**Agenda Item SC.2.1**

# Crocodile Specialist Group Steering Committee Meeting

**Skukuza, Kruger National Park, South Africa**
22 May 2016 (9.00 am - 5.00 pm)

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## Regional Report: East & Southern Africa

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### Angola

The Okavango Basin is shared by three countries, Angola, Botswana and Namibia. During a 3-month journey across three African countries (Angola, Botswana and Namibia) in aid of rhino conservation, two canoeist adventurers covered 1700 km of waterways, including a stretch of river in Angola. During their canoe ride, they paddled from the source of the Okavango River in Angola down to the inland finishing point in the Makgadikgadi Salt Pans in Botswana, and collected crocodile specific information on the way. Information from the upper reaches of the Okavango River have been extremely useful for the Okavango Crocodile Monitoring Programme (OCMP) as it provided additional data points to the biodiversity survey that they carried out in the catchment in 2012 and 2013. During that survey, the Cuito River was identified as a suitable nesting habitat for Nile crocodiles (juvenile crocodiles were captured at that time), although actual nests were not confirmed during that time. The two canoeists saw and documented crocodile nests - the first confirmed nesting sites in the Okavango catchment in Angola. The dispersal of crocodile nests in each of the neighbouring nations is good news for the species and shows that the crocodile's nesting range is larger than originally described.

The OCMP report that although large crocodiles are readily seen in the protected Okavango Delta, nests are not found; 98% of crocodile nesting sites are located along the unprotected Okavango panhandle. Research has shown that there has been a significant decrease in the number of nests along this stretch of river over the past 20 years. The Okavango is effectively a closed system and the recently discovered nesting habitat needs to be protected in order to ensure survival of the crocodile populations throughout the entire system. This discovery has possible management implications in terms of OKACOM's (The Permanent Okavango River Basin Water Commission) joint policy deliberations regarding the best possible use of the river's natural resources.

### Botswana

The Okavango Crocodile Monitoring Programme (OCMP), a registered research project with the Ministry of Environment, Wildlife and Tourism of Botswana, continues to assist the Department of Wildlife and National Parks (DWNP) with the conservation of the Nile crocodile population in the Okavango. In addition to being designated a Ramsar site, the Okavango Delta was successfully inscribed as a UNESCO World Heritage Site (22 June 2014), with the OCMP's work referenced in the IUCN Technical Evaluation document.

The OCMP has continued with its long term population monitoring surveys using capture-mark-recapture. Recent capture surveys resulted in the recapture of 5 crocodiles, all of which had more than 5 years between captures (one had 9 years between captures and another 11 years). The program is building a strong sample size of recaptured crocodiles which will soon

allow the OCMP to assess wild growth rates accurately in the Okavango for the various size classes.

The high flood cycle in the Okavango has continued to push adult crocodiles further down the Okavango's main channels and into the larger villages found on the outskirts of the Delta. The OCMP captured and relocated 15 crocodiles from the village of Maun back to the protected areas within the Delta. None of the relocated crocodiles have returned to the village to date. Relocation of problem crocodiles is now an accepted management tool of Botswana's Department of Wildlife and National Parks and a small group of wildlife officers have carried out training on crocodile capture, handling and transport in order to increase these capture operations in other parts of the Delta.

A study on the mercury levels in the Okavango showed that there was significant evidence of mercury bio-magnification concentrations for fish and crocodile in the Okavango system. This could have potential threats for subsistence fishing communities in the area, as well as for crocodiles.

**Egypt**

The Egyptian Crocodile Management Unit (ECMU) reports that activities carried out in Egypt have focused on population surveys, nuisance crocodile management, control and law enforcement; public awareness and a training program.

- Population surveys - three surveys of Lake Nasser were carried out in 2014 and 2015: in 2014, the survey covered 315 km of the lake's shoreline, where 47 crocodiles were spotted, their sizes ranging from 0.5 to 4 m total length; in 2015, the survey covered 100 km of Lake Nasser's shorelines and 13 crocodiles were observed, ranging between 0.5 to 3 m total length
- Nuisance crocodile management - in November 2015, the ECMU team caught a one-metre crocodile from an agricultural canal west of Cairo following reports that a crocodile was roaming free there. As the ECMU team was in the area for one week, they took the opportunity to raise public awareness about crocodiles. The crocodile was reintroduced to the wild at Lake Nasser.
- Investment programs - discussions between the ECMU and the Minister of Environment regarding crocodiles in Egypt focused on the need for a national crocodile management plan, the drafting of a new proposal to submit to CITES to determine a quota, the need for funding for the wild population monitoring program and a strategy to secure expert international advice for the planning process. The ECMU secured funding to carry out fieldwork and buy new equipment in order to collect the necessary data that will help in ensuring that investments are based on science for the conservation of Egypt's crocodile population.
- Illegal trade - Working closely with the Environment Police of Aswan, the ECMU is confiscating crocodile leather products from illegal hunting activities by local fishermen, as well as tackling the illegal trade in cross-border imports of crocodile leather from Sudan (800 pieces of crocodile leather) - this, in cooperation with the Egyptian border patrolling force.

**Ethiopia**

A final report of the review of the conservation, management and farming of crocodiles in Ethiopia that took place in 2014, was produced and is available on the CSG's website.

**Kenya**

A high school student (George Ndikumana) with an interest in crocodiles carried out his own personal project cataloguing the observations of large Nile crocodiles entitled: "Here be Tyrannosaurs: Observations of Large Nile Crocodiles (*Crocodylus niloticus*)". He contacted the TV presenter Brady Barr (National Geographic Channel program entitled "Dangerous Encounters: Size Matters" and the CSG's Chair Grahame Webb for contact information and input to his manuscript, which will be published in the CSG Newsletter.

**Madagascar**

Rob Gandola continues with his PhD studies and completed a preliminary investigation into the phylogenetic status of *Crocodylus* from Madagascar, with the aim to identify management and conservation needs.

Madagascar's CITES trade ban on the export of Nile crocodiles was finally lifted in December 2014. The Madagascar Crocodile Conservation & Sustainable Use Project (MCCSUP) was set up in October 2014 with financial support from Kering. The aim of the MCCSUP is to assist Madagascar to improve its management regime for crocodiles, based on sustainable use principles and improved livelihoods.

Following the MCCSUP launch in Madagascar in October 2014, the Direction Générale des Fôrets (DGF) established a dedicated Crocodile Management Unit (CMU), which acts as the focal point for all crocodile issues. During the first year of the MCCSUP, and following a detailed workplan, the CMU/DGF carried out key activities including: a detailed analysis of historic survey data; wild population survey and report; creation of a database for and subsequent analysis of HCC (a poster will be presented at the CSG's Working Meeting in Skukuza); a value-chain analysis of the Artisanal Crocodile Leather Industry; improved control of ranching operations.

It was evident that the recent CITES-imposed trade suspension impacted negatively on the crocodile industry in Madagascar, thus highlighting the industry's vulnerability to Madagascar's non-compliance with international regulations. The CITES Management Authority (DGF), have embraced the assistance provided through the MCCSUP and collaborated on the recommendations identified that would assist Madagascar with its compliance issues under CITES, as well as provide opportunities for crocodile industry players to become active, legal, sustainable and verifiable players on the international market. One of the key recommendations - and a specific activity under the Program - is that the DGF should revise its National Crocodile Management Program as a matter of urgency, where the overarching goal should be the sustainable use of Nile crocodiles for the benefit of the people of Madagascar.

ITC continued to provide funding assistance to follow-up activities related to the artisanal crocodile leather trade study that was initiated in 2014. A training workshop was held in Madagascar in April 2015, bringing together key artisans (tanners, manufacturers, retailers).

In June 2015, ITC funded a 3-day workshop event in Tana regarding the conservation and sustainable trade in Madagascar's population of Nile crocodile: (i) a Government Working Meeting (held on Monday 22 June 2015) and (ii) a Producer Workshop (held over 2 days, 23 and 24 June 2015). Twelve government representatives from four different Ministries attended the Working Meeting, ie Ministry of Environment, Ecology, the Sea and Forests

(MEEMF, represented by the Direction General of Forests DGF), Ministry of Trade & Consumer Affairs (MCC, represented by the Department of Trade & Environment DTE), Ministry of Culture & Handicrafts (MCA) and the Ministry of Higher Education & Scientific Research (MRSSA, represented by the University of Antananarivo). Forty-nine (49) participants attended the two-day artisan workshop that addressed the issues of Tanning, Farming, Egg Collection, Crocodile Husbandry, Public Awareness, CITES. In addition, the recommendations from the ITC-funded value chain analysis were also shared with participants.

Public awareness is a very important issue in Madagascar given that crocodiles kill people, and that an effective conservation tool is to give crocodiles a value for trade.

With regard to Madagascar and CITES, the artisanal industry is an extremely important sector, particularly as it has changed over the years from a domestic market to one with potential for international markets. The DGF/CMU recognize that they must ensure that the artisans adhere to the national harvest quotas and size limits, which are important sources of data for Madagascar's Non-Detriment Finding (NDF). Once the industry is sustainable, the hope is that benefit sharing along the entire chain in Madagascar will become more equitable.

**Mozambique**

In addition to the crocodile projects carried out by the OCMP in the Okavango Delta, the team have also been working on crocodile research projects in Mozambique. Crocodiles were captures in the Urema, Umkombedzi, Vunduzi and Musakadzi Rivers within the Gorongosa National Park. The animals were sexed and blood and urine samples were taken for analysis, after which various morphometric measurements were recorded. A total of nine (9) crocodiles were captured from the boat (7), on foot (1) and in the trap (1). Eight of the nine crocodiles were tested for mercury in the urine, and only one of these, a 1.5m male, tested positive from the Urema River, below Lake Urema. It is interesting that the other crocodiles captured within close proximity of this one, did not exhibit detectable levels of mercury, which is considered to be a good sign for the health of the population. The team concluded that this 'mercury-positive' male crocodile was possibly a dispersing male, ie not from the same region as the other crocodiles.

The survey was carried out at the end of the dry season and water levels in the channels were very low. This low water level results in very large concentrations of crocodiles along specific undisturbed stretches of river. The team noted severe infestations of water hyacinth in most of the large water bodies. Brief discussions held with outside communities and wildlife scouts indicated that significant crocodile-human conflict still takes place along the Park's river boundaries.

**Namibia**

Since 2012 a Nile crocodile Management Plan has been drafted and implemented in Namibia. The Management plan consists of several objectives namely, ecological, economic, social and regional. Previous crocodile data were found to be outdated and crocodile numbers had to be re-evaluated. Recent aerial surveys have been used to estimate the abundance of Nile crocodiles in all of the Namibia crocodile inhabited river systems, Lower Kunene (Lyet *et al*. 2016), Okavango (Michaels 2011), Kwando and Mamili (unpublished data).

Crocodiles were found to be distributed throughout the Lower Kunene River system, which consists of several conservancies with minimal human occupants. In the Okavango River

system crocodiles show a preference to inhabiting the protected areas of the Mahango and Bwabwatwa National Park. The Okavango River supports a large number of people who have a negative impact on the river outside of protected areas.

Additional research on the Nile crocodile populations along the Lower Kunene and Okvagango River included population genetics studies to determine the diversity, population structure and phylogenetics of the populations (Versfeld 2016). The Lower Kunene and Okavango Nile crocodiles were found to be comparable to previously published neighbouring river systems (Bishop *et al*. 2009; Hekkala *et al*. 2010) and showed three sub-structured populations, with the Okavango river housing two populations as indicated by Short Tandem Repeats (STR) analyses, however the Lower Kunene and Okavango river systems did not show divergence as indicated by no mtDNA mutational differences. Furthermore, the Lower Kunene and Okavango individuals were compared to a Lower Shire (Malawi) sample set to indicate two separate lineages, (Lower Kunene-Okavango and Lower Shire lineage), both indicated by the control region mtDNA and STR analyses. This has previously been reported by the occurrence of two genetic clusters in Southern Africa (Hekkala *et al.* 2011).

Current ongoing projects involve a new concept for home-made, automated training devices to teach wild crocodiles to avoid the sound of bells. The study is currently ongoing and was initiated by Dr Patrick Aust to minimize human crocodile conflict in the country. Questionnaires on human crocodile conflict are being distributed along the Lower Kunene and Okavango River systems to investigate conflict between inhabitants and crocodiles. Water samples have been collected in the Lower Kunene and Okavango River to evaluate water quality and to determine if there is any concern of pansteatitis in Namibia.

Future work includes the identification of fish reserves in river systems relative to crocodile abundance for proposed crocodile protected areas. Primary nest site locations are being identified and the testing of new RFID tags with GPS capabilities carried out. Crocodile surveys along the Zambezi, Chobe and Linyanti River systems are planned for 2016. Also of interest will be confirmation whether the Nile crocodile can withstand the cold Atlantic Ocean at the Kunene River mouth by the use of GPS collars, the question being whether they are washed into the ocean or voluntarily swim out to sea.

**South Africa**

Repeated field studies, using detailed autopsy, histopathology, haematology and blood chemistry techniques, have been carried out (David Huchzermeyer) and results are showing an increasing prevalence of pansteatitis in African sharptooth catfish, *Clarias gariepinus* (Burchell), in the Olifants Gorge, an area where significant numbers of large Nile crocodiles *Crocodylus niloticus* (Laurenti) died of the same disease in 2008 and 2009. A detailed presentation of the research findings will be made during the CSG's 24th Working Meeting in Skukuza.

The National Exotic Leather Cluster (NELC) reported on previously has been formally constituted and was renamed Exotic Leather South Africa (ELSA). ELSA's mission is to position South Africa's exotic leather industry on the international exotic leather markets as a research-based, ethical and sustainable source of exotic leather with a commitment to delivering international best quality. ELSA is supported by the South African Department of Trade & Industry (DTI). In addition, and as part of ELSA's research into improved health and production systems, the University of Pretoria's Senate approved the establishment of the ***Exotic Leather Research Centre***, which will act as ELSA's technical collaborator. A Director

and Chairs have been appointed to focus on Crocodile Health & Welfare, Crocodile Production, and Exotic Leather Trade & Marketing.

In response to a call from the South African Department of Trade & Industry (DTI) for crocodile farmer representation within ELSA, the South African Crocodile Industry Association (SACIA) was established. The medium to long-term goal of SACIA is for every crocodile industry stakeholder in South Africa to join this body. ELSA and SACIA will use the opportunity of having numerous South African crocodile stakeholders together at the CSGWM 2016 to launch SACIA formally through their inaugural AGM.

ELSA and SACIA are currently drafting a Charter that will highlight the acceptable codes of practice in the crocodile industry, from farming to retailing. Animal welfare will comprise an important part of the Charter; the ethics of crocodile farming practices was in the media spotlight in 2015. The Charter aims to include the provisions of the existing SA National Standard on crocodile farming and provide directives on the minimum acceptable practices in the production cycle of the Nile crocodile through to the processing and retail stages. Its intended audience includes persons or organisations involved in the crocodile industry, as well as scientists and welfare experts. The Charter is not intended to replace the SABS standard on crocodiles in captivity but will act as a supplement (ie to cover matters not addressed in the Standards) and to include the entire value chain.

ELSA has established eight working groups: Tanneries; Manufacturing; Marketing & Trade; Health, Welfare & Production; Education; Community Development; Information Technology; Administration & Finance. Further information on ELSA's functions and planned projects can be obtained through the CSG's East & Southern Africa regional office.

SACIA is carrying out survey to ascertain the total number of crocodiles being farmed in South Africa. Results are expected in 2016.

**Uganda**

Samuel Amanya from the Uganda Wildlife Authority reports that recent activities in Uganda have focused principally on human crocodile conflict. Almost 100 crocodiles have been captured from a variety of lakes, rivers and swamps, and were relocated to Murchison Falls National Park (MFNP), which remains Uganda's crocodile hub (Uganda's sole crocodile ranch sources its crocodile eggs from MFNP).

HCC mitigation measures have been implemented in Uganda, with fences set up along selected rivers and lakes to protect fishing communities. HCC and fisheries activities are the two main threats to Uganda's crocodile conservation efforts. For example, crocodile surveys over the past five years in Lakes George, Edward and Mburo, the Kazinga Channel, Victoria Nile (Park), and Kidepo National Park have shown viable (and emerging) populations, whereas in Lake Victoria, where fishing activities are at their most intense, crocodile populations appear to be under pressure.

The Uganda Wildlife Authority (UFA) is planning to carry out a habitat suitability assessment in May 2016 to identify suitable 'safe' lakes (ie with limited HCC) where approximately 200 ranched crocodiles (1.5-2 m TL) can be released. But first the UFA aim to carry out a habitat (for release) suitability assessment (in May 2016). The Authority specifically thanks Dr. Alejandro Larriera for the training he provided on release skills and crocodile conservation issues.

**Zambia**

Vincent Nyirenda from the Department of Zoology and Aquatic Sciences at the Copperbelt University in Kitwe published a report on the population surveys he carried out in four areas in the Lower Zambezi to ascertain populations under different protection regimes (Herpetological Conservation and Biology 10(3): 874-882). High encounter rates coincided with high protection status along the river reaches (and vice versa), with a mean Nile crocodile count for reaches with national parks flanks of 20.62 +/- 0.44 crocodiles/km, and an overall mean for non-protected areas of 7.45 +/- 0.76 crocodiles/km of river. Further studies are needed to ascertain the impacts of protection regimes on persistence of crocodilians.

**Prepared by:** Christine Lippai

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