Agenda Item: SC. 2.2.

Crocodile Specialist Group Steering Committee Meeting
Double Tree Hilton, Darwin, Australia
(15 April 2024)

West and Central Africa

The West & Central Africa region (WCA) continues to advance its primary missions of: 1) better understanding crocodiles, their conservation and management needs throughout WACA; and, 2) attracting local personnel/organizations and developing capacity for crocodile work within the region. Since the last CSG working meeting (Chetumal, Mexico, 2022), we have been productive to these ends. Here we recount some of the events over the last two years.

Retirement of Regional Vice Chair: We said farewell to Christine Lippai, who stepped down as regional Vice Chair after nearly a decade of service to the region. Throughout her tenure as part of the WCA leadership team, Christine was instrumental in bringing increased attention to the region. In particular, she played critical roles helping to organize and implement our second (2010, Burkina Faso) and third (2015, Cote d'Ivoire) regional meetings. And was instrumental in bringing range State leadership to our team. We would like to thank Christine for all her valuable contributions to helping build up and support the WCA region throughout her tenure. We look forward to continuing to work with her through the Executive Committee.

Red List Assessments: WCA is one of the most diverse regions for crocodylian species, housing all seven of Africa's crocodylians. Since 2022, our regional leadership team has submitted assessment drafts for the West African slender-snouted crocodile *Mecistops cataphractus* (CR) and the Central African slender-snouted crocodile *M. leptorhynchus* (EN) - the first ever review for the latter. We are currently working on the assessment for the West African crocodile *Crocodylus suchus* (VU) and the Congo Dwarf crocodile (*Osteolaemus osborni*), also their first assessments and inclusion on the IUCN Red List. We anticipated that these assessments would be published on the Red List in 2022, but there have been delays. Part of the issue has to do with availability of the regional leadership team to move them forward, as well as changes in CSG's Red List team and their availability. But much of the issue has to do with building regional capacity to implement IUCN's Assess, Plan, Act cycle. We are using these assessments as opportunities to train CSG WCA members in Red List assessment methods - which can take considerably longer. We are hopeful that all will be submitted and published in 2024.

Conservation Action Plans: Conservation action plans have been in development for all 6 crocodylian species in the WCA region. For four of these species, *O. osborni*, *O. sp. nov. cf. tetraspis - West Africa*, *M. leptorhynchus* and *C. suchus*, this is the first time that they will be represented by CSG-produced action plans. And, for 5 of the 6 species, this is the first time that the action planning process is being led by range State CSG members working on these species. We were hopeful that they would be available as of 2022, but the work is advancing slowly. A recent SSC EDGE internal grant to the WCA region for *Osteolaemus* will certainly facilitate finalization of the plans for these species.

Updated Crocodylian Taxonomy: Since the early 2000s, increasing evidence has been found for the existence of cryptic crocodylian species from Africa, specifically the West and Central African region. There is now strong support for 7 crocodylian species on the continent. The formal resurrection and updated description of the West African crocodile *C. suchus* is still underway, though this species is now so entrenched in the literature this is just a formality. The genus *Osteolaemus* contains three taxa, with prior names available for all. Two of these, *O. tetraspis* and *O. osborni* are sufficiently entrenched in the literature, but the third taxon from West Africa Ghana westwards has yet to be formally resurrected in the literature. A formal description and systematic revision of the genus *Osteolaemus* is currently in the works as a collaborative effort amongst various CSG WCA members and we will be presenting updates on this during the working meeting.

Regional Capacity-building Program for Underrepresented Species (including crocodylians): Since 2022, M. Shirley and E. Amoah have been running a conservation science and planning program to support about 40 junior scientists from West and Central Africa as they build or reinforce their capacity to implement science and plan for conservation action for crocodylians and other underrepresented species. The 25 participants that continue in the program represent seven countries in the region. Two groups are getting ready to start implementing research projects on dwarf crocodiles, both of which will help fill significant knowledge gaps on these species.

Documentaries*:* One documentary was filmed on African Dwarf crocodiles in Gabon, again focusing on the unique population of cave-dwelling crocodiles in the Abanda cave system. This was filmed for the upcoming BBC series *Home* and will likely air in 2025.

We attach below the reports of some of the people working in these countries on crocodiles. In addition, we are aware of the following burgeoning or underway projects in this region:

- **Congo:** WCS is implementing a Key Biodiversity Areas (KBA) initiative in Congo and included *Mecistops* and *Osteolaemus* as potentially critical species triggering recognition of KBAs. The results are likely to be available in 2024 or 2025.

- **Gambia:** The NGO Project Wild Gambia continues its work around the country and has documented dwarf crocodiles in several sites that they were previously not known to inhabit. There are long-term plans to rehabilitate some of the habitats that favor this species to improve its conservation outlook in the country. And there are plans to repeat surveys in the River Gambia National Park to determine the status of *M. cataphractus* there since it was last seen in 2008, but as yet these efforts have not yet been implemented. Roy Armstrong, formerly of the University of Cumbria, is the lead point of contact.

- **Guinea:** Development of the Simandou Bauxite Mine in the Fouta Djallon highlands started again, including environmental impact assessments for the railway and port that will be used to export the ore. WCA members Michel Ahizi and Matt Shirley participated in the EIAs for the port, assessing the *C. suchus* population and its vulnerability to port development. Crocodiles continue to be widely, if not sparsely, distributed across the coastal area. Though no signs of *Osteolaemus* were detected, in contrast to similar efforts in 2012.

- **Guinea:** The potential presence of *Mecistops* in the region of Bankan triggered the need for surveys as part of the ESIA for a large industrial gold mining project. WCA members Christine Kouman and Matt Shirley facilitated this effort, but ultimately only found *C. suchus*. The areas are not likely to support the Critically Endangered slender-snouted crocodile.

- **Liberia:** In August 2023, a group of Critically Endangered *M. cataphractus* was confiscated by the Liberian Forestry Development Agency from a private citizen and transferred into the custody of the Libassa Wildlife Sanctuary. WCA Chair Matt Shirley coordinated between these stakeholders to guide their successful reintroduction back into the Gola Forest National Park. Surveys are needed in this part of Liberia to evaluate the continued presence of a small population of this species.

- **Senegal:** In collaboration with the NGO Panthera, who is in a co-management agreement with the Senegalese Government for Niokolo Koba National Park, the Project *Mecistops* team implemented surveys in search of *Mecistops* and *Osteolaemus*. Neither of these species have been documented in the area since the 1960s. We surveyed 72 km of riverine habitat, including the Gambia River, and four of its tributaries draining the central plateau of the park. We did not detect any *M. cataphractus* or *O. tetraspis*. Interestingly, the habitat along the Gambia River and its tributaries was suitable for nesting, providing the riparian forest needed by these species. However, the nighttime temperatures were quite low, around 15ºC, which is likely lower than the minimum threshold for either species. Unfortunately, we can likely declare both species as absent from the park and it is unknown if this represents local extinction or simply erroneous historic reporting. This also unfortunately means that *M. cataphractus* can most likely be declared eradicated from Senegal nationally. In contrast, we detected 432 *Crocodylus suchus* individuals ranging in size from yearlings (<0.5 m) to 3.5 m TL (Table 1). Happily, this population is one of the best thus far observed and surveyed anywhere in this species' distribution and we can consider Niokolo Koba National Park a stronghold for *C. suchus*.

- **Zambia:** Not strictly in the WCA region, but it was brought to the attention of Alison Leslie, who contacted M. Shirley, by African Parks that local community leaders around the Benguela wetlands believe there to be *M. leptorhynchus* present. There are no previously confirmed records for this species in that area, but it all connects to the Luapula River from which there are Zambian records. No further information is available at this time. As far as we know, efforts by Gladys Kasabo and Carl Huchzermeyer to locate this species in other parts of Zambia has yet to pay off.

Individual country reports can be found below.

Prepared by: Matthew Shirley
Date prepared: 7 March 2024

Benin

- **Two papers published from** R. Bio Ouré PhD thesis. PhD defense planned in June 2024 at the University of Abomey Calavi. Supervisors : Dr Nathalie Kpéra and Prof Kassa
- **Two papers under review**

R. Bio Ouré, G.N. Kpéra, C.A.M.S. Djagoun, B. Kassa, A. Natta, J.G. Djego, E.A. Eniang, G.A. Mensah, B. Sinsin (2023). **Does Crocodile Conservation Matter in Sacred Natural Sites of Benin (Western Africa)?** *West African Journal of Applied Ecology* 31(2): 69-85.

Abstract: Crocodiles are protected species present in Sacred Natural Sites (SNS) in Benin.The impact of SNSs on the conservation of crocodylians in Benin were carried out by (i) assessing the extent to which anthropogenic activities affect crocodylians' population, and (ii) analysing the impact of social and religious changes for the conservation of crocodylians over a timescale. The characteristics of the crocodile population and habitats in 11 SNSs during daytime and night were also provided. Semi-structured interviews with 330 respondents were conducted and land use/land cover changes with 2000 and 2020 remote sensing data were analysed. The West Africa crocodile (*Crocodylus suchus*) was recorded in 81.8% SNS and consisted of 61.5% hatchlings, 15.6% juveniles, 11.85% subadults, and 11.1% adults (N= 135 crocodiles). With increasing degradation of natural ecosystems and increasing settlements/agricultural lands, there has been a significant decrease in crocodile abundance and extirpation (18.2% SNSs). Communities perceived crocodiles as sacred, a link with ancestors, the god of fertility, and a way to preserve water. Nevertheless, respondents also perceived the negative impact of introduced religions (70.9%) and no longer worshiped sacred crocodiles (52.7%) due to religious prohibition. Raising awareness, and participatory management of SNSs with the communities would help to mitigate the threats.

R. Bio Ouré, G.N. Kpéra, C.A.M.S. Djagoun, B. Kassa, A. Natta, G. A. Mensah, B. Sinsin. (2023). **Population patterns of the West African crocodile, Crocodylus suchus (Saint-Hilaire, 1807) in the agropastoral dams of Benin.** *Annales de l'Université de Parakou - Série Sciences Naturelles et Agronomie*

Abstract : Agropastoral dams (APDs) are popular methods of providing communities with permanent water during dry season. We provided insight into the impact of APDs for crocodilians conservation in northern Benin in the Sudanian ecological regions over the last two decades by (i) establishing shift in geographic distribution with ArcGis 10.4 and habitat-lost rate (HLR), (ii) assessing population structure (hatchling, juveniles, sub-adults, adults) and abundance, and (iii) analysing drivers of population decline through dam users' perception and Land Use Land Cover Change. Geographic coordinates were recorded with GPS during field surveys for mapping geographic distribution. Population structure and abundance were established respectively with day binocular counts and night spotlight surveys. Each crocodile was classified based on its total length. We interviewed 370 dam users selected by snowball technique around 25 APDs. The number of crocodiles APDs decreased up to 59% HLR. The population structure of the west Africa crocodile (Crocodylus suchus) recorded, showed significant difference between age classes (Kruskal-Wallis chi-squared= 7.96, DF= 3, P= 0.046) that were 4.2% hatchling, 8.3% subadults and 87.5% adults. Day counts showed significant difference between the year 2002 and 2020 (Kruskal-Wallis chi-squared = 6.9325, df = 1, p-value= 0.008464) revealing a significant population decrease. Dam users' perception varied significantly according to the period (P<0.001) and they perceived a decrease in crocodiles' abundance. Poaching (72.7%), prey depletion (71.4%), habitat degradation (63.5%) and negative perception (51.1%) were the main drivers of crocodile populations decline. The threats that face *C. suchus* call for enhancing their conservation by local authorities and forest administration.

- **One (01) PhD thesis started in January 202 at the Agricultural University of Kétou (BENIN)**

Supervisors : Dr. Nathalie Kpéra & Prof. Djossa

Title: Improving crocodile husbandry in Benin

Abstract: This research work aims at providing crocodile farmers with a technical framework (a crocodile breeding guide) in the Beninese context with a view to improving the management of crocodile breeding in captivity in Benin. Specifically, this will involve: i - georeferencing crocodile farms in Benin; ii- to characterize crocodile farms in Benin, iii- to make a typology of crocodile farms, iv- to identify the state of health of crocodiles held in captivity in Benin, v- to identify problems encountered in the farms and the solutions applied, vi- and to develop a technical guide to crocodile breeding. The beneficiaries of the findings of this research are the breeders and agro-breeders (men and women) of crocodiles in captivity, the researchers, the political decision-makers with a view to their use to promote husbandry in Benin.

Prepared by: Nathalie Kpera
Date prepared: 25 January 2024

Burkina Faso

For 2022, we were able to carry out two field trips with students to raise awareness of crocodile conservation measures in times of insecurity at the Kanazoe reservoir in Oauhigouya and the Baoule sacred crocodile river in the center of the country. Given the security situation, illegal crocodile harvesting is on the increase in many parts of Burkina Faso.

In addition to the field trips, we gave an oral presentation on the crocodiles of Burkina Faso at the University of Fada N'Gourma during the scientific days titled "Distribution of *Crocodylus suchus* (Geoffroy Saint-Hilaire, 1807) and human-crocodile relations in Burkina Faso".

We published an article on the "Impact of Anthropogenic Activities on the Abundance of Crocodylus suchus (Saint-Hilaire 1807) within the Nazinga Game Ranch, Burkina Faso". Open Journal of Ecology 12: 788-803. *https://doi.org/10.4236/oje.2022.1212046*

Prepared by: Ilassa Ouedraogo
Date prepared: 30 January 2024

Cameroon

La Cameroon Reptiles and Ecosystems Valorisation Society carried out several activities at the end of 2022 and beginning of 2023 as part of the crocodile research project following the recommendations of Professor Ekke Waitkuwait (wewaitkuwait@gmail.com) in Agenda Item SC. 2.2 by Dr Matthew Shirley, Regional Chair West and Central Africa published on 2 July 2022.

1. Bioecological characteristics of the crocodiles of Lake Boboyo in Kaélé

The study of the bioecological characteristics of crocodiles present in Lake Boboyo was carried out from 5-26 February 2023 by David Makongo, Evrad Medjo, Stéphane Tchakoudeu from CREVS in collaboration with wildlife officers from the Kaélé forestry station and the Association Cameroon Tour. Lake Boboyo is located in the Locality of Kaélé, Arrondissement of Mayo-kani, Northern Region near Chad. Created in 1986 as part of the stone quarry, Lake Boboyo has an average temperature of 31°C, an average depth of 71 m and not far from homes. From direct observations at night, using lighting lamps and the reflection of the eyes, we counted approximately 74 crocodiles distributed as follows: 28 adults, 22 sub-adults and 24 juveniles. The crocodile identification keys from several crocodile specialists allowed us to conclude that it is a species of crocodile, namely: the suchus crocodile (*C. suchus*). Their presence is believed to be due to involuntary introductions during floods from the tributaries of the Bénoué River. Several species of Cichlidae (Tilapia), Clarias (catfish), and crabs are present in the lake. The study of the socio-cultural aspects of the crocodiles of Lake Boboyo reveals good coexistence with the surrounding populations and no loss of human life has been deplored for years due to the crocodiles of the lake. Several research projects are planned from March 2024.

Left: A crocodile in Lake Boboyo. Right: Lake Boboyo.

2. Agreement between CREVS and INSTITUTE OF FISHERIES AND AQUATIC SCIENCES AT YABASSI (I S H) for the study and research on Nile crocodiles in the zones: (NKAM – Wouri) and (Douala- Edéa)

The Terms of Reference for teaching and research on Nile crocodiles to students of the Institute of Fisheries and Aquatic Sciences at Yabassi (ISH) proposed by the CREVS Coordinator, David Makongo, were validated by Professor Tomedi Eyango Minette (Director of ISH) during a consultation meeting held on 20 November 2023. It will be a question of providing the course on the domestication of African crocodiles in particular:

- General morphology of the species: *O. tetraspis*; *C. suchus*; *C. niloticus* and *Mecistops*
- Habitat, diet, reproduction, threats and status of species

- Species distribution, inventory and management of crocodiles
- Captive breeding of crocodiles.

Students will carry out scientific research during their various academic internships either at the CREVS or the ZSL in Edea. Thus, this work will allow better knowledge of African crocodiles and significant advances for scientific research in Camaroun. Through CREVS, we continue to monitor wild crocodile captures in the Nkam-Wouri area and raise awareness among local populations.

Prepared by: Stéphane Tchakoudeu Kehou, David F. Makongo Ndilock and Evrard Kouopestchop Medjo
Date prepared: 30 January 2024

Cote d'Ivoire

Over the last two years, crocodile conservation in Côte d'Ivoire has significantly improved due on various activities ranging from captive breeding to tourism based on crocodiles. Efforts were mainly focused on *Mecistops cataphractus*. We briefly synthetise some key activities undertaken during this period.

Activity 1: Merging bioacoustic and camera trap approaches to inform the critically endangered West African slender snouted crocodile (*Mecistops cataphractus*) nesting behaviour. Throughout this study, we aim to identify *Mecistops cataphractus* nesting behaviour from camera traps and audiomoths data. We will determine both nest-guarding female defence-related visual displays and vocalisation patterns.

Picture1: Camera trap and audiomonth deployed in *Mecistops cataphractus* nesting area in Taï National Parc

Activity 2: Identify knowledge, perception and attitude of locals toward crocodiles around Taï National Park and Voluntary Reserve of Grand-Béréby. We carried out focus groups, participatory ethnography and semi-structured interviews in ten villages (five in each study area) to understand interactions between crocodiles and all stakeholders. We found that people are less tolerant of crocodiles due to their perceived dangerousness, they have no information on their environmental role nor their touristic value. However, in all targeted villages, crocodile bile is believed to be very poisonous, and an extant local law requires a person to inform local authorities for each crocodile caught by a villager, so that they can proceed to a public destruction of the bile. This traditional belief limits threats on crocodiles, providing an indigenous conservation strategy of *M. cataphractus* and *C. suchus*, but does not extend protection to the dwarf crocodile because their bile is not considered as poisonous.

Activity 3: Technical assistance for safeguarding crocodile populations during a dam construction. A private enterprise called IHE (Ivoire-hydro Energy) is building a new dam on a section of the Bandama River inhabiting individuals of *Mecistops cataphractus*. We conducted multiple surveys to capture all crocodile species in the vicinity of the dam construction area. Crocodile individuals were translocated and kept in the Abidjan Zoo before their release in a safe site. We recorded nine individuals of *M. cataphractus* and two dwarf crocodiles. Based on the ecology of both species; we plan to reintroduce them with some individuals from our breeding program in a secured zone for over 10 years of monitoring.

Activity 4: Captive-breeding program in Abidjan Zoo. During the 2022 and 2023 breeding season, *Mecistops cataphractus* females laid a total of 198 eggs. 148 eggs were fertile, and we recorded 56 hatchlings. To date, 10 individuals from the 2022 hatch and 25 from the 2023 breeding season have survived.

Activity 5: Empowering crocodile conservation through ecotourism in the first marine protected areas of Côte d'Ivoire. We trained eight people of Mani-Bérébi village to conduct daytime and nocturnal crocodile surveys for tourists. This

activity has improved the understanding of the local community members on the economic value of crocodiles, ensuring their conservation by locals. We currently have one boat and received our first tourists visit, with enthusiasm.

Picture 2: Training session with locals from Man-Bérébi village and first tourist visit in the first marine protected areas of Côte d'Ivoire.

Prepared by: Michel Ahizi and Christine Kouman
Date prepared: 15 February 2024

Gabon

The Smithsonian Gabon Biodiversity Program (GBP) is supporting high environmental standards and biodiversity conservation activities in the Assala Gabon Biodiversity Management Plan through biodiversity project research and monitoring of focal taxa, including hippopotamus, forest elephants and crocodiles in the Gamba Complex of Protected Areas, SW Gabon. Regarding crocodiles, the project includes:

1. **Nesting ecology of West African dwarf crocodiles (***Osteolaemus tetraspis***) in the vicinity of the oil production gathering terminal in Gamba, Gabon**

   Status: Nests detection, although no nests were detected in 2022.
   Aim: This study aims to investigate nesting ecology of *O. tetraspis* to understand the species ecology for best practise development and conservation awareness.
   Progress: The 12 missions of 62 linear km (covering 16 km^2) from May 2022 to December 2022 revealed no nests. Night patrols will be necessary to track the presence of hatchlings in the study area to confirm the presence or absence of nesting in the survey area. In December 2023, we found a dead specimen in a swampy Raphia forest (Figure 1), which reinforces the idea that they are present but in remote locations.

2. **Nile crocodile nest monitoring of Nile crocodiles (***Crocodilus niloticus***) in the south of the Gamba Complex of Protected Areas. Gabon**

   In 2022, the GBP found six Nile crocodile nests on the Mouambi river, six others at Malabi and one at Ipadou, both on the Ndougou Lagoon and nothing at the Nyanga river mouth. From the 13 nests detected, only one hatched on the Mouambi River and the other five were destroyed by monitor lizards. On the Ndougou Lagoon, the seven nests were all human predated.

For both species, the African Dwarf crocodile and the Nile crocodile, the negative results urged us to raise an awareness campaign in 2023 in order to value the crocodiles in the ecosystem where they occur (Figure 4). In August 2023, we designed an awareness poster (Figure 5), as part of the campaign for crocodile conservation in the southern part of the Gamba Complex. The poster highlights all three species of crocodile in Gabon, that they are integrally protected but they are threatened either by predation or collection of their eggs, bycatch, or illegal hunting. At the same time, the poster indicates the important roles crocodiles play in their respective ecosystems - ones which people also depend on.

A month later, the GBP team organized and led a workshop on crocodile conservation to start preparing the awareness campaign on crocodile conservation in the Gamba Complex in collaboration with local conservation actors. Nine representatives of all local conservation partners involved participated at the workshop (2 local NGOs: Kussu and Diboty Conservation, the ministries of water and forests and of fisheries and the national park agency). The poster distribution and awareness campaign were carried out with these collaborators. We also made wooden panels to display posters for visual awareness in the vicinity of the nesting sites where eggs had been illegally harvested. In total, we reached 165

fishers and families in 23 camps and villages across Ndougou Lagoon and Nyanga River. We also erected five awareness signs on the hotspots.

The joint awareness campaign involved 18 members from eight institutions including the National Park Agency, Water and forest Brigade and local NGOs. During the campaign, the team discovered that crowbars were used to dig for crocodile eggs (Figure 3) and trapping crocodiles on the Ndougou lagoon nesting sites also occurred (Figure 2). This really reinforced the necessity of intensive awareness and a call to action by the rangers to start prosecuting offenders.

In November, we contributed to a social media event organized by the Crocodile Research Coalition which was named "28 days of CROCmas". For this crocodilian outreach campaign, information and status of one of 28 crocodile species was published on Facebook on 28 days in December. The GBP contributed to raising awareness of the Nile crocodile (*Crocodylus niloticus*) found in Gabon and can be found here.

Regulatory changes
Since 2011, the three crocodile species enjoyed full protection throughout the territory meaning that their hunting, capture, possession, commercialization and transport was strictly prohibited, and therefore punishable by law, except upon issuance of a scientific hunting permit and scientific capture permit (Article 92 of the Forest Code; Decree No. 064/PR/MEF of January 19, 2011 on the classification and killing latitudes of animal species).

Currently, a new law, Decree no. 0040 bis PR/MEFPECCHF November 2, 2023 classifying wild animal species is being enacted. Within this law, Article 4b, declassifies the status of the African Dwarf crocodile from full protection to partial protection. This means that they can be hunted, captured, possessed, commercialised and transported from 16 March to 14 September during a defined hunting season. We are still awaiting information on whether quotas will be enforced. There is considerable cause for concern, as the species was already heavily hunted even when fully protected. The lack of information on the ecology of the species *Osteolaemus tetraspis*, coupled with poor law enforcement, could further decrease the species population in the country. This is especially so, since the African Dwarf crocodile is one of the top bushmeat species consumed in Gabon.

Figure 1: Dead Dwarf crocodile

Figure 2: A Nile crocodile trap in Malabi

Figure 1: Nile crocodile nest dug in Ipadou

Figure 4: An awareness campaign

Figure 5: Crocodile awareness poster

Prepared by: Elie Tobi
Date prepared: 26 January 2024

Ghana

Over the past two years, Ghana's crocodile work has focused on building strong grassroots support for crocodile conservation through stakeholder engagement, exploring the potential of urban ecology, and discovering and safeguarding

significant populations. Through this broad aim, we worked with local communities to mitigate habitat threats, rehabilitate degraded nesting areas, train 24 local volunteers to support our conservation initiatives and support four undergraduate students to successfully conduct their thesis research on crocodiles.

One of the most exciting news from the last two years is that our team is working in partnership with the Rainforest Trust to create Africa's first crocodile protected at the upstream portion of the Tano River. The creation of the Tano River Crocodile Sanctuary will safeguard a 40-km stretch of the Tano River with an estimated riparian buffer of 971 acres, which currently harbours the largest known population of the Critically Endangered West African slender-snouted crocodile outside protected areas. In 2022, one of the members of the Ghana crocodile team, Emmanuel Amoah, was recognized by the UK-based charity, the Whitley Fund for Nature, for his outstanding contribution to the conservation of the Critically Endangered West African slender-snouted crocodile in the Tano River. Overall, the period under review has been very inspiring for crocodile research and conservation in Ghana. Below are the brief highlights of the projects initiated in the last two years.

1. Creating the Tano River Crocodile Sanctuary, Ghana

Status: Ongoing
Aim: This project aims to secure legal protection of a 40-km stretch of Tano River through the creation of a 40-m riparian buffer to safeguard the habitat of one the known significant populations of the Critically Endangered West African slender-snouted crocodile.
Progress: There have been comprehensive ecological studies about the population, distribution, and threats of West African slender-snouted crocodiles at the site and findings indicate the site is suitable for the creation of a sanctuary. There have been a series of stakeholder engagements including landowners, traditional leaders, government institutions, and general host community assessments to determine local acceptance of the creation of the sanctuary**.** Our meetings with these stakeholders have had positive outcomes and a clear indication of local support. We are currently working with host communities to develop by-laws that will guide the establishment of the sanctuary.

2. Safeguarding the last stronghold of West Africa slender-snouted crocodile in Ghana

Status: Ongoing
Aim: The goal of this project is to address the habitat threats faced by the West African slender-snouted crocodile in the Tano River by fostering grassroots engagement, enhancing local capacity through volunteer training, and restoring degraded nesting areas through tree planting.
Progress: Through this project, 24 local volunteers have been trained in crocodile conservation including night surveys and nest monitoring, over 5000 indigenous trees have been planted across critical nesting habitats, and over 2000 locals have been educated through awareness campaigns. The awareness campaigns have reduced riparian vegetation by over 50% over the past two years.

3. Nesting Ecology of West African slender-snouted crocodiles in the Tano River, Ghana

Status: Ongoing
Aim: The project seeks to investigate the nesting habitat requirements, nesting success, and incubation temperature of West African slender-snouted crocodile.
Progress: Through this project, we have recorded 36 nests, identified critical factors influencing West African slender-snouted crocodile nest site selection, and determined incubation temperature as well as the influence of external temperature on nests.

4. Scaling Up the Conservation of West African Slender-Snouted Crocodiles in the Obuasi Municipality

Status: Ongoing
Aim: This project aims to restore degraded critical nesting habitats of West African slender-snouted crocodiles along the Jimi River in Obuasi.
Progress: Over 2000 indigenous trees have been planted across identified critical nesting areas. The trees are currently being monitored to ensure fast growth and high survival rate.

5. Urban ecology and Conservation of the West Arican Dwarf Crocodile in the City of Kumasi, Ghana

Status: Ongoing
Aim: Promote crocodile conservation in urban ecosystems which are as equally important as the non-urban ecosystems.
Progress: Investigated the population structure and encounter rates of the West African dwarf crocodile in urban landscapes, which have been neglected in research due to their perceived lack of biodiversity. The study was conducted in six purposively selected urban centres in the Kumasi metropolis of Ghana, where surveys were

conducted using interviews, literature review, and standard nocturnal crocodile survey methods. The study found no significant difference (H= 6.88, df= 4, P= 0.143) in encounter rates when compared with the findings of similar studies conducted on the species in its non-urban ranges, with the mean encounter rates varying significantly (H= 18.95, df= 5, p= 0.002) across the different freshwater habitats, ranging from 2.000±0.540/km in KNUST campus to 0.063±0.125/km in the Complex (Uaddara Barracks) site. The population structure composed of all the three major size classes dominated by adults and hatchlings (41.176% [n= 28]; and 39.706% [n= 27]) followed by juveniles (19.118% [n= 13]) although did not vary significantly among sites, as well as when compared with similar studies on the species. Factors (habitat characteristics) that influence the distribution (abundance) of the species included opened canopy, closed canopy, dredged sites, agriculture land, settlement, and grassland, with closed canopy recording the highest abundance. The study underscores the significance of conserving habitats with forest fragments in urban areas for West African dwarf crocodile management programs, offering essential baseline data for policymakers to develop sustainable urban management strategies that prioritize biodiversity and support inclusive urban development.

Next Step: Creation of riparian buffer and habitat expansion through restoration at the Kwame Nkrumah University of Science and Technology in the Kumasi city.

6. Survey of Crocodile Trade in Ghana: Case of Kumasi, Tamale, and Accra Markets

Status: Completed
Aim: Obtain first-hand knowledge and understanding of crocodile trade in Ghana
Findings: Various parts of all three different crocodile species were recorded from the three markets surveyed. Crocodile parts were sold by some specific people within the markets and 100 people were interviewed 40, 30, and 30 from Kumasi, Tamale, and Accra respectively. The parts included the skin, feet, teeth, bile, and excreters. The dominant part commonly traded was the skin followed by the feet and bile mostly coming from the dwarf crocodile. No crocodile meat was recorded at the meat markets surveyed. When asked about the sources of those crocodile parts, most of the respondents replied that they have contacts around the country, mostly hunters and farmers, who supply the parts. The respondents also confirmed that the meat is sometimes either eaten by the killer or by individuals who eat crocodile meat or sold at local markets. We realized that the parts are not sold anywhere across the cities studied but rather found at the traditional medicinal markets within these cities. Kumasi which is the second largest city in Ghana after Accra recorded the highest number of individuals who sell crocodile parts.

Crocodile skin on display at traditional medicine shops in Kumasi Central Market.

7. Assessment and Strengthening of the Local Protection of the Vulnerable West African Dwarf Crocodile in Payinammisa, Ghana

Status: Ongoing
Aim: Build local capacity and capitalise on traditional beliefs to promote community-based protection of the West African dwarf crocodile

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Date prepared: 1 February 2024

Sierra Leone

Three species of crocodiles are known to occur in Sierra Leone, including the West African crocodile (*Crocodylus suchus*), West African dwarf crocodile (*Osteolaemus* sp. nov. cf. *tetraspis*) and West African Slender-snouted crocodile

(*Crocodylus cataphractus*) (Zug, 1987; Okoni-Williams *et al.* 2004; Aruna *et al.* 2013, 2014, 2015). The occurrence of these species in Sierra Leone is now confirmed by research and therefore widely believed that the Dwarf crocodiles occur in a large number at the Mamuta Mayosso Wildlife Sanctuary (Okoni-Williams, et al 2004). The species also occur in other areas, sparsely distributed in streams, estuaries and other wetland areas in Sierra Leone.

According to biodiversity assessment surveys carried out by various institutions including the Reptile and Amphibian Program – Sierra Leone (RAP-SL), Save the Crocs Initiative, Conservation Society of Sierra Leone (CSSL), Wildlife Conservation Division of the Forestry Department at the Ministry of Environment, Institute of Marine Biology and Oceanography (IMBO), and results of Environmental and Social Impact Assessment (ESIA) studies carried out around the country by various consultancy firms, crocodiles are known to occur in many parts of the country. Of the known three species, the Dwarf and West African crocodiles are the most common species.

Though crocodiles are particularly hunted for meat within the southern region of Sierra Leone, they are not targeted in the northern region. Generally, juvenile crocodiles sometimes entangle in local fishing nets and once trapped or found astray due to extensive flooding; they are either kept as pets or killed. This happens because locals are not adequately aware of the laws that prohibit them killing or keeping crocodiles as pets in Sierra Leone. This situation resulted in the establishment of the "Save the Crocs Initiative Sanctuary" which caters mainly for confiscated juvenile crocodiles comprising largely of West African Nile and Dwarfs from around the country. Others isolated cases include three domestic pet facilities known to exist in Bo (Western African Crocodile), Eastern Freetown and Kenema. There still remain to be one that has been habituated in the Western Area Peninsula Forest at Tokeh village. (https://www.youtube.com/watch?v=VpiCZgMg-2E).

In order to curb these situations, the Wildlife Conservation Unit at the Forestry Department under the Ministry of Environment has, over the years, been working on improving and enacting the Wildlife Conservation Act of 1972. The document has been updated and enacted. All species of crocodiles in Sierra Leone are included as prohibited and protected animals. This status however accords them protection and conservation, but at present there is particularly no special prioritized research on the species. RAP-SL, a biodiversity conservation NGO, is undertaking low key survey of all reptile species in the country during its field trips and ESIA consultancy surveys. The Forestry Department at the Ministry of Environment is with the full intention of assessing the biodiversity status of all protected areas and also ensuring that all protected/prohibited species are protected together with their habitats.

Being that the wildlife laws of Sierra Leone still continue to prohibit the keeping of crocs as pets, some locals have abstained from the keeping of crocodiles as pets. For all species in captivity, there is a continuous effort in identifying suitable sites for their release into the wild though this still remains a challenging issue at present.

There is presently no dedicated survey, monitoring or research on crocodiles in Sierra Leone, with all reports about their occurrence being incidental and anecdotal. RAP-SL is presently searching for funds for a national survey of reptiles and amphibians of Sierra Leone in order to establish a comprehensive list of reptile and amphibian species of Sierra Leone with enough evidence including photos and videos where possible. In the interim, RAP-SL is documenting reptiles and amphibians across the country through opportunistic encounters and ESIA surveys. In RAP-SL's many survey trips around the country in 2023; there hasn't been any report of crocodile meat sales in marketplaces around the country.

At a regional level, the need for crocodile protection and implementing projects for their conservation is invaluable. Sierra Leone is working towards the conservation of the species, since they have been included in the wildlife conservation act and also at local level, community leaders have by-laws in place that cater for the protection of crocodiles in many communities in Sierra Leone.

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Date prepared: 27 January 2024