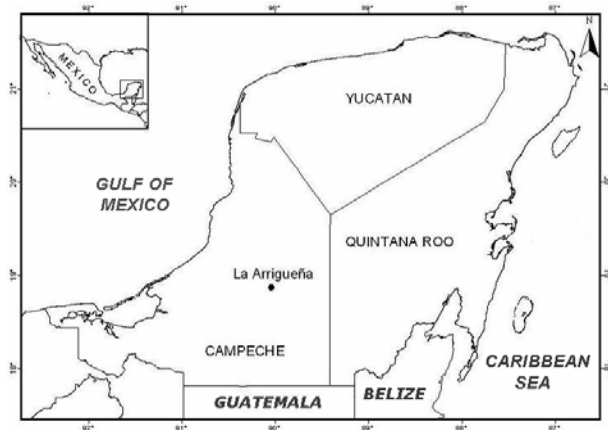


Figure 1. Location of La Arrigueña Lagoon in central Campeche, México.

During the rainy season, the watercourse of La Arrigueña flows into the Gulf of Mexico throughout the Río Champotón. Surrounding vegetation consists of native grass and riparian forest of Pukté (*Bucida buceras*) and Palo de Campeche (*Haematoxylum campechianum*) trees, contrasting with the deciduous forest of the area (Fig. 2).

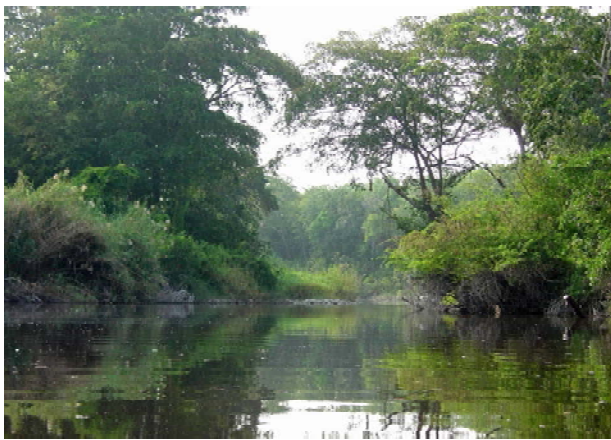


Figure 2. View of La Arrigueña Lagoon. Photograph: Mauro Sanvicente.

During daytime we observed some crocodiles basking on the banks, but at night we detected 23 and 16 individuals (7.6 and 5.3 crocodiles/km) on the first and second nights respectively. La Arrigueña represents a suitable habitat for *C. moreletii*, and based on these encounter rates, this aquatic system contains a healthy population. Future long-term monitoring surveys are recommended to determine population size and structure as well as to establish adequate conservation strategies and management plans for sustainable use.

## Acknowledgements

We thank Janneth A. Padilla Saldívar for the map.

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## Colombia

RETURN OF THE “BABILLA” (*CAIMAN CROCODYLUS FUSCUS*): A KEY SPECIES IN THE CONSERVATION AND SUSTAINABLE USE OF WETLANDS IN THE DEPARTMENT OF ATLANTICO (COLOMBIA). For the last 24 months Atlántico’s Regional Corporation (CRA) has been developing a program of conservation, management and sustainable use of the wetlands in its jurisdiction. The program is based on the reintroduction of hundreds of Babillas to recover its wild populations, in order to develop a proposal of sustainable use for this and other species of economic importance in the wetlands (turtles, birds and aquatic mammals amongst others), and allow an improvement in the quality of life of the department’s communities and conservation of the biodiversity of the environment.

The Department of Atlántico is located in the north of the Colombian territory. Being part of the Caribbean plain, it is bordered by the Caribbean Sea to the north. The continuity of this plain is dissected by the Magdalena River and the Canal del Dique (a 116 km artificial canal linking the Magdalena River with the Caribbean Sea), which also

separates the Department of Atlantico from the Departments of Bolivar and Magdalena to the east and south.

The Department of Atlantico covers 3338 km<sup>2</sup> and its physical surface possesses flat zones interrupted by mountainous elements with heights that do not exceed 500 m osl (over sea level). The average temperature throughout the year is 28°C. Given that the climate is determined by two main variables, temperature and rainfall, the department belongs to a dry tropical climate group, steppe type with high temperatures.

The main economic activities of the department are:

- Cattle farming: 71.2% (237,666 ha) of the departmental territory (333,800 ha) is suitable for cattle farming. This area has expanded to 241,171 ha between 1995 and 2001, with a 9.4% growth in cattle farming activity.
- Forest (wood industry): The territory has 15.1% (50,404 ha) of forest, of which 39.2% (20,280 ha) corresponds to secondary forest and 0.2% (605 ha) to planted forest.
- Agriculture: 6% (20,028 ha) is used for agricultural activities, of which 30% (6000 ha) are irrigated by two irrigation districts and 9 mini-districts, with a potential of 777,600 m<sup>3</sup>/year.
- Water Sources: 6.5% (21,697 ha) is comprised of water bodies with a potential productive capacity of 125,000 ton/year. In spite of this, fishing activity is handmade, extractive and for sustenance purposes mainly.
- Ecotourism: The tourist and eco-tourist potential is represented in 104 sites of landscaping beauty and 72 km of beaches, of which 45 km need to be environmentally recovered.

The department has almost 22,000 ha of wetlands, of which about 16,000 ha belong to the El Guajaro Dam, which in the last decades has reduced its water surface to 12,000 ha - this reduction is considered as one of the most serious causes of loss of biodiversity in the department. The other 6000 ha are distributed on the wetlands of the lagoon complex of Malambo, El Rincon Swamp, Palmar de Varela Swamp, and the San Juan de Tocagua Swamp, amongst the most important ones

The main reasons for the decrease in the water surfaces of these wetlands are the agricultural and cattle activities that have been stimulated over many years, without a concomitant stimulus for the sustainable use of biodiversity. For this reason, the managers of the CRA objective, led by Dr. Tohunny Palencia Londoño, is to develop a strategy of conservation based on the use of biodiversity. The idea arose from the study of the report made for Colombia by the CSG ["Final Report Mission to Colombia (IUCN-SSC Crocodile Specialist Group, March 2004)"], which supports the initiative developed by the BIODIVERSA foundation (2002) in the ports of Gambote and Puerto Badel (Department of Bolivar), where a small program of Babilla conservation and management with

participation of the community took place. In the report, the extension of this type of program to other areas where a natural distribution of the species occurs is suggested.

Agreeing with this suggestion, and visualizing the importance of a program of this magnitude, the CRA director designed it with a great coverage. In many stages it will cover all of the department's wetlands, which will become the largest and greatest coverage conservation program of crocodilidae in Colombia.

For this purpose, State companies and breeding farms (independent and belonging to AZOOCOL) from where specimens for the repopulation will come as required by Colombian law, have been brought together to the Atlantico University's Faculty of Biology, together with private investigators with experience in conservation and management of crocodilids, all of them under the coordination of biologist Ayari Rojano from the team of Biodiversity of the CRA.

With this team a management system was designed, with five main components:

- a) Characterization and current description of the habitat where the program is planned to be developed.
- b) Identification and mitigation of the causes of loss, misuse, and contamination of the selected habitats.
- c) Knowledge and management of specimens in captivity, by the communities benefiting from the program.
- d) Re-supplying, tracking and monitoring of marked sub-adult specimens released in specified areas.
- e) Redefinition of the cycle.

This way the conservation program, is being developed in 8 water bodies of the department: El Convento swamp, Santo Tomas' swamp, Luisa and Manatí swamps, Uvero swamp, El Guájaro Dam, and El Rincon swamp, located in 11 municipalities and involving 13 communities within the program. Equally, the social group beneficiary of the project is formed by fishermen, housewives and members of communal action boards.

The a) and b) components are developed with the participation of the Atlantico University's Biology faculty, its academic and student sectors, and the community that by means of periodic and programmed trips have established amongst others, the conditions of the selected wetlands in this program. They also established the holding capacity of each wetland, taking into account the nutritional supply based on both aquatic macroinvertebrates and small vertebrates associated with the wetlands, also being censused, the current populations of Babilla, in each site where the reintroduction of specimens is going to take place, the main opposite situations will be identified and strategies for their overcoming will be developed.

The c) component is developed under one of the universal principles of the environmental education, "knowing to



learn" and "experiencing to remember", this way newborn specimens of *C. c. fuscus* have been delivered, coming from the breeding farms of closed cycle to housewives who at this moment dedicate part of their time to take care of 13,819 individuals from 21,783 that correspond to the initial goal distributed in groups of 100 by participant housewives, which totals 138 women that devote themselves partially to the care and protection of Babilla individuals, with a monthly remuneration of 500 pesos (\$USD0.21) for each alive animal maintained in captivity. The animal groups are kept in cement sinks specially designed for this purpose. The handling, feeding, growth and health of the individuals are constantly being supervised by trained biologists. When the year expires, the individuals are set free in swamps of the participant communities with previous evaluation of their physical condition and health to give new specimens to the housewives who will continue with the program.

The d) component is complementary to the previous one, but in this case the individuals given by the breeding farms are sub-adults (male and females) between 100 and 115 cm long. They are released in selected swamps after going through the indicated procedures for these cases (quarantine, examination, etc.). All specimens are marked by amputation of single vertical scales of the tail, and they are monitored with respect to their capture and recapture, geographical reference of their positions to establish the migration maps (emigration or immigration) in order to be able to establish the dynamics of these artificially created populations, etc. Finally with the d) component there will be an analysis of all the variables presented during a certain cycle (a year) and certain adjustments will be made to continue with the program. It is necessary to reiterate that the strategy is established for an indefinite development, hoping that the handled populations contribute to a production of nests or individuals to establish harvest fees and commercial use without putting in danger the recovered populations.

The total cost of the program is estimated to be \$1,600,000,000 equivalent to \$USD673,188 which will be invested during the development of the program and will generate in a direct way 358 jobs, plus another 60 from tourist and eco-tourist activities inherent to the program.

Corporacion Autonoma Regional del Atlantico [*Tohny Palencia Londoño (General Manager), Ayari Maria Rojano Marin (Biologist, Coordinator of the Team of Biodiversity of CRA), Sergio Arturo Medrano-Bitar (Biologist, Scientific Advisor to the Program)*].

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## Bolivia

AN EXPERIENCE OF INTEGRAL USE OF CAIMAN MEAT. In 1999 a National Program for the Sustainable

use of caiman (*Caiman crocodilus yacare*), which is the most widely distributed Bolivian crocodile species was launched after several years of prohibition of exploitation. The Program allows hunting of annual quotas of wild adult caimans based on estimated population studies performed by the Scientific Authority and regulated by the Bolivian CITES Management Authority in Bolivia (the Wildlife General Direction under the National Ministry of Sustainable Development and Environment).

This National Program has been developed mostly in the Beni region in the north of the country, which consist mainly of lowlands. Due to its geographic and climatic conditions this is a natural habitat for caimans, and the development of this Program has represented a productive chain in which active involvement of many actors such as indigenous communities, peasants and cattle ranchers has been achieved.

Together with launching of the Program, the company Bolivian Leathers emerged as a private entrepreneurship to become one of the main bonds of the productive chain: the production link that adds value to the products by manufacturing the skins into tanned leathers and later on into finished products. However, the company was funded under the main premise and long-scope vision of sustainable use of biodiversity resources, and since then it has been actively involved contributing with proposals and strategies to improve the Sustainable Use Program.

Since the start, one of the main concerns of Bolivian Leathers was the deplorable waste of meat resulting from harvest for skins and a "wild" idea came into mind - the establishment of a company for meat processing with the aim of integral and sustainable use of the species. Hence, a research project was started in 2003 to investigate the feasibility of including research on crocodylian biology, feeding and handling techniques as well as marketing, technology and regulatory issues. Although there is already some available information on other crocodylian species, information over caimans was especially scarce and much research and "figuring out" had to be done to set it out.

In the meantime, global tendencies set a favorable scenario that appeared to support launching of the project. For example, various food crises, especially in developed countries, caused consumers to be concerned about safety of the food processing chain and intensive breeding practices. These crises also turned the attention of many people to minimally processed foods and organic products, which also have to be processed under strict food sanitation principles. Moreover, ethnic and exotic cuisine experienced a considerable growth, as did the necessity of it being certified as being derived from sustainable programs which respect the wild populations so to keep a healthy and long-lasting relationship with the wild environment (Fig. 1).



Figure 1. There has been an increasing demand for caiman meat in recent years.

PROTEIN (g/100g)	FAT (g/100g)	ENERGY (Kcal/100g)
18.68	0.57	80

Figure 2. Caiman meat is being produced under high quality standards, including HACCP and GMP (see text).

Hence, the new food division “Wild Meat” emerged through the entrepreneurship of Bolivian Leathers & Food in 2004, incorporating caiman meat cuts for export complying with high quality standards and Food Safety Assurance Systems including HACCP (Hazard Analysis and Critical Control Points) and GMPs (Good Manufacturing Practices) (Fig. 2). This experience also meant developing jointly adequate administrative procedures for harvesting control and tag lists presentation, since only skins were considered previously.

Since then, during 2004 and 2005, a small but growing percentage of the national quota has been recovered, processed and exported to the United States and other countries, and 2006 processing is planned to involve about 15,000 specimens.

The panorama ahead requires in our view, the necessity of moving on to Management Plans for the Sustainable Use of the species, meaning the rational, planned and

sustainable use of caimans in their natural habitats, defined areas of several TCOs (indigenous territories preserved as such and legally delivered to indigenous communities by the government).

The implementation of management plans would have several advantages for the sustainability of healthy caiman populations: more precise population studies could be conducted on-site before a defined, restricted harvesting period; monitoring and follow-up procedures would be performed during the harvest period; and, a full range of post-studies could be conducted including evaluation and feedback, which would enrich the scarce information on biology and ecology of wild populations, and cause-effect studies on the harvest trials.

In summary, these two years have been represented a whole bunch of experiences and “step by step” achievements, and at the beginning of the new harvesting period we are facing new challenges such as promoting Management Plans, increasing the percentage of processing of the annual quota, developing new processed products based on the lower value cuts and increasing the percentage of use of byproducts in order to achieve a better integral and sustainable use of the animals.

Katherine Fuentes, *Bolivian Leathers & Food*, <kfuentes@bolivianleathers.com>.

## West Asia

### **Nepal**

NEPALESE MARSH CROCODILES BASK IN THE SUN. Surrounded by marsh, meadows and forest, Ghodaghodi Lake, Nepal’s lowest lowland lake in the western part of the country, is long been rich in biodiversity and wildlife. But years of heavy exploitation and poaching in and around the lake have threatened the survival of many important species, including turtles and crocodiles.

Recognizing the threat, WWF and the Government of Nepal, through the Terai Arc Landscape (TAL) Programme, initiated a project to improve this wetland habitat, which is one of four Ramsar wetland sites of international importance in Nepal (Ghodaghodi Lake Area, Beeshazar and associated Lakes, Jagadishpur Reservoir and Koshi Tappu).

Located in the shadow of the Himalayas, the Terai Arc covers 5 million hectares, from Nepal’s Bagmati River in the east to India’s Yamuna River in the west. It provides critical habitat for greater one-horned rhinoceros, royal Bengal tigers, Asian elephants, 80 other mammal, 47 reptile and amphibian species, 556 bird species, and more than 2100 species of flowering plants.

As part of the Terai Arc Landscape (TAL) Programme, WWF and its partners are working to restore and reconnect 11 national parks in Nepal and India to create one continuous landscape. Improving the habitat for the marsh mugger crocodile is just one small part of species conservation and restoring the landscape.

“The marsh mugger is not among the most endearing species but they are an important part of wetland biodiversity,” said Neera Shrestha Pradhan, WWF Nepal’s Freshwater Officer. “That is why we, together with local communities living near the lake, have built a reinforced sand bank. We hope this will become a suitable nesting site for the crocodiles.”

Recently, a local monitoring team found a number of footprints at the site, evidence that the sand bank is already being used by the marsh muggers for basking in the sun, and potentially, for nesting.



Figure 1. Sandbank built by TAL Program and local communities to improve *Crocodylus palustris* habitat at Ghodaghodi Lake. Photograph copyright: WWF Nepal/Anand Chaudhary.

In addition, WWF helped a local youth form a community-based anti-poaching operation, the first of its kind in the region, to protect the wetlands and its resources. “This group is actively involved in preventing poaching and encroachment within and around Lake Ghodaghodi,” Pradhan added.

The anti-poaching group has confiscated over 800 fish hooks, three boats and nearly 200 gill nets. Several local poachers have also voluntarily surrendered their spears and even dugout canoes.

*Note: The Convention on Wetlands is an intergovernmental treaty providing the framework for national action and international cooperation for the conservation of wetlands and their resources. There are presently 152 parties to the Convention, with 1611 wetland sites, totaling 145.2 million*

*hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance.*

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## Australia and Oceania

### **Australia**

There has been renewed debate on whether safari hunting of *Crocodylus porosus* should be permitted in the Northern Territory following the fatal attack on an 8-year-old Aboriginal girl at Gadji Outstation, Blyth River, on 8 July. In October 2005, the Australian Federal Government announced that it would not approve safari hunting as part of the Northern Territory’s management program [see Crocodile Specialist Group Newsletter 25(1): 5-6]

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## North America

### **USA**

**ALLIGATOR NESTING DECREASED BY LINGERING HURRICANE EFFECTS AND DROUGHT.** Nearly all of Louisiana is currently experiencing drought conditions with coastal marshes particularly dry after limited rainfall this winter. Severe drought can have adverse effects on alligators as they are an aquatic species and prefer water of low or moderate salinity, and generally will not nest in highly saline marshes. Alligators may be forced to move from their normal nesting habitat if ponds at/near their den site become dry due to lack of rainfall. Recent reports indicate the drought is the most severe experienced in Louisiana in 111 years of documented weather records.

The current drought could be particularly deleterious as marsh pond salinities were already higher than normal, due to storm surge from Hurricanes Katrina and Rita in summer 2005. Normally rainfall in the winter would dilute this and temper the high salinities, but the dearth of rainfall and unusually warm weather (and more evaporative losses) have accentuated already higher than normal salinities. Alligators prefer marshes that are fresh to intermediate, but good populations do occur in brackish marshes in some regions. Alligators can tolerate high salinities and will inhabit salt marshes on a limited basis, but nesting in salt marshes is very rare.





Figure 1. Aerial view of marsh on Rockefeller Refuge, taken during the nest survey of 12 June 2006. There was very little water in remaining ponds, and much of the vegetation had yet to recover from storm surge salinities. Photograph: Phillip "Scooter" Trosclair.

Biologists in the Louisiana Department of Wildlife and Fisheries Alligator Management Section have been closely monitoring the state's valuable alligator resource since the devastating hurricanes. Starting in February, night-time surveys evaluated alligator numbers, general body condition and behavior, and blood samples were taken to

document possible hurricane effects. By late spring, drought conditions led to worsening environmental conditions in some areas, and daytime searches showed limited indications of pre-nesting activity in the hardest hit regions. Pond salinities of 25-30 ppt and higher were documented in late spring and early summer. Pond salinities of 40-45 ppt were recorded on 12 June south of Highway 82 in Grand Chenier while conducting a helicopter survey to search for alligator nests.

The coastal nesting survey was recently completed, and indeed alligator nesting in some areas was markedly affected by current harsh environmental conditions. Interestingly, in some regions nesting was improved (St. Mary, St. John, and Tangipahoa Parishes) as compared to prior years. Parishes hardest hit by Hurricanes Katrina (St. Bernard and portions of Plaquemines) and Rita (Cameron and Vermilion Parishes) showed reductions in nest counts from past years, particularly in brackish marshes nearest the coast. Relative to 2005, nest production in southwest Louisiana dropped by 84.5%, while nest production in southeast Louisiana dropped by 35.3%. Of note 2005 was the third highest nest count on record in recent years. Of great concern are habitat alterations and vegetative damage, which has been slow to show evidence of recovery, and may be long-lasting; whereas hopefully normal rainfall in future months will minimize drought effects.

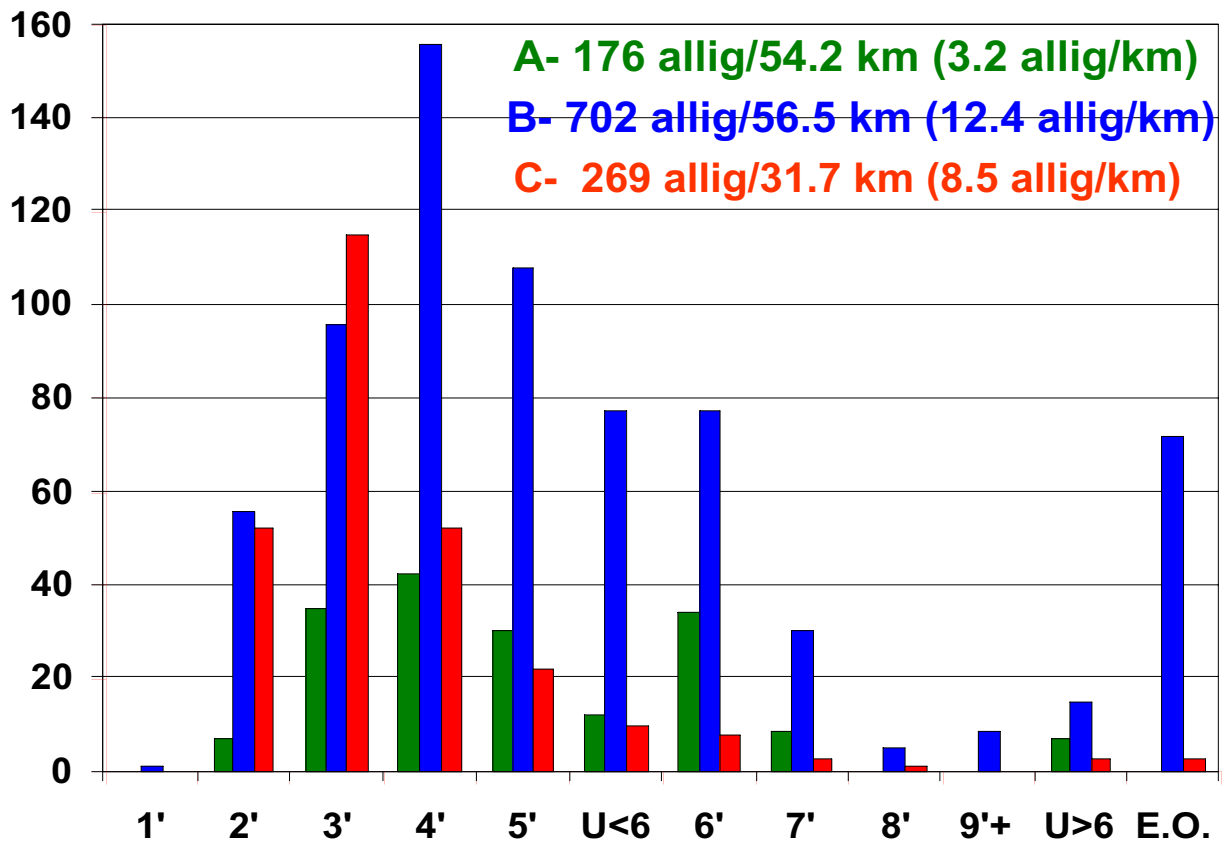


Figure 2. Night counts (June 2006) showing size structure (TL in feet) in low (3.2 km<sup>-1</sup>), medium (8.5 km<sup>-1</sup>) and high (12.4 km<sup>-1</sup>) density areas.



Female alligators are susceptible to environmental stressors, and may not nest in drought and high salinity conditions. Our coastal nest surveys revealed this in the severe drought of summer 2000. The animals do not usually die, but they simply will not nest that year as environmental conditions are not ideal. In general, population indices rebound from drought by the next year, if water levels have returned to normal.

Lightning fires can be problematic during drought years. We have documented loss of alligator eggs/nests due to uncontrolled summer lightning fires in past years of unusually low water levels.

Due to the hurricanes, extensive areas of marsh were scoured and marsh vegetation has died or has been covered by debris or mud from the storm surge. Some conversion of healthy marshes to open water by retained salt water may cause alligators to nest on levees or construct nests of sub-optimum nesting materials.

Despite harsh environmental conditions, the aerial helicopter nesting survey led to an estimated production of over 20,000 alligator nests in coastal Louisiana. Additional nests are found in some 750,000 acres of cypress-tupelo swamp habitat, which is not surveyed as canopy cover precludes visualization of alligator nests from the air. Night-time surveys conducted in June showed varying results (702 alligators counted in one survey; 12.4 alligators per kilometre) (Fig. 2), and we were pleased to see large numbers of small alligators in hurricane affected areas, as we'd theorized the smallest alligators would be least likely to tolerate the persistent high salinities.



Figure 3. Alligator caught on 14 June 2006 near the Rockefeller Refuge office. Note the completely dry pasture. A tail notch and web tags indicate that this animal is a recapture from study with Val Lance. Photograph: Ruth Elsey.



Figure 4. This alligator was found in a pond near Rockefeller Refuge workshop, and was caught on 15 June 2006. It was almost played out from fighting being stuck in the mud, and turned out to be a recapture (one of Val Lance's alligators originally caught on 16 July 2001). The alligator had lost a large section of its tail, and its bottom jaw was broken and unstable. Photograph: Ruth Elsey.



Figure 5. Parke Moore (LDWF) catches a sub-adult alligator for blood sampling on Rockefeller Refuge on 9 August 2006. Twenty alligators, all in good body condition, were caught and bled in 60 minutes, indicative of recovering alligator population densities. In June this impoundment was completely dry, and all alligators were forced to move to deep water canals. Photograph: Ruth Elsey.

Recent rainfall (in July) in some areas rapidly led to more observations of alligator movement, and may lead to redistribution of alligators back to their prior preferred habitat in the coastal zone. A trip on 10 August to catch additional alligators on Rockefeller Wildlife Refuge for blood sampling [to check plasma corticosterone ("stress hormone") levels and possibly electrolytes to evaluate any changes possibly due to higher than normal salinities] showed alligator densities closer to normal pre-hurricane

and pre-drought levels. Twenty sub-adult alligators were caught and blood samples taken, in exactly one hour; indicative of the relatively high densities of alligator populations in the area (Fig. 5). All alligators appeared in good body condition. Continued close monitoring of the recovery from the habitat changes will follow over the next several months.

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## East and Southeast Asia

### Malaysia

The New Straits Times (19 August 2006) reported "Crocodiles still lurking in two Kuantan rivers". Contrary to popular belief, Saltwater Crocodiles (*Crocodylus porosus*) occur in Sungai Kuantan and Sungai Pahang. Earlier this year, two 1.5 m long crocodiles were found at the Pahang Royal golf course in Jalan Teluk Sisek. They are believed to have become trapped in a pond when the Sungai Kuantan overflowed.

Kuantan Municipal Council (MPK) staff assisted in the capture of the two crocodiles, and their relocation to a nearby council mini-zoo. Wan Mustaza Wan Mustaffar (50), who is in charge of the MPK's mini-zoo next to the golf course, he had never encountered a wild crocodile before.

The mini-zoo now has six crocodiles, that either caught by MPK staff or surrendered by the public or the Fire and Rescue Department over the past 8 years. One of these crocodiles had laid eggs recently, but all were predated by monitor lizards.

Zoo-keeper Zukifli Yusof (32) had last seen a crocodile in the wild 10 years ago, in Sungai Pahang. Apart from *C. porosus*, Buaya Jolong-jolong (*Tomistoma schlegelii*) is also believed to occur in Pahang, mainly in Tasek Bera and occasionally in smaller streams associated with Sungai Pahang.

Perhilitan Pahang Director Zainuddin Ab Shukor stated that both species were almost extinct, but believed that the present population could be preserved if they were not killed by poachers. No program is in place to conserve crocodiles in Pahang.

Source: *M. Hamzah Jamaludin, New Straits Times, 19 August 2006.*

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**CROCODILE SNATCHES BOY AWAY.** A 12-year-old boy was taken by a crocodile at the Sarawak River at

Kampung Bako Ulu, about 25 km from Kuching, on 3 September. The boy was swimming with his friend in the river at 1530 h, about 200 m from his house. Neither of the boys noticed the presence of the crocodile, which grabbed the victim and pushed aside the other boy, who said it felt like a bulldozer had hit him.

By 1830 h some 200 people, including Fire and Rescue Department staff, were searching for the crocodile. By the time of this press report there was no sign of the boy or the crocodile.

Source: *Firdaus Abdullah, New Straits Times, 4 September 2006.*

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### Vietnam

**CROCODILE MEAT HITS SUPERMARKET SHELVES.** The Hoa Ca Crocodile Company will soon finalise contracts to supply crocodile meat to Metro and other supermarkets throughout Vietnam's southern metro Ho Chi Minh City. The company expects to supply 1000 to 2000 crocodiles (1.5 to 2 years old) for fresh meat every week.

Hoa Ca has signed contracts with nearly 6000 households in HCMC and the Mekong Delta to raise around 20,000 crocodiles. The company provides technical assistance and later buys the whole crocodiles. It set up a crocodile village in 2003, where visitors can view each stage of the crocodile rearing process and buy crocodile leather goods.

Source: *Nguoi Lao Dong, VNA (translated by Thu Thuy).*

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**SOUTHERN EXPORTERS GET NOD TO SELL CROCODILES OVERSEAS.** Four exporters, including The company recently trialed the sale of frozen crocodile fillets at Parkson Plaza, in HCMC's District 1, with prices ranging from \$US3.76 to \$US7.53 per kilogram (Figs. 1 and 2).

Crocodiles were previously raised primarily for their skins to make handicrafts for export to Japan, Korea, Hungary and Belgium, and for sale at local shopping and tourism outlets in HCMC. It has also supplied fresh crocodile meat to restaurants in HCMC, Hanoi, Vung Tau and Hue.

Ton Phat, Hoa Ca, Forimex and Suoi Tien will transport 34,850 crocodiles overseas this year. The farms have exported 550 crocodiles and 925 crocodile skins to China, Japan and European markets.

Only four crocodile farms in Vietnam are registered as captive breeding operations with CITES, and are therefore the only ones permitted to export crocodiles and products. However, there are many households and private farms that are raising crocodiles according to the Ministry



of Agriculture and Rural Development. Ho Chi Minh City has 35 crocodile raising farms attracting 120 households, with a total of 78,534 crocodiles. The Ministry warned local breeders to seek registration as a CITES captive breeding operation, or be restricted to domestic sales.



Figure 1. Sign in a Vietnamese supermarket indicating different cuts of crocodile meat, in Vietnamese and English: rib, viscera, tail, thigh, foreleg, foot, tail-end. Photograph: Minh Thanh.



Figure 2. Crocodile meat on sale in Vietnamese shops. Photograph: Minh Thanh.

It is reported that crocodile meat can sell for as much as \$US15-20 per kilogram on the international market. In local markets, including HCMC, restaurants purchase meat at the same price, although the domestic market is much smaller than the international market.

Source: *Sai Gon Giai Phong*, 12 June 2006 (translated by *Ha Viet*).

## China

Following the CSG meeting in France, I made a brief visit to China, and took the opportunity to visit: captive breeding facilities at Xuancheng (Anhui Province) and Changxing

(Zhejiang Province); sites containing wild Chinese alligators (Anhui Province); and, a proposed site for reintroduction of Chinese alligators.

Wild alligator sites visited were:

**Red Star Pond:** A rice farm pond with 9 adult alligators. Two successful nests recorded in 2005. Hatchlings were predated by birds, so the remaining 19 hatchlings were removed to a small netted pond enclosure (Fig. 1) adjacent to the farm house. Alligators are cared for by a widow, who is engaged by Forestry as the caretaker, while her son and grandson manage the rice farm.



Figure 1. Red Star Pond, with protective netting.

**Shong Keng Ponds:** A series of 6 ponds adjacent to a rice farming area. Forestry employs the caretaker. There were two nests in 2005, without eggs.



Figure 2. From left, Shao Ming, Wang Chaolin, Tom Dacey and Wu Xiaobing at wild Chinese alligator nest at Zhong Qiao Reserve Site. Photograph: Zhu Jialong.

**Zhong Qiao Reserve Site:** Isolated site with 4 wild alligators. One nest in 2005 (13 eggs; producing 8

hatchlings). A new nest containing 20 eggs was laid on 23 June 2006 (Fig. 2). The site is proposed as a future release site for re-introductions.

**Chang Le Reserve Site:** Small rice farm with several small ponds. Main pond has a centre island where the alligators nest. The alligators move through the rice fields to the various ponds. The area contains 4 adult and 2 hatchling alligators that are cared for by the rice farmer.

The State Forestry Administration, in conjunction with the Anhui Normal University's College of Life Sciences, is developing the Gaojing Miao Forest Farm (150 ha) as a major alligator release site. Of the 41 proposed ponds, 6 have been constructed to date, and work has commenced on construction of on-site student facilities. Six alligators fitted with VHF transmitters were released into one pond on 28 April 2006, and students from the university are tracking their movements.

Discussion with Chinese experts indicated that:

- Monitoring of wild populations of alligators continues, and survey results in 2005 indicate that the wild population has stabilised in recent years. However, the subpopulations are still small and habitats are separated and dispersed, and cannot support the long-term viability of the wild population.
- Anhui Province has a large captive population of Chinese Alligators to support reintroductions to the wild, when suitable habitat can be identified and/or constructed.
- SFA are actively pursuing implementation of the "China Action Plan for Conservation and Introduction of Chinese Alligator", within the limits of available resources.
- External funding may be required to assist SFA to achieve its goals with the maintenance and expansion of the wild populations of Chinese Alligators.

I undertook the trip in a personal capacity, and the assistance from various Chinese authorities and colleagues was greatly appreciated. A summary report is available at "www.wmi.com.au/csgarticles".

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

## Philippines

The results of crocodile surveys carried out on Dalupiri and Fuga Islands, northern Philippines, in May and August 2005, were previously reported in the Crocodile Specialist Group Newsletter [24(3): 14-15]. A detailed report on the surveys is now available (www.wmi.com.au/csgarticles).

The surveys aimed to verify reports of sightings, identify the species involved and gather data on crocodile

abundance and distribution. The occurrence of the critically endangered Philippine crocodile *Crocodylus mindorensis* was confirmed on Dalupiri Island. Track searches and spotlight searches on revealed the presence of a female adult, a juvenile and a hatchling along Caucauyan Creek. Crocodiles have not been sighted by local residents on Fuga Island over the past decade.

There is potential for conservation of the wild *C. mindorensis* population on Dalupiri Island, with the presence of suitable habitat, breeding crocodiles and positive community attitudes, although the population size is probably extremely small. Further information and education activities, monitoring of the crocodile population and of habitat changes and stakeholder consultations are recommended.

### Literature

Oliveros, C., Telan, S. and Van Weerd, M. (2006). Crocodile surveys on Dalupiri and Fuga. *Isla Biodiversity Conservation*, Mabuwaya Foundation Inc: Philippines. 11 pp.

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## Science



### Recent Publications

Mark Merchant and Adam Britton (2006). Characterization of serum complement activity of saltwater (*Crocodylus porosus*) and freshwater (*Crocodylus johnstoni*) crocodiles. *Comparative Biochemistry and Physiology Part A* 143: 488-493.

**Abstract:** We employed a spectroscopic assay, based on the hemolysis of sheep red blood cells (SRBCs), to assess the innate immune function of saltwater and freshwater crocodiles *in vitro*. Incubation of serum from freshwater and saltwater crocodiles with SRBCs resulted in concentration-dependent increases in SRBC hemolysis. The hemolytic activity occurred rapidly, with detectable activity within 2 min and maximum activity at 20 min. These activities, in both crocodilian species, were heat sensitive, unaffected by 20 mM methylamine, and completely inhibited by low concentrations of EDTA, suggesting that the alternative serum complement cascade is responsible for the observed effects. The hemolytic activities of the sera were inhibited by other chelators of divalent metal ions, such as phosphate and citrate. The inhibition of SRBC hemolysis by EDTA could be completely restored by the addition of 10 mM Ca<sup>2+</sup> or Mg<sup>2+</sup>, but not Ba<sup>2+</sup>, Cu<sup>2+</sup> or Fe<sup>2+</sup>, indicating specificity for these metal ions. The serum



complement activities of both crocodylians were temperature-dependent, with peak activities occurring at 25-30°C and reduced activities below 25°C and above 35°C.

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William R. Vasconcelos, Tomas Hrbek, Ronis Da Silveira, Benoit de Thoisy, Boris Marioni and Izeni P. Farias (2006). Population genetic analysis of *Caiman crocodilus* (Linnaeus, 1758) from South America. *Genetics and Molecular Biology* 29(2): 220-230.

**Abstract:** The genetic structure of *Caiman crocodilus* was investigated using a 1085 bp mtDNA fragment of the cytochrome b gene. Inferences were based on 125 individuals from nine localities in Peru, Brazil and French Guiana. With the exception of Mamirauá Lake, Anavilhanas Archipelago and the Tapará Community which show a signal of demographic expansion, the sampled localities are in a mutation-drift genetic equilibrium. Divergence between the Amazon basin and extra-Amazon basin localities is significant; however, inference from Nested Clade Analysis cannot distinguish between continuous range expansion, long distance colonization or past fragmentation; however, past fragmentation is unlikely due to low number of mutational steps separating these two regions. The divergence is probably maintained by the reduced ability of *C. crocodilus* to cross salt water barriers. Within the Amazon basin, continuous range expansion without isolation-by-distance is the most likely process causing genetic structuring. The observed genetic patterns are compatible with the ecology of *C. crocodilus*, and history of human exploitation. As commercial hunting depleted more valuable species, *C. crocodilus* expanded its range and ecological niche, prompting hunters to harvest it. Following a period of intense hunting, *C. crocodilus* is now experiencing recovery and a second population expansion especially in protected areas.

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Ted H. Wu, Jaclyn E. Cañas, Thomas R. Rainwater, Steven G. Platt, Scott T. McMurry and Todd A. Anderson (2006). Organochlorine contaminants in complete clutches of Morelet's crocodile (*Crocodylus moreletii*) eggs from Belize. *Environmental Pollution* 144: 151-157.

Seven complete clutches of Morelet's crocodile (*Crocodylus moreletii*) eggs were collected in northern Belize and examined for organochlorine (OC) pesticide residues. The primary OC detected, p,p'-DDE, was found in every egg analyzed (n= 175). Other OCs detected included p,p'-DDT, p,p'-DDD, methoxychlor, aldrin, and endosulfan I. Concentrations of individual OCs ranged from 4 ppb (ng chemical/g egg, wet weight) to greater than 500 ppb. A statistical evaluation of p,p'-DDE levels in three complete clutches was used to derive the minimum number of eggs needed from a clutch to precisely determine the

mean p,p'-DDE concentration representative of that clutch. Sample sizes of 8 (80% confidence level) and 11 (90% confidence level) were determined to yield an accurate estimate of contaminant levels in a full clutch of eggs. The statistically recommended sample size of 11 eggs (at 90% confidence level) was successfully tested on the four additional clutches.

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Steven G. Platt, Rohan H.P. Holloway, Patrick T. Evans, Kiran Paudyal, Has Piron and Thomas R. Rainwater (2006). Evidence for the historic occurrence of *Crocodylus porosus* Schneider, 1801 in Tonle Sap, Cambodia. *Hamadryad* 30(1-2): 206-209.

A mandible of an estimated 5.1 m long crocodylian located at Tonle Sap Lake in Cambodia, is thought to belong to a Saltwater Crocodile (*Crocodylus porosus*), as it exceeds the maximum total length for the Siamese Crocodile (*C. siamensis*). If so, this is the first physical evidence that *C. porosus* may have inhabited Tonle Sap Lake, in sympatry with *C. siamensis*. It is believed that *C. porosus* was extirpated from the lake about 30-50 years ago.

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Karsten Kruckert, Birte Flachsbarth, Stefan Schulz, Ute Hentschel and Paul J. Weldon (2006). Ethyl-branched aldehydes, ketones, and diketones from caimans (*Caiman* and *Paleosuchus*; Crocodylia, Reptilia). *Journal of Natural Products*.

**Abstract:** Secretions from the paracloacal glands of alligators (*Alligator* spp.) and caimans (*Caiman* spp., *Melanosuchus niger*, and *Paleosuchus* spp.) were examined by GC-MS. The secretions of the common caiman (*C. crocodilus*), the broad-snouted caiman (*C. latirostris*), the yacare caiman (*C. yacare*), the dwarf caiman (*P. palpebrosus*), and the smooth-fronted caiman (*P. trigonatus*) yielded a new family of 43 aliphatic carbonyl compounds that includes aldehydes, ketones, and b-diketones with an ethyl branch adjacent to the carbonyl group. The identification of these glandular components and the syntheses and stereochemical investigations of selected compounds are described.

[Overview provided by Kent Vliet]. This paper describes a new family of lipid with unusual branched chain structures. Forty-three aldehydes and ketones, not previously described from Nature, are reported from the paracloacal glands of *Caiman* and *Paleosuchus*, most of which were observed in *Caiman* spp. Similar compound structures have been previously been described only from microorganisms. An examination of the secretions of *Caiman crocodilus* for microbes that might produce these compounds indicated typical skin or enteric organisms; no organisms were isolated that produce the compounds reported. It is possible, however, that anaerobic bacteria, which are difficult to isolate and culture, may be responsible for their

biosynthesis. The results of this study further attest to the unusual nature of lipids produced in crocodilian skin glands. The samples analyzed for this study were obtained from captive animals at the St. Augustine Alligator Farm (FL), Silver Springs Wildlife Park (FL), National Aquarium in Baltimore (MD), and Bronx Zoo (NY).

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Corey J.A. Bradshaw, Yusuke Fukuda, Mike Letnic and Barry W. Brook (2006). Incorporating known sources of uncertainty to determine precautionary harvests of saltwater crocodiles. *Ecological Applications* 16(4): 1436-1448.

Abstract. It has been demonstrated repeatedly that the degree to which regulation operates and the magnitude of environmental variation in an exploited population will together dictate the type of sustainable harvest achievable. Yet typically, harvest models fail to incorporate uncertainty in the underlying dynamics of the target population by assuming a particular (unknown) form of endogenous control. We use a novel approach to estimate the sustainable yield of saltwater crocodile (*Crocodylus porosus*) populations from major river systems in the Northern Territory, Australia, as an example of a system with high uncertainty. We used multimodel inference to incorporate three levels of uncertainty in yield estimation: (1) uncertainty in the choice of the underlying model(s) used to describe population dynamics, (2) the error associated with the precision and bias of model parameter estimation, and (3) environmental fluctuation (process error). We demonstrate varying strength of evidence for density regulation (1.3-96.7%) for crocodiles among 19 river systems by applying a continuum of five dynamical models (density-independent with and without drift and three alternative density-dependent models) to time series of density estimates. Evidence for density dependence increased with the number of yearly transitions over which each river system was monitored. Deterministic proportional maximum sustainable yield (PMSY) models varied widely among river systems (0.042-0.611), and there was strong evidence for an increasing PMSY as support for density dependence rose. However, there was also a large discrepancy between PMSY values and those produced by the full stochastic simulation projection incorporating all forms of uncertainty, which can be explained by the contribution of process error to estimates of sustainable harvest. We also determined that a fixed-quota harvest strategy (up to 0.2K) reduces population size much more rapidly than proportional harvest (the latter strategy requiring temporal monitoring of population size to adjust harvest quotas) and greatly inflates the risk of resource depletion. Using an iconic species recovering from recent extreme overexploitation to examine the potential for renewed sustainable harvest, we have demonstrated that incorporating major forms of uncertainty into a single quantitative framework provides a robust approach to modeling the dynamics of exploited populations.

Mitsuha Yoshikane, Winston R. Kay, Yasuyuki Shibata, Maki Inoue, Tokuma Yanai, Ryo Kamata, John S. Edmonds and Masatoshi Morita (2006). Very high concentrations of DDE and toxaphene residues in crocodiles from the Ord River, Western Australia: an investigation into possible endocrine disruption. *Journal of Environmental Monitoring* 8: 649-661.

Abstract: Organochlorine pesticide concentrations, particularly those of the DDT family and of toxaphene, were measured by gas chromatography in samples of liver and body fat taken from Australian freshwater crocodiles *Crocodylus johnstoni* at three locations along the Ord River in Western Australia. The three sampling sites were the irrigation area, downstream of the irrigation area, and well upstream of the irrigation area; the last site serving as the control. DDT and toxaphene were applied in large and known quantities to cotton grown in the Ord Irrigation Area from 1964 to 1974. Thus the residues in the crocodile tissues are representative of the situation almost thirty years after the use of DDT and toxaphene ceased in the area. Very high concentrations of *p,p'*-DDE and toxaphene were found in the lipid-rich tissues that were examined. Livers and body fat from estuarine crocodiles *Crocodylus porosus* from the downstream site were also analysed. As *p,p'*-DDE and toxaphene are both known to be disruptive of endocrine systems, a range of blood parameters, including estradiol and testosterone concentrations, were also measured for all the animals studied. The ovaries and testes of the freshwater crocodiles were also examined histologically. There were no obvious effects on blood chemistry or gonad histology of the large burden of pesticides and their metabolites carried by exposed animals, although the limited number of samples and the variability of the breeding state of the animals examined may have masked possible effects. The isolation of the area, the accurately known applications of DDT and toxaphene, and the simplicity of the drainage system make the lower Ord River a unique natural laboratory for studying the long term breakdown and effects of pesticides applied in a tropical environment.

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### Submitted Articles

CROCODILE BONE IMPLANTS. Kathi Lewis, a researcher at the University of Technology (Sydney, Australia) has suggested that crocodile bones may be a potential source of bone grafts in the future. Synthetic bone implants are expensive, donated bones need to be matched for compatibility, and bones from elsewhere in the patient's body can lead to further discomfort. Lewis found that the tail and tibia bones of "Thai and Australian" crocodiles contain large pores and extensive networks of pores. This high surface area would act as a means for increased bioactivity and osteointegration, that could be exploited for bone graft applications (eg for people with osteoporosis). A combination of chemical treatment and

heating (to 600°C) removed all organic material from crocodile bones, a feature that is not known with any other types of bone. Further research is required, and Lewis states that trials on implants in other animals more closely related to humans are still “some way off”.

Source: Australian Science 27(7); 14.

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**MISSING LINK UNEARTHED.** A fossil 90-95 million year-old crocodylian fossil unearthed near Isiford, in Queensland, Australia, is the world’s first known modern crocodylian. As the most primitive ancestor of modern crocodylians, the *Isifordia duncani* fills the gap between the mesosuchians and the modern crocodylians that we know today. The discovery suggests that the world’s living crocodylians began their history in Australia, rather than Europe or North America as previously thought.

Modern crocodylians have internal nostrils, the bones around them are sutured together to form a broad plate, and loosely-fitting ball-and-socket joints allow them to grow large without losing the ability to walk and swim efficiently. The Isiford crocodylian’s palatal plate had only just begun to form and the vertebrae were developing the ball-and-socket joints, characteristics that suggest that it may have been one of the first crocodylians to use the “death roll”, and that it would be able to move as comfortably on land as it was in the water.

The first fossils of *I. duncani* were found in the mid-1990s, but the skull was not complete. It was not until several more specimens were found, including a complete skull, that questions could be answered. The shape of the skull of *I. duncani* suggests it was not primarily a fish-eating specialist. Adults are thought to have been a little over 1 m long and weigh 3-4 kg, contrasting with the 10 m long crocodylians that appeared over the next 20 million years.

Sources: Salisbury, Steve (2006). Dawn of a crocodylian dynasty. Australian Geographic Jul-Sep: 52-53; Luntz, S. (2006). Mother of all crocodylians unearthed. Science 27(7): 6-7; Salleh, A., Science Online (www.abc.net.au/newsitems/200606/s1662797.htm).

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**RECORD OF A LARGE SALTWATER CROCODILE FROM ORISSA, INDIA.** The carcass of a large, male Saltwater crocodile (*Crocodylus porosus*) was recovered on 5 May 2005 from the Dhamara River system of Bhitarkanika Wildlife Sanctuary/National Park, Orissa. The total length (TL) of the crocodile was 6.04 m (19’ 8”). The entire skeleton, including the skull (Fig. 1), is now in the Museum/Interpretation Centre at the Saltwater Crocodile Research Centre, Dangmal/Bhitarkanika National Park.

There are few records of very large *C. porosus*, and so there are few data on the morphometrics of the skull in

relation to body length. Skull measurements of this specimen were:

- Cranial platform width: 18 cm
- Cranial platform midpoint width: 15 cm
- Maximum head width: 40 cm
- Interocular width: 8 cm
- Snout-eye length: 35 cm
- Total head length: 68 cm



Figure 1. Skull of 6.04 m long *Crocodylus porosus*. Photograph: S.K. Kar.

The Bhitarkanika River system in Orissa is one of the strongholds of *C. porosus* and holds the largest population, including a few crocodiles over 6 m long. The January 2006 survey results indicated 1462 crocodile sightings (657 hatchlings, 283 yearlings, 197 juveniles, 122 sub-adults and 203 adults) in the river systems of the sanctuary. This represents a greater than 15 times increase in the *C. porosus* population since 1976.

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**RECORD OF A LARGE SALTWATER CROCODILE FROM THE NORTHERN TERRITORY, AUSTRALIA.** The pictured skull (Fig. 1) was taken from a *Crocodylus porosus* from Point Stuart, Northern Territory of Australia. The crocodile, estimated to be about 6.7 m long, had become entangled in a fishing net and was believed by fishermen to have drowned. After the fishermen took photographs of themselves with the crocodile, including with their heads in its mouth, the crocodile suddenly recovered. It was then dispatched with an axe. Skull measurements were:

- Cranial platform width: 23.0 cm
- Cranial platform midpoint width: 19.4 cm
- Maximum head width: 45.8 cm
- Interocular width: 7.1 cm
- Snout-eye length: 50.0 cm
- Total head length: 72.8 cm





Figure 1. The *C. porosus* skull is on display at the Corroboree Tavern, on the Arnhem Highway, about one hour out of Darwin. Photograph: Charlie Manolis.

Charlie Manolis, *CSG Regional Chairman, Australia and Oceania*, <cmanolis@wmi.com.au>. Compiled from information provided by Peter Shappert (Corroboree Tavern) and Terry Hulse (owner of the skull).

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### **Crocodile Statue at the Neptune Fountain in Berlin**

Normally surrounded by water, two jets of water spray out of the snout of this crocodilian statue at the Neptune Fountain (1891) in central Berlin [image found by Ralf Sommerlad on the internet (Achim Raschka, November/December 2004, German Wikipedia, License: GFDL)].



### **New Gold “Crocodile” Coin**

The Perth Mint’s (Australia) Fauna Gold Series features a Saltwater Crocodile (*Crocodylus porosus*). The 2006 coin is struck from 1/10 oz of 99.99% pure gold in proof quality (see [www.perthmint.com.au](http://www.perthmint.com.au)).



### **Meetings**

#### **Forum on Crocodiles in the Republic of the Philippines**

(Manila, 31 January - 2 February 2007)

#### **CALL FOR PAPERS**

Papers can be presented either as an oral presentation or as a poster. Papers must be relevant to the management, conservation, natural history, utilisation and/or politics of crocodiles in the Republic of the Philippines. Oral presentations should be no longer than 20 minutes including a question period. Proceedings of the Forum will be published.

Abstracts should be submitted electronically (preferably in Microsoft Word format) to the Forum Secretariat at <philippinecroc@yahoo.com> no later than 15 November 2006. The Secretariat will review submitted abstracts and notify the author(s) of acceptance by e-mail before 15 December 2006.

Information on registration and accommodation is available at <philippinecroc@yahoo.com>.

The forum will be held at Tambunting Hall, Museum of the Filipino People, Finance Drive, Luneta Park, Ermita, Manila.

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## Book Review

Michael Garlok (2006). *Killer Gators and Crocs, Gruesome Encounters from across the Globe*. The Lyons Press: Guilford, CT USA.

A reviewer is not filled with optimism when he sees a grievous error of fact in the opening sentence of Michael Garlock's book, "Killer Gators and Crocs", which proceeds to meet the gloomy prediction of its opening. The book is filled with mis-statements, incorrect information and what appear to be outright fabrications.

Linnaeus and subsequent systematists might be perplexed by the statement (page 1), "In the moral and intellectual vacuum that altruism often produces, it is at best nigh near impossible (or at worst a contradiction in terms) to rank life forms---". And this is only part of the sentence! Errors I noticed include: dwarf Nile crocodiles in Mauretania are direct descendants of *Saurosuchus imperator* (page 110); as crocodiles grow their eyes do not increase in size (page 119); Nile crocodiles are not traded as live specimens (page 135); and, Lake St Lucia is in Kenya (page 137). Alligator farmers will be interested to hear that, "alligator farming is almost a reptilian license to print money" and "is still an incredibly profitable industry" (page 51).

This reviewer was even more startled read in a section about crocodilian conservation in Thailand that, "Dr. James Perran Ross, a wealthy, shrewd and conservation-minded businessman, established a crocodile farm---. He bought every captured and known wild crocodile in the country--" (pages 169-170). The section goes on to describe the shrewd Dr. Ross' business practices and unsuccessful

crocodile reintroduction project. It really does seem unlikely to me that the author just stumbled across the name or fortuitously made it up. I am neither a businessman nor wealthy, and many colleagues will question if I am shrewd. I have never purchased a crocodilian of any kind, do not own a crocodile farm in Thailand or anywhere else, and my role in Thailand's reintroduction program was minor and advisory. The section is at best a complete fabrication, falsely associating my name with a fictitious program. This does not give me confidence in the accuracy of the remaining information.

Notwithstanding the way it is written and organised, and the inaccurate and somewhat distorted content, I do expect it to sell well as the title is attractively sensational and the content padded out with numerous gory accounts of crocodile attacks, apparently quoted or paraphrased without attribution to source. It will become a vital, must-have, part of every crocodilian library, along with your original copy of McIlhenny's "Alligator's Life History", Graham and Beard's "Eyelids of the Morning", Webb's "Numunwari", and your complete set of "Proceedings of CSG Working Meetings", to show that you really do have all the crocodilian literature.

Oh! And the error in the first sentence? " --- if you happen to be living in a temperate (sic) part of the world --- calamity may take the form of an opportunistic, ambush-hunting alligator, caiman or crocodile." Imagine how bad they are in the tropics!

Perran Ross, *Department Wildlife Ecology and Conservation, University of Florida, Gainesville, FL USA*, <rossp@wec.ufl.edu>.

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# SPECIAL ARTICLE

## Concerns on the Conservation Status of Central African Crocodilians Half a Century Ago

Long before the Species Survival Commission of the IUCN-World Conservation Union, founded way back in the early 1970s, one of its first species thematic herpetological orientated specialist groups dealing with crocodilians were two outstanding worldwide known personalities - the Nobel Peace Prize winner Albert Schweitzer and the German herpetologist Heinz Wermuth - who exchanged views on the conservation status of crocodilians in Central Africa.

Professor Dr. Heinz Wermuth, one of the world's leading herpetologists and a long-standing member of the IUCN-

SSC Crocodile Specialist Group, worked in the 1950s Curator and Head of the Herpetological Section of the Zoological Museum in Berlin. Heinz Wermuth never made a secret of his favorite taxonomic groups, turtles and crocodilians, which held his main scientific interests. Furthermore, he was a strong advocate of keeping reptiles as pets, and some of his publications as well his private keeping of an amazing assemblage of live specimens of turtles and crocodilians of remarkable sizes in his rather small government flat at the Museum, document this well. Among these specimens were a common caiman (over 2.5 m long) and a 60 cm long American alligator (Fig. 1).



Figure 1. Professor Heinz Wermuth with one of his pets.

In addition to his outstanding taxonomic work, Heinz Wermuth was a passionate conservationist, long before the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) came into effect in 1975. Prior to CITES and in tough negotiations Wermuth pressured the German reptile leather industry (at that time amongst the most important consumers of crocodilian skins) to unilaterally put an import moratorium on several crocodilian species whose conservation status was in decline (Jelden 2003).

His particular commitment to crocodilian conservation is also reflected in the form of his initiative in 1956 to send out a memorandum to the IUCN in Gland, Switzerland, together with three other highly reputed fellow herpetologists, urging the IUCN to take steps “to prevent the extinction of all crocodile species.” This document, also published in a German aquarium and terrarium magazine in 1956 [Aqua-Terra (Leipzig) 3: 248-250], contained 11 recommendations and was signed by P.E.P. Deraniyagala (Colombo/Sri Lanka), Frederico Medem (Bogotá, Colombia), Robert Mertens (Frankfurt/Germany), and of course the driving spirit behind it, Heinz Wermuth (Honegger 2003).

In the course of Wermuth’s 1956 IUCN initiative he also contacted Professor Albert Schweitzer, two years after the latter had received the peace Nobel Peace Prize, with a letter urging him to sign the IUCN memorandum for the conservation of crocodilians.

Besides being a physician, minister, theologian and philosopher, Albert Schweitzer was also a deeply entrenched environmentalist and animal lover. His respect for any form of life is among others well documented in his 1936 publication “The Philosophy of Civilization and from The Ethics of Reverence for Life” (Anon 2006), in which he wrote:

“A man is truly ethical only when he obeys the compulsion

to help all life which he is able to assist, and shrinks from injuring anything that lives.

An absolute ethic calls for the creating of perfection in this life. It cannot be completely achieved; but that fact does not really matter. In this sense reverence for life is an absolute ethic. It makes only the maintenance and promotion of life rank as good. All destruction of and injury to life, under whatever circumstances, it condemns as evil. True, in practice we are forced to choose. At times we have to decide arbitrarily which forms of life, and even which particular individuals, we shall save, and which we shall destroy. But the principle of reverence for life is nonetheless universal and absolute.”

This kind of ethical humanitarian spirit is also well reflected in Schweitzer’s response to Wermuth when at that time he was living again in Lambarene, Afrique Equatoriale Francaise (now Gabon), on the banks of the Ogooué River. The contents of Prof. Wermuth and Albert Schweitzer’s letters are depicted below:

Dear Professor,

Your admirable support for humanity gives me the courage to ask you for the backing of a petition to be delivered to the “International Union for the Conservation of Nature (i.e. IUCN – the authors)” by availing myself of the moral weight of your personality. May I take the liberty of defining the circumstances of the matter below.

Recently, there is deplorable news from all parts of the world that the population of crocodiles, those witnesses of an era long forgotten, is diminishing following a degrading and inhuman pursuit. For this reason, an international committee consisting of reptile researchers has been formed who have prepared a petition addressed to the “International Union for the Conservation of Nature” that warns of the imminent threat of extinction of the crocodiles. We have copied this memorandum (please find a copy attached), have translated it into three languages (German, English, French) and have forwarded it to reptile researchers all over the world in order to sign our petition. The original of the petition including the collected signatures is then supposed to be handed over to the International Authority of Nature Conservation as a plea to take beneficial measures to save the crocodiles from extinction.

Much to our pleasure, the majority of the people we have asked, i.e. roughly 130 of a total of 175 herpetologists, have agreed to our request; some gentlemen have even expressed their satisfaction for this action by writing enthusiastic letters to us. It would be quite a privilege and an invaluable



support for our concerns if you, dear Professor, would also give your approval by signing the coupon you will find below on the enclosed form.

With my dearest thanks in advance,  
And by expressing my reverential respect, I remain,

Yours very obediently,  
Heinz Wermuth

-----  
Albert Schweitzer 2.1.57  
Lambarene, Gabun  
Französ. Äquatorial Afrika

Dear Doctor,

My writer's cramp does not allow me to write to you as I would like to.

You are quite right in standing up for the crocodiles. In my thoughts I will, of course, sign your appeal, but with ink, unfortunately, I cannot do so - as it is my personal policy for years not to write memoranda, not to provide recommendations of any kind, not to take over any honorary presidency and not to undersign any appeal whatsoever. For so many times I was put in the position to do just that, so therefore and at my age I only could save myself by asking for the privilege of not having to provide for something like this. So I mustn't make any exception to this rule. This between us.

Anyhow, your case doesn't need my name written on it since my mindset of the reverence of life does include all the creatures. In a report on Lambarene to my friends I wrote many years ago: "I never kill the crocodile that rests on the sandbank because there is actually no necessity for me to do so. I plead with all Blacks and Whites not to thoughtlessly hold their rifle at the animals of the forests and rivers." Should you like to refer to these lines you may use them within your own discretion.

I am sorry that I do adhere to my principles even if activities for animal protection are concerned which is a subject very close to my heart. However, there was no other way.

Here, the crocodiles are living a relatively good life. Although banished by motorboats from the great water basins they are living nearly undisturbed in the ones which flow in the sparsely populated natural forests.

With best thoughts,  
Yours obediently,

Albert Schweitzer

The issue of conservation of crocodiles in francophone African countries was one of the main topics discussed at the 18th Working Meeting of the Crocodile Specialist Group in Montélimar, France (see pages 3-14, this issue). Little recent information on the conservation status of crocodiles of this part of Africa has come to the attention of conservationists around the world. However, a subregional workshop for francophone African countries scheduled for late 2007 in Niger will hopefully advance our knowledge about crocodiles in this part of the world and contribute to the conservation of these remarkable animals which would also be in the spirit of the two outstanding personalities, Heinz Wermuth and Albert Schweitzer.

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**[A complete version of this article, with the original letters (in German) can be downloaded at [www.wmi.com.au/csgarticles](http://www.wmi.com.au/csgarticles).]**



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