CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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Fifty-eighth meeting of the Standing Committee
Geneva (Switzerland), 6-10 July 2009

# ILLEGAL TRADE IN *CROCODYLUS NILOTICUS* FROM MADAGASCAR

The attached document has been submitted by the Secretariat on behalf of IUCN*.

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*


Chairman: Dr Grahame Webb; Vice-Chairmen: Dr. Dietrich Jelden and Mr. Alejandro Larriera.
Executive Officer: Mr. Tom Dacey, PO Box 530 Sanderson, NT 0813, Australia. E-mail: gwebb@wmi.com.au

3 March 2009

Mr. Willem Wijnstekers
CITES Secretary General
International Environment House
Chemin des Anemones
CH-1219 Chatelaine
Geneva
Switzerland

Email: willem.wijnstekers@cites.org

Dear Willem,

Re: Illegal Trade in *Crocodylus niloticus* from Madagascar

On 6 July 2006 I wrote to you (Attachment 1) concerning what appeared to be blatant breaches of CITES in regard to the laundering and export of wild *C. niloticus* skins from Madagascar. This was but one step in a long chronology of activities (Attachment 2) aimed at encouraging trade in *C. niloticus* skins from Madagascar to become legal, sustainable and verifiable; activities that I'm sorry to say have largely failed. In more recent times:

(a) A CITES review mission to Madagascar (November 2006) confirmed irregularities and made differential recommendations about the two main exporters of raw salted skins, both of whom launder wild skins (with CITES permits). The aim of the CITES review recommendations was to encourage a transfer to more responsible management, rather than curtail trade until improvements were made.

(b) The CSG subsequently sent some of its most skilled managers to Madagascar to work with the Malagasy Government to both improve management and to survey parts of the remaining, remnant wild population; (Aug 2007, March 2008 and Aug 2008) and,

(c) The CSG have intervened with some industry sectors purchasing skins from Madagascar, only to see the trade in large wild skins, laundered through ranches with CITES permits, shift to other skin buyers. Indeed, this situation has recently been confirmed by exporters in Madagascar complaining about each other getting access to the large, illegal skins (Attachment 3).

I was astounded to learn from my CSG review team, that one of the major interests in the results of the recent CSG surveys was the location of any remaining *C. niloticus* populations the CSG may have found, so that they could be harvested by the quickest to get the information! The seriousness of the situation has simply not been accepted by the crocodile industry within Madagascar.

Notwithstanding the socio-economic hardships that exist for many rural people in Madagascar, and the biological potential for crocodiles to be managed as a renewable resource, which can theoretically help alleviate poverty, we are of the opinion that a total ban on trade in crocodile skins and products from Madagascar is the only action that may result in changes to the *status quo.*

The crocodile resources are very severely depleted, and become more so every year due to commercial hunting (CSG analysis of 20yrs of egg collection data, unpublished report), specifically to provide skins and products for international trade. Article IV of the Convention is ignored. Every wild crocodile that can be taken is taken. The remnant wild population survives in areas where access to hunters is restricted by habitat and remoteness. All these findings have been confirmed in depth again through a GTZ co-funded survey of wild crocodile populations in July 2008 of which we have attached for your information the report of December 2008 with the kind approval obtained by GTZ. If the national status of *C. niloticus* in Madagascar were assessed against the criteria of Resolution Conf. 9.24 Rev. CoP 14, the Madagascar population would easily meet the criteria for Appendix I. If assessed against the IUCN Red List criteria, it would easily meet the decline criteria for "critically endangered".

In my experience, the situation with *C. niloticus* in Madagascar is about as bad as it gets. This is not a matter of a technical breach of CITES for an abundant and secure wild population. It is a clear case of the fundamental principles of CITES being ignored. A wild population, perhaps already reduced to a few percent of its former abundance, being driven to even lower levels, specifically by commercial, international trade. This situation undermines crocodile management around the world, undermines CITES, undermines industry cooperation with legal trade (illegal skins with legal CITES permits), undermines the principles of sustainable use, complicates the current review of trade in finished products, removes incentives to improve crocodile management locally, and in our opinion puts the survival of species in large tracts of Madagascar at risk. In the interests of crocodile conservation, strong action by the Parties to CITES is needed.

In my opinion the wild population should be transferred back to Appendix I as a matter of urgency, and all trade restricted. No captive breeding facilities in Madagascar should be registered for commercial production of *C. niloticus* until their *bona fide* is established unequivocally, and mechanisms are in place to ensure the skins and products exported from such establishments are truly emanating from captive production.

The ultimate goal for the management of *C. niloticus* in Madagascar should still be that the wild population be managed as a renewable resource, under Appendix II, so that local people benefit commercially from having to coexist with large and dangerous predators. However, we find there is no evidence to support the view that this can be achieved by gradual improvement while *any* options for legal trade exist.

The situation in Madagascar regarding the use and export of *C. niloticus* is considered very serious. Under the circumstances, I strongly recommend that the provisions of Resolution Conf 11.16 (Rev. CoP14), paragraph (d) of the Recommendations be invoked. The Standing Committee should consider requesting the Depositary Government to prepare an amendment proposal transferring the Malagasy population of *Crocodylus niloticus* from Appendix II to Appendix I of the Convention until such time as the CITES Management Authority of Madagascar has demonstrated its capacity to manage its population of the species in a sustainable manner.

The CSG will of course continue to provide such technical assistance to Madagascar as resources allow, but to do so while illegal trade continues unabated is untenable for us.

Yours sincerely

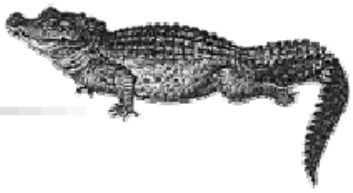
Dr Grahame Webb
Chairman
IUCN-SSC-Crocodile Specialist Group

cc: H.E. Sr. Cristian Maquieira A. – cmaquieira@minrel.gov.cl
cc: Mr. Thomas Althaus – thomas.althaus@waza.org

**Attachment 1**

IUCN - World Conservation Union • Species Survival Commission

Crocodile Specialist Group



Chairman: Dr Grahame Webb; Vice-Chairmen: Dr. Deitrich Jelden and Mr. Alejandro Larriera.
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6th July 2006

Willem Wijnstekers
CITES Secretary General,
Internatiuonal Environment House,
Chemin des Anemopnes,
CH-1219 Chatelaine, Geneva,
Switzerland fax: 4122.797.3417

Dear Willem,

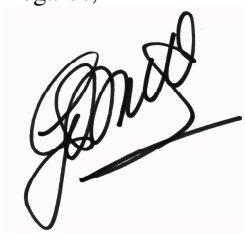
At the 18th Working Meeting of the IUCN-SSC Crocodile Specialist Group (CSG) (19-23 June 2006), trade in *Crocodylus niloticus* from Madagascar was the subject of intense discussions. We continue to have serious concerns.

The CSG has long been receiving information suggesting that under the current ranching scheme some farms appear to be laundering wild harvested skins declared as ranched specimens, thus circumventing the current quota for wild-harvested crocodiles. We have forwarded this information to the Secretariat, in the hope that it can assist them. However, the problems are continuing.

We strongly recommend to the CITES Secretariat that the case be brought to the attention of the CITES Standing Committee for the forthcoming 54th meeting in October this year.

At the current levels of exploitation it is impossible for the CSG to reject the possibility that international trade is detrimentally affecting the survival of the species in the wild, and that the ranching program itself is very much detrimental to the conservation of the species, rather than assisting conservation.

Regards,



Professor Grahame Webb
Chairman, CSG

**Attachment 2**

**IUCN/SSC/CSG Assistance to Madagascar, 2007-2008**

**Summary Report - January 2009**

**June 2007**

The CSG met with the Malagasy delegation to CITES at CoP14 in The Hague and commenced discussions on how the CSG could assist the Government of Madagascar with conservation of crocodiles in terms of its obligations under CITES. These discussions were in response to the recommendations in SC Doc. 55.13.

**September 2007**

The IUCN/SSC/Crocodile Specialist Group (CSG) undertook a first mission to Madagascar in September 2007. The objective of the first mission was to develop, in collaboration with the Government of Madagascar (GoM), a national crocodile work plan that would assist the GoM with implementation of the recommendations in SC Doc. 55.13. Following meetings with relevant stakeholders from government, the international donor community, environmental NGOs, and those involved in the crocodile skin industry, a focused round-table discussion was convened and the draft national crocodile workplan was presented.

**National Crocodile Work Plan**

A roundtable discussion was convened at the DGEEF offices on 12 September 2007. After much discussion during the preparation phase of the mission, it was agreed that participants at the roundtable meeting would be focused and limited to key stakeholders only, including Government officials [eg CITES Management Authority (MA)] and the two licensed crocodile ranches (Reptel and Croco Ranch II). The aim of the roundtable discussion was to have an open and transparent debate of the draft work plan, which was modified, revised and approved by participants into a working programme. The GoM immediately endorsed the final workplan which was submitted to CITES and comprises the working document for crocodile management and conservation in Madagascar.

***Notes from the Round Table Discussions:*** *there was a lot of interest to improve and increase crocodile farming here in Madagascar, particularly given the growth in international trade in crocodile products; accordingly, good systems must be put in place now that will help to avoid the crocodile population in Madagascar being transferred to Appendix I. ie this was the CSG's intention - to help MG to prevent transfer to Appendix I.*

*The DG summarized by saying that progress had been made but that Croco Ranch II must make more effort to change and improve its facilities, as has been recommended by the CSG. Mme Aline said that she is making a request for improvements and extensions. She agreed to make improvements, but was unhappy that "she was being singled out"*

*when it is clear that everyone should be made to clean up and improve their operations. In response, the DG said that the meeting was not convened to judge people, and reiterated his earlier point that everyone should work together to improve crocodile management in Madagascar for downlisting to Appendix II with no quota restrictions. He said that he was in favour of a wild harvest of 5000 skins and also of increasing wild collection for the local market.*

**Aerial 'Survey'**

On the 14th September 2007, the CSG delegation flew from Antananarivo to Mahajunga with Michel Louys, a pilot based in Madagascar who had participated in the aerial surveys of 1988 and 1997. This recent survey of the Mahavavy River was carried out over the same section of river surveyed in 1997. Twenty-three crocodiles were sighted (16 on the east bank, 7 on the west bank), ranging in size from 1 to 3 m TL. Extensive grazing and agricultural activities were noted along the whole river.

The habitat of the Besalampy region was also examined by air, indicating significant wetlands (e.g. ox-bows, scrolls) relative to the Mahavavy River. The region of Besalampy is the main crocodile egg collection site in terms of Madagascar's ranching programme. Analysis of egg harvest data indicates a significant decline in the wild C. niloticus population.

The objective of the aerial survey during the mission was to secure a visual reconnaissance of the area with a view to developing the survey methodology in Activity 9.2 of the final national crocodile workplan.

**March 2008**

In order to secure financial assistance to carry out a crocodile population survey in the wild, a funding proposal was drafted by the CSG and submitted to the GTZ-MG office. Considerable negotiation was required as the GTZ-MG personnel had changed since the 2007 mission to Madagascar. In addition, the funding proposal had to be in line with the GTZ's areas of focus and intervention following their strategic planning session. The proposal included anticipated co-financing from the CSG as well as from the Malagasy crocodile ranchers.

The CSG carried out a second mission to Madagascar (the flight was paid for by the CITES Secretariat as Christine Lippai was on a separate CITES contract to Madagascar) to meet with the newly appointed DGEFT personnel, including the Minister and Secretary General at the Ministry of Environment, Water, Forests and Tourism (now the MEFT).

**July 2008**

The CSG visited Madagascar and carried out a survey of wild crocodile populations in the north and west of the island.

CL arrived in advance in Madagascar on 11 July 2008 to prepare logistics, and BO arrived on 20 July 2008. Appropriate protocol was respected and the proposed itinerary and team members were endorsed by the Director General (DG) of DGEFT (Mr. Gérard Rambeloarisoa). The team was required by DGEFT to contact Regional and Inter-Regional Directorates of DGEFT in the main towns visited during the population survey.

**CSG FINDINGS following MISSIONS TO MADAGASCAR**

**Survey data**

The survey data indicates that wild crocodile population densities are low in those areas where crocodiles were previously relatively abundant. In addition, the egg harvest data indicate that there are serious declines in populations of breeding crocodiles within the nesting areas.

The GTZ-co-funded survey did not attempt to provide a population estimate as it was considered important to quantify the habitat from the available maps, but there is clearly unregulated hunting of crocodiles of all sizes, which is not only depleting wild populations, but is in contravention of Madagascar's obligations under CITES and the conditionality for the down-listing of its crocodile population from Appendix I to II based on a ranching programme.

**Wild Off-Take**

The off-take of wild skins remains ambiguous and does not conform with CITES requirements that these crocodiles be reported as nuisance animals. Crocodiles are recognised at the local level as having an economic value but this resource is seriously under-valued. Given the subsistence existence of many of Madagascar's rural poor, it is understandable that any amount offered for such opportunistic gain will be readily accepted. However, caution should be exercised when attempting to increase the value of the resource down the value chain as a point may be reached where the increased value of the crocodile resource could lead to its local extirpation.

In terms of the GTZ contractual obligations and terms of reference, the activities undertaken delivered the following:

- a survey of crocodile populations in selected rivers, lakes, waterways, etc.
- meetings with various stakeholders in Madagascar (including DGEFT, Direction Regionale de EFT, NGOs, crocodile ranches, artisans, etc.) to ensure appropriate protocol is respected and to share knowledge on crocodile survey techniques
- data to allow the development of an annual crocodile population monitoring program
- report on survey results and analysis
- provision of in-country training for national counterparts on survey methodology and monitoring

In addition, the contract resulted in the capacity development and training at the institutional level (MEFT/CITES focal point) in accordance with GTZ's priorities for

action under the Madagascar Action Plan (Activity 7.3.1 of the MAP – to: *Ensure that international environmental conventions ratified by Madagascar are applied effectively*).

The survey and capacity building contract was an important step toward assisting Madagascar with its compliance under CITES, enabling Madagascar to control and monitor the sustainable use of its natural resources, particularly in this instance its wild population of the Nile crocodile. The survey methodology report contributes to the national monitoring and evaluation system and serves as a working example for "on-the-ground" data collection and its transformation into aggregated bio-data for national decision-making.

***Stakeholder commitment***

All sectors of the crocodile industry in Madagascar must have a clear understanding of their obligations under the Government crocodile management program and CITES obligations. It was disappointing to see that this is still not the case.

Without Government commitment and understanding of the current critical situation surrounding crocodile management in Madagascar, there can be no prospect for progress with the national crocodile workplan. It is imperative that continuity be secured within the Ministry so that training and assistance provided is not lost when personnel changes occur.

The results of the survey and questionnaires confirm the intense hunting pressure on crocodiles of all sizes. There appears to be no regulation or enforcement of stated harvest quotas. For the crocodile program to become sustainable in the long-term, industry must play a more sincere role and assist Government with regard to harvest regulation. The possible ramifications for Madagascar's crocodile industry with continued non-compliance is the transfer of the wild *C. niloticus* population back to Appendix I, and subsequent cessation of all international trade in *C. niloticus* from Madagascar**.**

The role of the rural people, often living in poverty, in future crocodile management and conservation must be taken into consideration and incorporated into the development of the management program. The success of many crocodilian management programmes around the world has been based on grass-roots support and the creation of economic incentives for crocodile conservation at that level. Notwithstanding the lack of regulation of the wild harvest (crocodiles of any size are taken), the results of interviews undertaken during the survey indicated that rural people are not deriving the maximum possible benefit from the resource.

**Socio-Economic Aspect**

A socio-economic analysis of how crocodiles could contribute to rural development may be beneficial; this would require collaboration with the Ministry of Rural Development and other relevant cross-sectoral Ministries. The provision of safe watering areas for humans and livestock should be investigated in those areas where large problem crocodiles are know to occur. Whilst local *fady* or taboos may assist crocodile conservation in some areas, crocodiles are generally seen as a "dangerous" pest. Further

consideration should be given to the elaboration of the human crocodile conflict database within the DGEFT, as well as reporting criteria at the local level. This would give a more accurate picture of the extent of the conflict between man and crocodiles

Current land use practices (grazing, agriculture) are causing significant degradation of riverine habitats. It is unclear how this will impact crocodile populations (eg crocodile nesting banks) in the long-term. Monitoring of established nesting areas during the egg harvest season could provide relevant information.

**Madagascar's national management plan for crocodiles**

The *Stratégie et plan de gestion des crocodiles à Madagascar* was drafted in 2004 and has remained un-endorsed and un-applied in the country to this date. Activity 2 in the National crocodile management workplan (2007-2010) aims to "Revise, update, endorse and commence implementation of the Crocodile Management Plan". The activities carried out under contract with GTZ has provided population data that the **GoM** and relevant stakeholders can discuss and incorporate into a revised Strategy document. The activities envisaged under Activity 2 of the national workplan (2007-2010) should be carried out as a matter of some urgency, particularly in light of Madagascar's obligations to report on progress effected on the national workplan to the CITES Standing Committee meeting scheduled for June 2009.

The potential income-generating benefits of crocodile ranching in a poor-country like Madagascar, where communities can receive financial incentives to conserve the species through egg harvests (instead of once-off slaughter of adult crocodiles) should be given priority attention. Any cost-benefit and value chain analysis carried out in Madagascar in terms of investigations into the economic value of natural resources in general, should automatically include reference to the crocodile ranching and wild skin harvest industries (national and international). Research and investigation into the historical and current economic value and income generating potential of egg harvest at the local level and throughout the chain should be initiated as a matter of priority. Linkages with rural development entities concerned with the alleviation of poverty should be investigated and created where non-existent, or strengthened where linkages do occur.

**Conservation of crocodiles within national parks**

Current information on the newly extended protected area system needs to be secured and incorporated into the regional zoning component of the crocodile management plan. Environmental NGOs in Madagascar are generally apportioned particular areas where they assist Government with biodiversity conservation. The role of protected areas in Madagascar for crocodile conservation requires further assessment.

ANGAP (the National Association for the Management of Protected Areas) continues to be the organisation that manages Madagascar's protected areas system.
ANGAP may be an important partner in the conservation and sustainable management of wild crocodiles of Madagascar as the national parks (current and especially proposed national parks in the north west of Madagascar) may become safe havens for wild crocodiles. The 2008 survey indicated that crocodiles are not tolerated in those areas

visited and Madagascar's wild crocodile population needs time and space to recover. National parks may provide such havens, particularly in the immediate future.

**Future surveys**

Surveys should be continued in 2009 and thought given to expanding the survey area. Already, additional funding has been secured since the 2008 survey and an additional section of the Mahavavy River has been surveyed by the national crocodile consultant together with WWF-Madagascar's support.

Madagascar's crocodile monitoring programme will need to use various population indices to monitor the impact of harvesting on the wild *C. niloticus* population, including egg harvest data (reflection of adult breeding female segment of the population); harvest statistics (eg number, sex, size of harvested animals); and direct surveys (spotlight, aerial). Catch-per-unit effort (CPUE) could also be considered for specific areas.

Given the first-hand experience from the field, the manner in which surveys are undertaken in 2009 should be modified to improve cost-effectiveness. The following should be given serious consideration:

- allow for time to: contact local people for information and guiding services; find tracks/roads into rivers and lakes; assess waterways for their suitability as survey units; and, undertake daytime waterway reconnaissance.
- where possible, rivers to be surveyed should be travelled during the day first to learn where channels, obstacles, etc are, thus improving efficiency and safety of surveying.
- inclusion of some protected areas in order to assess their role in conservation of crocodile habitat and crocodiles.
- there is little doubt that having a suitable, dedicated boat, such as a Zodiac or 3.5 m moulded plastic punt, with a 9.9-15hp outboard motor, would have enabled considerably greater distances and more areas to be included in the survey program in 2008. Suitable funding should be sought to acquire a boat, motor and other related equipment (small generator), which can also be used for other crocodile-related activities (eg research, problem crocodiles), and ideally the survey should include a trained boat driver.
- An earlier commencement date (eg late May/early June) would allow better navigability due to higher water levels.

**CHRONOLOGY OF CSG INVOLVEMENT WITH MADAGASCAR (1987 – 2008)**

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| Jan 1987 | Madagascar submits CITES proposal for Appendix II listing, with annual export quota of 4000 wild and 1500 ranched skins. |
| Oct 1987 | Jon Hutton/Olivier Behra contact each other. |
| Nov 1987 | Olivier Behra undertakes first crocodile survey in Madagascar. |
| Feb 1988 | Letter from CITES re proposal for 1989 CoP RC 5.21 annual export quota |
| Mar 1988 | Letter from Madagascar to CITES requesting extra export of 4000 for 1988. Response from CITES negative. |
| Jun 1988 | Jon Hutton in Mauritius – Madagascar crocodile products seen in market. |
| Jun 1988 | Jon Hutton, Kevin van Jaarsveldt & Olivier Behra visit Madagascar – survey crocodile products in markets, hold meetings with Chef de Service & Director meet Reptel owners, visit tanneries in Tana. Undertook tagging of skins in stockpile. This section reported in CNCP book – Chapter 5. |
| Jun 1988 | Jon Hutton & Olivier Behra undertakes night counts at Lac Vert, Voelumar (?) & Salume rivers. Aerial surveys of Betsiboka river; Mahavavy river; Manambolo river; Tsiribihina river; Marondava river; Mongoky rver (good numbers). Presidential decree issued transferring crocodiles from vermin to game. This section is reported in CNCP book – Chapter 4. |
| Jul 1988 | Jon Hutton Preliminary report on Madagascar by CITES Nile Crocodile Project. |
| Sep 1988 | Letter to CITES re doubts on Madagascar proposal. |
| Oct 1988 | Letter to SSC – CITES re Malawi & Madagascar proposals. |
| Oct 1988 | Discussion of Madagascar proposal at 9th CSG Working Meeting, Lae, PNG. |
| Nov 1989 | Madagascar proposal – RC 5.21 & 3.15. |

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| Jun 1990 | Very detailed report with 13 Appendices – FAO Project TCP/MAG/8954 – in French & Malagache – "Development of the rearing of crocodiles in MG" – This was done by Bolton. |
| Apr 1991 | Madagascar proposal to CITES RC 3.15 ranching. |
| Sep 1992 | Crocodile management & ranching programme – O. Behra (as CSG representative). |
| Mar 1993 | Crocodile management & ranching programme – A review in March 1993 – O. Behra (as CSG representative). |
| Dec 1994 | CSG letter to DEF re export quotas & inspection of ranched stock. |
| Jul 1997 | Madagascar Crocodile Survey July (by Games, Ramandimbison & Lippai)<br>– Draft Report sent to CITES. This includes a summary of all of the captive populations, including photos of the facilities etc. |
| Mar 1998 | Report on Madagascar Crocodiles (by Games, Ramandimbison & Lippai) sent to CITES. |
| Mar 1999 | CSG visit approved however, Richard Fergusson & Kevin van Jaarsveldt never went because Animals Committee meeting in Madagascar. |
| Jul 1999 | During the course of 15th Animals Committee meeting Jon Hutton, Dietrich Jelden and Georges Evrard (Head CITES MA of Belgium) undertook an inspection visit of Croc Ranch II to evaluate and assess its stocks, operation and production potential. |
| Nov 2000 | Richard Fergusson has meetings with DEF and undertakes a survey of Ampijaru River, following Human-Crocodile-Conflict incident. |
| Dec 2000 | "Programme for the conservation and management of crocodiles in Madagascar" Not sure who wrote this but obviously from Madagascar government. |
| Dec 2000 | Report on genetics of Lac Ravelobe population – published in Cons Biol meeting proceedings – Hekkala, Fergusson & Paulin. |
| Feb 2001 | Richard Fergusson & Olivier Behra report to the CSG on aspects of the national crocodile management situation in Madagascar -<br>• The lack of monitoring of the wild population |

- The increase in the annual export quota to 500, despite the lack of population data and the apparently minimal control on harvesting and documentation.
- Control and monitoring of ranches and their production.
- Egg collection in the Besalampy area

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| Mar 2001 | Proposal from Dimby on Monitoring Besalampy egg collection & review of Human-Crocodile-Conflict and problem crocodile quota usage. |
| Oct 2001 | Report from Dimby on Egg collection survey of Besalampy. |
| ??? 2002 | Proposal from Dimby on Madagascar Problem Crocodiles. |
| Feb 2003 | Emails from Olivier Behra concerning increase in the wild quota. |
| Jun 2004 | CSG Madagascar survey proposal – Richard Fergusson, using basis & budget from Dimby proposal above. |
| ??? 2004 | Draft Management Plan from Dimby, drawn from Ian Games et al 1997/8 & updated data. |
| May 2004 | Richard Fergusson visit to Madagascar - drafting of "Strategie et Plan de Gestion des Crocodiles a Madagascar" and a series of meeting with DEF Director and senior staff and producers. Richard Fergusson visits farms to assess production capacity and relate to exports |
| Mar 2005 | Letter from CSG Africa to the CITES Scientific Authority of Madagascar re stock numbers seen on the farms and particularly the export of skins from Croco Ranch II, possibly from the wild and not ranched stocks. |
| Dec 2005 | CITES requests annual reports on Ranching. |
| May 2006 | CSG responds to CITES request on annual reports on Ranching. |
| May 2006 | Dimby confidential report to Chair CSG. |
| July 2006 | CSG Chair wrote to the CITES Secretary General, concerning the apparent laundering of wild harvested skins in Madagascar and recommending that the matter be brought to the attention of the 54th meeting of the CITES Standing Committee. |
| Aug 2006 | Dimby and Olivier Behra submit proposal for a Ranching & Management programme for wild crocodiles in Madagascar. Also |

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| | Dimby proposal – monitoring Besalampy population, through egg collection. |
| Sep 2006 | CSG Chair receives a report from Mr. Yochi Takehara on his personal visit to Madagascar and meetings with DEF. |
| Nov 2006 | CITES Secretariat (Tom De Meulenaer) & Dietrich Jelden undertook a Mission to Madagascar –<br>"Verification of compliance with Resolution Conf.11.16 for Ranching of *Crocodylus Niloticus* in Madagascar". |
| Mar-Aug 2007 | Regular email correspondence between Dietrich Jelden, Grahame Webb, Charlie Manolis, Tom Dacey, Richard Fergusson, Olivier Behra, GTZ, Christine Lippai to prepare for the CSG's assistance to the Government of Madagascar. |
| May 2007` | Christine Lippai entered into contract with CSG to assist Madagascar with the Management Plan (in terms of compliance with CITES requirements). Christine Lippai contacts DGEF to ensure that appropriate protocol and approval from Government of Madagascar is secured prior to visiting Madagascar. |
| July 2007 | Christine Lippai, Detrich Jelden, Charlie Manolis and Tom Dacey work throughout the month (emails and skype conversations) to draft a workplan for crocodile management in Madagascar based on the recommendations in document SC55.13 |
| Aug/Sept 2007 | CSG Project team (comprised Christine Lippai, Dietrich Jelden and Charlie Manolis) visit Madagascar, contact all relevant stakeholders, convene a roundtable discussion, present the draft workplan, assist in the finalisation of the National crocodile workplan, that was immediately endorsed by Madagascar DGEFT and sent to CITES as official working document. |
| Sept 2007 | Summary findings of the CITES Mission presented at SC55, The Hague, Netherlands.<br>Madagascar was requested to provide progress reports of achievements at SC 57 (2008) & SC 58 (2009). |
| Sept 2007 | CSG had to deal with the accusatory letter that was sent by Mme Aline to the Minister and DG. |
| October 2007 | Charlie Manolis, Detrich Jelden and Christine Lippai assist Andry Malan'Ny Aina Rakotondrazafy with Human Crocodile Conflict data analysis. Nesting data collected during Sept 2007 mission to |

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| | Madagascar is analysed by Charlie Manolis and a draft report written. |
| November 2007 | Discussions continue between CSG and GTZ regarding potential funding for crocodile survey work in Madagascar. |
| Jan 2008 | CITES issue a Notification to the Parties No. 2008/004, concerning Madagascar's need to provide progress reports |
| Mar 2008 | CSG team coordinator (Christine Lippai) visits Madagascar and undertakes liaison with GTZ office to secure funding support for survey activities. Also met with the newly appointed Minister and made preparations for crocodile surveys. Christine Lippai and Charlie Manolis liaise on daily basis via skype and email.<br><br>**NB**: CSG were informed that our counterpart at the DGEFT (Voahirana) was to leave her post at the end of the month. Her replacement had not been announced and we met with the Minister and SG (the DG had also been replaced, but his replacement had not yet been announced/decided) to stress the urgency of completing tasks under the National Workplan, particularly in light of the forthcoming Animals Committee meeting in Geneva (April 2008). In addition, Mme Orly RABEONY, the technical officer at DGEEF who has been responsible for crocodile issues for the past few years, had been informed in a letter that she is not to deal with crocodile issues until further notice. |
| April 2008 | CITES AC meeting, Geneva. CSG Chair & Christine Lippai meet with Malagasy delegation to offer continued support to Madagascar Govt and also stressed importance of national crocodile workplan and the requirement that Madagascar implement control and monitoring processes in –country. Mme Vololona had been named as the CITES Officer at DGEF. Christine Lippai provided information and relevant documentation to Vololona and maintained regular email/cellphone contact with her as she stepped into her new role. Christine Lippai and DGEF worked together to determine how to proceed with set-up of National Crocodile Committee. |
| May 2008 | Christine Lippai in regular contact with DGEF re: National Crocodile Committee meeting, reporting to CITES SC, funding for crocodile survey in the wild and other CITES-related issues (quota setting). Christine Lippai and Charlie Manolis in daily contact regarding contract with GTZ and financial budgeting for the survey. |

| | |
|---|---|
| June 2008 | Christine Lippai and Charlie Manolis worked on a letter that was sent to the National Crocodile Committee for their consideration at their inaugural meeting. |
| July 2008 | At the CITES Standing Committee meeting, SC 57, the Committee noted the progress made by Madagascar in implementing the recommendations. Important to note that Madagascar missed the reporting deadline for the Steering Committee meeting. Through the CSG (Christine Lippai), Madagascar prepared an Inf. Doc. based on the activities outlined in the national workplan to demonstrate progress. |
| Jul/Aug 2008 | CSG Project team (comprised of Christine Lippai, Brett Ottley, Andry Malan'Ny Aina Rakotondrazafy) undertook crocodile surveys.<br><br>Subsequently, additional input has been made to Madagascar DGEF through email correspondence and through Andry Malan'Ny Aina Rakotondrazafy's inputs in-country. Andry Malan'Ny Aina Rakotondrazafy has been liaising directly with the DGEF on a regular basis and more so since becoming a member of the CSG. He has attended the National Crocodile Committee meetings and conveyed messages to the Madagascar CITES Management Authority and Scientific Authority with regard to ranching operations and other CITES-related issues. Andry Malan'Ny Aina Rakotondrazafy was asked by the DGEF (at the request of the Minister) to assist with installing a monitoring system within the DGEF for human-crocodile- conflict data collection and analysis. |
| Dec 2008 | CSG final report on "Assisting Madagascar to comply with CITES Standing Committee recommendations (SC Doc. 55.13): conducting surveys of wild crocodile populations in Madagascar in terms of the National Crocodile Management Workplan (2007-2010). |

**Attachment 3**

## Email Message of 13 January 2009 from Mme Aline to Christine Lippai

Bonjour Christine
Ce message de toute façon continue de nous faire tourner en rond parce chacun donne son avis , mais personne ne prend de décision, et pareillement depuis des dizaines de Réunion , sauf pour appliquer les lois aux malgaches.

Depuis 2007 , lorsque nous étions accusés d'acheter des peaux sauvages , tout le monde le faisait , sans exception , CrocFarm en premier , et en quantité énorme par rapport à nous et aux artisans , et pourtant CSG a recommandé sous son influence , des mesures draconiens , mais que pour les malgaches , et seul un opérateur pouvait continuer d'acheter des peaux braconnées en quantité , la quantité habituelle comme tous les ans , sauf que pour échapper aux surveillance , ce sont ses employés qui les achètent et les stock chez eux pour les livrer par la suite .à leur ferme .Faites donc des enquêtes auprès des chasseurs , ils sont toujours les memes.

Alors pourquoi nous interdire d'exporter seulement nous ???

Dans vos rapports , QUOTA ZERO POUR CRII en 2007 , Après ma réclamation , Mr Dietrich avait répondu : OK , vous pouvez n'exporter que ce que avez dans votre ferme alors ..; OK , alors pourquoi même en 2008 vous ne voulez toujours pas lever cette interdiction ?
Alors que Mr Dietrich avait reconnu lui même qu'il n'avait même pas contrôler minutieusement tout le stock dans le contenair rempli de chez
Croc Farm , des énormes et de tout gabarit , et chez , comme si on avait tué des hommes , il ne leur manquait plus que des armes kalachnikov!!
n'est pas un complot..uniquement contre nous ?

Je vous avais bien préciser et demander : sue quel critère vous vous basez des quota 3000/an de Reptel ?
Pensez vous qu'ils les tuent certainement tous les ans et que ce ne sont pas les mêmes qui sont là ? et de petites tailles en plus?
Si le CSG est équitable , vous auriez dû recommander les inventaires complets de tout les bassins , ça ne prendra qu'une semaine mais au moins ce sera fait ..; parce que pouvez très bien faire contrôler ces peaux par la douane et CITES à pays destination,
soit disant de Ferme ou Ranch , et pourtant braconnées , presque toutes qui sont exportées, et tous les articles dérivés, ces peaux sont elles déclarées , produits de ferme ?

Ce que je réclame haut et fort , c'est simplement que la loi soit pour tout le monde, et pas deux poids , deux mesures ...Si vous voulez prendre et imposer des mesures draconiennes , O.K mais pour pour tous les opérateurs ..;
Même les échanges des quotas Wild , du cinéma pur et ridicules ...et incite aux spéculations..;
Notre demande a été de nous laisser exporter uniquement le quota de notre Ranch ..; et personne n'est capable de confirmer.

Je pense qu'en 2009 ,inventorier tous les bassins , numéroter tous les bébés ( sur la queue ,ne gène aucunement ) et tous les Un et deux ans , assister à totalité des abattages et de suite , mettre les étiquettes et ne mesurer qu'au moment d'export est plus préventive et transparence ...et éviter inutilement tous les ans des réunions à des sentences éternelles et traiter le gouvernement d'incompétent.

Remerciements d" m'avoir lu jusqu'à,la fin .
Mme Aline .

Ministère de
l'Environnement,
des Forêts et
du Tourisme

Programme Germano-Malgache pour l'Environnement

**PGM-E**


# Surveys of wild crocodile populations in Madagascar

**Assisting Madagascar to comply with CITES Standing Committee recommendations (SC Doc. 55.13): conducting surveys of wild crocodile populations in Madagascar in terms of The National Crocodile Management Workplan (2007-2010)**

# Final report

**December 2008**

gtz Partner for the Future. Worldwide.

*The opinions expressed in this report are those of the authors and not necessarily those of the PGM-E/GTZ*

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**Antananarivo/Madagascar – December 2008**

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Particular thanks are extended to the GTZ drivers (Mr Julien and Mr Harison) who regularly worked beyond the call of duty at unsociable hours of the early morning, to ensure the safety and efficacy of the team's endeavours.

We thank the Director General and staff at the DGEF for their continuing support, particularly Mr Gérard Rambeloarisoa, Mme Lydie Raharimaniraka and Mme Vololoniaina Olivia Rakotondrabenja. Thanks are also extended to the staff at the Regional Direction offices of the DGEF in Maevatanana (Mr Parany, Mme Noeline) and Miandrivazo (Mr Josuah Andriamasy) who welcomed us into their offices and provided valuable local information.

We are most grateful to ANGAP-Mahajanga for their approval to conduct a night-time survey of the sacred lake in Ampijoroa, which was made possible by the efforts of Mme Jacqueline Razaiarimanana (Research Officer) and Mr Harinaina Léon Razafindralaisa (Interim Director) of ANGAP-Mahajanga.

Whilst in Madagascar, many individuals gave freely of their time and expertise, including Ramandimbison and Olivier Behra (MATE), Birdlife Madagascar (ASITY), Richard Lewis, Mr Ernest and Mr Mahita (Durrell Wildlife Conservation Trust), Serge Rajaobelina (FANAMBY), Mr Daniel Bessaguet, Marc Gansuana, Mr Jaspert, Mr Livaniaina R Andrianjaratina (Croc Farm), Mme Aline Ralimanana (CrocoRanching II), Jeremy Matrin (Madagascar oil), members of the Artisanal Crocodile Leather Associations, Mr Frederic Memena and his family at the Hotel Karon (Mahajanga) and Mr Erwan Gonnet [Lakana Voyage (tourist operator)]. We thank them all collectively.

Special acknowledgment is given to the local people encountered in Madagascar who also gave freely of their time and knowledge.

Charlie Manolis (Wildlife Management International; CSG) contributed considerable time guiding this survey and assisting with data analysis, as well as reviewing and improving the technical report. Dr Dietrich Jelden (CSG) also assisted in reviewing the report, and has provided overall guidance throughout the project.

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**Objective:**

To assist the Ministry of Environment, Forests and Tourism (MEFT) through its Direction de Valorisation des Ressources Naturelles (DVRN) and its CITES Focal Point in improving the conservation, management and sustainable use of crocodiles with respect to Madagascar's obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

## 1. Introduction

Following several IUCN-SSC Crocodile Specialist Group (CSG) missions to Madagascar to assist the Government of Madagascar (GoM) with implementation of its National Crocodile Workplan and to ensure Madagascar's compliance with the provisions of CITES Resolution Conf. 11.16 (Rev. CoP14) [http://www.cites.org/eng/res/11/11-16R14.shtml] on ranching, a funding proposal with in-kind and cash contributions from the CSG and industry was submitted to the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) office in Antananarivo to undertake population surveys of wild crocodiles (*Crocodylus niloticus*). This activity goes towards fulfilling the activities outlined under Output 9 of the National Crocodile Workplan (see 2.2 below for details).

**PGDRN priorities for action in Madagascar**

The activities within this contract streamline with the GTZ PGDRN's priorities for action in Madagascar, namely to:

- combat poverty;
- stabilise and protect ecosystems; and,
- ensure the transparent and focused use of forest ecosystems and protected areas for poverty alleviation.

With regard to poverty alleviation, the PGDRN is "seeking tangible impacts on the rural poor through the conservation and sustainable use of natural resources" (http://www.gtzprogramme-mg.org). The sustainable use of wild crocodile populations can be a useful tool for not only the conservation of this species, but also for improving livelihoods of Madagascar's rural poor who live alongside this predator. In this regard, the downlisting of Madagascar's wild *C. niloticus* population from Appendix I to Appendix II (CoP10, Harare, 1997) was based on community participation in the Besalampy region for the ranching of crocodile eggs. The 2008 survey will contribute also to GTZ PGDRN's assistance to the GoM with national policy and implementation of international conventions (http://www.gtzprogramme-mg.org/organigram.html).

## 2. Background

### *2.1. CITES Compliance*

The wild Nile crocodile (*C. niloticus*) population in Madagascar is listed on Appendix II of CITES for the purposes of ranching. In addition there is a limited wild harvest of wild crocodiles that are considered to be a threat to humans and/or their livestock. However, for some time there have been serious concerns about the legality of international trade in crocodile skins from Madagascar. In late 2006 the CITES Secretariat undertook a review mission to Madagascar, which resulted in a suite of recommendations to guide the country in fulfilling its obligations to CITES.

CITES is currently one of the few international environmental-related Conventions signed by the GoM, which is able to create tangible economic impacts for the MEFT

and the private sector. Effective application of CITES with supporting national legislation can provide an exemplary model for other conventions with regard to the environment and the sustainable use of natural resources in Madagascar.

As a compliance issue, the situation with crocodiles in Madagascar falls under the CITES Standing Committee's (SC) responsibilities. In June 2007, the SC considered Document SC55.13 (Annex 1), which included the following recommendations:

*"1. The Management Authority (MA) and the Scientific Authority (SA) of Madagascar, with the support of stakeholders and experts as necessary, should revise, update and implement the Stratégie et Plan de Gestion des crocodiles de Madagascar (Ministry of Environment, Waters and Forests of Madagascar, May 2004).*

*2. Recognizing that many of the issues mentioned below are already contained in its current version, the Strategy and Management Plan should inter alia address the following:*

*2 (g). the research and surveys of wild crocodile populations required in compliance with Resolution Conf. 11.16. These studies should be undertaken within two years with the active involvement of the Scientific Authority. Independent experts, preferably from the IUCN/SSC Crocodile Specialist Group, should be invited to participate in the design and conduct of these research activities, which, as a matter of priority, should concentrate on: a) the conservation status and distribution of C. niloticus in Madagascar, and comparisons with previous studies; b) the impact on wild populations of current legal and illegal offtake, including egg collection for ranching programmes, and measures that can ensure sustainable harvests; and c) the occurrence and nature of human/crocodile conflicts in Madagascar, the relationship between locations of current wild harvests and conflict zones, and the effects of different strategies to deal with the conflicts;*

*3. The MA should invite external experts between 2007 and 2010, preferably from or associated with the IUCN/SSC Crocodile Specialist Group, to assist in capacity building and training activities concerning the management of C. niloticus in Madagascar and the implementation of the Strategy and the Management Plan. Areas where capacity building could be required include: farm monitoring techniques; record keeping; tagging and measuring skins; aging and sexing of animals; determining the annual production of farms; identification of the origin and the age of skins; the number and kind of products that can manufactured from a crocodile skin; counting and monitoring wild crocodile populations; methods and practices to reduce or minimize human/crocodile conflicts; and the development of relevant manuals and identification materials for government agencies and stakeholders."*

### *2.2. National Crocodile Management Workplan (2007-2010)*

In response to the SC recommendations, the CSG drafted a workplan, which was presented to various stakeholders in Madagascar and discussed at a national Round Table meeting in September 2007. The 3-year workplan (Annex II) was approved and validated by the GoM**.** Outputs from the component "Survey of wild crocodile populations" in this workplan will include, *inter alia*, the following:

- Measurable improved conservation, management and sustainable use of crocodiles in Madagascar;
- Revised and updated Crocodile Management Program (Stratégie et Plan de Gestion des Crocodiles à Madagascar);
- Research and analysis to address the historical status and distribution of *C. niloticus*;
- Survey of the current status and distribution of *C. niloticus* in the wild;
- Design of cost-effective methods for monitoring the wild population;
- Impact of current legal and illegal harvesting on the wild population; establishment of sustainable harvest limits; quantification of human-crocodile conflict, identified

areas for local community participation and benefit; and potential for a limited harvest of wild non-nuisance crocodiles; and,

- Capacity building and training activities to establish a monitoring and evaluation system of *C. niloticus* populations in Madagascar.

### *2.3. Funding requirements*

The CSG visited Madagascar on previous occasions in 2007 and early 2008 and consulted with relevant stakeholders, including DGEF, with regard to the proposed workplan activities. In particular, issues of financial and logistic support were addressed, resulting in the proposal submitted to GTZ. Timelines for activities were thus very much dependent on approval of funding and subsequent signing of contractual agreements between various parties once the proposal was accepted by GTZ. For example, although surveys could have been carried out earlier in the year, this was difficult to plan without the assurance of funding to cover expenditure.

Suitably qualified international and national consultants, Brett Ottley (BO) and Andry Malan'Ny Aina Rakotondrazafy (AMAR) respectively, with field experience in both aerial and spotlight surveying, were identified to undertake the population survey component. In addition, several CSG members provided input and expertise into the design and analysis of the survey program and activities outlined in the Terms of Reference, which combined to extend the scope of the contract and enhance considerably the value of the services provided in the contract with GTZ. Whilst the additional expertise has not been quantified in monetary terms and is not reported in the financial section of this report, the co-financing value more than triples the budgeted amount of the GTZ.

## 3. Monitoring of wild crocodile populations

### *3.1. Historical Data Analysis*

Section 3.1 of the terms of reference required an analysis and assessment of historical population survey and wild egg harvest data. Aerial surveys were carried out on Madagascar's wild population of *C. niloticus* in 1987/88 and 1997 in a selection of rivers, and some spotlight surveys were also carried out in 1988. These previous survey reports and data were secured and analysed for comparison with the 2008 survey. The results of these analyses are provided in the Results section below (Section 5).

The available wild egg harvest data were also secured and an analysis carried out. Nest counts are used in various crocodile programs to monitor population trends [eg Papua New Guinea (Sine *et al.* 2006[1]), USA (Elsey and Kinler 2004[2]), Argentina (see Jenkins *et al.* 2006[3]), Australia (see Webb *et al.* 2000; WMI, unpublished[4]), and Zimbabwe (Craig

[1] **Sine, R. and Kula, V. (2006).** Status of *Crocodylus porosus* and *C. novaeguineae* in Papua New Guinea after twenty-five years (1981-2006) of aerial nesting surveys. Pp. 292 in Crocodiles. Proceedings of the 18th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland

[2] **Elsey, R.M. and Kinler, N. (2004).** Louisiana's alligator program: adapting management as populations recover and risk of unsustainable use decreases. Pp. 92-101 in Crocodiles. Proceedings of the 17th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.

[3] **Jenkins, R.W.G, Jelden, D., Webb, G.J.W. and Manolis, S.C. (eds.) (2006).** Review of Crocodile Ranching Programmes. Conducted for CITES by IUCN-SSC Crocodile Specialist Group. AC22 Inf. 2, www.cites.org/eng/com/AC/22/index.shtml.

[4] **Webb, G.J.W., Britton, A.R.C, Manolis, S.C, Ottley, B. and Stirrat, S. (2000).** The recovery of Crocodylus porosus in the Northern Territory of Australia: 1971-1998. Pp. 196-235 in Crocodiles. Proceedings of the 15th Working Meeting of the IUCN-SSC Crocodile Specialist Group. IUCN: Gland.

*et al.* 1992[5])], albeit the method targets only one segment of the population (nesting females). However, in cases where the nature of the habitat makes other survey methods unsuitable, nest counts do nonetheless provide a reliable index of the population.

For Madagascar, detailed historical data on nest/egg harvests by one operator were available (Table 1: Ramandimbison *et al.* 1998[6], 2004[7], unpublished data). These data indicate that new nesting sites were continually included within the egg collection program over time (ranging from a low of 6 nest sites in 1991 to a high of 23 sites in 2001). This made it difficult to establish trends over time for many areas. However, more importantly, the data were of limited value for assessing nesting trends as the numbers of nests recorded equated to the number collected, rather than the total nesting effort at any particular site (see Results).

## 4. Methodology

Prior to the team's visit to the survey sites, appropriate protocol was respected and the proposed itinerary and team members were presented to and endorsed by the Director General (DG) of DGEF (Mr Gérard Rambeloarisoa). The DGEF required that the survey team contact Regional Directorates of Environment, Forests and Tourism (DREFT) in the main towns visited during the population survey. The final itinerary is detailed in Annex III.

### *4.1. Survey Team*

The survey team comprised four core members who participated throughout the survey period:

- Christine Lippai (CSG Madagascar crocodile project coordinator)
- Brett Ottley (International crocodile survey consultant contracted by GTZ)
- Andry Malan'Ny Aina Rakotondrazafy (University of Antananarivo, National crocodile survey consultant contracted by GTZ)
- Rosanna Hutton (student volunteer)

Additional individuals participated for varying times and at different locations within the survey period, and included:

- Ramandimbison (crocodile egg harvest coordinator)
- Danô (pirogue boatman and guide on Ikopa River)
- Philibert (pirogue boatman and guide on Lake Amparihibe/Bekipoly)
- Roland (boat driver Mahajanga region)
- Stéphan (guide from Ambato Boeny on Lake Marovovo)
- Raymand and Mamy (owner and boat driver from Ile Continent Voyage, supplied 4.9 m Argos boat)
- Izano Ananaxo [Jean-Pierre] (guide on Mahajilo River)
- Marcellin (guide on Mahajilo River)

### *4.2. Population Surveys*

Aerial surveys were carried out for *C. niloticus* in 1988 and 1997. However, the consultants undertaking these surveys indicated that the results obtained were of

[5] **Craig, G. C., Gibson, D.St.C. and Hutton, J.M. (1992).** A population model for the Nile crocodile and simulation of differing harvesting strategies. Pp. 1-52 in CITES and the Nile Crocodile in East/Central Africa and Madagascar, ed. by J. M. Hutton and I. Games. CITES: Lausanne.

[6] **Ramandimbison, Games, I. & Lippai, C. (1998).** Madagascar Crocodiles. Report to CITES, March 1998.

[7] **Ramandimbison, Razafimahatratra, M., Rahajaharison, J. and Rakotoniriana, V. (2004).** Les Crocodiles de Madagascar. Report to CITES, May 2004

limited utility in evaluating population trends. Aerial surveys target larger crocodiles in the population and smaller individuals are typically not sighted. Spotlight surveys on the other hand provide more detailed information on the population (eg size structure), but may be more prone to logistic difficulties and be more time-consuming. Spotlight surveys were carried out in some rivers in Madagascar in 1987/88.

Given the constraints of available funding and the evaluation of previous population surveys, aerial surveys were not considered feasible for 2008, and efforts were directed at spotlight surveys. Consideration was given to undertaking limited aerial surveys in order to quantify the relationship between aerial and spotlight surveys, but this was not possible for the same reasons. Although aerial surveys may be more cost-effective than spotlight surveys, the relatively high costs involved may be prohibitive for an annual monitoring program. Nonetheless, this aspect will be examined in more detail in 2009.

The primary goals of the 2008 spotlight survey program were:
- to assess selected areas for potential inclusion in a population monitoring program; and,
- to obtain population density data from representative habitat types that could be used to provide an estimate of the total population (a requirement for a future CITES proposal for an unqualified Appendix-II listing).

### *4.3. Logistics*

The logistic difficulties encountered resulted in considerable time being expended getting to and from different survey locations. A tentative schedule was drawn up prior to departure from Antananarivo into the field, in consultation with local experts (eg Ramandimbison, Livaniaina Andrianjaratina, Marc Gansuana, Olivier Behra), but with full awareness that this plan would probably need to be changed depending on local conditions encountered.

Prior to commencement of fieldwork, it became obvious that there was little detailed information (eg access points, river characteristics, navigability) available to allow specific rivers to be assessed for suitability without visiting them. The following information was provided through discussions:
- many of the rivers are too shallow to be surveyed by boat
- access is only possible to most areas by oxcart and/or by foot
- regional roads are very rough and largely unsuitable for vehicular access.

No information could be provided on the availability of suitable boats in the different regions. The original proposal submitted to GTZ anticipated the purchase or fabrication of a suitable flat-bottom boat. However, at the 11th hour the CSG was informed that equipment purchase of this sort was an ineligible cost, although funding could be provided for boat rental. Ultimately this decision created serious logistic and timing difficulties, as a "suitable" boat had to be sourced at each of the survey locations.

Limited road access and un-maintained dirt roads resulted in time being used to reach specific access points to rivers and lakes. The situation with boats was particularly frustrating, with time being expended trying to locate suitable boats. Pirogues were readily available, but in most cases without outboard motors, thus restricting their use to relatively short lengths of river that could be covered each night. The physical effort needed to "pole" pirogues against the water flow and across sandbars also made it difficult to approach crocodile "eyeshines" for size estimation.

### *4.4. Survey methodology*

The spotlight survey technique used in these surveys follows the method described by Messel *et al.* (1981). A 100W spotlight powered by 12 volt vehicle batteries is used to scan the water surface and banks. Crocodiles are located by their red eyeshine. When an eyeshine is detected, the crocodile is approached and size estimated. Crocodiles that submerge before they can be sized are recorded as an eyeshine (ES). The location of all crocodile sightings are recorded by GPS.

Each section of river selected for a survey section was identified by a start and stop point. This allows for the calculation of densities (crocodiles seen per km of river surveyed) and establishes repeatable survey sections for the future monitoring program. Lakes were identified with reference locations and the area covered on each lake was recorded onto maps.

### *4.5. Rivers selected*

With the limited background information of river systems the survey team initiated fieldwork in the Betsiboka/Mahajanga regions, with a view to selecting subsequent survey areas based on local conditions. At each town/village, local people and government officials were contacted and advised of the work being undertaken, and information sought from them. Where possible, local people were hired to act as guides, on the assumption that they had intimate knowledge on rivers in their area. Unfortunately this was not always the case, with local guides usually being familiar with sections of the river in the immediate vicinity of their residence, but not familiar with areas just a few kilometres away. In some cases guides simply did not have the river knowledge which they professed to have!

Local people were generally "cautious" of foreigners, especially in smaller villages away from the main arterial roads. For this reason, negotiations for guides and boats were handled by Malagasy team members (ie National consultant). In most cases there were no problems, but residents of one village were sufficiently concerned by the presence of the team that they refused to provide guides, fearing for their safety.

Sections of the Ikopa/Betsiboka, Mahavavy and Mahajilo River systems were surveyed, as well as a short section of the Kamoro River (tributary of the Betsiboka River), four lakes associated with the Ikopa (Lakes Bokapila and Amborovy) and Betsiboka (Lakes Amparihibe/Bekipoly complex and Lake Marovovo) Rivers, and the sacred Lake Ravelobe in Parc National Ankarafantsika (Table 7). The surveys covered representative habitats in the major rivers.

Surveys of the Ikopa, Maroala sections of the Betsiboka and Lake Amparihibe/Bekipoly were done using pirogues. A 3.5 m moulded plastic punt with a 9.9 hp outboard motor was used for the surveys of the Betsiboka mouth and Ambato Boeny section, the Kamoro and Mahavavy Rivers and Lake Marovovo. A 7.2 m shallow V-hull fibreglass boat (Argos design) with twin 30 hp outboards was used as a mother ship to access the mouths of the Mahavavy and Betsiboka Rivers. The plastic punt was towed behind the mother ship. The Mahajilo River was surveyed using a 4.9 m shallow v-hull fibreglass Argos boat with 40 hp outboard.

Where boats/pirogues were unsuitable, some areas were surveyed by walking the waters' edge. All surveys were outside of protected areas apart from Lake Ravelobe in the Parc National Ankarafantsika. The lake was surveyed using the ANGAP boat and driver (5 m punt with 5 hp motor). Prior to effecting the survey of the sacred Lake Ravelobe, authorisation had to be secured from the Regional Director of ANGAP based in Mahajanga, as well as an agreement from the director of research (Chef de Service Appui Scientifique) at the Ampijoroa ANGAP office. The National Park of Ankarafantsika has 6 sacred lakes within its boundaries: it will be interesting to carry

out surveys of these other lakes as they are in more remote areas of the mountainous national park and could serve as secure sites with integral protection for crocodiles in Madagascar.

### *4.6. Itinerary*

Extensive discussions were held in Antananarivo with stakeholders from Government, industry, research centres and the private consulting sector in order to devise a workable itinerary for the 2008 survey. The itinerary was updated and amended several times before a final program was submitted to GTZ, with the understanding that this program could and would change once in the field and local circumstances had been evaluated.

The logistical effort required to organise and undertake these surveys is indicated by the vehicle travel needed to access regions and find access routes into rivers and lakes. A total of 3874 km were travelled to obtain 127 km of crocodile surveys. A summary of the vehicle log for the field work is presented in Annex IV.

## 5. Results

### *5.1. Historical data analysis*

Analyses of egg harvest data, wild skin harvest data and previous survey data (from 1987, 1988 and 1997) were carried out.

#### 5.1.1. Egg harvest data

Detailed data on nest/egg collection by one operator in Madagascar are available (Table 1; Ramandimbison *et al.* 1998, 2004, unpublished data). The results of this assessment are available in a separate, detailed report but are summarised here.

For 12 nesting sites, sufficient data were available from 1996 to 2003 (7 years) to allow quantification of trends in nesting effort. Each of the 12 nest sites has shown reduced nesting, ranging from -33% in the Bemarivo and Marotondro Rivers, -52% in the Maningoza River and -55% in the Sambao River. Considering all areas together, the estimated decrease in nesting is -45%, which better reflects the change for the area as a whole, as it takes into account the differences in absolute nesting effort between the different rivers. This decrease (-45% over 7 years) is equivalent to a mean rate of decrease in nesting of around -10% per annum. Hunting is considered to be the main reason for these declines, as it has increased in the area since 2000, with traps commonly sighted during the egg collection period (September-October) (Ramandimbison, pers. comm.).

**Table 1. Numbers of *C. niloticus* nests collected at different nest sites in the Maningoza, Sambao, Hafay and Bemarivo Rivers, 1990 to 2006 (Sources: Ramandimbison *et al.* 1998, 2004, unpublished data).**

| River/Nest Site | '90 | '91 | '92 | '93 | '94 | '95 | '96 | '97 | '98 | '99 | '00 | '01 | '02 | '03 | '04 | '05 | '06 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maningoza River | | | | | | | | | | | | | | | | | |
| Ambilombahaza | 2 | | 7 | 20 | 14 | 3 | | 7 | 7 | 5 | 4 | 5 | 4 5 | 4 | 1 | 10 | 7 |
| Ampitampoha | 3 | | 4 | 5 | 27 | 20 | 14 | 11 | 10 | 5 | 5 | 12 | 9 12 | 6 | | | |
| Ambohitramboalambo | 3 | | | | | | | | | | | | | | | | |
| Antafofo | 12 | | 16 | 24 | 25 | 25 | 25 | 12 | 10 | 5 | 8 | 8 | 7 8 | 8 | 6 | 7 | 6 |
| Tsimetrakingabe | | 3 | | | | | | | | | | | | | | | |
| Maningoza-Andaka | | 2 | | | | 5 | 1 | | 3 | 4 | 2 | 3 | 3 3 | 2 | 5 | 3 | 5 |
| Ambalatany | | 5 | | | | 4 | 4 | | 3 | 3 | | 3 | 2 2 | 3 | | | |
| Ankingabe | | 6 | 5 | | 5 | 4 | 21 | 5 | 5 | 7 | | 9 | 11 11 | 5 | | | |
| Antsirasirakely | | | 1 | | | | | | | | | | | | | | |
| Ambato | | | 5 | | | 3 | 2 | 8 | 5 | 4 | 5 | 5 | 3 3 | | | | |
| Namakia | | | 4 | | | | | 3 | 2 | 2 | 3 | 2 | 3 3 | 3 | | | |
| Anosinjia | | | | | 5 | | | | 2 | 2 | 2 | 1 | 3 3 | 2 | | | |
| Ambohipisaka | | | 1 | | | | | | | | 1 | 1 | | | 2 | | 2 |
| Antanimandoso | | | 5 | | | | | | | | | | | | | | |
| Ambatobe | | | 8 | | 2 | | | | | | | | | 2 | | | |
| Maningozamaty | | | | | 2 | 6 | 19 | 18 | 10 | 7 | 3 | 6 | 10 10 | 5 | 14 | | 14 |
| Maningoza | | | | 1 | 11 | 17 | | | 10 | 9 | 1 | 6 | 8 7 | 6 | | | |
| Andrompezo | | | | 1 | | | | | | | | | | | | | |
| Marotana | | | | | 2 | | | | | | | | | | | | |
| Manozony | | | | | 1 | | | | | | | | | | | | |
| Ankiliolio | | | | | 2 | 1 | | 3 | 2 | 2 | | 2 | 2 0 | 1 | 7 | | |
| Tselokoreky | | | | | 8 | 2 | | 12 | 4 | 10 | 8 | 8 | 7 0 | 6 | | 5 | 7 |
| Tsiazohena | | | | | | 8 | | | 5 | | | 7 | 3 0 | 5 | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Andranomaitso | | | | | | 1 | | | | | | | | | | | |
| Anteramena | | | | | | 1 | | | | | | | | | 1 | 6 | 1 |
| Marovaikely | | | | | | 1 | | | | | | | | | | | |
| Ambararatabe | | | | | | 2 | | | | | 2 | | | | | | |
| Analapaka | | | | | | 8 | | | | 6 | | 7 | 5 0 | 6 | | | |
| Tambuno | | | | | | 3 | | | | | | | | | | | |
| Andasibe | | | | | | | 1 | | | | | | | 1 | | | |
| Ambakivao | | | | | | | 7 | | 3 | 5 | 2 | 4 | | 3 | | | |
| Ambalarano | | | | | | | 8 | | | | | | | | | | |
| Ampoza | | | | | | | 15 | 10 | 10 | 6 | | 10 | 8 0 | 7 | 3 | | 3 |
| Andranovory | | | | | | | | 2 | | 2 | | 2 | | | | | |
| Anosimanety | | | | | | | | 2 | 2 | | 1 | | | 2 | | | |
| Maningoza mouth | | | | | | | | | | | | 10 | 15 0 | 10 | | | |
| Behily | | | | | | | | | | | | | | | 3 | | 5 |
| Soasano | | | | | | | | | | | | | | | 1 | | |
| Ambohidsavola | | | | | | | | | | | | | | | 6 | | |
| Ankara | | | | | | | | | | | | | | | 2 | | 2 |
| Marovoay | | | | | | | | | | | | | | | 1 | | 1 |
| **Subtotal** | **20** | **16** | **56** | **51** | **104** | **114** | **117** | **93** | **93** | **84** | **47** | **111** | **103** | **87** | **52** | **31** | **53** |
| | | | | | | | | | | | | | | | | | |
| **Sambao River** | | | | | | | | | | | | | | | | | |
| Sambao | | | 1 | | | | | | | | | | | | | | |
| Sonenga-Sambao | | | | | | | | | | | | | | | | | |
| Sambao mouth | | | | | | | | | | | | 10 | 10 3 | 10 | | | |
| Ampanano | 5 | | 4 | 1 | | | | | | | | | | | | | |
| Ambinany | 2 | 2 | 3 | | | | | | | | | | | | | | |
| Ankonatsa-Andaka | 2 | | 2 | | 2 | | | 3 | | | | | | | | | |
| Maintimaso-Andaka | 1 | 2 | 2 | 2 | 5 | | | | | | | | | | | | |
| Ambatoatoandro | | | | | 5 | | | | | | | | | | | | |
| Maintimaso | | | | | 5 | | | | | | | | | | | | |
| **Subtotal** | **10** | **4** | **12** | **3** | **17** | **-** | **-** | **3** | **-** | **-** | **-** | **10** | **10** | **10** | **-** | **-** | **-** |

**Bemarivo River**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bemarivo | | | | 3 | 9 | | | | 4 | | 5 | 4 | 2 22 2 | 3 | 7 | 3 | 7 |
| Tsimelara | | | | | | | | | | | | | | | | | |
| **Subtotal** | **-** | **-** | **-** | **3** | **9** | **-** | **-** | **4** | **4** | **-** | **5** | **4** | **4** | **3** | **7** | **3** | **7** |
| **Marotondro River** | | | | | | | | | | | | | | | | | |
| Marotondro | | | | 3 | 3 | 6 | 8 | 2 | 6 | | 6 | 4 | 3 4 | 3 | 13 | 18 | 13 |
| Andramonakanga | | | | | | | | | | | | | | 1 | 1 | 1 | |
| **Subtotal** | **-** | **-** | **-** | **3** | **3** | **6** | **8** | **2** | **6** | **-** | **6** | **4** | **3** | **3** | **14** | **19** | **13** |
| **Hafay River** | **-** | **-** | **-** | **-** | **2** | **-** | **-** | **4** | **-** | **2** | **2** | **1** | **2 0** | **2** | **-** | **-** | **-** |
| **TOTAL** | **30** | **20** | **68** | **60** | **135** | **120** | **125** | **106** | **103** | **86** | **60** | **130** | **122** | **105** | **73** | **53** | **73** |

Local information on crocodile densities indicates that whilst crocodiles used to be seen basking in groups on sandbanks in the past, they are now usually sighted as individual specimens.

Hunting is considered the main reason for the decline in nesting. Increased hunting pressure for skins is known to have increased in these areas since around 2000, and it has intensified in more recent years - traps are now commonly sighted during the egg collection period (late September-early October) (Ramandimbison, M. Gansuana, pers. comm.). Nests were collected from Maningoza Mouth in 2001-2003, where according to locals nesting was not known to occur historically. Researchers believe that female *C. niloticus* have moved downstream to nest, due to disturbance in the upstream nesting areas (Ramandimbison, pers. comm.). However, this hypothesis remains to be tested.

**Table 2.** Total annual nesting effort and percentage change in nesting over time (see text) for 11 nesting sites in the Besalampy area, 1996-2003.

| River/Nest Site | 1996 | 1997 | 2001 | 2003 | % Change |
|---|---|---|---|---|---|
| **Maningoza River** | | | | | |
| Ampoza | 42 | 52 | 28 | 29 | -45% |
| Antofofo | 28 | 30 | 15 | 10 | -58% |
| Andaka-Ambalarano | 13 | 2 | 7 | 9 | -38% |
| Ampitampoha | 19 | 16 | 11 | 8 | -50% |
| Ankiliholiho L. | 10 | 4 | 4 | 1 | -75% |
| **Subtotal** | **112** | **104** | **65** | **57** | **-46%** |
| **Marotondro River** | **20** | **18** | **11** | **16** | **-33%** |
| **Bemarivo River** | **26** | **22** | **15** | **20** | **-33%** |
| **Sambao River** | | | | | |
| Sambao-Andaka | 17 | 8 | 14 | 9 | -32% |
| Ampanano L. | 8 | 3 | 0 | 0 | -100% |
| Amparihy L. | 6 | 2 | 0 | 4 | -67% |
| Maintamiso L. | 10 | 7 | 4 | 6 | -50% |
| **Subtotal** | **41** | **20** | **18** | **19** | **-55%** |
| **ALL AREAS** | **199** | **164** | **109** | **112** | **-44%** |

A more rigorous reporting system is now being utilised by some collectors for one crocodile ranch, but a consistent system for all collectors has not yet been implemented at this time. It is unclear whether previously harvested areas are no longer being harvested as it is no longer cost-effective to do so (ie reduced nesting effort) or whether other factors (eg landowner interest) are involved. The former is most likely to be the case.

For two nesting sites (Antafofo and Ambilombahaza) on the Maningoza River, clutch size data spanning the period 1990-2006 were available. The addition of a third site (Ampitampoha) provided data from 1990 up to 2003.

For Antafofo and Ambilombahaza combined, there was no significant relationship between mean clutch size and year (r2= 0.27, p= 0.18, N= 14; Fig. 1). The trend was towards increasing clutch size, although closer examination of the data suggested that there were two somewhat distinct periods evident, up to 1998 and after 1998. Mean clutch size for 1990-1998 was 39.0 eggs, which was lower but not significantly different from the mean of 44.1 for 1999-2006 (Table 3).

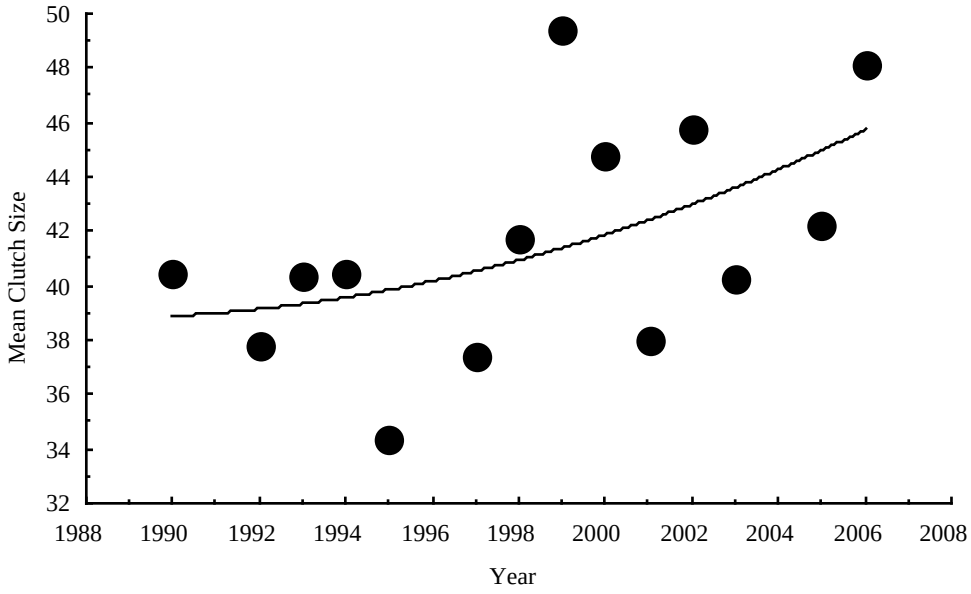


**Figure 1.** Relationship between mean clutch size and year for *C. niloticus* nests collected from Antafofo and Ambilombahaza nest sites, Maningoza River. Line indicates the non-significant polynomial regression relationship (r2= 0.27, p= 0.18. N= 14).

**Table 3.** Mean clutch size (mean of annual means) of *C. niloticus* nests collected from Antafofo (A), Ambilombahaza (B) and Ampitampoha (C) nesting sites, Maningoza River. Only years with more than 10 nests were used to calculate period means.

| | -------- Sites A+B -------- | | | ------- Sites A+B+C ------- | | |
|---|---|---|---|---|---|---|
| **Period** | **N** | **Mean** | **SE** | **N** | **Mean** | **SE** |
| 1990-1998 | 7 | 39.0 | 0.96 | 7 | 38.6 | 0.80 |
| 1999-2006 | 7 | 44.1 | 1.56 | - | - | - |
| 1999-2003 | - | - | - | 5 | 40.5 | 1.78 |

The addition of Ampitampoha revealed similar trends. That is, the relationship between mean clutch size and year was not significant ($r^2$= 0.001, p= 0.92, N= 12; Fig. 2) and the mean of 38.6 eggs for 1990-1998 was lower but not significantly different from mean of 40.5 eggs for 1999-2003 (Table 3).

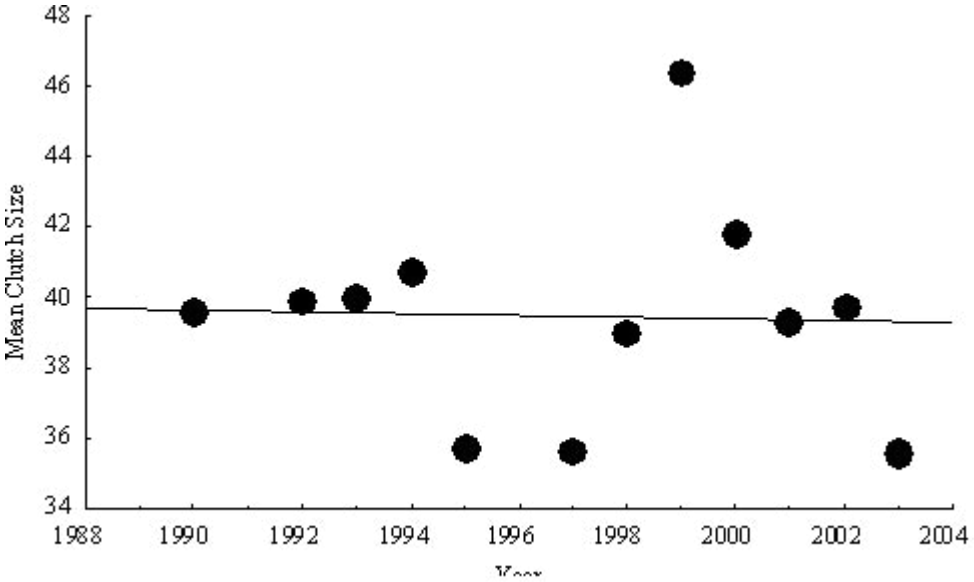


**Figure 2.** Relationship between mean clutch size and year for *C. niloticus* nests collected from Antafofo, Ambilombahaza and Ampitampoha nest sites, Maningoza River. Line indicates the non-significant linear regression relationship ($r^2$= 0.001, p= 0.92, N= 12).

Annual clutch size data for the Hafay, Marontondro and Bemrivo Rivers are too low to allow any meaningful analysis of trends in clutch size over time. For the Sambao River, areas collected in 1990-1997 were different from those collected in 2001-2003 (see Table 1), making comparison difficult.

The percentage of clutches containing less than 25 eggs provides an index of smaller nesting females in the population. For Antafofo+Ambilombahaza there was no significant relationship between proportion of small clutches and year ($r^2$= 0.12, p= 0.20, N= 15); mean = 3.4% (SE= 1.71, range 0.0 to 23.1%, N= 15). For the three areas combined a similar result was obtained ($r^2$= 0.26, p= 0.09, N= 12), but due to higher numbers of small clutches at Ampitampoha, the overall mean was higher (mean= 10.9%; SE= 1.78, range 0.0 to 19.6%, N= 12).

These data suggest that hunting at the nest sites has reduced numbers of females of all sizes. One long-term collector (Ramandimbison, pers. comm.) felt that more smaller females were now nesting than was apparent in the 1990s, but the absence of any data on size of nesting females does not allow any assessment on possible changes in size structure due to hunting.

### 5.1.2 Historical survey data

Four aerial surveys have been carried out in Madagascar previously. Whilst the results of three of these surveys are available (Behra and Hutton 1987, 1988; Games *et al.* 1997), the fourth survey, conducted in 1990 to establish egg collection areas for the ranching project, appears

not to have survived. The 1987/1988 surveys were carried out in June and again in October, but with different methodology, as the earlier survey involved two observers in the aircraft, whilst the later survey involved only one observer. In addition, spotlight surveys were carried out in 1988. A summary of the results from these surveys is presented in Table 4 below.

**Table 4: Madagascar crocodile aerial surveys 1987-1988**

| Date | River/Lake | Long./Lat. | km | No. | Density |
|---|---|---|---|---|---|
| **June 1988 (2 observers)** | | | | | |
| 23/06/88 | Sofia mouth to Bemarivo | 15°25S/47°15E 15°29S/47°39E | 50 | 6 | 0.12 |
| 23/06/88 | Bemarivo from Sofia up to | 15°29S/47°39E 15°48S/47°40E | 50 | 2 | 0.04 |
| 23/06/88 | Mahajamba From mouth us | 15°36S/47°7E | 65 | 1 | 0.01 |
| 23/06/88 | Betsiboka | 18°7S/47°30E | 455 | 16 | 0.03 |
| 23/06/88 | Lac Amparihibe | 16°41S/46°53E | 30 | 0 | - |
| 24/06/88 | Mahavavy | 15°54S/45°50E | 65 | 3 | 0.04 |
| 24/06/88 | Mitsinjo | 15°58S/45°31E | 15 | 0 | - |
| 24/06/88 | Kinkony | 16°07S/45°50E | 80 | 0 | - |
| 24/06/88 | Katondro | 16°12S/46°01E | 22 | 0 | - |
| 25/06/88 | Manambolo | 19°17.5S/44°24.5E | 165 | 19 | 0.11 |
| 25/06/88 | Etang d'Ambala | 18°51S/45°16E | 17 | 2 | 0.01 |
| 25/06/88 | Mania | 19°50.5S/45°44E | 23 | 3 | 0.10 |
| 25/06/88 | Sakeny | 20°46S/45°42E | 50 | 0 | - |
| 25/06/88 | Morondava | 20°36.5S/44°23.5E | 150 | 5 | 0.03 |
| 26/06/88 | Tsiribihina | 19°35.5S/44°17.5E | 160 | 8 | 0.05 |
| 26/06/88 | Mangoky | 21°29.5S/47°27E | 180 | 50 | 0.27 |
| 26/06/88 | Lac Ihotry | 21°56S/43°43E | 50 | 0 | - |
| **October 1988 (single observer)** | | | | | |
| 11/10/88 | Lac Befotaka | 19°01.5S/44°24.5E | 14 | 1 | 0.07 |
| 11/10/88 | Lac Soamalipo | 19°01.5S/44°25.5E | 22 | 1 | 0.04 |
| 11/10/88 | Lac Masama | 18°51.5S/44°28E | 35 | 1 | - |
| 11/10/88 | Manambolomaty | 18°42.5S/45°15E | 165 | 4 | 0.02 |
| 11/10/88 | Etang d'Ambala | 18°51S/45°16E | 17 | 1 | 0.05 |
| 12/10/88 | Mangoky | 21°29.5S/47°27E | 180 | 17 | 0.09 |
| 12/10/88 | Onilahy | 23°32S/43°46E | 140 | 0 | - |
| 13/10/88 | Mangoky | 21°29.5S/47°27E | 180 | 10 | 0.05 |

**Madagascar crocodile spotlight surveys 1987-1988**

| Date | River/Lake | Long/Lat | km | Nb | Density |
|---|---|---|---|---|---|
| 07/11/87 | Mangoro | 19°04S/48°06E | 4 | 0 | - |
| 11/11/87 | Maningory | 17°17.5S/49°16.5E | 8 | 2 | 0.25 |
| 12/11/87 | Pangalanes | 18°36S/49°13E | 15 | 0 | - |
| 17/11/87 | Lac Ampariasara | 16°46S/46°58E | 8 | 6 | 0.75 |
| 18/11/87 | Betsiboka Maty | 16°09S/46°27E | | 2 | - |
| 22/11/87 | Manazeba | 13°00S/49°E | 4 | 18 | 4.50 |
| 26/11/87 | Bemarivo/Sofia | 15°34S/47°40E | 15 | 10 | 0.67 |
| 19/06/88 | Manambery | 13°27.5S/50°01E | 10 | 3 | 0.30 |
| 20/06/88 | Fanambana | 13°30S/50°01E | 2 | 0 | - |
| 20/06/88 | Antsimorogia | 13 °33S/50°00E | 12 | 5 | 0.42 |
| 15/10/88 | Pangalanes | 21°13S/48°21E | 20 | 0 | - |
| 28/11/88 | Canal betw Lac Kinkony and Mahavavy | | 3 | 0 | - |

The countrywide aerial survey carried out in 1997 attempted to cover many of the same areas surveyed in 1988. The survey was carried out in late July 1997, and nearly 1200 km of river were surveyed. A total of 241 crocodiles were seen, with densities varying between 0.00 and 1.75 crocodiles per kilometre. A summary of the 1997 aerial survey is presented in Table 5 as follows:

**Table 5: Summary of the 1997 aerial survey of crocodiles**

| River | km | Crocs | Dens | Comments |
|---|---|---|---|---|
| Sofia | 53 | 4 | 0.08 | Crocs in gorges close to Antsiranana-Mahajunga Road |
| Bemarivo | 50 | 0 | 0 | Densely populated with extensive agriculture |
| Mahajamba | 106 | 3 | 0.03 | |
| Betsiboka | 167 | 20 | 0.12 | 1 croc seen above the 500 m contour |
| Mahavavy | 144 | 39 | 0.27 | Almost all crocs seen were under 2.5 m |
| Sambao | 125 | 18 | 0.16 | Maningoza swamps and lakes have many crocodiles but a formal survey was difficult owing to the terrain |
| Manambolo | 115 | 18 | 0.16 | Estimates from Ankavandra to Bekopaka only, 50% of crocs seen in gorges at Bemaraha 2 crocs seen in Etang d'Ambala |
| Soahania | 57 | 100 | 1.75 | Most crocs seen in a large group near the sea |
| Tsiribihina | 114 | 2 | 0.02 | considerable boat traffic |
| Mangoky | 235 | 15 | 0.06 | Most crocs in gorges at upper end |

**Table 6: Comparison between 1988 and 1997 aerial surveys**

| River | 1988 | | | 1997 | | | Comments |
|---|---|---|---|---|---|---|---|
| | Km | Nb | Dens | km | Nb | Dens | |
| Sofia | 50 | 6 | 0.12 | 53 | 4 | 0.08 | Same section of river |
| Bemarivo | 50 | 2 | 0.04 | 50 | 0 | - | Same section of river |
| Mahajamba | 65 | 1 | 0.01 | 106 | 3 | 0.03 | basically same section |
| Betsiboka | 455 | 16 | | 167 | 20 | 0.10 | the 1988 report states (obliquely) that most of the crocs were seen in the river above Ikopa junction – the same section surveyed in 1997 |
| Mahavavy | 65 | 3 | 0.04 | 154 | 39 | 0.25 | No overlap. 1988 survey covered the section downstream of this survey |
| Manambolo | 165 | 19 | 0.11 | 154 | 18 | 0.12 | Same section of river |
| Tsiribihina | 160 | 8 | 0.05 | 114 | 2 | 0.02 | More of the river surveyed in 1988. Up to Miandrivazo |
| Mangoky | 180 | 50 | 0.27 | 235 | 15 | 0.08 | Most crocs seen downstream of Tsitanandro in gorges in 1988. |

### 5.1.3 Wild Harvest data

A wild harvest program for nuisance animals has been effective in Madagascar for at least 10 years; it was established by the **GoM** under a quota system based on recommendations made in "Madagascar Crocodiles: Report to CITES, March 1998 (Ramandimbison *et al.* 1998). In 1998 it was estimated that the local market was using 6000 skins, down from approximately 12,000 in 1990. The export of wild skins should be in compliance with the provisions of

Article IV[8] of the Convention, specifically that levels of export should be non-detrimental to wild populations of *C. niloticus* in Madagascar. The document SC55.13 notes that it has been unclear how non-detriment findings have been made by Madagascar's CITES SA.

Given that the two main crocodile ranches have been involved in the wild harvest of 'nuisance' animals, no detailed records have been kept by these operations on the number of skins bought from hunters, the prices paid, the sizes of the skins and the reason for the offtake. Based on the recommendations in the SC55.13 document, the DGEF has reduced the quota of wild skins to be exported from Madagascar to 200; this has been allocated as follows: 50 wild skins to Reptel, 50 wild skins to Croco Ranching II, and 100 wild skins to the local artisanal crocodile leather associations. It remains unclear how rigorous the reporting requirements are for these wild skins, although their offtake from the wild is governed by official harvest permits issued by the DGEF in Antananarivo.

The DGEF maintains a record of permits issued to the crocodile ranches for the harvest of wild crocodiles. The following schedule, based on the data provided in the SC55.13 document, shows the export of wild skins from Madagascar's two registered ranches based on export permits issued by the CITES Management Authority (source: DGEF) for 2004, 2005 and 2006.

| | Year | | |
|---|---|---|---|
| | **2004** | **2005** | **2006** |
| **Reptel** | 300 | 400 | 400 |
| **CRII** | 200 | 350 | 300 |
| **TOTAL** | **500** | **750** | **700** |

However, the data register at the UNEP-WCMC (Gross Export Trade Data http://www.unep-wcmc.org/citestrade/report.cfm) shows a clear discrepancy between the total export permits issued by the DGEF and the gross export trade data reported for wild skins from Madagascar, as illustrated in the following schedule:

| | Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** |
| **TOTAL** | **700** | **200** | **500** | **512** | **715** | **500** | **900** | **1250** |

The system of permitting at the DGEF is one element of control that requires additional input and training. Permitting can be a simple process but in this instance has an additional layer of complication given the in-country transfer and swapping of wild-caught crocodile skins harvested under a DGEF-issued permit with ranched skins from an approved ranch (Reptel). It may also be the case that the CITES permits are being checked more rigorously at the point of export such that the identification of wild-caught skins is being recorded 'accurately' at the airport but that the DGEF are reporting only based on the harvest permits issued. This is an element of control and application of CITES that needs to be addressed and is included as a sub-activity in the national workplan for crocodiles.

[8] Article IV of the Convention states: 2. The export of any specimen of a species included in Appendix II shall require the prior grant and presentation of an export permit. An export permit shall only be granted when the following conditions have been met: (a) a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species; (b) a Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora;

### *5.2. 2008 Survey results*

The raw data with way points and observations made are provided in Annex V.

The maps showing the rivers, lakes and waterways surveyed from July to August 2008 are included in the Appendices as Annex VI.

The results of the August 2008 spotlight surveys are provided in Table 7 below.

**Table 7. Results of *C. niloticus* spotlight surveys, July-August 2008.**
us= upstream; ms= mainstream; ES= eye-shines; H= hatchlings.
Crocodile sizes are estimated in one-foot size categories.

| Date | River | km | H | 1-2' | 2-3' | 3-4' | 4-5' | 5-6' | 6-7' | 7-8' | 8-9' | >9' | ES | Total | Dens |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23/7/08 | Ikopa River ms (us of Maevatanana) | 8.2 | - | - | - | - | - | - | - | - | - | - | 4 | 4 | 0.49 |
| 23/7/08 | Ikopa - Lake Bokapila | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 0.00 |
| 23/7/08 | Ikopa - Lake Amborovy | - | - | - | - | - | - | - | - | - | - | - | - | 0 | 0.00 |
| 24/7/08 | Lake Amparihibe/Bekipoly | 9.6 | - | 1 | 1 | - | - | - | - | - | - | - | 4 | 6 | 0.63 |
| 26/7/08 | Betsiboka River ms (Maroala) | 18.0 | 1 | 1 | - | - | 1 | - | - | - | 1 | - | 1 | 5 | 0.28 |
| 27/7/08 | Kamoro River | 4.0 | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 0.25 |
| 28/7/08 | Mahavavy River | 17.1 | - | 1 | | | 3 | | 2 | 1 | | | 2 | 9 | 0.53 |
| 30/7/08 | Betsiboka River mouth | 26.2 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0.00 |
| 1/8/08 | Lake Ravelobe | | - | - | - | - | - | 1 | 1 | | 1 | - | 10 | 13 | - |
| 2/8/08 | Lake Marovovo (Ambato Boeny) | 3.5 | - | - | - | - | - | - | - | - | - | - | - | 0 | 0.00 |
| 2/8/08 | Betsiboka River mainstream (us of Ambato Boeny) | 13.0 | - | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.23 |
| 7/8/08 | Mahajilo River ms | 27.3 | 3 | - | - | 1 | - | - | - | - | - | - | 8 | 12 | 0.44 |

The proportion of crocodiles recorded as eyeshines was relatively high (62% of all sightings). While this may reflect the level of wariness in crocodile populations, in this case the high proportion of eyeshines was largely due to river conditions; shallow water and extensive sandbars made it difficult to approach crocodiles. Often, disturbance created by people handling the boat across sandbars and shallow water areas resulted in crocodiles submerging and moving away before they could be sized. In the case of Lake Ravelobe (the sacred lake) crocodiles were very quiet, but extensive mats of water hyacinth prevented the boat from approaching many of the crocodiles.

The type of spotlight used during the surveys is able to detect crocodile eyeshines up to 300 m away. Wary crocodiles are often only detected as an eyeshine at these distances, but can be recorded as a sighting before they quickly submerge. Interestingly, during these surveys, no eyeshines were detected in the distance.

#### 5.2.1. <u>Perception of Crocodiles by Rural People</u>

Crocodiles of any size are considered to be "vermin", and are simply not tolerated by many local people. For example, local people at Lake Belano at Ambato Boeny had sighted a single crocodile in the lake the previous week - and wanted it removed! The commercial value of

crocodiles is well known to people although crocodiles are highly under-valued at the local level.

Crocodiles of all sizes are reportedly taken whenever a fisherman or farmer chances upon them. It is thus difficult to separate real concerns for safety due to "problem" crocodiles from illegal harvesting of crocodiles for some economic gain. From a management perspective this presents a significant challenge for authorities to address.

Questionnaire surveys were carried out with local people to collect information on the number of crocodiles seen in the area, how often crocodiles were encountered, how regularly crocodiles were hunted (opportunistically and/or in an organised fashion), the trade chain in place. In addition, any socio-economic information and history of the area was also collated. It was decided to conduct the questionnaires on a strictly informal basis in order to gain the confidence of the interviewee. The same questions were asked in Malagasy by the national crocodile survey consultant at each of the survey sites.

In 2003, a CSG-supported survey of human/crocodile conflicts in Madagascar indicated that, in comparison with countries on mainland Africa, there were fewer crocodile-associated fatalities in Madagascar. The survey therefore questioned the DGEF's request to increase the problem animal wild skin quota from 200 to 500 (in 2000), and again to 750 in 2005, particularly given the uncertain status of the wild population. The SC55.13 document recommends a reduction in Madagascar's wild skin quota to 200 until such time that reliable wild population and human crocodile conflict data becomes available for a valued judgment to be made justifying any change in this quota.

Although the traditional life is being slowly eroded in many areas in Madagascar, everyday life in the rural areas is generally regulated by numerous taboos or fady, which vary from one region to another. Fady can forbid certain foods (eg lemur, turtle, etc.), bathing in a river of lake (Lake Ravelobe, Ankarafantsika) or speaking the name of an animal (eg crocodile in the east of the island). Where one tribe will inadvertently protect crocodiles through 'hands-off' fady, other tribes will have no such restriction on hunting crocodiles. With in-migration of different ethnic tribes (there are 18 tribes on the island) the problem of removing crocodiles is often carried out by members of certain tribes that permit such off-take.

The document SC55.13 notes that the recording of cases or localities where problem animals were destroyed and skins obtained needs to be improved. The *Stratégie et plan national pour la gestion des crocodiles* proposes to deal with problem animals at the regional level by establishing hunting quotas per zone where skins will be marked as early as possible after slaughter in order to counter any abuse of the system. The 1998 survey report proposed that a commercial operator could be allowed to collect (say) 50 skins from identified problem areas which would help to make the operation of finding and destroying problem animals financially viable, and alleviate the conflicts between people and crocodiles in the area. Whatever the management tool adopted, careful consideration should be given to instances where local people kill animals themselves. Compensation schemes or paying for skins from such animals might create incentives to kill any crocodile and claim that they were a problem. Current control or monitoring mechanisms to prevent illegal off-take or over-harvesting appear ineffective.

### 5.2.2. Habitat Alteration

There was significant people pressure on all waterways visited, which is resulting in reduced habitat availability for crocodiles. Lakes and rivers are being extensively used for rice and other crop production. Rice is being planted right up to the waters' edge and maize grown on river/lake banks.

As a result of clearing for agriculture both locally and upstream, siltation is a problem for many of the rivers and lakes visited. For example, a farmer on the Mahajilo River reported that the

river was considerably narrower and deeper 20 years ago. Today, it is very wide and extremely shallow with numerous sandbanks midstream. Another villager from Ambandsomany village on the Kamoro River explained that this river used to be much deeper and easily navigable by pirogue all year, and that the current shallowness is why there are fewer crocodiles there now. The Kamoro is a tributary of the Betsiboka River with its headwaters connected to the Mahajamba River. Siltation has restricted the dry season flow from the Mahajamba River and the Kamoro River is now characterised by extensive sandbars.

A number of the lakes in the Ambato Boeny area that had been selected for survey were completely dry or too shallow for a boat, including small pirogues. Lake Marovovo was mostly shallow, and only a small part of it could be navigated by boat.

Fishermen and pirogues were present on every river and lake visited, and in some cases the density of boats/pirogues and occurrence of cultivation and human habitat encountered was quantified (Table 8). Most fishing is carried out using nets. There is also considerable grazing by zebu as well as general movement of livestock and people. The frequency of human activity is presented as the average record or observation every 1km of river bank (range 0.4-1.8 km).

Siltation may also have a broader ecological impact on a multitude of other aquatic species that rely on the riverine habitats. Crocodile nesting banks are likely to be impacted by activities of cattle and subsequent trampling.

**Table 8: Frequency of observations of human activity and presence from *C. niloticus* spotlight surveys, July-August 2008.**

| River System & Lakes | Length (km) | Record of human activity | Frequency (No. records per km) | Notes |
|---|---|---|---|---|
| Ikopa | 8.2 | See notes | - | Fishermen on river, farm huts, cattle and cultivation regularly seen on banks |
| Ikopa - Lake Bokapila | - | See notes | - | Extensive cultivation around lake |
| Ikopa - Lake Amborovy | - | See notes | - | Extensive cultivation around lake |
| Lake Amparihibe | 9.6 | See notes | - | Large community and extensive cultivation around lake |
| Betsiboka River – Marovavy Section | 18.0 | See notes | - | Villages, farm huts, cattle and cultivation regularly seen on banks |
| Kamoro River | 4.0 | 10 | 2.5 | Fishermen, set nets, huts and cultivation regularly seen |
| Mahavavy River | 17.1 | 22 | 1.3 | Banks mangrove line and tidal. Huts and areas of cultivation in mangroves |
| Betsiboka River mouth | 26.2 | 24 | 0.9 | Banks mangrove line and tidal. Huts and areas of cultivation in mangroves |
| Lake Ravelobe | | 13 | - | Parc Ankarafantsika, sacred lake in protected area |
| Lake Marovovo (Ambato Boeny) | 3.5 | See notes | | Cultivation was continuous along banks |
| Betsiboka River ms (upst of Ambato Boeny) | 13.0 | 17 | 1.3 | Cultivation, huts, cattle and pirogues regularly seen |
| Mahajilo River ms | 27.3 | 15 | 0.5 | Cultivation, huts, cattle and pirogues regularly seen |

### 5.2.3. Training

Due to lack of time prior to commencement of fieldwork, training in crocodile survey methodology was provided to the national crocodile survey consultant (the Department of

Animal Biology at the University of Antananarivo is the CITES Scientific Authority for fauna) in the field. The importance of standardised survey procedures was an important element of the training. The survey of Lake Ravelobe in Parc National Ankarafantsika was used as a training exercise for the national consultant on spotlighting and size estimation of crocodiles under supervision. This lake had a reasonable number of crocodiles present within a range of size classes and possessed areas of open water, exposed shoreline and dense wetland vegetation. Literature on crocodile survey methodology, biology, management, etc., was also provided to the national consultant and the University of Antananarivo.

As with all other missions to Madagascar, discussions with DGEF personnel resulted in the transfer of specific information relating to the application of CITES in the country, as well as assistance with crocodile management and conservation techniques. This transfer of capacity falls under activities envisaged in the national crocodile workplan (Activity 11: "Capacity building measures on non-detriment finding regarding crocodile harvest and general management of Nile crocodile in Madagascar").

### 5.2.4. Stakeholders' Meeting

Members of the team participated in a meeting at DGEF offices in Antananarivo on 8 August 2008, at the end of the surveys. A brief summary of results was provided to representatives from three crocodile ranches, members of the crocodile leather artisanal associations, a representative of the Wildlife Conservation Society, a representative of the CITES SA and DGEF personnel, including the DG.

The questions directed at the team indicated that there is still a serious lack of understanding regarding the goals of the survey program, and indeed the reasons why the project has been implemented. The predominant focus of discussion at the meeting was the possibility of increasing the wild harvest quota as a result of the survey and identifying the rivers and lakes where the most crocodiles had been sighted.

Although significant efforts have been made by CITES, CSG and others to explain the problem with current crocodile management (or lack thereof) to stakeholders, it appears that the issues that need to be addressed by Government and industry alike are either not fully understood, and/or are simply not being taken seriously. Perhaps the implications of continued non-compliance with CITES and the effect of the return of *C. niloticus* to Appendix I on international trade have not been conveyed to industry clearly.

There were natural concerns on how DGEF staff would carry out future monitoring. All efforts will be made over the next two years to develop a monitoring program that is simple to implement, without losing the ability to detect significant changes in the population as a result of use or other factors (see above).

### 5.2.5. Additional Crocodile Ranches

During the March 2008 mission to Madagascar, the CSG was informed of a third crocodile ranch (in Mahajanga area) which had been approved by the DGEF in December 2007. The ranch did receive a permit to harvest eggs under Madagascar's ranching programme, but unfortunately did not collect any eggs during the 2007 egg collection season. However, in order to stock the farm, this ranch received an exceptional permit to collect 500 hatchlings from the wild. It remains unclear whether this ranch is actually operational. Members of the survey team visited the "address" noted on the ranch's authorisation forms, but this proved to be a motorbike-repair shop in the abattoir district of Mahajanga city. Time constraints prevented any further investigation into the current status of the farm.

It was a surprise to learn during the survey that a fourth 'ranch' is operating at Miandrivazo. The survey team chanced upon its existence and visited this operation and met with the

manager and his wife. The premises are that of the "Socrobe Crocodile Ranch", which was closed down by the DGEF approximately 10 years ago following a site inspection with CSG members. On the day of the recent visit, around 100 crocodiles ranging from hatchlings to 1 m long juveniles were observed. A basic incubation room had been prepared with wooden boxes for egg storage, although the standard falls short of accepted norms. The team was informed that the owner of this 'ranch' is Mme. Aline Ralimanana, who is also the owner of Croco Ranching II. Although previous CITES and CSG review teams were informed that a satellite set-up existed in the 'north', it was noted in the CITES document SC55.13 that:

*"For many years, the ranch was said to operate an incubation and hatchling facility in northern Madagascar from where stock was periodically transferred to the main facility in Antananarivo. Stock records or inspection reports for this second facility were not available. The owners of Croco Ranching II explained that the facility had been closed earlier in 2006."* [page 10, paragraph 8)

DGEF personnel in Antananarivo were not aware of the presence of this operation and, along with the CITES Scientific Authority, had not conducted any site visit. It should be noted that there had been several changes in personnel at the DGEF since the 2006 CITES mission, particularly in the position of CITES focal officer. It remains unclear whether the site in Miandrivazo operates as a satellite facility of Croco Ranching II, or in some other capacity.

During the survey team's stay in Miandrivazo, there were reports that requests for hatchlings and any other live crocodiles had been made recently over the local Miandrivazo radio station. The DGEF personnel in Antananarivo were not aware of any permits for this operator to harvest live hatchlings, although and as noted in Document SC55.13:

*"The mission established that in 2006, the collection of wild crocodile hatchlings by Croco Ranching II has been authorized, which seems a new technique that was not described in the proposal in 1997 and of which the Secretariat had not been informed."* [ page 16, para 41] and further:

*"It is not known if Croco Ranching II eventually obtained a prolongation of its collection permit."* [ para 48 on page 17).

In addition, any harvest of wild crocodiles must be accompanied by a collection permit as well as conform to Madagascar's obligations under Article IV of the Convention on non-detriment findings.

Croc Farm/Reptel have secured a new, second site for their ranching operation in Maevatanana. The survey team visited this site with the manager, Marc Gansuana, who explained that the new ranch would serve as a grow-out centre. Incubation and hatchling rearing for the first year would continue to be carried out in Antananarivo.

### 5.2.6. Regional DREFT Participation

Previous CSG missions to Madagascar noted the importance of including regional forestry officials from the Ministry of EFT and securing their active participation and engagement in the national crocodile workplan. The DGEF in Antananarivo once again specifically noted the requirement that regional officers be included in the workplan and particularly in the 2008 surveys; the reasoning behind this being more effective control and monitoring of crocodile management outside the capital. The Regional Directions in Maevatanana, Mahajanga and Miandrivazo were all contacted upon arrival in the respective towns and informed of the national crocodile action plan and the survey objectives and schedule. In addition, regional personnel from these offices were invited to participate in the surveys and accompany the team on the rivers and waterways.

At the highest level, the Government of Madagascar has expressed the desire and commitment to ensure compliance with CITES requirements, including the recommendations of SC55.13. However, at the level of implementation there remains limited capacity, particularly at the Provincial levels where the resource is located.

## 6. Conclusions and recommendations

In terms of the GTZ contractual obligations and terms of reference, the activities undertaken delivered the following:

- a survey of crocodile populations in selected rivers, lakes, waterways, etc.
- meetings with various stakeholders in Madagascar (including DGEF, DREFT, NGOs, crocodile ranches, artisans, etc.) to ensure appropriate protocol is respected and to share knowledge on crocodile survey techniques
- data to allow the development of an annual crocodile population monitoring program
- report on survey results and analysis
- provision of in-country training for national counterparts on survey methodology and monitoring

In addition, the contract has resulted in the capacity development and training at the institutional level (MEFT/DVRN/CITES focal point) in accordance with activity 7.3.1 of the MAP – to: *Assure la mise en oeuvre des conventions internationals relatives à l'environnement ratifiés par Madagascar.*

The survey and capacity building contract has been an important step toward assisting Madagascar with its compliance under CITES, enabling Madagascar to control and monitor the sustainable use of its natural resources, particularly in this instance its wild population of the Nile crocodile. This conforms with the Government's Madagascar Action Plan (MAP[9]), particularly Commitment 7 and sub-activity 7.1.10 ("to capitalise conservation plans for endangered species"). Additionally, the survey methodology report will contribute to the national monitoring and evaluation system and serve as a working example for "on-the-ground" data collection and its transformation into aggregated bio-data for national decision-making.

### *2008 Survey data*

The survey data in Section 5 above indicates that wild crocodile population densities are low in those areas where crocodiles were previously relatively abundant. In addition, the egg harvest data indicate that there are serious declines in populations of breeding crocodiles within the nesting areas.

This GTZ-co-funded survey has not attempted to provide a population estimate as it remains important to quantify habitat (from the available maps), but there is clearly unregulated hunting of crocodiles of all sizes, which is not only depleting wild populations, but is in contravention of Madagascar's obligations under CITES and the conditionality for the down-listing of its crocodile population from Appendix I to II based on a ranching programme.

The off-take of wild skins remains ambiguous and does not conform with CITES requirements that these crocodiles be reported as nuisance animals. Crocodiles are recognised at the local level as having an economic value but this resource is seriously under-valued. Given the subsistence existence of many of Madagascar's rural poor, it is understandable that any amount offered for such opportunistic gain will be readily accepted. However, caution should be exercised when

[9] Madagascar Action Plan - the Government of Madagascar, in recognition of the challenges and opportunities for poverty alleviation, has elaborated a 'Madagascar Action Plan' (MAP) detailing development guidelines for the country to improve, inter alia, environmental management (MAP Commitment 7: 'Cherish the Environment'). In order to achieve the MAP Commitments, the Government of Madagascar has developed a series of major reforms, or Breakthrough Reform Initiatives (BRI), which are effectively urgent projects that require immediate attention.

attempting to increase the value of the resource down the value chain as a point may be reached where the increased value of the crocodile resource could lead to its local extirpation.

Madagascar's crocodile monitoring programme will need to use various population indices to monitor the impact of harvesting on the wild *C. niloticus* population, including egg harvest data (reflection of adult breeding female segment of the population); harvest statistics (eg number, sex, size of harvested animals); and direct surveys (spotlight, aerial). Catch-per-unit effort (CPUE) could also be considered for specific areas.

### *Stakeholder commitment*

All sectors of the crocodile industry in Madagascar must have a clear understanding of their obligations under the Government crocodile management program and CITES obligations. It was disappointing to see that this is still not the case.

Without Government commitment and understanding of the current critical situation surrounding crocodile management in Madagascar, there can be no prospect for progress with the national crocodile workplan. It is imperative that continuity be secured within the Ministry so that training and assistance provided is not lost when personnel changes occur.

The role of the rural people, often living in poverty, in future crocodile management and conservation must be taken into consideration and incorporated into the development of the management program. The success of many crocodilian management programmes around the world has been based on grass-roots support and the creation of economic incentives for crocodile conservation at that level. Notwithstanding the lack of regulation of the wild harvest (crocodiles of any size are taken), the results of interviews undertaken during the survey indicated that rural people are not deriving the maximum possible benefit from the resource.

Analysis of egg harvest data indicates a significant decline in the wild *C. niloticus* population. The results of the survey and questionnaires confirm the intense hunting pressure on crocodiles of all sizes. There appears to be no regulation or enforcement of stated harvest quotas. For the crocodile program to become sustainable in the long-term, industry must play a more sincere role and assist Government with regard to harvest regulation. **The possible ramifications for Madagascar's crocodile industry with continued non-compliance is the transfer of the wild *C. niloticus* population back to Appendix I, and subsequent cessation of all international trade in *C. niloticus* from Madagascar.**

A socio-economic analysis of how crocodiles could contribute to rural development may be beneficial; this would require collaboration with the Ministry of Rural Development and other relevant cross-sectoral Ministries. The provision of safe watering areas for humans and livestock should be investigated in those areas where large problem crocodiles are know to occur. Whilst local *fady* or taboos may assist crocodile conservation in some areas, crocodiles are generally seen as a "dangerous" pest. Further consideration should be given to the elaboration of the human crocodile conflict database within the DGEF, as well as reporting criteria at the local level. This would give a more accurate picture of the extent of the conflict between man and crocodiles

Current land use practices (grazing, agriculture) are causing significant degradation of riverine habitats. It is unclear how this will impact crocodile populations (eg crocodile nesting banks) in the long-term. Monitoring of established nesting areas during the egg harvest season could provide relevant information.

### *Future surveys*

Surveys should be continued in 2009 and thought given to expanding the survey area. Already, additional funding has been secured since the 2008 survey and an additional section of the Mahavavy River has been surveyed by the national crocodile consultant together with WWF-Madagascar's support.

Given the first-hand experience from the field, the manner in which surveys are undertaken in 2009 should be modified to improve cost-effectiveness. The following should be given serious consideration:

- allow for time to: contact local people for information and guiding services; find tracks/roads into rivers and lakes; assess waterways for their suitability as survey units; and, undertake daytime waterway reconnaissance.
- where possible, rivers to be surveyed should be travelled during the day first to learn where channels, obstacles, etc are, thus improving efficiency and safety of surveying.
- inclusion of some protected areas in order to assess their role in conservation of crocodile habitat and crocodiles.
- there is little doubt that having a suitable, dedicated boat, such as a Zodiac or 3.5 m moulded plastic punt, with a 9.9-15hp outboard motor, would have enabled considerably greater distances and more areas to be included in the survey program in 2008. Suitable funding should be sought to acquire a boat, motor and other related equipment (small generator), which can also be used for other crocodile-related activities (eg research, problem crocodiles), and ideally the survey should include a trained boat driver.
- An earlier commencement date (eg late May/early June) would allow better navigability due to higher water levels.

**Conservation of crocodiles within national parks**
Current information on the newly extended protected area system needs to be secured and incorporated into the regional zoning component of the crocodile management plan. Environmental NGOs in Madagascar are generally apportioned particular areas where they assist Government with biodiversity conservation. The role of protected areas in Madagascar for crocodile conservation requires further assessment.

In January 2006, Madagascar introduced a new park management system, the System of Protected Areas of Madagascar (SAPM), the aim being to simplify the legal process used to create a protected area and to allow varying degrees of sustainable resource use as a tool to alleviate poverty and contribute to sustainable development. SAPM's 5-fold mission includes:

- *Safeguarding Madagascar's ecosystems.*
- *Researching the potential of Madagascar's biodiversity.*
- *Developing environmental education programs for local people.*
- *Promoting potential commercial applications of Madagascar's biodiversity (ecotourism, for example).*
- *Supporting sustainable development activities in areas surrounding protected zones.*

ANGAP (the National Association for the Management of Protected Areas) continues to be the organisation that manages Madagascar's protected areas system.

ANGAP may be an important partner in the conservation and sustainable management of wild crocodiles of Madagascar as the national parks (current and especially proposed national parks in the north west of Madagascar) may become safe havens for wild crocodiles. The 2008 survey indicated that crocodiles are not tolerated in those areas visited and Madagascar's wild crocodile population needs time and space to recover. National parks may provide such havens, particularly in the immediate future.

**Madagascar's national management plan for crocodiles**
The *Stratégie et plan de gestion des crocodiles à Madagascar* was drafted in 2004 and has remained un-endorsed and un-applied in the country to this date. Activity 2 in the National crocodile management workplan (2007-2010) aims to "Revise, update, endorse and commence implementation of the Crocodile Management Plan". The activities carried out under this contract with GTZ should provide population data that the **GoM** and relevant stakeholders can discuss and

incorporate into a revised Strategy document. The activities envisaged under Activity 2 of the national workplan (2007-2010) should be carried out as a matter of some urgency, particularly in light of Madagascar's obligations to report on progress effected on the national workplan to the CITES Standing Committee meeting scheduled for June 2009.

The potential income-generating benefits of crocodile ranching in a poor-country like Madagascar, where communities can receive financial incentives to conserve the species through egg harvests (instead of once-off slaughter of adult crocodiles) should be given priority attention. Any cost-benefit and value chain analysis carried out in Madagascar in terms of investigations into the economic value of natural resources in general, should automatically include reference to the crocodile ranching and wild skin harvest industries (national and international). Research and investigation into the historical and current economic value and income generating potential of egg harvest at the local level and throughout the chain should be initiated as a matter of priority. Linkages with rural development entities concerned with the alleviation of poverty should be investigated and created where non-existent, or strengthened where linkages do occur.

## 7. Appendices

SC55 Doc. 13

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

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Fifty-fifth meeting of the Standing Committee
The Hague (Netherlands), 2 June 2007

Interpretation and implementation of the Convention

Species trade and conservation issues

# RANCHING OPERATIONS

1. This document has been prepared by the Secretariat.

2. The population of the Nile crocodile (*Crocodylus niloticus*) from Madagascar is included in Appendix II subject to the conditions outlined in Resolution Conf. 11.16 (Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II). Global crocodile ranching programmes were reviewed at the 22nd meeting of the Animals Committee (Lima, July 2006, see documents AC22 Doc. 12.2 and AC22 Inf. 2) and Madagascar's compliance with the provisions of Resolution Conf. 11.16 was discussed at the 54th meeting of the Standing Committee (SC54, Geneva, October 2006; see document SC54 Doc. 32). In view of concerns that ranching could be used to disguise or launder skins of adult crocodiles harvested from the wild, and the perceived deficiencies in monitoring wild crocodile populations, inspecting ranching operations and controlling exports of crocodile skins, the Standing Committee endorsed the Secretariat's proposal to visit and examine the ranching operations for *C. niloticus* in Madagascar in compliance with paragraphs b) and c) under the section *Regarding monitoring and reporting in relation to species transferred from Appendix I to Appendix II for ranching* of the Resolution. Madagascar agreed to this visit and provided full support to the Secretariat before and during its mission to Madagascar.

3. Resolution Conf. 11.16 recommends that "all Parties prohibit trade in products of ranching operations unless such trade complies with all the terms, conditions and requirements of the approved ranching proposal for the population concerned". These terms, conditions and requirements are mainly laid out in the section *Regarding proposals to transfer populations from Appendix I to Appendix II for ranching* of the Resolution. For Madagascar's population of *C. niloticus*, they were specified in proposal Prop. 10.2, *Maintenance of the Malagasy population of* C. niloticus *in Appendix II pursuant to the Resolution on ranching*, adopted at the 10th meeting of the Conference of the Parties (Harare, 1997). Madagascar should furthermore comply with the Resolution's provisions regarding monitoring and reporting, which recommend that annual reports on all relevant aspects of each approved ranching operation be submitted to the Secretariat.

4. With generous support from the Deutsche Gezellschaft für Technische Zusammenarbeit (GTZ) – Madagascar, the Secretariat undertook a one-week mission to Madagascar from 26 November to 2 December 2006. The Secretariat is grateful to the CITES Authorities of Madagascar for their cooperation and support throughout the mission.

5. It was confirmed during the mission that Madagascar did not fully comply with certain provisions of Resolution Conf. 11.16, and that the controls of the farming operations had been insufficient in recent years to prevent abuses. Since July 2006, several initiatives have been taken to improve the situation with, to the Secretariat's impression, immediate effect, suggesting that a fairly straightforward and normal level of oversight and control of the ranching operations could probably suffice to avoid significant abuse. The Secretariat's mission concluded that the existing Strategy and

Management Plan for Crocodiles in Madagascar, drafted in 2004, should be updated and effectively implemented as soon as possible. It offered a number of suggestions to strengthen the Strategy, and formulated specific recommendations on Madagascar's ranching programme, including a temporary suspension of exports of specimens of *C. niloticus* from one of the operations (see Annex 1). The summary findings of the mission are presented in Annex 2 to this document; this is in English only, except for the executive summary. The findings and recommendations were discussed with the Management and Scientific Authorities of Madagascar at the end of the mission.

Recommendations

6. The Secretariat suggests that the Standing Committee request Madagascar to put into effect the recommendations concerning ranching of *C. niloticus* in Madagascar and compliance with Resolution Conf. 11.16 that are presented in Annex 1 to this document. The Management Authority of Madagascar should, as part of its annual reporting obligations under Resolution Conf. 11.16, provide well-documented information on progress in implementing these recommendations. These reports should be reviewed at the regular meetings of the Standing Committee in 2008 and 2009.

7. It should be noted that the Animals Committee has proposed a revision of Resolution Conf. 11.16 in document CoP14 Doc. 21 for consideration at the 14th meeting of the Conference of the Parties. This concerns particularly a simplification of the reporting by the Parties. In its comments, the Secretariat has generally welcomed this revision which, if adopted, would not discharge Madagascar from the regular reporting to the Standing Committee proposed in paragraph 6 above.

8. The Standing Committee should recommend that Parties only allow the import of specimens of *C. niloticus* from Madagascar that are part of an annual export quota published on the CITES website.

SC55 Doc. 13
Annex 1

RECOMMENDATIONS CONCERNING RANCHING OF *CROCODYLUS NILOTICUS* IN MADAGASCAR AND COMPLIANCE WITH RESOLUTION CONF. 11.16

*Concerning general management of* C. niloticus

1. The Management Authority (MA) and the Scientific Authority (SA) of Madagascar, with the support of stakeholders and experts as necessary, should revise, update and implement the *Stratégie et Plan de Gestion des crocodiles de Madagascar* (Ministry of Environment, Waters and Forests of Madagascar, May 2004). The Strategy should lay out:

   a) time-frames for the execution of its different components;

   b) the specific roles and inputs of government agencies and stakeholders;

   c) the resources available to enact the plan; d) resource needs and sources for support; and

   d) measurable indicators of progress or success.

2. Recognizing that many of the issues mentioned below are already contained in its current version, the Strategy and Management Plan should *inter alia* address the following:

   a) the establishment of a National Crocodile Committee to oversee and guide the implementation of the Strategy and the Management Plan, composed of representatives of the MA and SA, the farming industry, the leather manufacturing industry, NGOs qualified in crocodile conservation or the management of crocodile habitat, and donors with an interest in supporting crocodile management programmes;

   b) regional approaches for managing crocodiles that are adapted to local circumstances, for example to deal with problem animals, decide on the collection sites of eggs, identify where the potential exists for sustained wild harvest, involve local people in the management of crocodilians, etc.;

   c) the human/crocodile conflict in the country including systematic, computerized record keeping and follow-up on the reported cases, and the development and evaluation of adequate measures to effectively eliminate problem animals while minimizing possible abuses, such as the killing of wild crocodiles that are not nuisance animals;

   d) an effective control and tagging system for skins, that allows to distinguish skins from captive, ranched and wild origins and that covers the chain of custody from source to export;

   e) enhanced controls over ranching operations (see below);

   f) measures to provide sufficient crocodile skins to the local artisans, improve their technical skills, increase their revenues, and ensure that local handicraft comes from legally obtained skins;

   g) the research and surveys of wild crocodile populations required in compliance with Resolution Conf. 11.16. These studies should be undertaken within two years with the active involvement of the SA. Independent experts, preferably from the IUCN/SSC Crocodile Specialist Group, should be invited to participate in the design and conduct of these research activities, which, as a matter of priority, should concentrate on: a) the conservation status and distribution of *C. niloticus* in Madagascar, and comparisons with previous studies; b) the impact on wild populations of current legal and illegal offtake, including egg collection for ranching programmes, and measures that can ensure sustainable harvests; and c) the occurrence and nature of human/crocodile conflicts in Madagascar, the relationship between locations of current wild harvests and conflict zones, and the effects of different strategies to deal with the conflicts;

h) the development of cost-effective mechanisms for continuous monitoring of wild populations (e.g. Catch Per Unit Effort or monitoring nesting sites and success) and of an associated adaptive management programme that can effectively guide the management of wild crocodiles;

i) the promotion of data collection by the ranching operations and other stakeholders, modelled after databases used by Reptel, and regular analysis of this information to assess indirectly the effects of egg collection, breeding rates, seasonality and successes of breeding, distribution, etc. to complement other (government-run) monitoring programmes for wild crocodile populations;

j) an evaluation of the possibility for a limited harvest of wild non-nuisance crocodiles based on the studies and field work mentioned above and in close consultation with independent experts and the CITES Secretariat, which could ultimately lead to a proposal to include the population of *C. niloticus* of Madagascar in Appendix II without reference to Resolution Conf. 11.16;

k) a regular (for instance annual) revision of Madagascar's crocodile policy to evaluate the sustainability of the wild harvest and its compliance with Article IV regarding specimens that are to be exported, the integration of ranching programmes and captive breeding efforts in the management approaches, and the involvement of local stakeholders through benefit sharing;

l) guidelines and associated activities to make sure that the ranching programme and harvesting of wild crocodiles are primarily beneficial to the conservation of *C. niloticus* in Madagascar and, where applicable, contribute to its maintenance in the wild or promote protection of the species' habitat; and

m) ways to improve the understanding of the socio-economic relevance and structure of the crocodile industry in Madagascar, with monitoring mechanisms to assess market trends and industry developments.

3. The MA should invite external experts between 2007 and 2010, preferably from or associated with the IUCN/SSC Crocodile Specialist Group, to assist in capacity building and training activities concerning the management of *C. niloticus* in Madagascar and the implementation of the Strategy and the Management Plan. Areas where capacity building could be required include: farm monitoring techniques; record keeping; tagging and measuring skins; aging and sexing of animals; determining the annual production of farms; identification of the origin and the age of skins; the number and kind of products that can manufactured from a crocodile skin; counting and monitoring wild crocodile populations; methods and practices to reduce or minimize human/crocodile conflicts; and the development of relevant manuals and identification materials for government agencies and stakeholders.

*Concerning crocodile ranching operations*

4. Each ranching operation should be inspected regularly, for instance quarterly, during the period from 2007 to 2010.

5. A watertight control system should be put in place to ensure that on the farms, ranched skins (source 'R') cannot be mixed with skins of captive bred or wild origins (source codes 'W' or 'C'). It should include: tight record keeping; slaughter, tagging and packaging in the presence of staff or representatives of the MA and independent experts; and proof of truly collecting eggs from the wild, hatching and raising animals to commercial sizes.

6. The annual export quotas for ranched skins of *C. niloticus* allocated to the farms should reflect their true production capacity for the year. For 2007, these are recommended to be zero for Croco Ranching II (see the following two paragraphs) and 3,000 for Reptel.

7. The MA should suspend the issuance of all CITES export permits (or re-export certificates) for specimens of *C. niloticus* from Croco Ranching II until:

a) the MA, with the assistance of independent experts, has fully inventoried and verified the stocks of live animals and skins in the ranching operation;

b) the MA, with the assistance of independent experts, has verified that the production of the farm corresponds to the numbers, sexes and age structure of the live animals kept on the farm, its infrastructure, husbandry standards, volume of food provided, etc.;

c) an annual export quota for skins of source code 'R' is established by the MA, assisted by independent experts, that is based on the farm's true annual production potential; and

d) the *Stratégie et Plan de Gestion des crocodiles de Madagascar* has entered into effect.

8. In case the control system mentioned in paragraph 5 above is put in place, and based on the stock of live animals observed on the farm in November 2006, Croco Ranching II could be allowed in 2007 to sell 300 skins of ranched animals for the local internal market.

9. All tags for crocodile skins should be collected by the MA with a view of issuing new ones, which should clearly differentiate between wild harvested, ranched and captive bred skins. The issuance and application of these tags should be closely controlled by the MA so that operations can only purchase tags with the approval of or from the MA on the basis of demonstrated ranch production. The MA should tag the skins or be present when this happens.

10. Before issuing export permits for skins of *C. niloticus*, the MA and an independent expert should verify the number, size and markings of skins to be exported. Once tagged for export, skins should be packed in containers that are sealed under supervision by the MA to prevent any substitution or adding of skins, and to ensure that the skins match those stated on the export permits.

11. At the end of each calendar year, the MA, in the presence of an independent expert, should destroy all tags that were not used.

*Concerning trade in skins of* C. niloticus *of wild origin*

12. The export of skins of source code 'W' should be limited to those coming from problem animals that were hunted in zones where they have been documented and verified to cause damage. Skins of such individuals should be 2 m or longer and have a belly with of at least 45 cm (skins of smaller sizes cannot be ascertained to have come from problem animals). The size of each such skin should be mentioned in an annex attached to the export permit. The annual export of skins of source code 'W' should be reduced to a maximum of 200.

*Concerning annual export quotas for trade in specimens of* C. niloticus

13. The Secretariat should be informed before the end of each year about the annual export quotas for trade in specimens of *C. niloticus* from Madagascar so that the Parties can be notified accordingly.

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Annex 2

VERIFICATION OF COMPLIANCE WITH RESOLUTION CONF. 11.16
FOR RANCHING OF *CROCODYLUS NILOTICUS* IN MADAGASCAR

SUMMARY FINDINGS

Executive summary

A. Madagascar exports specimens of *C. niloticus* from captive, wild and ranched origins (the latter two under a system of annual quotas). In recent years, exports of ranched skins remained considerably lower than allocated under the annual quota, while the quotas for wild skins were completely exhausted or exceeded.

B. There are two ranching operations for *C. niloticus* in Madagascar, Reptel and Croco Ranching II. Both process and export most skins of wild crocodiles. Additionally, Reptel runs a closed cycle captive breeding programme.

C. The infrastructure, live animals and skins in stock, egg collection, production and trade records, production capacity and overall management of both farms were inspected. Recent levels of export by Croco Ranching II of "ranched" skins were found to be incompatible with its limited capacity for producing such skins, suggesting that the operation has mostly exported wild skins falsely labelled as 'ranched'. Reptel improved recordkeeping and management in recent years, is expanding its infrastructure and has significant potential for producing ranched and captive bred skins and other products.

D. Both ranching operations have been involved in the wild harvest programme for nuisance animals, established under a governmental quota system. The gradual increase of this quota over time has not been justified, and relevant research and management measures proposed in 2005 have yet to be implemented. The current quota appears exaggerated, and the actual policy to deal with human-crocodile conflicts not particularly effective. There is no systematic, computerized record of incidents or localities where problem animals were destroyed and skins obtained. Controls to prevent illegal offtake, over-harvesting, killing of non-nuisance animals, and laundering of illegal skins are insufficient.

E. The regulation of local markets for specimens of *C. niloticus*, which remains sizable, is recognized to be inadequate.

F. Regarding compliance with provisions in Resolution Conf. 11.16 relevant to the ranching of *C. niloticus* in Madagascar, the following was established:

- No comprehensive inventories of wild populations have been undertaken since the late nineties and therefore, the impact of the annual collection of wild eggs for ranching, the harvest of at least 750 wild crocodiles, the species' current status and distribution, and its response to habitat changes, human-induced pressures, and ongoing legal and illegal offtake remain largely unknown. Ranching activities may well be sustainable and beneficial for *C. niloticus* in certain areas, but this needs further study and confirmation. *C. niloticus* remains a widely distributed species, but is often persecuted and may be in decline.

- The controls by the CITES Authorities of the two ranching operations and their exports of *C. niloticus* skins and leatherwear have been deficient in recent years. Most skins exported by Croco Ranchig II were falsely marked as 'ranched', while Reptel occasionally mixed wild skins with ranched skins. Several thousand wild skins may have been laundered in this way, and there is little doubt that many were obtained from illegally killed wild animals.

- No animals from the ranching operations have been returned to the wild, which would not be realistic and is not necessary from a species management point of view.

- The biological viability and economic success of the two ranching operations has been inadequate monitored. This should have shown that in recent years, Croco Ranching II did not have the breeding capacity to produce the number of 'ranched' skins that it declared.

- The sector is probably of great socio-economic importance, but this has not been analysed, preventing the authorities to e.g. determine if additional ranching operations would be viable, what prices local stakeholders should receive, or what taxation levels might be appropriate along the chain of custody.

- The CITES authorities irregularly complied with annual reporting obligations, submitting in 2006 a report covering 2000 to 2006. The reliability and overall quality of the reporting is more of concern than its frequency: certain reported data and statements seemed erroneous or unsubstantiated, while apparent new policy decisions to allow Croco Ranching II to collect live animals for ranching purposes in 2006 were not mentioned.

G. Since July 2006, several initiatives have been taken to improve controls of the two ranching operations with immediate positive effect, suggesting that a fairly straightforward and normal level of oversight and control could probably suffice to avoid significant abuses in future.

H. New population surveys may be undertaken in 2007, building on the studies conducted in the late nineties. The development of permanent, cost-effective population monitoring mechanisms and associated adaptive management programmes to guide the management of wild crocodiles in the country will be equally important.

I. CITES authorities and all the main stakeholders showed great interest in collaborating to improve the management of *C. niloticus* in Madagascar, which was recognized to be an important resource. A strategy and management plan for crocodiles in Madagascar, drafted in May 2004 by the Ministry of Environment, Waters and Forests, remains non-operational to date. Once updated and implemented, it would form a very good basis for future crocodile management and conservation in the country.

Introduction

1. The Secretariat undertook a one-week mission to Madagascar from 26 November to 2 December 2006, conducted by its Senior Scientific Officer and Mr Dietrich Jelden (IUCN/SSC Crocodile Specialist Group; German Management Authority). The mission had the following objectives:

   – To visit and examine the two existing *C. niloticus* ranching operations in Madagascar;

   – To assess compliance by the relevant authorities and stakeholders in Madagascar with the provisions in Resolution Conf. 11.16;

   – To identify remedial measures to improve the management of the ranching programmes in Madagascar, and to agree with relevant authorities on their implementation; and

   – To collect information allowing the Secretariat to report to the Standing Committee and propose an appropriate course of action.

Crocodile trade and management in Madagascar

*Trade in specimens of* C. niloticus

2. Madagascar uses the source codes 'C', 'R' or 'W' for export permits issued for crocodile skins and other specimens. Madagascar had a quota of 7,600 skins from ranched animals since 1999, and of 500 skins from wild nuisance animals in 2002, 2003 and 2004 (with recorded annual exports of 512, 700 and 500 skins respectively), and of 750 animals in 2005 and 2006 (see Table 1). Trade data from the UNEP World Conservation Monitoring Centre (UNEP-WCMC) on Madagascar's exports of skins of *C. niloticus* since 1992 indicate a steady increase until 2001 (see Table 2). Reported exports then dropped to 6,936 skins in 2002, and then increased slightly in 2003 to 7,300. Reported exports fell further to 4,760 in 2004, of which 2,110 were reportedly captive-bred, 2,150 ranched and 500 from the wild. The export figures reported by UNEP-WCMC do not completely reconcile with those provided by the Direction of Waters and Forests, the CITES Management Authority (MA) for Madagascar.

Table 1 – Export quotas for specimens of *C. niloticus* from Madagascar 1997-2006

| **Madagascar - Export quotas for specimens of *C. niloticus*** | | | | | |
|---|---|---|---|---|---|
| **Year** | **Skins, ranched** | **Stuffed specimens from ranched animals** | **Manufactured skin products from ranched specimens** | **Skins, wild-taken** | **Skins from problem animals** |
| 2006 | 7,600 | 500 | 900 | 750 | |
| 2005 | 7,600 | 500 | 900 | 750 | |
| 2004 | 7,600 | 500 | 900 | | 500 |
| 2003 | 7,600 | 500 | 900 | 500 | |
| 2002 | 7,600 | 500 | 900 | 500 | |
| 2001 | 7,600 | 500 | 900 | 500 | |
| 2000 | 7,600 | 500 | 900 | | 500 |
| 1999 | 7,600 | 500 | 900 | | 200 |
| 1998 | 6,200 | 200 | 600 | | 200 |
| 1997 | 4,500 | | | | 200 |

Table 2 – Exports of skins of *C. niloticus* from Madagascar 1992-2004

| **Madagascar – exports of skins of *C. niloticus*** | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **92** | **93** | **94** | **95** | **96** | **97** | **98** | **99** | **00** | **01** | **02** | **03** | **04** |
| **No. of skins** | 1,344 | 1,909 | 2,800 | 2,412 | 4,589 | 5,464 | 6,120 | 7,207 | 5,506 | 9,408 | 6,936 | 7,300 | 4,760 |

*Crocodile management policy*

3. A strategy and management plan for crocodiles in Madagascar, *Stratégie et plan de gestion des crocodiles de Madagascar*, was drafted in May 2004 by the Ministry of Environment, Waters and Forests as the result of a collaborative effort between the CITES Management and Scientific Authorities, the ranching operations and the IUCN/SSC Crocodile Specialists Group (CSG). The draft strategy and plan has however not yet been endorsed at ministerial level and remains non operational to date. The mission reviewed the strategy and management plan and concluded that once updated and implemented, it would form a very good basis for future crocodile management and conservation in the country.

Ranching operations

4. There are two ranching operations for *C. niloticus* in Madagascar: Reptel Sarl. (Reptel; Antananarivo) and Croco Ranching II (C.R. II; Antananarivo). They were already active at the time that Madagascar's population of *C. niloticus* was downlisted in 1997. There is no producers' association, but local leather manufacturers and artisans have established an organization. The Scientific Authority (SA) for fauna (the department for animals biology of the University of Antananarivo) participates in controls of the ranching operations and advises on levels of harvest from the wild (eggs for ranching operations and quotas for problem animals) and export. The two ranching operations buy, process and export most if not all the skins of crocodiles of wild origins (source code W') that are part of Madagascar's annual quota for such skins. In addition, Reptel runs a closed-cycle captive breeding programme that produces skins and other specimens of source code 'C'.

*Export of specimens of* C. niloticus *by the ranching operations*

5. In its report to the CITES Secretariat on the activities of the ranching programme for the years 2000 to 2005 *(Rapport sur les activités entreprises dans le cadre des élevages en ranch de* Crocodylus niloticus *année 2000 à 2005)*, available on the CITES website, the MA provided information on the number of ranched skins that each of the farms exported. During the mission, the data were completed and verified for the period 2004-2006, showing some discrepancies with those which had been reported by the MA. In recent years, exports of ranched skins remained considerably lower than allocated under the annual quota (usually well bellow 50 %) while the quotas for wild skins were completely exhausted or exceeded.

Table 3 – Exports of skins of *C. niloticus* by Croco Ranching II and Reptel in 2000-2006

| **Madagascar – Exports of skins of *C. niloticus* by its two ranching operations** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ranching operation** | **Source of data** | **Origin** | **Year** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** |
| Reptel | MA* | R | | 3,000 | 3,284 | 2,500 | 2,500 | 500 | 1,200 | |
| | Mission Nov 06** | R | | | | | | 1,000 | 700 | 1,200 |
| | | C | | | | | | 2,160 | 1,200 | 1,210 |
| | | W | | | | | | 300 | 400 | 400 |
| C.R. II | MA* | R | | 2,360 | 0 | 718 | 2,050 | 1,650 | 1,700 | |
| | Mission Nov 06** | R | | | | | | 1,650 | 2,000 | 1,850 |
| | | W | | | | | | 200 | 350 | 300 |

| **Madagascar – Exports of skins of *C. niloticus* by its two ranching operations** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ranching operation** | **Source of data** | **Origin** | **Year** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** |
| Totals<br><br>Reptel + C.R. II | MA* | R | | 5,360 | 3,284 | 3,218 | 4,550 | 2,150 | 2,900 | |
| | Mission Nov 06** | R | | | | | | 2,650 | 2,700 | 3,050 |
| | | C | | | | | | 2,160 | 1,200 | 1,210 |
| | | W | | | | | | 500 | 750 | 700 |
| | | Total R + C + W | | | | | | 5,310 | 4,650 | 4,960 |

* *Data contained in 'Rapport sur les activités entreprises dans le cadre des élevages en ranch de* Crocodylus niloticus *année 2000 à 2005', presented by the MA to the Secretariat in 2006.*

** *Data collected during the present mission, based on an analysis of export permits issued by the MA.*

6. The production of ranched skins has been variable in recent years, fluctuating around 3,500 annually. Combining the figures of the MA with the updates collected during the mission, it was concluded that from 2000 to 2006, Reptel exported 14,184 ranched skins (57 %), and Croco Ranching II 10,628 (43 %). From 2004 to 2006, Croco Ranching II reportedly exported 5,500 skins of ranched origin, nearly double the amount exported by Reptel during this period (2,900 skins). These records are remarkable in view of the mission's findings that over the last five years, Croco Ranching II's potential for producing ranched skins has been far smaller than that of Reptel.

*Egg collection by the ranching operations*

7. The ranching operations are allowed to collect eggs from the wild in accordance with their hatching capacity. The collection of eggs is subject to a permit that is issued annually by the MA.

8. Reptel has a successful egg collection programme focusing on the Besalampy region and pays local villagers for eggs collected. This has raised awareness about the value of crocodiles and thereby may have promoted interest in their protection in the area. Croco Ranching II has a permit to collect eggs in the Toliara and Mahajunga regions. For many years, the ranch was said to operate an incubation and hatchling facility in northern Madagascar from where stock was periodically transferred to the main facility in Antananarivo. Stock records or inspection reports for this second facility were not available. The owners of Croco Ranching II explained that the facility had been closed earlier in 2006.

9. Over the years, both farms have kept records of their egg collection activities but the data were not standardized. The degree of detail and – presumably – trustworthiness of the records vary widely.

10. According to the MA's report of 2006, 39,646 eggs were collected during the seven-year period from 1999 to 2005, of which 33,032 (83.4 %) by Reptel and 6,614 (16.6 %) by Croco Ranching II (see Table 4). The number of eggs collected by Reptel has not fluctuated significantly during this period, averaging 4,719 eggs per year. In the case of Croco Ranching II, about 1,000 eggs have been collected annually from 1999 to 2004, dropping to 180 eggs in 2005. The significant

difference between the two operations in the amount of eggs that they have collected for ranching purposes is not reflected in the numbers of skins of ranched origins that they claim to have produced.

Table 4 – Eggs of *C. niloticus* collected from the wild by Croco Ranching II and Reptel for ranching purposes

| Year | CROCO RANCHING II | REPTEL | Totals |
|---|---|---|---|
| 1999 | 750 | 4,500 | 5,250 |
| 2000 | 900 | 4,957 | 5,857 |
| 2001 | 962 | 6,548 | 7,510 |
| 2002 | 1,400 | 5,248 | 6,648 |
| 2003 | 1,300 | 4,213 | 5,513 |
| 2004 | 1,122 | 3,754 | 4,876 |
| 2005 | 180 | 3,812 | 3992 |
| Totals | 6,614 | 33,032 | 39,646 |

11. While no information could be found on the past egg collections carried out by Croco Ranching II, Reptel had records on the eggs collected and nests localities over the past decade. Since two years, Reptel started to more systematically monitor the sites where it collected eggs and the hatching success of these eggs on the ranch, including site positioning by GPS, recording hatching successes per nest, identifying causes for poor or good hatching, etc. This information was stored in a detailed computer database which could be accessed and analysed by the mission without problems. These data offer valuable indicators of the effects of egg collection, breeding rates, seasonality of breeding, overall breeding successes, distribution, etc., and could usefully complement other (government-run) monitoring programmes for wild crocodile populations. It is of some concern that Reptel's own records on the number of eggs collected from the wild and brought to the ranching operation are significantly different from the figures reported by the MA to the Secretariat in 2006, as shown in the comparison below:

| Year | Number of eggs collected by Reptel as reported by the MA in 2006 | Number of eggs collected as recorded by Reptel in 2006 |
|---|---|---|
| 2004 | 3,754 | 5,739 (3,163 hatched – 55 %) |
| 2005 | 3,812 | 3,653 (2,464 hatched – 67 %) |
| 2006 | Data not available | 4,354 |

12. As with other ranching programmes, there was initially a requirement that hatchlings from 5 % of the eggs collected by the ranching operations be returned to the wild after they have attained a size of at least 1.2 m. This has not happened in Madagascar but the authorities requested that the operations supply an equivalent amount of ranched skins to the artisanal market. The purpose was to keep the craftsmen in business without them having to resort to skins of wild specimens. Artisans seem to prefer the smaller skins produced by farms. They swap them against skins of wild specimens that they continue to obtain, thereby defying the policy objective and calling for stricter controls of the internal skin market.

*Present and future production capacity of Reptel*

13. The production of skins has increased over the last few three years (2004-2005). This can largely be attributed to an improvement of its captive breeding programme due to better hatchability of captive bred eggs and a growth in farm-produced nests from 98 to 114. The farm is extending its holding facilities to accommodate a doubling of the current stock The production is planned to increase further by expanding the current egg collection scheme, further reducing mortality rates, improving the hatchability of eggs collected in the wild and produced on the farm, and by bringing new breeders into egg production (the farm raised already 59 animals close to reproductive size). In 2007, the ranching operation could produce up to 3,000 ranched skins, with gradual increases to be expected in the coming years.

*Present and future production capacity of Croco Ranching II*

14. In May 2004, an inventory of this ranching operation was undertaken by the CSG. The total number of animals of a size suitable for slaughter during the remaining months of 2004 was 420, with a further two adult animals and approximately 140 yearlings. Taking into consideration the available space in the pens and other facilities, and the numbers of wild eggs collected from 1992 to 1999 (maximum 3,119), the CSG estimated that the ranch could produce up to 1,500 relatively small skins per year. It noted that the export of 1,650 ranched skins in 2004 exceeded the estimated total number of slaughter-size live animals on the farm and the skins it held in stock.

15. This mission found that a minor collection of wild eggs had been undertaken by Croco Ranching II in 2004, of which some 115 animals of 50-70 cm long were still present at the farm. According to the owners, only six animals had been obtained from eggs collected in 2005. In 2006, about 1,700 eggs had been collected. Upon inspection, it was found that many were in a rather bad state, with some already broken and destroyed. Under the conditions observed, the hatching success would probably be less than 50 %. The ranching operation held an estimated 420 and 460 live animals in stock, as well as 304 raw salted skins which were said to have been produced from ranched animals slaughtered in 2006.

16. The mission concluded that the export by Croco Ranching II of 1,650 "ranched" skins in 2004, 2,000 in 2005 and 1,850 in 2006 (see Table 3) could not be reconciled with the farm's capacity for producing ranched skins, thereby confirming CSG's findings of 2004. The very large majority or even all the skins that were exported by Croco Ranching II in recent years probably came from crocodiles hunted in the wild, and not from ranched animals. This conclusion was further supported by examining 150 of the 304 raw skins in stock which revealed that some of the larger skins clearly showed spear holes in the neck part, or had massive scars on the belly typical for skins taken from the wild, unlike well-cared animals raised on farms.

17. On the basis of the preliminary stock inventory undertaken during the mission, Croco Ranching II could produce in 2007 about 250 to 300 skins of 1.20-1.50 m, and 20 skins of 2.00-3.00 m when all individuals of these size classes on the farm would be culled. The production in 2008 from the remaining stock would be no more than some 120 skins of 1.20-1.50 m.

Problem animals and wild populations

18. Both Croco Ranching II and Reptel have been involved for at least 10 years in the wild harvest programme for nuisance animals, established by the Government of Madagascar under a quota system.

19. Crocodile habitat is under threat from human-related activities in Madagascar, and the expansion of people into crocodile habitat increases the conflicts between crocodiles, people and their livestock. Many rural people work close to watercourses and lakes to grow rice, one of the main crops. There are regular reports on people getting attacked or even killed, by crocodiles, and on lose of livestock. The downlisting proposal of 1997 argued that ranching was the only way to help the wild population of crocodiles because people would tolerate crocodiles if they could make some benefit from them, with the exception of destructive animals of which the killing was legally allowed unreservedly. The quota of 200 wild sourced skins, claimed to come from problem or potentially dangerous animals that was agreed to in 1997, therefore seemed justified.

20. In 2003, the CSG supported a survey of human/crocodile conflicts in Madagascar, demonstrating that in comparison with countries on mainland African, there were fewer fatalities in Madagascar. It therefore questioned the necessity for increasing the quota for skins of problem animals from 200 to 500 in 2000, and to 750 in 2005, particularly given the uncertain status of the wild population. The export of wild skins should be in compliance with the provisions of Article IV of the Convention, specifically that levels of export should be non-detrimental to wild populations of *C. niloticus* in Madagascar. It is unclear how these non-detriment findings have been made by the SA.

21. The hunting of problem animals usually follows a letter to the MA from regional forestry offices providing details on the case (locality, number of destructive animals, damage caused, etc.). The MA would then organize the destruction of the animal. The mission found that there is no systematic,

computerized record of these cases or the localities where problem animals were destroyed and skins obtained, although that this seems feasible based on the reports from the local agents.

22. The management plan mentioned in paragraph 2 above proposes to deal with the problem animals at a regional scale by establishing hunting quotas per zone, and combat abuses by marking the skins as early as possible. Alternatively, a commercial operator could be allowed to collect (say) 50 skins from identified problem areas which would help to make the operation of finding and destroying problem animals financially viable, and alleviate the conflicts between people and crocodiles in the area. The mission believes that careful consideration should be given to instances where local people kill animals themselves. Compensation schemes or paying for skins from such animals might create incentives to kill large crocodiles and claim that they were a problem.

23. Control or monitoring mechanisms to prevent illegal offtake or over-harvesting appear ineffective. The skins that are used by the local craftsmen for the production of leather goods may partially continue to be obtained from the wild. Although the number of such products offered for sale seems to have diminished over the last decade, the annual offtake of animals for this purpose may still be relatively significant (perhaps several hundreds of smaller sized animals per year). The regulation of local markets for specimens of *C. niloticus* is in any case recognized to be inadequate.

24. Aerial surveys of wild crocodile populations in Madagascar have been conducted in 1987, 1988 and 1997. The MA's report of 2006 states that due to its wide distribution and limited resources, the MA had been unable to monitor the wild populations from 2000 to 2005. However, damages caused by wild crocodiles to people and livestock were significant, leading the MA to conclude that the wild population was increasing. No evidence to support this claim could be found during the mission. Most stakeholders indicated to the contrary that wild populations of *C. niloticus* appeared to decline. The newly appointed SA showed interested in undertaking a new survey of wild populations but stated to lack the necessary technical capacity and to be in need of training and assistance.

Compliance with Resolution Conf. 11.16

25. The evaluation by the Secretariat of the provisions in the operational part of Resolution Conf. 11.16 that are relevant to the ranching of *C. niloticus* in Madagascar is discussed below.

***Regarding proposals to transfer populations from Appendix I to Appendix II for ranching***

Paragraph b) i)

26. It is difficult to clearly determine whether Madagascar's ranching programme for *C. niloticus* has been or is "primarily beneficial to the conservation of the local population". The collection of eggs for the ranching operations may have had a positive effect on the maintenance of certain wild populations and indirectly on the conservation of crocodile habitat, but this has not been properly ascertained. Although still widespread, *C. niloticus* seems to be persecuted in many parts of the country while anecdotal information suggests that the wild population may have declined in recent years. The collection of eggs and the subsequent cash income to local people has helped to reduce the killing of crocodiles in the Besalampy area, but it seems that poaching has continued as well. Overall, the impact on wild populations of the annual collection of wild eggs and the harvest of at least 750 wild crocodiles remain poorly understood.

27. Based on a study conducted in 1998 under the auspices of the CITES Secretariat, the MA estimated in its report of 2006 that in the zones where egg-collection by the two farms took place, 20,000 to 25,000 eggs were produced by wild crocodiles during each breeding season. The collection by the ranching operations of an average of 5,663 eggs per year would therefore represent an offtake of 22.6 %, and the MA stated that this had no adverse impact on, or harm, the wild population of *C. niloticus*. However, it is unclear how this conclusion was reached. Field surveys of nest sites in the Besalampy region, where Reptel collects crocodile eggs, have been conducted on four occasions between 1996 and 2003, but other than these, no recent field work has taken place to ascertain the breeding rate, breeding success or the evolution of the breeding populations in the collection zones. The mission doubts whether the MA has been involved in these field surveys, or analysed the results thereof. No information or impact studies were found concerning areas where eggs have been or are being collected by Croco Ranching II.

28. According to information given by Reptel, harvesting of eggs has been concentrated over many years on certain river systems in West Madagascar such as Besalampy, Tambohorano, Antsalova and Kiranomena. Reptel's records for the past three years indicate a slight downwards trend in the number of nests that were harvested with the exception of the Besalampy area. In 2004, the CSG reported that the decline in the number of nests found and eggs collected by Reptel in several localities was attributed to forest clearing and burning causing the siltation of smaller lakes and the erosion of nesting areas. The CSG also noted a trend towards egg collection in new areas each successive year to reach the target number of eggs, but this observation could not be confirmed during this mission.

29. Reptel's multiple year records of its egg collection programme could form the basis for calculating a nesting index which indirectly could provide information on the reproductive population in harvested areas, and on population trends. As egg harvesting by Reptel has been an ongoing activity for more than 10 years in the same regions, this could indicate that the wild population can sustain the level of harvest. However, this assumption needs to be confirmed as a mater of priority, and the relevant populations need to be closely monitored to verify the sustainability of the ongoing harvest levels.

Paragraph b) ii)

30. The recommendation that all products (including live specimens) of each operation must be adequately identified and documented to ensure that they can be readily distinguished from products of Appendix-I populations is linked to the labelling of skins and products thereof mentioned in paragraph c) in the same section of Resolution Conf. 11.16. In the opinion of the mission, the MA has undertaken too few on-the-ground controls of the ranching operations to effectively verify the origin of the live specimens, eggs, skins and finished products held in stock on the farms. In terms of documenting the specimens on the ranching operations, Reptel started in 2004 to keep detailed computerized records of all the live specimens and eggs that it kept. The record keeping could be expanded further to include other specimens of *C. niloticus*, for example skins, which should facilitate the monitoring of the ranching operation by the MA and benefit stock management and ranching activities. No detailed records were kept by Croco Ranching II.

31. Apparently, inspection of the ranches is scheduled twice annually to verify stock figures. The ranches forecast tag requirements each year, obtain a letter of authority from the MA and order tags from suppliers in the United States of America which are delivered directly to each producer. There is no apparent supervision of the tagging procedure.

32. Both farms have been involved in the wild harvest programme for nuisance animals. It was therefore expected that detailed records would have been kept by both operations on e.g. the number of skins bought from local hunters, prices paid, skins sizes, the geographic origin or the reason why the crocodiles had been determined to be nuisance animals and had to be killed. However, this was not the case, leaving open the possibility for abuses. This matter needs to be addressed through more rigorous reporting by the ranching operations and regular inspections.

Paragraph b) iii)

33. No comprehensive inventories of wild populations have been undertaken since the late nineties and therefore, the species' current status, distribution, and response to habitat changes, ongoing legal and illegal offtake, human-induced pressures, etc. remain largely unknown. However, population surveys in 1988 and 1998 provide valid data points that could offer base line information on the wild populations, and there are plans to undertake surveys in 2007. These should be conducted in such a manner that their findings can be compared with the earlier surveys. The main issue therefore remains the development of more permanent, cost-effective monitoring mechanisms and of an associated adaptive management programme that can effectively guide the management of wild crocodiles in the country.

Paragraph b) iv)

34. No animals from the ranching operations are or have been returned to the wild. The downlisting proposal adopted in 1997 (see proposal Prop. 10.2) mentioned in this regard:

> *One of the criteria that a proposal to the Secretariat must meet according to Resolution Conf. 3.15 is that breeding must assist conservation of the local population and, if circumstances permit, contribute to increasing the number of crocodiles in the wild. Although restocking must be one of the considerations of ranch breeding, the importance of the problem brought on by the dangers that crocodiles represent for human populations and their livestock is so great that it is difficult to allay man's aversion to the animals. At the moment, restocking would be seen by the public as the introduction of potentially destructive animals into regions where there are people and livestock. That is why there is no restocking project at this time. Before any restocking project in Madagascar, there would have to be an awareness promoting program aimed at the local population. Such activities are planned within the framework of a project for which the Waters and Forests Branch is seeking funding.*

and with regard to compliance with Resolution Conf. 3.15, subsection b. i) (which stated "the operation must be primarily beneficial to the conservation of the local population (i.e. where applicable, contribute to its increase in the wild)"):

> *A study on restocking, an important element to ensure the increase of crocodiles in the wild, is scheduled in the context of a project for which the Waters and Forests Branch is seeking funding.*

35. This mission concluded that the challenges described in the proposal concerning potential restocking and the recommendations regarding the need to educate people before any reintroduction could be envisaged still prevail. The study on restocking mentioned in the proposal has not been executed to date. At this stage, this seems not realistic or necessary from a species management point of view.

Paragraph c)

36. The downlisting proposal adopted in 1997 contained the following information on marking and the type of products to be exported:

> *Breeding products agreed to by the administration body and destined for export for commercial ends have the documents required by CITES (permits and stamps) and the hides are correctly identified with CITES security stamps according to Resolution Conf. 9.22 on the characteristics stated in section 26 of Decree No. 94-700.*

and with regard to the description of the methods to be used to identify the products, the proposal noted:

> *In Madagascar, crocodile breeders export green salted hide (raw hide). They are in compliance with the usual requirements of CITES already mentioned and conform to the documentation required by the administration body.*

37. The mission established that, given the observed production capacity of the two ranching operations, the widespread availability of skins of wild-caught animals, statements by stakeholders, and the size and nature of the skins and animals that were inspected, many thousands of skins have been exported from Madagascar in recent years that were in all likelihood originating from the wild and not 'ranched' as marked and claimed on CITES documents. There is little doubt that many of these skins were obtained from illegally killed animals. Overall, it is clear that the controls on marking in the two ranching operations have been unsatisfactory.

38. Falsely declared 'ranched' skins probably not only include wild skins from larger adults but also skins from younger crocodiles because economically, it is cheaper for the farms to buy an illegal wild skin than to produce a similarly-sized skin in the ranching operation. Skins of 2 m or more in length are not or only very rarely produced in the farms, and must practically all be assumed to have come from

the wild. Also many of the skins used by Malagasy artisans and the finished products derived thereof that are exported or offered for sale to tourists in Madagascar may be of illegal wild origins.

39. The authorities explained that their controls of the ranching operations and exports of skins and leatherwear have been deficient in recent years, and that the local markets remained difficult to monitor. Since July 2006, several initiatives have been taken to improve the situation with, to the team's impression, immediate effect, suggesting that a fairly straightforward and normal level of oversight and control of the ranching operations could probably suffice to avoid significant abuse.

Paragraph d)

40. The provisions in subparagraphs i) to v) partially overlap those in paragraphs b) and c) in the same section of Resolution Conf. 11.16. The mission noted the following deficiencies in the implementation of these provisions:

a) Lack of recent studies to understand the impact on wild populations of the harvesting of eggs and 'nuisance' animals from the wild, and limited or no follow-up in this regard on measures proposed in studies conducted in 1998 under the auspices of the CITES Secretariat [subparagraph i)];

b) Inadequate monitoring of the biological viability and economic success of the accredited ranching operations, with little or no verification of hatching and rearing at the farms, husbandry standards, production capacity, marking of products, etc. which should have shown that for the last four to six years, one of the farms did not have the breeding capacity to produce the number of 'ranched' skins that it declared, while the other seems to have occasionally mixed wild skins with ranched skins [subparagraph ii)];

c) No good understanding of the current socio-economic importance of the sector, which is probably significant, preventing the authorities for instance to determine if additional ranching operations would be viable or desirable, what prices local stakeholders should receive, or what taxation levels might be appropriate along the chain of custody [subparagraph ii)];

d) Limited attention for or controls of the conditions in which the animals are kept, particularly the food requirements and husbandry standards [subparagraph iii)];

e) Little recent information – and due to lack of field studies and other surveys no documented evidence – to demonstrate that ranching might benefit wild populations of *C. niloticus* and its habitats in Madagascar, and no guidance on the potential for reintroductions or other ways to enhance the conservation of *C. niloticus* in Madagascar [subparagraph iv)]; and

f) Irregular compliance by the MA with the annual reporting obligations, preventing an assessment whether the general criteria under which the downlisting proposal was accepted in 1997 continue to be met [subparagraph v)].

Paragraph g)

41. Paragraph g) of Resolution Conf. 11.16 provides that Madagascar should limit the manner of exploitation of wild populations of *C. niloticus* to those techniques described in its downlisting proposal and not, for example, later initiate new short-term programmes for taking wild animals without notifying the Secretariat. Madagascar has duly notified the Secretariat about any increase in the number of wild problem animals that it allowed to take, although that the reasons for these increases have been questioned. The mission established that in 2006, the collection of wild crocodile hatchlings by Croco Ranching II has been authorized, which seems a new technique that was not described in the proposal in 1997 and of which the Secretariat had not been informed.

42. The proposal explained that, following a review of the national crocodile management policy, it had been decided to suspend the commercial hunting of crocodiles. However, provisions were made for exceptional hunts for killing of destructive or dangerous wild animals. Madagascar was allowed an annual export quota of 200 skins of wild problem animals per year in 1997. Madagascar increased

this to 500 skins from 2000 to 2004, and to 750 skins in 2005 and 2006. These annual quotas were each time notified to the Secretariat before the end of the previous year.

43. The Secretariat required information from the Malagasy CITES authorities in 2000 concerning the basis for concluding that 500 nuisance crocodiles should be removed from the wild for export, noting that the increase may impact on the viability of the wild populations and ranching programmes as nuisance animals are almost always mature individuals. It also noted that the provisions of Article IV continued to apply for trade in these nuisance specimens. Madagascar replied that the increase had been discussed with the CSG during a mission in December 2000.

44. The MA justified the increase to 750 skins in 2005 by writing to the Secretariat that, on the basis of meetings that had been held with the SA and experts, *C. niloticus* had been categorized as "a priority species for establishing and justifying quotas". It listed the following management measures, although it did not clarify whether, how or when they would be implemented:

    a) *Promotion of egg collection whereby local people obtain a benefit that motivates them to tolerate large adult animals; because not all eggs are discovered or collected, the populations can continue to breed.*

    b) *For establishing quotas, the population levels need to be monitored in each zone; investigations have to be undertaken in all problem areas to establish appropriate hunting quotas for nuisance animals; and a study is being undertaken to inform about the establishment of quotas for nuisance animals.*

    c) *Annual monitoring of the stocks of animals in each of the ranching operations at the end of hatching season.*

45. All measures mentioned above continue to be pertinent, but the mission found that not a single one had been implemented since the quota had been increased from 500 to 750 skins. The study on quotas for wild nuisance animals, alluded at in the letter of the MA in 2005, has clearly not been undertaken.

46. The MA stated in its report of 2006 that from 2000 to 2005, no collection of live animals had been undertaken for the ranching operations. The downlisting proposal noted in this regard:

    *In 1994 and 1995, the administration body authorized the gathering of newly hatched crocs as follows: for the Société CROCORANCHING II (815 and 967 respectively) […].This capturing was authorized only in the Ambilobe Region in 1994 and 1995 (CROCORANCHING II) […]. This capturing was exceptional and was intended to help Malagasy businesses to get started in areas where operators do not have the financial means to install incubators.*

47. A study conducted in 1998 under the auspices on the Secretariat stated that "Hatchling collection for the ranches will no longer be permitted under the current agreement with CITES", recommending that enforcing this stipulation would help to stop one metre "hatchlings" appearing on farms. The management plan mentioned in paragraph 3 above also proposes that the collection from the wild be limited to eggs for ranching operations and the removal of animals that pose genuine problems.

48. It is however unclear if Madagascar still adheres to these policies. The mission received copies of an application in March 2006 by Croco Ranching II for the collection of 2,250 young crocodiles from the wild during the season 2005/2006. This request was referring to a permit for the collection of 2,500 eggs and the difficulties that had been encountered to reach this target – only 180 eggs had been obtained by the farm. It can be deduced from further correspondence that the application for the collection of wild hatchlings had been approved for a three-month period. In September 2006, Croco Ranching II wrote to the MA that by 30 March 2006, the operation hade been able to collect about 386 young crocodiles instead of the 2,200 that it had wanted. The poor collecting rate was claimed to be linked to the dangers and difficulties in gathering young animals, the logistical problems, and the limited period during which harvesting had been allowed. It is not known if Croco Ranching II eventually obtained a prolongation of its collection permit.

***Regarding monitoring and reporting in relation to species transfer populations from Appendix I to Appendix II for ranching***

49. The Conference of the Parties recommends that each Party that has made a successful proposal to transfer a population of a species from Appendix I to Appendix II for ranching purposes should submit to the Secretariat annual reports on all relevant aspects of the approved ranching operation. This matter was extensively discussed at the 54th meeting of the Standing Committee. Madagascar submitted a report to the Secretariat in May 2006 that covers the period 2000-2005.

50. The mission found data that seem to contradict some of the figures presented in Madagascar's report of 2006, while certain claims in that report seem to have been made without proper research basis. New policy developments were missing or only superficially touched upon. Not so much the frequency of the reporting as its reliability, overall quality and comprehensiveness could be questioned.

Annex A
(English only / únicamente en inglés / seulement en anglais)

**Production parameters for ranching of *C. niloticus* in Madagascar, 2001-05**

| Parameter | 2001 | 2002 | 2003 | 2004 | 2005 |
|---|---|---|---|---|---|
| No. of farms/ranches | 2 | 2 | 2 | 2 | 2 |
| No. of captive breeding stock | 170 | 182 | 212 | 154 | 154 |
| No. of captive-bred clutches produced | No data | No data | No data | 98 (2620 eggs)* | 108 (3369 eggs)* |
| Slaughter stock (> 1 year) | 11,202* | 13,544* | 16,895* | No data | No data |
| Wild clutches collected | 130* | 120* | 105* | 137 (3164 eggs)* | 86 (2464 eggs)* |
| Wild eggs hatched | 3596* | 2871* | 2870* | | |
| Farm eggs hatched | No data | 5248 * | 4021* | 2620* | 3369* |
| % production from wild eggs | | 35.4 %* | 36.4 %* | 53 %* | 42 %* |
| Hatchling mortality (%) | 21.4** | 24.4** | No data | 6,5 %* | 7,9 %* |
| Rearing mortality (%) | 0.6** | 17.6** | No data | No data | No data |
| Skins exported (separated according to source C, R, W) | 4322 C<br>4191 R | 3206 C<br>2723 R | 2700 C<br>3900 R | 2650 R<br>2610 C<br>500 W | 2700 R<br>1200 C<br>750 W |
| Articles exported | 804 | 934 | 2460 | | |

* *Data for Reptel only*
** *Data for Croco Ranching II only*

**Farm investigation sheet for Croco Ranching II (inspection date: 27/11/06)**

| Pen sizes | Estimated number of live *C. niloticus* | Size class | Estimated age |
|---|---|---|---|
| 1 pen (10 x 20 m) | 60–70 | 1.20–1.50 m | 3–4 years |
| 1 pen (20 x 8 m) | 7 | 2–3 m | 10–15 years |
| 1 pen (20 x 15 m) | 20 | 2–2.20 m | 5–8 years |
| 1 pen (20 x 20 m) | 2 adult breeders | 2.5–3 m | > 15 years |
| 1 pen (25 x 25 m) | 100–120 | 1.20–1.40 | 4–5 years |
| 1 pen (20 x 30 m) | 110–120 | 1.20–1.40 | 4–5 years |
| 10 darkened indoor hatchling pens ('dark environmental chambers') | 9 pens: 115<br>1 pen: 6 | 9 pens: 50–70 cm<br>1 pen: 0–40 cm | 9 pens: 2 years<br>1 pen: yearlings |
| **Total** | **420–460 animals** | | |

| **Other housing facilities** |
|---|
| - There were four larger pens (each measuring about 20 x 30 m) and a heated winter shed with 13 small pens available but all were empty at the time of the inspection and seemed not to have been used recently. |
| - The egg incubator room was filled with 19 boxes which contained altogether 1,756 recently collected eggs from the west coast area of Madagascar, which would roughly correspond to 40 to 45 harvested nests. Many entirely spoiled and rotten eggs were seen which had not been removed. In addition, 29 recently hatched baby crocodiles were found in the same room. |
| - Overall, the breeding conditions could be significantly improved from a hygienic point of view and also with regard to hatchling care. |

| **Additional Information** | |
|---|---|
| Numbers produced through breeding | None on this farm |
| Skins tagged | None |
| Tags on stock | None. However information was received that blue tags were used for ranched specimens and yellow ones for specimen taken from the wild. |
| Hatching success | According to the owner, this would be around 70 %, which appears optimistic |
| Rearing mortality in the first year | Claimed to be around 10-20 % |
| Reporting on production and trade | None |
| Skins in stock and tanning status | In total, 304 raw salted skins were identified, of which 150 were inspected closely, including measurement of total length. Except for about 10 larger skins with many scars on the belly and holes in the neck part, no direct indication was given that these skins possibly did not originate from the ranch. |

**Farm investigation sheet for Reptel (inspection date: 28/11/06)**

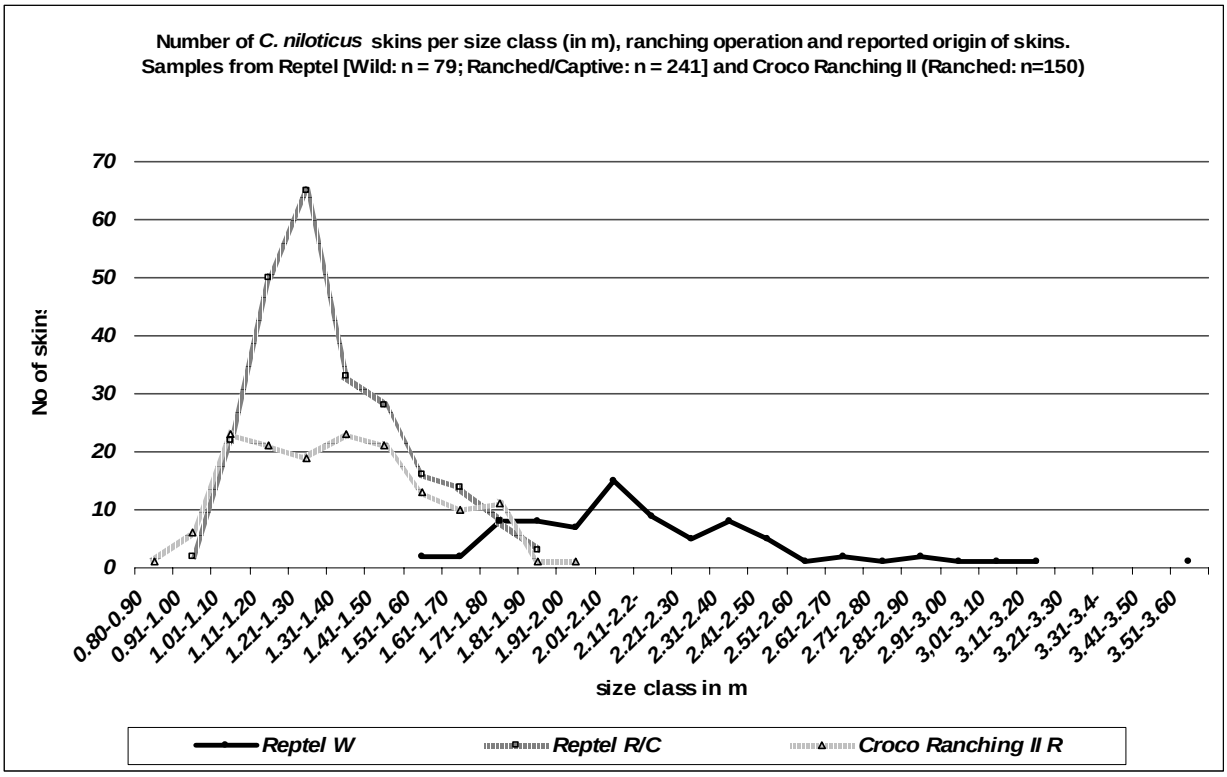
| Pen size | Estimated number of live *C. niloticus* | Size class | Estimated age |
|---|---|---|---|
| Hatchery | 150 | 25–30 cm | New born |
| 6 pens all concrete each 20 x 20 m | 4,464 | 60–80 cm | 1–2 years |
| 5 pens with concrete pool and earth surrounding | 5,071 | 80–120 cm | 2–3 years |
| 1 pen in natural setting with future breeders | 59 (42 females) | 2.50–3.30 m | 10–15 years |
| Large breeding enclosure ('Le Lac') | 151 (124 females) | | |
| **Total** | **9,895 animals** | | |

| **Other housing facilities** |
|---|
| - In total three large indoor rearing facilities (BAT I – III) for hatchlings, each with 500 m² surfaces and with two levels; newly constructed but had currently not in use. |
| - All animals are kept together, irrespective of their farmed or ranched origin, as long as they do correspond with regard to their size. |
| - Butchering and skinning facilities are excellent and well equipped to meet current standards. |

| **Additional Information** | |
|---|---|
| Incubator | There are two standard equipped and well-designed incubators on the farm. Both had been in use at the end of the farm breeding season and the egg collection period in the wild. |
| Numbers of breeding animals | 125 females and 27 males. |
| Numbers produced through breeding | In 2006, there were 114 nests on the farm which produced 4,357 viable eggs. In addition, in 2006 104 nests with 4,354 eggs were collected. |
| Skins tagged | None |
| Tags on stock | None |

| **Additional Information** | |
|---|---|
| Hatching success | 2004: 5,739 eggs collected - 3,163 hatched (55 %);<br>2005: 3,653 eggs collected - 2,464 hatched (67 %)<br>2006: 4,354 eggs collected; hatching success expected to be 70 % |
| Rearing mortality in the first year | Not known. |
| Reporting on production and trade | A readily retrievable report on actual production and trade was submitted to the review team |
| Skins in stock and tanning status | About 480 untanned salted skins were observed of which some 80 were measured and reported by representatives from the Ministry of Environment to be of wild origin. Most of the wild skins were about 2 m long. However, some larger skins originating from reproductive animals were seen of which the largest measured 3.50 m long. |

**Results of measurements of skins held on the ranching operations (Reptel: 320 skins measured; Croco Ranching II: 150 skins measured)**




**Exports of crocodilian skins of Reptel and Croco Ranching II in 2004, 2005 and 2006**

| Year | Company | Destination | Quantity | Purpose | Source | Permit | Date |
|---|---|---|---|---|---|---|---|
| **2006** | | | | | | | |
| | C.R. II | Japan | 350 | T | R | 275C EA04 | 28.10.06 |
| | Rept. | Japan | 100 | T | R | 261C EA04 | 26.4.06 |
| | | | 100 | T | W | 261C EA04 | 26.4.06 |
| | Rept. | France | 500 | T | R | 340C EA05 | 29.5.06 |
| | Rept. | Japan | 100 | T | W | 430C EA 06 | 20.6.06 |
| | | | 100 | T | R | 430C EA 06 | 20.6.06 |
| | C.R. II | Japan | 300 | T | R | 380C EA 06 | 10.6.06 |
| | C.R. II | Japan | 350 | T | R | 415C EA 06 | 20.6.06 |
| | C.R. II | Japan | 350 | T | R | 465C EA 07 | 14.7.06 |
| | Rept. | France | 500 | T | R | 510C EA 08 | 14.8.06 |

| Year | Company | Destination | Quantity | Purpose | Source | Permit | Date |
|---|---|---|---|---|---|---|---|
| | C.R.II | Japan | 500 | T | R | 590C EA 10 | 31.10.06 |
| | Rept. | France | 500 | T | C | 682C EA 10 | 26.10.06 |
| | Rept. | Japan | 100 | T | W | 600C EA 10 | 2.10.06 |
| | | | 100 | T | C | 600C EA 10 | 2.10.06 |
| | C.R.II | Japan | 150 | T | W | 648C EA 10 | 18.10.06 |
| | Rept. | Japan | 100 | T | C | 683C EA 10 | 26.10.06 |
| | | | 100 | T | W | 683C EA 10 | 26.10.06 |
| | C.R. II | Japan | 150 | T | W | 649C EA 06 | 1.6.06 |
| | Rept. | France | 10 | T | C | 293C EA 05 | 11.5.06 |
| | Rept. | France | 500 | T | C | 163C EA 03 | 23.3.06 |
| **2005** | | | | | | | |
| | C.R. II | Japan | 300 | T | R | 384C EA06 | 23.6.05 |
| | C.R.II | Japan | 350 | T | R | 482C EA07 | 19.7.05 |
| | C.R.II | Japan | 300 | T | R | 489C EA08 | 31.8.06 |
| | C.R. II | Japan | 300 | T | R | 590C EA 10 | 13.10.05 |
| | C.R. II | Japan | 300 | T | R | 720C EA 11 | 25.11.05 |
| | Rept. | Japan | 100 | T | W | 710C EA 11 | 16.11.05 |
| | | Japan | 100 | T | R | | |
| | Rept. | France | 500 | T | R | 709C EA 11 | 11.11.05 |
| | C.R. II | Japan | 300 | T | R | 820C EA 12 | 15.12.05 |
| | Rept. | Japan | 100 | T | W | 867C EA12 | 27.12.05 |
| | | Japan | 100 | T | R | | |
| | C.R. II | Japan | 150 | T | R | 864C EA 12 | 26.12.05 |
| | Rept. | Japan | 100 | T | W | 385C EA 06 | 24.6.05 |
| | | | 100 | T | C | | |
| | Rept. | Japan | 100 | T | W | 533C EA 09 | 26.9.05 |
| | | Japan | 100 | T | C | | |
| | C.R. II | Japan | 150 | T | W | 601C EA 10 | 20.10.05 |
| | C.R. II | Japan | 150 | T | W | 837C EA 12 | 19.12.05 |
| | C.R. II | Japan | 50 | T | W | 869C EA 12 | 28.12.05 |
| | Rept. | France | 500 | T | C | 432C EA 07 | 20.7.05 |
| | Rept. | France | 500 | T | C | 575C EA 10 | 7.10.05 |
| **2004** | | | | | | | |
| | Rept. | France | 500 | T | R | 722C EA12 | 17.12.04 |
| | C.R.II | Japan | 300 | T | R | 398C EA07 | 15.7.04 |
| | C.R.II | Japan | 300 | T | R | 464C EA08 | 18.8.04 |
| | C.R. II | France | 250 | T | R | 508C EA 09 | 15.9.04 |
| | C.R. II | Japan | 300 | T | R | 606C EA 11 | 8.11.04 |
| | C.R. II | Japan | 200 | T | R | 701C EA 12 | 13.12.04 |
| | C.R. II | Japan | 300 | T | R | 700C EA 12 | 13.12.04 |
| | Rept. | Japan | 100 | T | W | 724C EA 12 | 17.12.04 |
| | | Japan | 100 | T | C | | |
| | Rept. | Japan | 60 | T | W | 560C EA10 | 15.10.04 |
| | | Japan | 160 | T | C | | |
| | C.R. II | Japan | 200 | T | W | 633C EA 11 | 17.9.04 |
| | Rept. | Japan | 140 | T | W | 362C EA 07 | 15.7.04 |
| | | | 300 | T | C | | |
| | Rept. | France | 100 | T | C | 572C EA 10 | 20.10.04 |
| | Rept. | France | 850 | T | C | 490C EA 09 | 6.9.04 |
| | Rept. | France | 100 | T | C | 307C EA 06 | 10.6.04 |
| | Rept. | Italy | 500 | T | C | 306C EA 06 | 10.6.04 |
| | Rept. | France | 500 | T | R | 722C EA 12 | 17.12.04 |
| | Rept. | France | 500 | T | C | 674C EA 12 | 1.12.04 |

Annex B
(French only / únicamente en francés / aeulement en français)

STRATEGIE ET PLAN DE GESTION DES CROCODILES A MADAGASCAR

Présentés par le Ministre de l'Environnement, des Eaux et Forêts

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Ministère de l'Environnement, des Eaux et Forêts
Direction Générale des Eaux et Forêts
Antananarivo, Madagascar

## 1. INTRODUCTION

Le Crocodile du Nil, *Crocodylus niloticus*, est un reptile, de loin le plus grand prédateur du pays. Peu d'études sur son écologie spécifique ont été menées mais on peut considérer que comme ses congénères du continent africain il joue un rôle écologique important.

Présent avant l'arrivé des hommes sur l'île il a été vénéré par certaines tribus, en particulier de l'ouest, et est toujours sacré dans le nord. Le crocodile est quoi qu'il en soit généralement craint des populations humaines avec lesquelles il entre en conflit, sur les zones les plus peuplées en particulier.

Cette espèce a été en particulier largement exploitée à Madagascar depuis la fin des années 1940. Des dizaines de milliers d'animaux ont été abattus dans des régions relativement facile d'accès où les populations ont été réduites à de très faibles densités. L'extension des populations humaines a d'autre part rendu cette diminution des densités inévitable dans certaines zones.

Madagascar a disposé en 1985 d'un quota annuel d'exportation de 1000 peaux provenant de chasse dans la nature. Celui-ci fût par la suite considéré dangereux pour la survie de l'espèce et ne valorisant pas la ressource de façon intéressante, et fût supprimé en 1989.

En reconnaissance de son statut international de conservation, le crocodile a été classé dans la catégorie des animaux gibier de la législation nationale en 1989. En anticipation des conflits humain/crocodiles, une orientation particulière a été donnée dès cette date vers la valorisation économique plus poussée pour rendre aux populations de crocodiles une valeur économique directe. Depuis 1989 la Direction des Eaux et Forêts a fait la promotion de l'élevage en ranch et a défini des règles pour le développement de cet élevage.

Le programme de gestion des crocodiles de Madagascar s'est fait avec l'implication des populations locales et a son intérêt qui a été reconnu au niveau international en tant que modèle original de création durable de lien entre le secteur privé, les populations rurales et le gouvernement pour la gestion d'une ressource naturelle. Ainsi Madagascar s'est vu octroyer la possibilité d'exportation des peaux produites dans le cadre de l'élevage en ranch.

Reconnaissant l'existence de crocodiles pouvant présenter une menace directe sur certaines populations humaines, les pays Parties à la CITES ont octroyé à Madagascar à partir de 1992 un quota d'exportation d'animaux pour valoriser les animaux devant être abattus pour protéger la vie humaine. Ce quota est passé de 100 par an en 1992, à 200 entre 1996 et 1999. 500 peaux par an ont par la suite été exportées mais cela s'est fait sans une approbation formelle des Parties à la CITES.

Aucune donnée n'a pu être fournie à ce jour sur l'impact de ces prélèvements et Madagascar est sensé depuis 1998 fournir un plan de gestion pour justifier de l'utilisation durable de ses populations de crocodiles dans le cadre de la CITES qui a été ratifié par Madagascar en 1975.

C'est à cet effet que la Direction des Eaux et Forêt a organisé une revue de la situation en considérant les rôles des différents acteurs dans le programme d'élevage en ranch et l'intégration

du règlement des problèmes populations humaines/crocodiles par la gestion d'abattage d'animaux spécifiquement dangereux.

## 2. POLITIQUE

La stratégie de gestion des crocodiles s'insère dans la politique globale de gestion et de conservation de la nature à Madagascar, en particulier dans la Stratégie Nationale pour l'Environnement mais aussi dans la Stratégie de Réduction de la Pauvreté.

En effet cette espèce unique dans la grande île mérite d'être préservée au titre de la stratégie de conservation de la biodiversité mais surtout parce qu'elle peut-être gérée dans le cadre des orientations politiques de valorisation des ressources naturelles en générant des revenus à des niveaux locaux où il n'existe que peu d'opportunités.

## 3. PROBLÉMATIQUE

Le crocodile est un animal qui est perçu comme dangereux dans son ensemble par la population malgache, perception qui est exacerbée par des problèmes de dangers immédiats dans certaines zones. Le crocodile n'en est pas moins une espèce faisant partie du patrimoine de Madagascar, qui plus est une espèce utile d'un point de vue commerciale. Il mériterait ainsi largement d'être préservé et valorisé au mieux. On manque jusqu'à ce jour d'un programme de gestion permettant cette valorisation liée à la préservation.

Il apparaît indispensable qu'un programme de gestion puisse de plus servir la promotion politique de la gestion en ce sens qu'il règlerait les conflits humains / crocodiles.

Les accords ratifiés par Madagascar sont à satisfaire. Politique et législation nationales sont ainsi à mettre en conformité avec ces accords, ceux de la CITES en particulier.

## 4. STRATÉGIE

La stratégie globale de gestion des crocodiles de Madagascar est de répartir les bénéfices et les coûts des crocodiles entre les différents acteurs pour assurer que l'ensemble des valeurs écologiques et économiques perdurent dans un cadre acceptable par les populations humaines.

Ainsi:

*RECONNAISSANT que Madagascar possède des populations de crocodiles importantes et significatives au niveau international qui ne sont pas menacées d'extinction immédiate;*

*CONSCIENT que l'abondance actuelle et à venir des crocodiles à Madagascar est une conséquence directe des mesures législatives nationales et internationales mais surtout de la mise en place d'une approche de gestion pour la conservation et l'utilisation durable de la ressource;*

*ACCEPTANT que le plan de gestion actuel des crocodiles de Madagascar doit prendre en compte et influencer les considérations socio-économiques conflictuelles telles que:*

*a) Les crocodiles sont de gros et dangereux prédateurs pour les populations humaines et les animaux d'élevage,*

*b) L'existence de crocodiles dans certaines zones peut être un obstacle au développement d'autres activités économiques,*

*c) Les crocodiles et les produits qui en sont dérivés ont une valeur économique significative,*

*d) Des investissements conséquents ont déjà été réalisés pour développer avec succès une industrie bénéficiant et pouvant bénéficier encore plus aux populations rurales;*

*SE REPOSANT SUR les activités respectives des autorités administratives et d'une autorité scientifique et en particulier celles de suivi administratif et technique et d'évaluation scientifique de l'impact non préjudiciable des prélèvements;*

*REAFFIRMANT le besoin d'adopter une politique sur les crocodiles pour diriger la gestion future en accord avec les obligations nationales et internationales,*

La stratégie de gestion pourra être décomposée selon les points suivants:

a) Répartir les intérêts des différents acteurs pour assurer que les différents bénéfices obtenus des crocodiles perdurent et que la stratégie de gestion soit politiquement acceptable.

b) Poursuivre la conservation et la gestion technique et scientifique des populations de crocodiles sauvages dans l'ensemble de l'île pour maintenir des densités acceptables suivant les conditions locales.

c) Réduire les conflits entre les crocodiles et les populations humaines par un zoning et une gestion appropriés des populations de crocodiles.

d) Promouvoir la conservation des crocodiles par leur utilisation durable en accord avec la gestion des populations.

e) Poursuivre l'augmentation de la valeur des crocodiles sauvages pour les populations humaines et en particulier, pour les communautés locales par l'éducation et l'augmentation des activités économiques liées aux crocodiles.

f) Poursuivre la dynamisation de la coopération entre les opérateurs privés et les communautés de base afin d'atteindre les objectifs de conservation et d'utilisation durable de la politique et du plan de gestion.

g) Mettre à jour la législation pour servir les objectifs stratégiques de gestion et rechercher les moyens d'intervention les plus appropriés.

h) Créer des liens avec les scientifiques et gestionnaires d'autres pays de l'aire de distribution du crocodile du Nil et les organisations spécialisées pour promouvoir conjointement des politiques et des programmes d'utilisation durable de l'espèce.

## 5. OUTIL DE MISE EN ŒUVRE

### 5.1 Législation

La gestion des crocodiles restera soumise aux législations de base en vigueur pour les parcs nationaux et la gestion de la faune, mais le Ministère de l'Environnement, des Eaux et Forêts (MINENVEF) évaluera l'état de développement du programme de gestion et identifiera périodiquement les besoins de contrôle appropriés par rapports aux objectifs de gestion.

### 5.2 Administration

Le MINENVEF désignera un responsable en charge du dossier crocodile et mettra a disposition le staff administratif pour gérer les opérations relatives aux crocodiles. Ce responsable, directement responsable vis à vis du Directeur Général des Eaux et Forêts, travaillera en étroite collaboration avec l'Autorité scientifique, le représentant du Groupe des Spécialistes de Crocodiles (SSC-UICN). Ce groupe est désigné sous le terme comité « crocodiles ». Ses responsabilités sont décrites à la section 6.4.

### 5.3 Utilisation

Dans les zones appropriées, le Directeur Général des Eaux et Forêts (DGEF) autorisera l'utilisation des crocodiles suivant un plan de gestion évolutif approuvé par l'Autorité scientifique.

L'utilisation est restreinte à la collecte des œufs pour le ranching, à l'abattage des animaux clairement à problème, et à l'artisanat local.

### 5.4 Contrôle

La DGEF est responsable du suivi des élevages et de l'abattage des animaux à problème sur les terres sous son autorité. Les bureaux des services forestiers locaux pourront autoriser la capture et l'abattage d'un nombre limité de crocodiles adultes par des chasseurs locaux, suivant un système de quota par zones préalablement défini pour l'ensemble du territoire et approuvé par le DGEF et l'autorité scientifique. Les bureaux des Eaux et Forêts garderont des notes relatives aux activités et à la présence des crocodiles.

Les éventuels abattages non commerciaux d'animaux dangereux qui restent autorisés suivant la législation en vigueur seront répertoriés par les services forestiers locaux.

### 5.5 Suivi

Le suivi des crocodiles dans chaque zone de gestion sera coordonné par l'Autorité scientifique CITES de Madagascar qui rendra compte au MINENVEF. Des inventaires seront conduits suivant les lignes directrices de la section 6.4.1. Le comité crocodiles sollicitera les spécialistes internationaux expérimentés si besoin est, en particulier pour la mise en place de leurs programmes scientifiques et techniques de suivi.

### 5.6 Fonctionnement et développement du programme

Les opérateurs privés pourront être sollicités pour contribuer au programme de gestion suivant un plan préparé par le comité crocodiles, autant que possible annuellement, qui leur sera soumis par le DGEF pour approbation. Une attention particulière sera portée à la formation de cadres nationaux et des responsables des services forestiers locaux dans les zones de prévalence des crocodiles. Des fonds pourront être sollicités auprès de sources extérieures pour des formations, des études spécifiques ou l'amélioration de la gestion du programme dans son ensemble.

## 6. MODALITÉ DE MISE EN ŒUVRE

### 6.1 Gestion par zones

6.1.1 Critères pour le zoning

Le principe de l'exploitation par zones consiste à reconnaître que les populations de crocodiles n'ont pas les mêmes densités et ne sont pas au même niveau de conflit avec les populations humaines selon les régions ou les zones spécifiques de ces régions.

Madagascar sera ainsi considéré divisé en zones suivant les critères suivants:

a) le statut de conservation des zones

b) les tailles des populations existantes et potentielles dans la zone

c) l'importance des zones pour la reproduction des crocodiles

d) l'impact potentiel des crocodiles sur les populations humaines résidentes et les impacts attendus des activités humaines sur les crocodiles.

6.1.2 Zones proposées pour la gestion

La répartition par zone sera évolutive et sera réévaluée suivant l'état des connaissances sur les populations sauvages et de l'évolution du programme de gestion. Pour les besoins de la gestion et de la conservation des crocodiles, Madagascar est divisé en quatre types de zones:

a) Les rivières de la Mahavavy et de l'Ankarana hors aire protégée.

b) Les zones de Besalampy (Maningoza et Sambao) et d'Antsalova.

c) Les terres sous contrat de gestion ou les terres privées.

d) Les autres terres publiques.

Remarque: les Aires Protégées ont leurs populations de crocodiles protégées par principe. Leur gestion est du ressort de l'ANGAP (Association Nationale pour la Gestion des Aires Protégées). Un accord se doit quoi qu'il en soit d'être établi entre le MINENVEF et l'ANGAP afin qu'il soit convenu que l'ANGAP respecte les provisions du présent plan de gestion dans les zones sous son contrôle.

6.1.3 Objectif de gestion par zone

Les objectifs de gestion dans ces zones sont:

a) Les rivières de la Mahavavy et de l'Ankarana hors aire protégée. Maintenir l'évolution naturelle des populations et porter une attention particulière à la prévention d'abattages illégaux de crocodiles sur ces zones. Les prélèvements n'y sont pas permis et les réductions de densités de crocodiles ne seraient autorisées qu'en cas de décès humain et les abattages d'animaux seraient alors restreints à l'élimination d'individus spécifiques.

b) Les zones de Besalampy (Maningoza et Sambao) et d'Antsalova. Maintenir l'évolution naturelle des populations et porter une attention particulière à la prévention d'abattages illégaux de crocodiles sur ces zones. Les collectes d'œufs de crocodiles y seront encouragées suivant les législations en vigueur et les plans de gestion spécifiques mis en place. Les autres utilisations commerciales n'y sont pas permises et les réductions de densités de crocodiles ne seraient autorisées qu'en cas de décès humain et les abattages d'animaux seraient alors restreints à l'élimination d'individus spécifiques.

c) Les terres sous contrats de gestion ou les terres privées. Les densités de crocodiles pourraient être augmentées, maintenues ou diminuées à des niveaux acceptables suivant les conditions locales et la collecte des œufs de crocodiles peut y être autorisée. Les décisions d'utilisations seront le fait des gestionnaires de ces zones (en effet un groupement ou une communauté locale gérant une zone où des abattages seraient autorisés pourrait préférer gérer les populations de crocodiles pour la production optimales d'œufs). Toute décision de gestion sur ces zones ne pourra cependant être mise en œuvre qu'avec l'approbation des autorités des Eaux et Forêts.

d) Les autres terres publiques. Les densités de crocodiles pourraient être augmentées, maintenues ou diminuées à des niveaux acceptables suivant les conditions locales et la collecte des œufs de crocodiles peut y être autorisée. Suivant l'évolution de l'état des connaissances sur les problèmes directs causés par les crocodiles aux populations humaines des localisations particulières seront identifiées sur cette zone pour diriger spécifiquement les abattages de crocodiles présentant des dangers immédiats pour les populations humaines.

## 6.2 Le ranching des crocodiles

6.2.1 La définition du ranching et du farming suit celle de la CITES excepté que le ranching n'inclut que la collecte des œufs.

6.2.2 Tous les éleveurs en ranch seront requis de fournir des rapports trimestriels sur leurs stocks au MINENVEF.

6.2.3 Tous les permis pour la collecte des œufs sauvages de crocodiles sont validés uniquement par le service en charge des crocodiles du MINENVEF.

6.2.4 Tous les ranchs et établissements maintenant des crocodiles en captivité se verront obligés d'être en possession d'un agrément. Son maintien dépendra de la soumission des informations requises par le MINENVEF.

### 6.3 Collecte, Contrôle et Exportation des crocodiles présentant des dangers immédiats

6.3.1 Le nombre total des crocodiles autorisés à être abattu à vocation commerciale sera égal au quota annuel d'exportation de la CITES.

6.3.2 Le service en charge des crocodiles du MINENVEF déterminera un quota d'abattage par zone et émettra des autorisations relatives à ces quotas qui seront transmises aux services locaux des Eaux et Forêts (le nombre étant déterminé principalement par le nombre d'incidents dus aux crocodiles les années précédentes). Les autorisations d'abattage par zones spécifiques de terrain seront référencées de numéros de séries (1 – 500) et de l'année. Les fiches accompagnant chaque peau auront la forme suivante:

| N° de série xxx/200x | Date d'abattage | Lieu d'abattage | Chasseur | Intermédiaire | Transporteur | Acheteur |
|---|---|---|---|---|---|---|
| | | | | | | |

6.3.3 Les services forestiers locaux préviendront les chasseurs locaux, les intermédiaires et les commerçants des conditions d'attribution des quotas et des besoins de référencement des peaux.

6.3.4 Les peaux de chaque crocodile abattu seront étiquetées le plus tôt possible. La localisation du lieu de capture, le chasseur et la date seront identifiés sur la fiche accompagnant la peau. La fiche sera signée par le responsable local des Eaux et Forêts et transmise au transporteur ou au propriétaire suivant de la peau.

6.3.5 Aucune peau ne devrait être transportée sans autorisation et fiches d'accompagnement.

6.3.6 Les propriétaire de ranch reconnus seront autorisés a acheter, stocker et exporter des peaux sauvages et ceux-ci achèteront uniquement des peaux légalement autorisées.

6.3.7 Les artisans formellement agréés pourront être autorisés à bénéficier d'une partie du quota des peaux sauvages. Ils achèteront uniquement des peaux légalement autorisées et ne pourront exporter ces peaux que sous la forme de produits finis.

6.3.8 Le permis d'exportation des peaux ne sera délivré que suite à la présentation des autorisations d'abattage et à la vérification des fiches d'accompagnement correspondantes.

6.3.9 Les exportateurs de peaux de crocodiles sauvages ou de produits transformés contribueront (à hauteur de 5 %) de leurs revenus par ces peaux à l'établissement des inventaires et à la gestion des populations sauvages de crocodiles. Cette contribution sera versée au MINENVEF qui l'attribuera spécifiquement et intégralement à la gestion des crocodiles.

### 6.4 Responsabilités du comité crocodiles

6.4.1 Suivi des populations de crocodiles

6.4.1.1 Le suivi de la collecte des œufs sera effectué annuellement

6.4.1.2 Le suivi des nids sur les zones prioritaires de collecte d'œufs sera conduit au moins tous les deux ans

6.4.1.3 Le détail des informations sur chaque crocodile abattu sera tenu par les bureaux régionaux des Eaux et Forêts et remis annuellement au comité crocodiles avec copie directement transmise au service en charge des crocodiles du MINENVEF

6.4.1.4 Les rapports relatifs aux attaques des crocodiles sur les humains seront compilés et analysés chaque année par le comité crocodiles

6.4.1.5 Il sera demandé à toutes les organisations œuvrant dans la conservation et travaillant dans des zones où se trouvent des crocodiles ainsi qu'aux autorités et populations locales de faire état des incidents survenant à cause des crocodiles

6.4.1.6 Des inventaires aériens de zones présélectionnées seront réalisés tous les cinq ans

6.4.1.7 Des inventaires nocturnes seront réalisés autant que possible

6.4.1.8 Les résultats des inventaires seront compilés, archivés par un responsable des crocodiles au sein de l'autorité scientifique, mais aussi transmis aux acteurs concernés par le comité crocodiles

6.4.2 Crocodiles posant des problèmes immédiats et abattages

6.4.2.1 Compiler et analyser les informations sur les attaques et les accidents

6.4.2.2 Répartir les quotas annuels suivant les zones à problème en fonction des nombres d'attaques et allouer les autorisations de terrain en conséquence aux services locaux des Eaux et Forêts

6.4.2.3 Organiser la diffusion sur le terrain des informations nécessaires pour la compréhension du programme par les agents de terrain des services des Eaux et Forêts et la diffusion des informations par ceux-ci

6.4.2.4 Effectuer l'édition, le contrôle et la compilation des informations de terrain

6.4.2.5 Inspecter les stocks de peaux sauvages détenues par les ranchs et vérifier les registres de peaux

6.4.2.6 Superviser l'application des étiquettes d'exportation CITES

6.4.3 Crocodiles de ranch

6.4.3.1 Emettre les agréments pour les ranchs et les établissements similaires si toutes les conditions sont conformes au cahier des charges pour l'élevage en ranch

6.4.3.2 Compiler les rapports trimestriels des ranchs qui détaillent:

| | Stock d'origine | Additions | Mortalité | Abattage | Stock final |
|---|---|---|---|---|---|
| Nouveaux nés | | | | | |
| Année 1 | | | | | |
| Année 2 | | | | | |
| Années 3 & 4 + | | | | | |
| Reproducteurs | | | | | |

6.4.3.2 Préparer un résumé annuel de la collecte des œufs, de l'incubation et des éclosions suivant le format

| | Nb. couvées | Localisation | Nb. d'œufs | Nb. d'œufs rejetés | Nb. incubés | Nb. éclos | Nb. ajouté au stock |
|---|---|---|---|---|---|---|---|
| Ranching | | | | | | | |
| Farming | | | | | | | |

6.4.3.2 Conserver les données détaillées de la localisation de chaque nid sauvage collectée et du nombre d'œufs contenu dans chaque nid

6.4.3.2 Inspecter tous les ranchs en activité tous les 6 mois, contrôler les stocks et évaluer l'état de nourrissage et sanitaire, etc.

6.4.3.2 Définir en collaboration avec les spécialistes de l'élevage de cette espèce les standards acceptables pour la production et évaluer les résultats des ranchs

6.4.3.2 Compiler les données dans un rapport annuel pour le MINENVEF, la CITES et les autres parties prenantes.

6.4.4 Supervision de l'artisanat

Les données collectées depuis quelques années amènent à penser que l'artisanat pourrait avoir un impact très limité sur les populations sauvages étant donné le peu de renouvellement des stocks constaté sur les étalages.

Le comité crocodiles assurera néanmoins:

6.4.4.1 La promotion de l'information pour les acheteurs au sujet de l'intérêt d'acheter des produits acquis dans le cadre du programme de gestion et permettant un suivi;

6.4.4.2 La compilation des données provenant des facturiers des artisans et si besoin est la vérification de la validité des informations recueillies;

6.4.4.3 La promotion de la fabrication d'articles produits à partir de peaux provenant de l'élevage en ranch; et

6.4.4.4 Au cas où une augmentation notable des ventes serait constatée ou qu'il soit estimé que l'artisanat a un impact négatif notable sur les populations sauvages de crocodiles, la proposition d'un programme de gestion de l'artisanat plus approprié sera effectuée.

6.4.5 Conformité avec le système d'étiquetage universel

Le comité crocodiles supervisera l'application de trois types d'étiquettes, à savoir:

a) Etiquettes CITES pour les peaux de ranch (déjà en place)

b) Etiquettes CITES pour l'exportation des peaux sauvages (séries de nombres différents) avec fiche d'accompagnement complétée qui doit être rendue pour chaque étiquette d'export remise

c) En cas d'achats de peaux par les artisans, ces peaux seront étiquetées par l'élevage pour le suivi et afin de déterminer la correspondance éventuelle de produits finis aux étiquettes.

Le comité par le biais des responsables de la DGEF habilités supervisera à la suite également l'émission des permis CITES pour les peaux correctement étiquetées.

6.4.6 Amélioration et développement du programme

Le comité crocodiles recherchera les moyens de parfaire sa formation, de transmettre les informations techniques aux agents de terrain, d'améliorer son système de compilation de données, de pouvoir effectuer les inventaires requis et sa capacité d'assistance pour résoudre les conflits causés par les crocodiles.

Direction Générale de l'Environnement,
des Eaux et Forets
*Organe de Gestion CITES du Madagascar*

# PLAN DE TRAVAIL (2007-2010)

Appui à l'amélioration de la conservation, de la gestion et de l'utilisation durable du Crocodile a Madagascar

**1. Gestion générale du *C. niloticus***

| ***ACTIVITES ET RESULTATS ATTENDUS*** | ***ACTIVITES SPECIFIQUES*** | ***QUI*** | ***QUAND*** | ***NOTES*** |
|---|---|---|---|---|
| 1. Mise en place du projet | 1.1. définir un plan de travail. | GSC (DJ, CL, CM) | FAIT | La table ronde prendra également en compte d'autres sujets, entre autres: la révision du Plan actuel de gestion des crocodiles (activité 2), formation (activité 11), création d'une comite nationale pour le crocodile (activité 3). |
| | 1.2. Envoyer l'ébauche du plan de travail avec une lettre d'introduction a l'OG. | GSC (TD) | FAIT | |
| | 1.3. visite du GSC à Madagascar pour rencontrer les autorités gouvernementales et identifier les principales parties prenantes. | GSC (CL) | FAIT | |
| | 1.4 Préparation et distribution de la documentation annexe, traduction des feuillets de formation, et aide a l'OG pour l'organisation d'une table ronde | GSC (CL), OG | FAIT | |
| | 1.5. table ronde avec le gouvernement et d'autres parties prenantes pour parler des objectifs du projet. | OG, GSC | FAIT | |
| | 1.6. Étudier des possibilités de financement pour le prolongement des activités au delà de la phase initiale. | OG, GSC | À partir de septembre 2007 | |

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|---|---|---|---|---|
| 2. Réviser, mettre à jour, valider et commencer la mise en œuvre du plan de gestion des Crocodiles (*Stratégie et Plan de Gestion des Crocodiles de Madagascar)* | 2.1. Révision du Plan de gestion des Crocodiles actuel à la lumière des résultats des récentes études menées par le CITES.<br><br>2.2. Modifier en conséquence le plan de gestion actuel suivant les activités prévues et les résultats achevés | OG, GSC<br><br>OG, GSC | A partir de novembre 2007<br><br>Parties prenantes donnent leurs commentaires a la DGEEF avant fin de septembre 2007 | Ceci nécessitera une concertation avec le gouvernement et les parties prenantes concernées pour assurer l'approbation de la version finale du plan de gestion des crocodiles.<br>Le plan de gestion doit être mise en œuvre le plutôt possible |
| 3. Mise en place d'un comité national pour la gestion du crocodile | 3.1. Mise en place d'un comité de pilotage sous la direction de la DGEEF, pour offrir des conseils sur la mise en œuvre du Plan de gestion des crocodiles.<br><br>3.2 Définir les termes de référence pour le comité national<br><br>3.3. Identifier les membres du comité<br><br>3.4. Officialiser la structure et la composition du comité.<br><br>3.4. Réunir le Comité et discuter de son mode de fonctionnement (ex: secrétariat si besoin). | OG, parties prenantes | A partir de septembre 2007 et a discuter entre GSC et OG<br><br>A partir de septembre 2007<br><br>Suite à la réunion du 12 septembre (table ronde)<br>Dès que possible<br><br>Dès que possible | Dépend de la validation d nouveau plan de gestion de crocodiles par l gouvernement<br><br>Les autorités gouvernementales *pourraient* exiger une législation spécifique pour la création d'un tel comité |
| 4. Mise en œuvre d'approches régionales pour la gestion des crocodiles. | 4.1. Visite des sites de collecte des œufs.<br><br>4.2. Compiler, réviser & évaluer les données historiques sur les collectes des œufs. Inclure toutes données de développement socio-économique afin d'impliquer la population locale.<br><br>4.3. Développer un plan de zonage du | GSC<br><br>GSC (CM) avec appui scientifique de l'autorité scientifique (AS) de la CITES | Octobre, 2008<br><br>à partir de sept 2007 | Ceci nécessitera une collaboration avec les éleveurs de crocodiles et les collecteurs pour assurer la coordination des sites spécifiques de collecte des œufs et les agences de la direction dans les régions, les fokontany etc |

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| | pays pour établir les unités de gestion des crocodiles.<br><br>4.4. Evaluer les données historiques sur la capture/l'abatage des crocodiles sauvages.<br><br>4.5. Développement d'un plan de zonage pour la capture/l'abatage en milieu sauvage. | OG en collaboration avec le GSC<br><br>GSC (CL/CM) avec appui d'AS<br><br>OG avec un expert du GSC | à partir de septembre 2007<br><br>Après Octobre 2007<br><br>Après Octobre 2007 | |
| 5. Conflit homme/crocodile | 5.1. Identifier les zones de conflits<br><br>5.2. Mise en place (et raffinage) d'une base de données permettant le suivi des conflits (et de la capture/l'abatage) (voir 10. ci-dessous). | OG (avec le GSC ou un expert indépendant si nécessaire) | | Lorsque cela est possible, la collecte des données devra être combinée avec les études sur les populations sauvages |
| 6. Amélioration de la mise en œuvre et le suivi du system actuel d'étiquetage des peaux | Voir activités 12 et 13 ci-dessous | OG avec DCAI (Direction de Contrôle et de l'Appui a l'Intégrité | | Ceci nécessite une attention particulière avec des recommandations spécifiques (voir Doc. SC 55.13).<br>OG est déjà en train d'améliorer le suivi d'étiquetage des peaux |
| 7. Amélioration du suivi des centres de ranching, des centres d'élevage en captivité et de l'industrie artisanale de la peau de crocodile | Voir 8. 12 et 13 ci-dessous | OG | | |
| 8. Suivie et amélioration si nécessaire du system national d'approvisionnement en peaux de crocodiles pour les marches artisanaux locaux. | 8.1 Rechercher les anciennes données des études sur le marché local de la peau de crocodile<br><br>8.2 Développer une stratégie pour la collecte de données à comparer et | OG (et/ou des consultants ou étudiants en doctorat/Maîtrise de l'Université d'Antananarivo sous la direction du chef du | Dès que possible<br><br>Juillet 2008 | Ceci nécessitera une analyse du temps de liquidation des produits fabriqués avec la peau de crocodiles sur les marchés locaux. |

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| | proposer des options pour améliorer l'industrie.<br><br>8.3 Etablir de bonnes relations de travail avec l'association pour la peau de crocodile artisanale pour faire le suivi et l'évaluation du system approvisionnement | département biologie animale)<br><br>Septembre 2007 | | |
| 9. Suivi des populations de crocodiles sauvages | 9.1 Analyse et évaluation des résultats des précédentes études et des données des collectes, en vue de les rendre plus économiques.<br><br>9.2 Organisation et conduite d'études par voie aérienne et par inventaire nocturne au phare.<br><br>9.3. Développement d'un future programme de suivi des populations sauvages (ex : indexes de sites, indices d'abondances, etc). | GSC en collaboration avec experts nationaux et internationaux<br><br>consultant GSC (avec financement d'un bailleur comme GTZ et d'autres)<br><br>GSC | Avant Juin 2008<br><br>Juillet-Aout 2008 (prochaine saison sèche)<br><br>D'ici septembre 2008 | Il est trop tard pour mener des études pour 2007, le programme devra également être évalué en vue d'améliorer sa rentabilité.<br><br>Le système devrait inclure la mise en place d'un plan de collecte de données assisté par ordinateur au niveau du ministère des Eaux et Forêts. Selon la disponibilité du matériel informatique adéquat au ministère. |
| 10. Evaluation de l'étendue, de la portée, de la localisation et de l'importance des futures captures/abatages en milieu sauvage. | 10.1. Mise en place d'un quota national de collecte avec des limites de tailles pour chaque zone identifiée (recherche sur les options futures y incluant un program de participation des populations locales pour le développement rural, un régime de chasse sportive sur quota, si approprie, etc)<br><br>10.2. Jusqu'a 2010, l'exportation des peaux ayant le code source 'W' devra être limitée aux seuls animaux nuisibles et lorsque leur origine remonte dans les zones où ils ont | OG (avec GSC si nécessaire)<br><br>OG | Après les études de 2008 préciser au dessus | Apres les études, les données seront inclus dans la proposition pour la prochaine CoP de la CITES en 2010 |

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| | causé des dégâts. Cette information devra se trouver dans les données correspondantes. | | | |
| 11. Renforcement des capacités sur les avis non préjudiciables concernant la capture/l'abatage et la gestion générale du crocodile du Nil a Madagascar | Les sujets à exposer devront inclure non exhaustivement:<br>- Le suivi des centres de ranching/élevage en captivité<br>- étiquetage et suivi des peaux<br>- Archivage des données<br>- Estimation des productions annuelles des centres de ranching/élevage en captivité<br>- identification des peaux (sauvage ou élevage)<br>- Suivi des crocodiles sauvages<br>- entretien des bases de données de suivi<br>- Création d'un manuel de formation | OG, AS, comité national pour le crocodile, GSC (DJ, CM, CL) | Immédiatement (ex : durant la table ronde) | A réaliser ponctuellement suivant l'ensemble des thèmes ressortant des chapitres 2 a 10, si besoin est. |

**2. Suivi des opérations de "ranching"**

| ***ACTIVITES ET RESULTATS ATTENDUS*** | ***ACTIVITES SPECIFIQUES*** | ***QUI*** | ***QUAND*** | ***NOTES*** |
|---|---|---|---|---|
| 12. inspection périodique des centres d'élevages; et développement et mise en œuvre d'un system de suivi | 12.1. Suivi des centres d'élevage (abatage, production d'œufs et de nouveaux nés en captivité, production d'œufs et de nouveaux nés en milieu sauvage, rapports de stocks, etc.)<br><br>12.2. Etiquetage des peaux en présence de l'OG.<br><br>12.3. Vérification des productions des centres | OG, avec l'aide d'un expert indépendant et éventuellement d'un représentant du Comité National pour le Crocodile | Trimestriellement (de 2007-2010) | A travers des contrôles réguliers pour s'assurer que les centres de ranching/d'élevage ne blanchissent pas des peaux sauvages illégalement obtenues a travers leurs opérations<br><br>CrocoRanch II aura un quota d'exportation nulle jusqu'a ce que leurs opérations de production auront été vérifiées |

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| | d'élevages pour la mise en place des futurs quotas. | | | |
| 13. Mise en place d'un quota d'exportation annuel pour les peaux de différentes origines (sauvage, d'élevage, de ranching) pour 2007/2008/2009/2010 | 13.1. Mise en place d'un quota basé sur les données disponibles (ex production des centres d'élevage, collectes sauvages, etc). | OG avec un expert indépendant, le Comité National pour le Crocodile et les autorités scientifiques du CITES | Annuellement | Les quotas devront être conformes aux productions des centres de ranching et aux quotas de capture/abatage sauvage;<br>La traçabilité ainsi que le suivi des quotas de différentes origines devra être effective. |

**3. Autres articles liés au comité permanant du CITES et a la 15eme conférence des parties du CITES**

| ***TACHES ET RESULTATS ATTENDUS*** | ***ACTITIVITES SPECIFIQUES*** | ***QUI*** | ***QUAND*** | ***NOTES*** |
|---|---|---|---|---|
| 14. Rapportage auprès du comité permanent du CITES | 14.1. Ecrire un rapport pour le SC57 et le soumettre avant la date d'échéance.<br><br>14.2. Ecrire un rapport pour le SC58 et le soumettre avant la date d'échéance. | OG<br><br>OG | Avant juillet 2008<br><br>a déterminer - 2009 | A préparer conformément aux recommandations du comité permanent et document SC55.13 |
| 15. Proposition d'ajout de la population de crocodiles de Madagascar sur Annexe II au CITES CoP15. | 15.1. Préparation d'une ébauche de proposition pour une révision et des commentaires.<br><br>15.2. Soumission de la proposition au CoP15 du CITES. | OG (avec l'aide de GSC) | Juillet 2009 | Dépend entièrement de la mise en œuvre sur une base durable du plan de gestion des crocodiles. |

**Annexe III: Final Itinerary and travel schedule**

| | |
|---|---|
| 22nd July | Depart Tana for Maevatanana (Ikopa / Betsiboka Rivers intersection) |
| 23rd July | Maevatanana – survey of Ikopa and Lakes around Antafia |
| 24th July | Maevatanana – survey of lake systems in sandy road |
| 25th July | Drive to Mahajanga – visit Ampijoroa on route to meet with ANGAP & Durrell + discussions in Anbalajanakomby |
| 26th July | Marovoay survey on Betsiboka |
| 27th July | Kamoro River survey |
| 28th July | Survey Mahavavy Delta |
| 29th July | Return to Mahajanga and survey Betsiboka Delta |
| 30th July | Day in Mahajanga to effect repairs to boat and motor |
| 31st July | Drive to Ampijoroa (Ankarafantsika National Park); no survey as ANGAP refused access to the lake at night; return to and overnight in Mahajanga |
| 1st August | Meet ANGAP in Mahajanga to secure approval to survey sacred lake; carry out survey of Lac Ravelobe at Ankarafantsika National Park, Ampijoroa on ANGAP boat |
| 2nd August | Drive to Ambato Boeny; survey Betsiboka and lake in area; discussions with local people |
| 3rd August | Return to Mahajanga and return boat; drive to and overnight in Maevatanana |
| 4th August | Return to Tana; change car and chauffer; drive to and overnight in Antsirabe |
| 5th August | Drive to Miandrivazo; secure boat and attempt survey upstream on Mahajilo |
| 6th August | Miandrivazo; drove to junction of Mahajilo and Tsiribihina Rivers, met with Regional Circonscription of EFT, reported to Police Station in accordance with local requirements, visited ex -Socrobe crocodile holding centre now owned by Mme Aline RALIMANAN A; secured boat (owner took GPS readings on a 5km stretch downstream on Mahajilo from 2pm until 7.30pm) |
| 7th August | Survey downstream Mahajilo River (from 2pm until 8am the next morning) |
| 8th August | Return drive to Tana; meeting at DGEFT with selected stakeholders |
| 9th August | Team Meeting to summarise data collected and way forward; visit Croc Farm at Ivato and meet with Marc GANSUANA |

## Annexe IV: Field log of distances covered by GTZ car from 22 July to 8 August

### 22 July – 4 August 2008: North West Madagascar

| Date | Place | Total Kms |
|---|---|---|
| 22-Jul-08 | Tana - Maevatanana | 354 |
| 23-Jul-08 | Maevatanana - Antafia - Pont Betsiboka | 86 |
| 24-Jul-08 | Maevatanana - Bevilany - Ambodromany - Maevatanana | 262 |
| 25-Jul-08 | Maevatanana - Ampijoroa - Mahajunga | 271 |
| 26-Jul-08 | Majunga - Marovoay - Maroala - Majunga | 272 |
| 27-Jul-08 | Majunga - Kamoro - Majunga | 369 |
| 28-Jul-08 | Majunga ville | 39 |
| 29-Jul-08 | Majunga ville | 13 |
| 30-Jul-08 | Majunga ville | 24 |
| 31-Jul-08 | Majunga - Ampijoroa - Majunga | 260 |
| 1-Aug-08 | Majunga ville - Ampijoroa | 153 |
| 2-Aug-08 | Ampijoroa - Ambato Boeny | 69 |
| 3-Aug-08 | Ambato Boeny - Majunga - Maevatanana | 411 |
| 4-Aug-08 | Maevatanana - Tana | 354 |
| | **sub-total** | **2,937** |

### 4 August - 8 August 2008: WEST OF MADAGASCAR

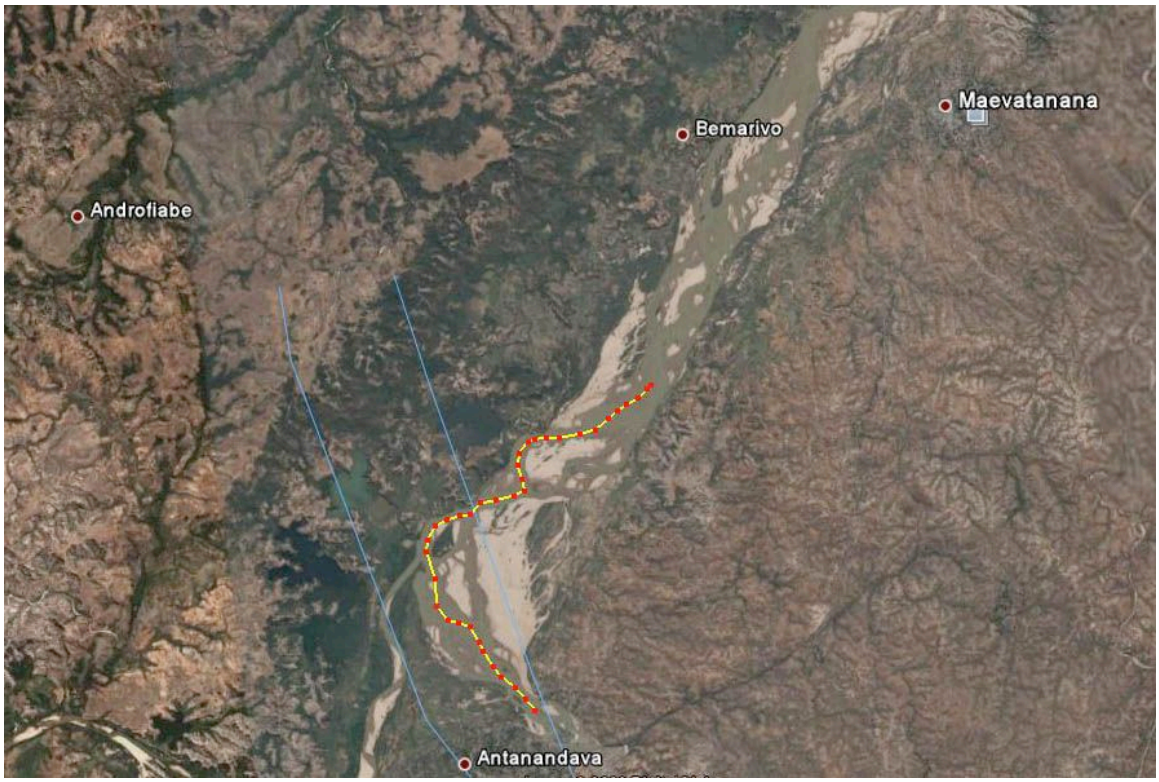
| | | |
|---|---|---|
| 4-Aug-08 | Tana - Antsirabe | 184 |
| 5-Aug-08 | Antsirabe - Miandrivazo | 248 |
| 6-Aug-08 | Miandrivazo - Bepeha | 85 |
| 7-Aug-08 | Miandrivazo | 16 |
| 8-Aug-08 | Miandrivazo - Tana | 404 |
| | **sub-total** | **937** |
| | **GRAND TOTAL** | **3,874** |

Annex V

| Date | River | Start point | | Stop Point | | km | Tot | Dens | Obs | Obs/km | km/obs |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Latitude | Longitude | Latitude | Longitude | | | | | | |
| 23/07/08 | Ikopa | 16.98232 | 46.77821 | 17.02365 | 46.75818 | 8.2 | 4 | 0.49 | | | |
| 23/07/08 | Ikopa - Lake Bokapila | 17.00050 | 46.73668 | | | - | 0 | 0.00 | | | |
| 23/07/08 | Ikopa - Lake Amborovy | 16.99486 | 46.74677 | | | - | 0 | 0.00 | | | |
| 24/07/08 | Lake Amparihibe | 16.70665 | 46.96549 | 16.69728 | 46.97238 | 9.6 | 6 | 0.63 | | | |
| 26/07/08 | Betsiboka River | 16.23408 | 46.54847 | 16.35750 | 46.57168 | 18.0 | 5 | 0.28 | | | |
| 27/07/08 | Kamoro River | 16.46579 | 47.17283 | 16.44263 | 47.14452 | 4.0 | 1 | 0.25 | 7 | 1.75 | 0.57 |
| 28/07/08 | Mahavavy River | 15.89304 | 45.86310 | 15.79604 | 45.81894 | 17.1 | 9 | 0.53 | 22 | 1.29 | 0.78 |
| 30/07/08 | Betsiboka River mouth | 15.89937 | 46.44167 | 16.01305 | 46.60057 | 26.2 | 0 | 0.00 | 24 | 0.92 | 1.09 |
| 01/08/08 | Lake Ravelobe | 16.81608 | 46.81608 | | | | 13 | - | | | |
| 02/08/08 | Lake Marovovo (Ambato Boeny) | 16.44728 | 46.72869 | 16.44577 | 46.71848 | 3.5 | 0 | 0.00 | | | |
| 02/08/08 | Betsiboka River ms (upst of Ambato Boeny) | 16.47357 | 46.71071 | 16.55683 | 46.69358 | 13.0 | 3 | 0.23 | 17 | 1.31 | 0.76 |
| 07/08/08 | Mahajilo River ms | 19.67364 | 45.37236 | 19.52449 | 45.42180 | 27.3 | 12 | 0.44 | 16 | 0.59 | 1.71 |
| | Totals | | | | | 126.9 | 53 | | 86 | | |
| | % of total kilometres covered by vehicle | | | | | 3% | | | | | |
| | km driven by vehicle per km surveyed on river | | | | | 30.5 | | | | | |

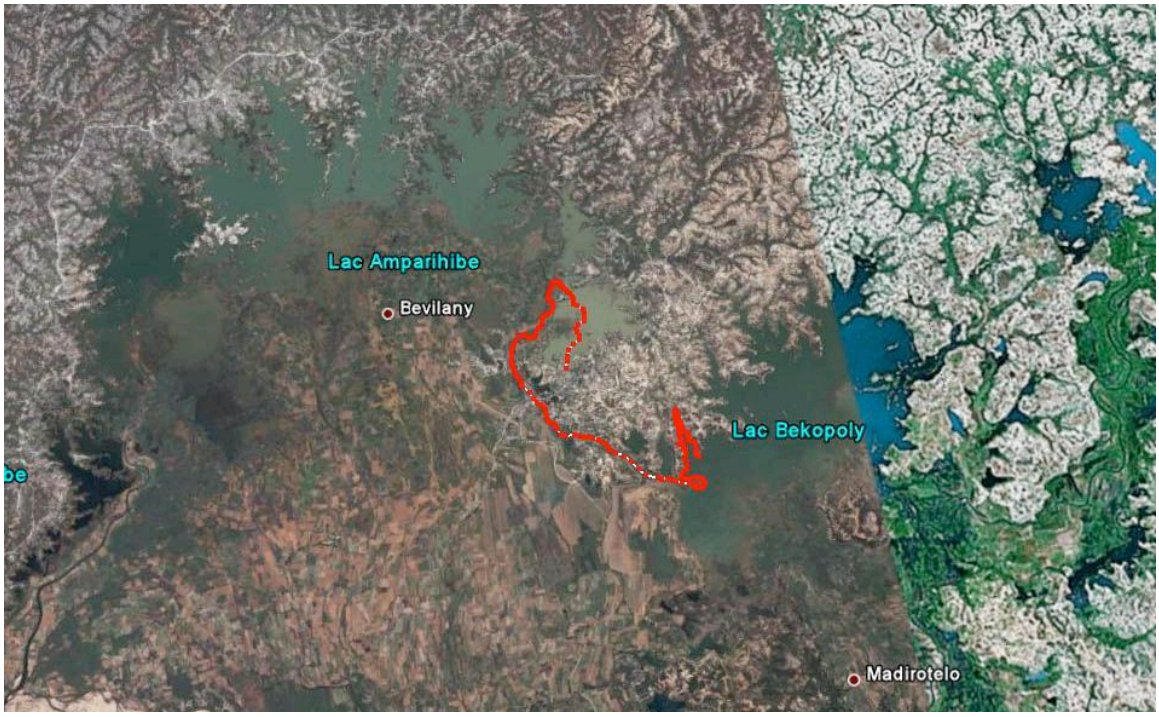
NB Lake coordinates are location coordinates rather than stop/start points

**Annex VI**



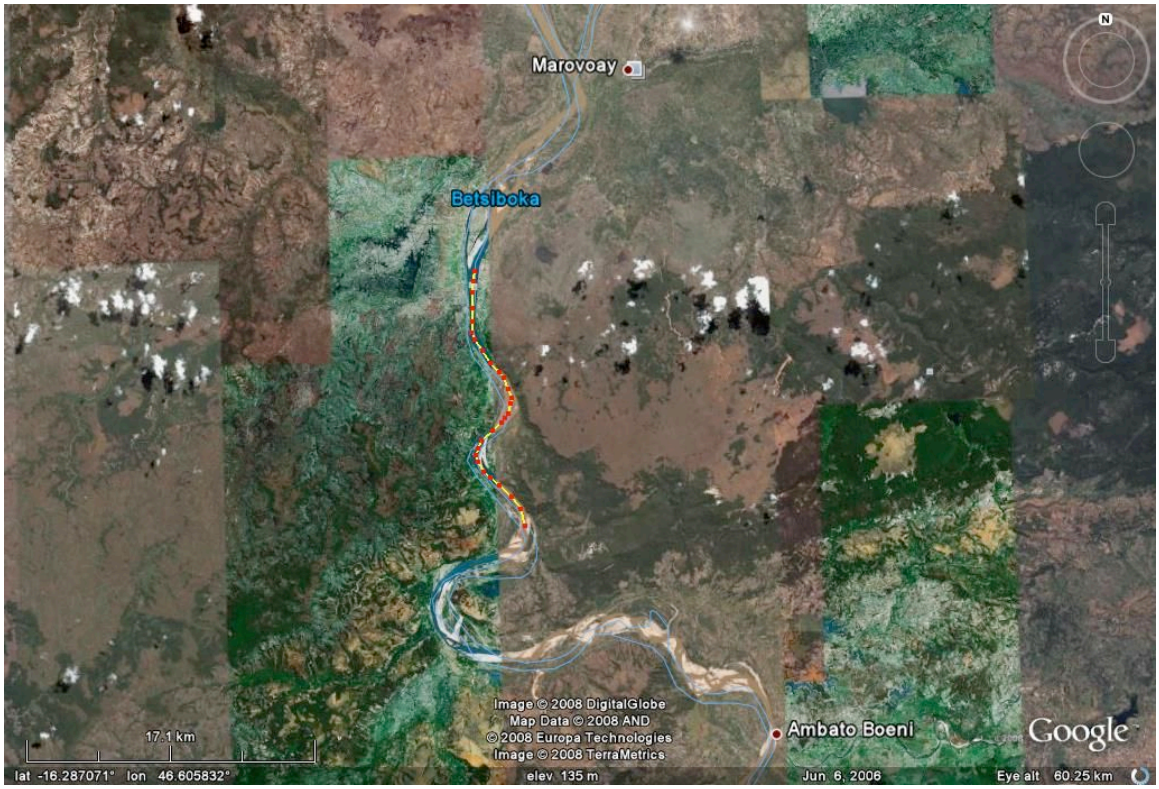

23-7-08 Ikopa River


23-7-08 Ikopa – Lake Bokapila & Lake Amborovy

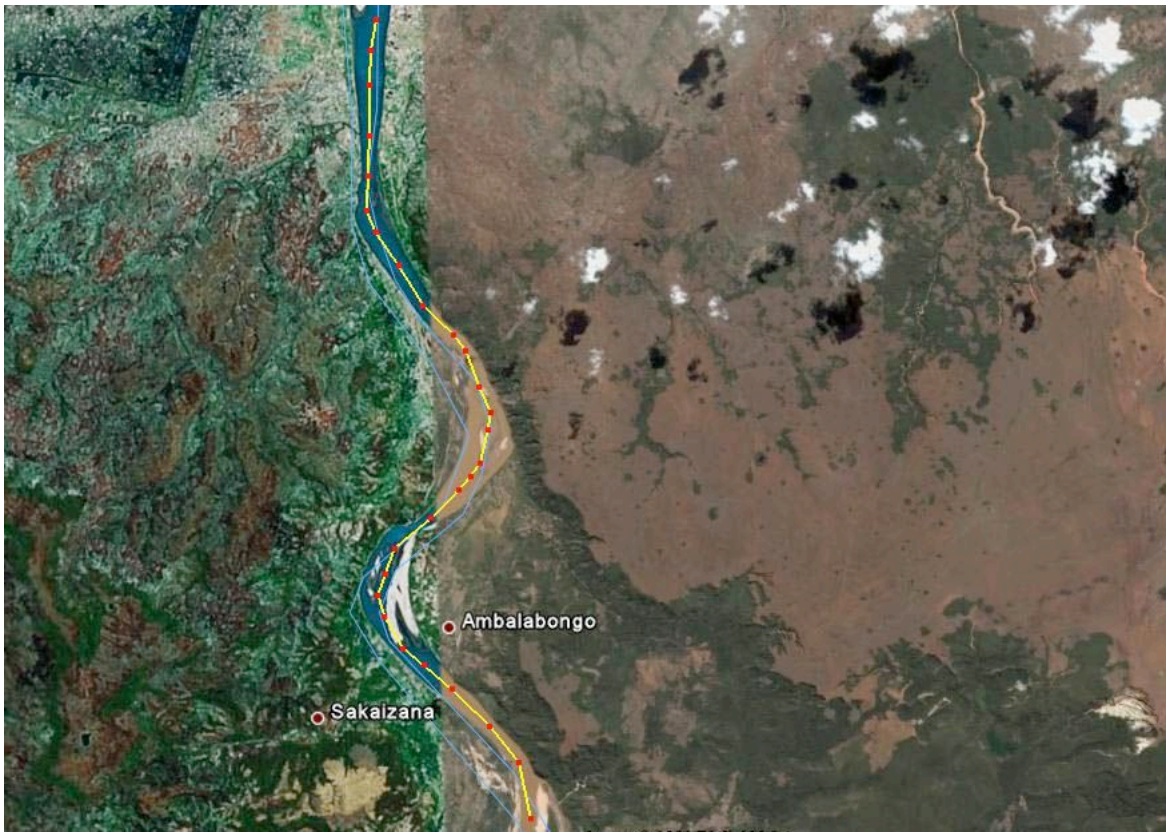



24-7-08 Lake Amparihibe & Lake Bekopoly


24-7-08 Lac Bekopoly



26-7-08 Betsiboka River – Maroala (1)



26-7-08 Betsiboka River – Maroala (2)


27-7-08 Kamoro River

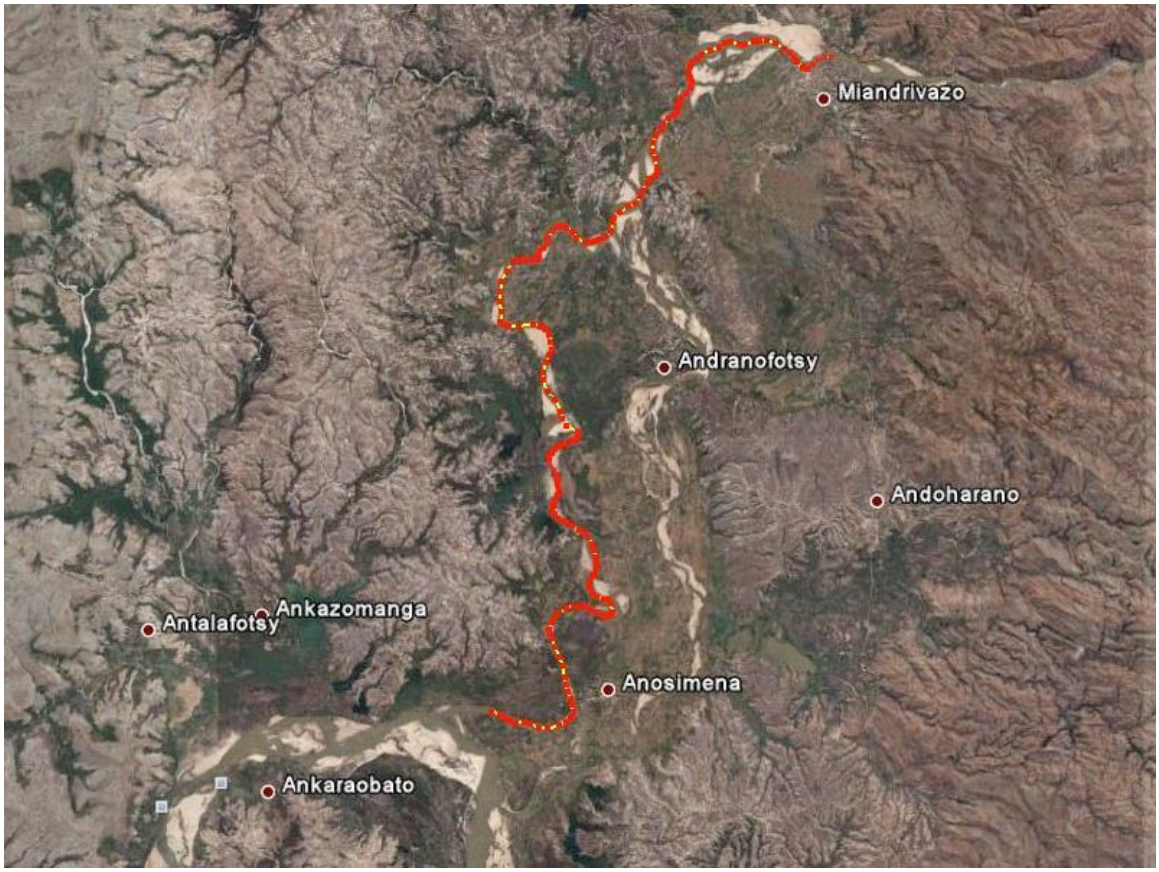
28-7-08 Mahavavy River


30-7-08 Betsiboka River Delta


1-8-08 Lake Ravelobe


2-8-08 Lake Marovovo (Ambato Boney)


2-8-08 Betsiboka River (Ambato Boney)




7-8-08 Mahajilo River Mandrivazo