

Crocodile Specialist Group Steering Committee Meeting
Universidad Nacional del Litoral, Santa Fe, Argentina
(6 May 2018)

Latin American and the Caribbean

Argentina - Information provided by Pablo Siroski, Carlos Piña, and Alejandro Larriera ¹ (¹We thanks for Walter Prado for information on skin exports)

In Argentina, same amount of ranching operations (7) registered programs at the Federal Government: 2 in Province of Formosa and Corrientes, and 1 in Provinces of Chaco, Entre Ríos and Santa Fe. The program from Entre Ríos still has only educational purpose and similar case for the program from Chaco but the purpose is tourism. All of these operations collect eggs of *Caiman latirostris* and *Caiman yacare* except Santa Fe and Entre Rios that only collect *C. latirostris*' eggs. The numbers of the two last ranching seasons were:

Province	Nests				Eggs collected				Hatching			
	2016/2017		2017/2018		2016/2017		2017/2018		2016/2017		2017/2018	
	<i>C. yacare</i>	<i>C. latirostris</i>	<i>C. yacare</i>	<i>C. latirostris</i>	<i>C. yacare</i>	<i>C. latirostris</i>	<i>C. yacare</i>	<i>C. latirostris</i>	<i>C. yacare</i>	<i>C. latirostris</i>	<i>C. yacare</i>	<i>C. latirostris</i>
Formosa* ^a	406	151	0	0	13578	4537	0	0	8009	3218	0	0
Corrientes* ^b	4	293	3	235	138	9091	111	7232	99	6516	* ^c	* ^c
Santa Fe		288		390		10227		13058		6626		* ^c

*^a Only one program collected the two last seasons.

*^b Only one program was reported.

*^c At the time of this report, the hatching have not had finished.

The ranching program from Entre Rios was not reported and Chaco had not eggs collect.

The period of the skins exported and their destination were informed to February 2018.

Year	Species	Raw	Tanned	Cuts*	Total	Italy	USA	Mexico	Spain	Germany	Other
2016	<i>C. latirostris</i>	25	4254	156	4435	2902	1412	30	69	16	6
2016	<i>C. yacare</i>	25	2080	2790	4895	25	3969	900	1	0	0
2017	<i>C. latirostris</i>	1610	2292	269	4171	3010	695	0	466	0	0
2017	<i>C. yacare</i>	0	610	9945	10555	0	10055	500	0	0	0
2018	<i>C. latirostris</i>	0	60	0	60	0	0	0	60	0	0
2018	<i>C. yacare</i>	0	0	810	810	0	810	0	0	0	0

*Most of those cuts were delivered to make boots

Instead of federal authorization, skins from *C. c. fuscus* were not imported in this period.

Surveys

Current ranching resolutions required to ranching operations an annual survey to evaluate the managed caiman populations. During 2016, in the Caiman surveys in Corrientes 17.7 km of lagoons were monitored. Distances on those places varied from 2.6 km to 5.3 km (average 4.4 km), and 93 local counts were done. A total of 223 *C. latirostris* individuals were counted, including Class I, with densities varying from 2.2 to 6.5 ind.km⁻¹, average 5.1 ind.km⁻¹ including Class I; and 4.8 excluding Class I. In La Salada Lagoon, it was found the larger number of caiman (49), this place is egg's collecting place in the ranching programs since 10 years ago; the second place was La Limpia Lagoon (close to Esquina city) with 27 caimans, with an average of 1.2 ± 3.4 animals. Of the 93 local counts, on 58 (62%) caiman were not detected, similar values were detected on previous years 57%, 50% y 46%, but during 2016 the water level was higher. Similarly to previous years, not evidences of hunting for meat or leather was observed, indicating the province and national controls are working well.

In the case of Santa Fe Province surveys from October 2016 to early April 2017, a total of 20 days of monitoring. The

surveys were made in the lagoon by the navigable part, counting the number of animals and trying to locate as closely as possible to identify them by class (Ross and Godshalk, 2003). When the animals could not be identified by size, were classified as eyes only (EO). The relative abundance index (Ind/Km) for the population was 40.1 Ind/km. The counts were very variable, across the 2 seasons, with a maximum of 314 and a minimum of 78 individuals. The population structure by size classes was 3.28% class I, 8.36% class II, 6.82% class III, 1.81% class IV and 79.73% EO; class I were observed before and after the hatching season.

Surveys reports from 2017 season have been not submitted at the time of this report.

Other activities

Post-Graduate course: “Nuevas tecnologías aplicadas a estudios ecotoxicológicos en animales silvestres.” Course director: Dr. Pablo Siroski. Course coordinator: Dr. Hugo Ortega. Course co-designers: Dr. Gisela Poletta and Dr. Maria Virginia Parachú Marcó. This was an intense one-week course in ecotoxicology focused on crocodylians as a wild animal model that involved lectures by 9 different experts.

Workshop. In September 2016 in Corrientes province, there was a workshop including state authorities, ranching operation Yacaré Porá representatives, and the people in charge of the monitoring populations. In those 2 days of workshop, they discussed about the results of the last 10 years of caiman surveys in Corrientes Province. The major results of the workshop were: Populations seem to be abundant in this province. Survey should be directed mostly to the SouthWest of the province where most of the harvesting occurs; and we also discuss about the low precision of the data of the surveys. Based on this workshop in 2017 the surveys were modified to number of nests estimation in the harvesting area using drones.

Belize - Information compiled by Marisa Tellez

1. *Crocodylus acutus* research

Currently, there is no conservation or management program for *Crocodylus acutus* in Belize. To knowledge, the only current and on-going research includes monthly nocturnal eyeshine surveys of the population on Caye Caulker. The population appears stable and healthy (~100 individuals) as previously described (Tellez, M., M. Boucher, and K. Kohlman (2016) Population status of the American Crocodile (*Crocodylus acutus*) on Caye Caulker, Belize. Mesoamerican Herpetology 3: 450-460). However, rapid development in the last 2 years is threatening key mangrove habitat of *C. acutus* on Caye Caulker. The local organization Forest and Marine Reserve of Caye Caulker (FAMRACC) is working alongside the community to ensure some mangrove remains intact. New eco-tourism opportunities in regards to crocodiles in various parts of the country are assisting in local conservation efforts of small populations.

In contrast, populations of *C. acutus* on Ambergris Caye (once considered a regional stronghold for the species) are illustrating signs of illness, and human-crocodile conflict is increasing on the island as *C. acutus* loses habitat in conjunction with the lack of tolerance towards the animals increases.

Assessment of individuals along the coast and mainland are currently opportunistic as captures of *C. acutus* are currently coinciding with the Morelet's crocodile (*C. moreletii*) countrywide survey. Individual *C. acutus* have been observed and captured 6 – 80 km upstream in various rivers. It is suggested *C. acutus* is dispersing further inland as they lose preferable and historical habitat among cayes and the coast.

There is current discussion between the Belize Forest Department as well as key organizations to organize a countrywide *C. acutus* population survey by 2019 given the last survey was performed ~20 years ago.

2. *Crocodylus moreletii* research

As of February 2018, Belize has completed about 85% done in conducting the countrywide Morelet's Crocodile (*Crocodylus moreletii*) population survey in accordance to the tri-country agreement among Belize, Guatemala, and Mexico to regionally assess the species. Research was delayed the last few months as the result of an extended rainy season that prevented traveling to certain sites. This survey also includes a community outreach campaign to further education and promote co-existence with crocodiles. The survey and basic analysis should be completed by December 2018; tissue samples are currently being collected for heavy metal and genetic analysis. The data from this survey will build the foundation to create a conservation and management program of *C. moreletii* (as there is currently no management plans for the species), as well as possibly begin the discussion and planning of a ranching program for *C. moreletii*.

The Belize Forest Department in collaboration with the Crocodile Research Coalition intends to hold a Tri-Country Review Meeting of *C. moreletii* among Belize, Guatemala, and Mexico by the end of 2018. This 2-3 day

meeting intends to discuss the following: country and regional status of the species; threats to the stability of crocodile populations (ie illegal hunting, pollution, climate change, etc.); regional research collaboration.

Currently, Dr. Marisa Tellez in collaboration with the Belize Forest Department, are in the early stages of organizing a 2-3 day CSG regional meeting in Belize, proposed for early June 2019. This 2-3 day meeting is intended to build the network of key stakeholders of Central America and Caribbean, discussing the current conservation and management issues as well as further collaborative research within the region.

Bolivia - Prepared by Alfonso Llobet¹ (¹We would like to express thanks for information provided by Dirección General de Biodiversidad y Áreas Protegidas - DGBAP, Pilar Becerra, Crocoland Farm, Juan Carlos Morales, Paola de la Quintana, Luis Pacheco and Alfonso Llobet).

1. *Caiman yacare* wild harvest program

1.1. Overview of the Program

During the last eight years, the harvesting quota authorized under the National Programme for Conservation and Sustainable Use of *Caiman yacare* vary from 41,578 individuals (in 2010 and 2011) to 38,446 individuals (in 2016). Moreover, the harvests have fluctuated between 32,208 individuals (in 2011) to 37,648 individuals (in 2013):

Year	2017	2016	2015	2014	2013	2012	2011	2010
Authorized	39,652	38,446	36,287	36,422	39,066	40,372	41,578	41,578
Harvested	*	37,280	36,215	36,206	37,648	32,267	32,208	37,223

* Currently in the process of reporting the data of the 2017 harvest (Dirección General de Biodiversidad y Áreas Protegidas - DGBAP, 2017)

The use of Yacare for the year 2017, was authorized with a quota of 39,652 individuals, according to the information of the Management Plan of the Natural Area of Integrated Management San Matías, Plan of Management of the Indigenous Territory (TCO) Tacana I, and the "Studies for the Integral Use of the Yacare, 2017 ", which includes the Isiboro Sécure Indigenous Territory and National Park (TIPNIS), the latter were developed based on the Yacare Harvesting Model (Noel Kempff Mercado Natural History Museum, 2010).

The National Program benefits approximately 800 families of indigenous and peasant communities that belong to 19 Indigenous Territories - TCOs (Joaquiniano, Moré, Movima I and II, Cayubaba, Sirionó, Itonama, Canichana, Tacana III, Baures, TIM, TIMI, Chacobo Pacahuara, Kabineño, Tacana-Cavineño, Multiethnic II, Guarayos, Tsimane, Tacana I), 25 indigenous communities and 14 peasant communities, from the Departments of Beni, Santa Cruz and La Paz.

In the search for fairer prices for local actors, prior to the annual authorization of the use, the Ministry of Environment and Water promotes a Negotiation Space, with the objective of facilitating and articulating economic relations between indigenous and peasant communities with the companies that buy mainly leather and yacare meat. These spaces have been developing since 2011. However, leather prices have tended to decrease since 2014, reaching its lowest level in 2017. According to the tanning companies in Bolivia, this decrease in national prices respond to the lack of buyers and to the drop in international leather prices.

1.2. Experience of Tacana I Indigenous Territory

The association of yacare harvesters "Matusha Aidha" of the Tacana I Indigenous Territory, works on the use of yacare since 2007. Thanks to its responsibility in the management and use of the species, it has managed to become the first local organization that performs the direct export of the leathers that they produce, establishing commercial ties with important companies such as Gucci, substantially improving their income and strengthening their capacities for the years 2015 and 2016.

1.3. Harvesting of yacare meat

With the focus of achieving an integral use of the species, the use of meat has been supported. In this framework there are some organizations such as Loreto, Bella Vista and Tacana I, who since 2009 have been trained to perform a good handling of meat. Currently new local organizations have joined the use of meat: the indigenous territories (TCOs) Itonama, Tacana III, Canichana, Joaquiniano and Siriono, and the indigenous communities of Puerto Mamoré.

Year	2014	2015	2016
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Amount of harvested yacare meat (kg)	13,215	9260	11,003
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Commercial strategies have been developed to support the use of yacare meat, looking for companies with corporate social responsibility that pay better prices for this product, mainly restaurants. On the other hand, work is being done with the national authority on sanitary issues (SENASAG) to have a regulation that allows obtaining sanitary registration to communities that produce yacare meat, complying with good handling and hygiene practices.

The "Yacare Leather and Meat Network" regulates the participation of tanneries, leather goods manufacturers, meat gatherers, restaurants, meat processors and stuffers, through a national registry for legal trade in leather and yacare meat; and it provides the national and departmental authorities with control over the commercialization of products.

2. *Caiman yacare* ranching and captive breeding program in Bolivia

2.1. Communal Ranching

Since 2015, this type of communal breeding center has been implemented as the first experience in Bolivia in the San Lorenzo community which was very well accepted by the community since it was the main source of income. In 2015, 4,649 newborns raised in the Communal breeding center were obtained as a final product, generating a direct income of 66,277 Bs (\$US9522), an amount obtained from egg harvests, births and for community benefit in general. In 2016, 13,100 newborns were counted, and direct income was 159,425 Bs (\$US22,905), almost tripling production and income for the community.

In both years (2015 and 2016) the release of 10% of the productive stock was made to its natural environment under the guidelines established by the DGBAP. In the year 2015 were reintroduced 465 animals to their natural environment and 1310 animals in the year 2016, for the reinforcement of the populations that are subject to harvests.

During 2017, the DGBAP, through Administrative Resolution 037/2016, approves the Regulations for the Use of Yacare Eggs and Implementation of Local Yacare Breeding Centers by the Native Peasant Indigenous Communities. As of that resolution, currently there are three authorized community breeding centers: San Pablo de Chontal (in the TCO TIM), Comunidad de Beremos (in the TCO Baures) and the Communities of Pariagua and Embrolla (of the TCO Huacaraje), all located in the department of Beni.

In 2017, the San Lorenzo and Beremos indigenous communities continued working on the implementation of the community breeding centers and managed to market a total of 4210 and 750 yacare neonates respectively to the Crocoland company. Additionally, as a contribution to the conservation of the species, these communities released to the wild 10% of their total productive stock (467 and 83 animals) under favorable conditions for the survival of these animals in the wild.

2.2. Crocoland Breeding Center

Crocoland Farm is still the only authorized facility to operate with captive breeding of *Caiman yacare* since 2007. Nowadays it is working on close production with captive breeding stock and advising Communal Ranching Programs. Currently, the company acquires individuals of approximately 4 to 6 months of age from these community breeding centers.

During the years 2013 and 2014, Crocoland only had production from its Farming system. For 2015, 2016 and 2017, individuals from the community breeding centers San Lorenzo de Moxos and Beremos were included in their productive stock.

From now, the Ranching activities are not going to be carried out by Crocoland, but it is currently the only legal market for Communal ranching activities and technically supports the activities of monitoring, harvesting and communal breeding.

Melanosuchus niger and *Caiman latirostris*

There were no advances regarding the development and implementation of the action plan for *Melanosuchus niger* and for *Caiman latirostris*. However, the DGBAP is making efforts to obtain funds and conduct population studies of *Melanosuchus niger*. On the other hand, as a thesis work to obtain the Master's degree, Paola de la Quintana conducted a research to estimate the size of the home range and evaluate habitat use for *Caiman yacare* and *Melanosuchus niger* during the wet season. The study was carried out in the Biosphere Reserve and Estación Biológica Beni. In this framework, there were captured 14 individuals in total, 10 *Melanosuchus niger* (6 females and 4 males) and 4 *Caiman yacare* (2 females and 2 males) for radio-tracking.

Capture, translocation and release of *Caiman yacare* from water bodies affected by the expansion of the Yucumo - San Borja road

In the framework of the improvement of the Yucumo - San Borja road (Beni Department), the responsible company, FOPECA SA, had wildlife mobilize program where the focus was the mobilization of *Caiman yacare* found in water bodies bordering the road section within the right of way.

In November 2016, a population diagnosis of the species was carried out in 53 km of the road where the improvement was planned; obtaining information regarding the relative abundance and structure of the population by size classes. The evaluation and translocation activities were carried out in two stages between the months of July and October 2017, under authorization of the Viceministry of Environment, and in coordination with the General Directorate of Biodiversity and Protected Areas (DGBAP).

Under this context, 118 *Caiman yacare* and 2 *Paleosuchus palpebrosus* were captured, mobilized and released. The animals were released in 2 permanent lagoons located approximately 12 km away from the road. Subsequently, monitoring actions were carried out that suggest the adequate adaptation of the animals to this new habitat. This wildlife translocation work carried out along a road section is a pioneering activity in Bolivia that leads to consider, the feasibility and the importance of the mobilization of some species of fauna that could be affected by the horizontal infrastructure works, such as the adaptations and improvements carried out on several roads. Additionally, the work laid the foundations for the development of protocols for capturing, handling, translocating and releasing crocodylians in Bolivia.

Brazil - prepared by Luis Bassetti

1. Industry and Trade

After many years of bureaucracy, Brazil licensed two specific slaughterhouses for caimans. One in the State of São Paulo (Abatedouro Aruman Ltda.), and another in the State of Mato Grosso do Sul (Caimasul). In 2016, 32 exportation documents were issued for commercial purposes for the *Caiman yacare*, totaling 1332 exported products (skin/leather and/or the following accessories – shoes, belts and purses) to UA, AE, DO, HK, IT, JP, KR, KW, LB, MA, MO, PT, US and ZA, and 2 exportation documents for *Caiman latirostris*, with 52 units to IT and CH. The following year, in 2017, Brazil issued 21 documents for commercial purposes for the *Caiman yacare*, with 15,950 exported products to US, CA, ES, IL, IT, JP, KR, MX, PT, QA, UA, DO, 1 exportation documents for *Caiman crocodilus* (512 units of skin) to ME and 1 exportation document for *Melanosuchus niger* (1044 units) to Mexico.

2. Conservation

In August 2016, the National Center of Reptiles and Amphibians (RAN/ICMBio) met to several researchers that participated in the evaluations of the status of conservation of crocodylians in Brazil. Among them, Willian Ernest (Bill) Magnusson (INPA), Izeni Farias (INPA), Zilca Campos (EMBRAPA/PANTANAL), Marcos Coutinho (ICMBio), Vera Luz (ICMBio), Yeda Bathaus (ICMBio), Juliana Rodrigues (ICMBio), Vívian Uhlig (ICMBio) and Luís Bassetti (CSG). The result of the evaluation is in the validation stage, that's why it's still not possible to officially publish the status that were applied to the species. However, it is known that no species is threatened with extinction. The results should be published in 2018.

3. Scientific Research

According to the Coordination of Research and Information Management in Biodiversity - COPEG/SISBIO, in 2016, Brazil provided 92 research permits including all six species of crocodylians that occurs in Brazil. Until June 2017, ICMBio had issued 42 permits for scientific research. On 16 August 2017, during the Brazilian Congress of Herpetology, the Symposium "Applied Science in the Conservation of Crocodylians" was held with the participation of CSG members (Ronis Da Silveira, Zilca Campos and Luís Bassetti) and Augusto Kluczkovski Junior. The main points discussed during this meeting were related to effects of the researches on the conservation of caiman in Brazil, and whether these surveys are generating positive results in the productive chain. In addition, aspects related to the future perspectives regarding the use and management of these species were discussed.

Colombia - prepared by Sergio Balaguera-Reina and Sergio Medrano-Bitar

Conservation and research

The environment ministry along with the National University of Colombia carried out a project in 2015 to assess how feasible could be the sustainable use of spectacled caimans via ranching in two areas of the Caribbean region. Unfortunately, the project was put in hold in 2016 due to logistical issues. The good news is that the project is again undergoing and we hope we will see the technical report of this research soon. The Humboldt institute updated and released in 2016 the regional reptile RedList assessment in which three species of crocodylians were assessed: the

American crocodile (*Crocodylus acutus*), the Orinoco crocodile (*Crocodylus intermedius*), and the black caiman (*Melanosuchus niger*). The American crocodile was down-listed from Critical endangered to Endangered based on new information collected in the Catatumbo and the Caribbean region, showing the species is recovering and population trends are increasing. However, large part of the range of the species in Colombia has been unstudied for a long period, which requires hands-on on this matter to determine the conservation state of the species in the country. The Orinoco crocodile stays as Critical Endangered due to the lack of information throughout its range. However, up-to-date information was included regarding new research going on in Meta, Casanare, and Vichada. The black Caiman also stays as Vulnerable but concerns are raised due to the lack of information in large areas of its distribution.

The project carried out in the Cispatá Bay was down-listed in the conference of the Parties CITES, Johannesburg 2016 from Appendix I to Appendix II, meaning that local communities could start making sustainable use of American crocodiles from this area. Currently, researchers from this project along with the national government are working to create the legislative framework to allow this process follow Colombia regulations.

Finally, a European Union commission visited the country to evaluate the commitments Colombia agreed to follow regarding farming and illegal extraction of spectacled caimans (*Caiman crocodilus*) from the wild in the 17 Conference of Parties CITES held in Johannesburg, South Africa. Delegates visited different projects around the country and met with members of the government, research institutes, and civilian society to see from first hand advances and accomplishments in this matter. A report from Sergio Balaguera-Reina about his meeting with this commission was submitted to the CSG Executive Committee.

Farming and mixed cycle

The last two years the expectation and practice in the management of crocodiles in Colombia has changed drastically. The management of farming has not been supervised by the regional environmental authorities (Regional Autonomous Corporations, CARS) and has been delegated through a Law of the Republic to the national environmental licensing authority (ANLA), it is a governmental institution and centralized in Bogotá. This has made it possible to unify the criteria and indicators that regulate the activity of crocodile farming in Colombia, since previously each corporation used its own criteria to measure the production and the state of the natural populations.

The result of this process has led to all breeding sites being measured in the same way, which facilitates the normalization of the production system. This fact is very positive in order to bring a technical and legal framework that facilitates the implementation of the mixed system that would be based on a quota of animals produced in farms plus animals obtained by harvest obtained from natural ecosystems allowing the participation of communities with the consequent benefits to habitats, crocodile populations and improving their quality of life.

Colombia continues to develop the model to activate established harvest centers after population studies in natural areas. In this framework, the Ministry of the Environment together with the Alexander von Humboldt Institute, in late 2017, was carried out the first international workshop on non-detrimental findings (DENP) in the city of Cartagena with the participation of all CITES scientific authorities of the country and complemented by a field session with the participation of representatives of four communities. The workshop was dictated by international experts as CITES authorities as well as private researchers and CSG Vice Chairman Alejandro Larriera.

Report from entities

FUNDACIÓN PALMARITO CASANARE: From February 2016 to March 2017 we did the radio-tracking of the Orinoco crocodiles (*Crocodylus intermedius*) released in El Tuparro National Park. We did five field trips monitoring about 200 km in each one. We also did four field trips to Private Reserve La Aurora to monitoring the crocodiles released over there in December 2015. The results obtained encourage us to continue with this activity. In 2016, 59 Orinoco crocodiles hatched at Wisirare Biopark (Orocúe, Casanare), but in 2017 the births increased by 313% (185 crocodiles hatched). This increase is due to a change in incubation conditions. Also, in May 2016, 159 wild Orinoco crocodile hatchlings were collected in Cravo Norte River (Arauca) and transported to Wisirare Biopark. In these days, at Wisirare Biopark remain 490 non-adult Orinoco crocodiles. All of them will be released in natural habitats, especially in the Arauca department, El Tuparro National Park (Vichada) and in private protected areas in Casanare department.

In Arauca, the Palmarito Foundation is promoting the local conservation of the Orinoco crocodile through the construction of enclosures for the captive breeding of neonates of this species by local people. In the same area were promoting an Msc Thesis (Universidad Javeriana) to evaluate relationships between local people and Orinoco crocodiles.

Costa Rica - prepared by Laura Porras Murillo

1. Research

Some studies on *Caiman crocodilus* population structure were done, They were identified some changes and related to climate change (Aranda-Coello, M. 2017. Cuadernos de Investigación UNED 9 (1):151-155). The only work on

population size of *C. acutus* was made in the Tempisque river basin and fewer individuals were registered than in the last years. For the rest of the country there is no data in the last year. Other studies conducted to Measuring the Economic Value and Social Impact of Crocodile Tourism in Tarcoles, Costa Rica *Crocodylus acutus*.

Some other projects are running like

- "Proposal of attention to the conflicts generated by the increased populations of crocodiles (*Crocodylus acutus*: Cuvier), tending to the expansion of knowledge, the generation of abilities and the reduction of risk in the Great Wetland of the Tempisque and the Central Pacific as a pilot case. Coordinator: Iván Sandoval, Escuela de Ciencias Biológicas, Universidad Nacional.
- "Interactions between humans and crocodilians in Costa Rica." Coordinator: Laura Patricia Porras Murillo, Instituto Internacional en Conservación y Manejo de Vida Silvestre, Universidad Nacional.

Recently projects completed

- "Evaluation of the population structure and exposure to pollutants in the population of *Crocodylus acutus* of the Tempisque river basin". Coordinator: Laura Patricia Porras Murillo, International Institute for Conservation and Management of Wildlife, National University. The project aimed to determine the abundance of crocodiles in the study area, as well as the population structure: sizes and sexes. In addition, determine the presence of contaminants and substances with endocrine disrupting potential in bodies of water and tissue, blood and crocodile eggs and analyze the temperature outside and within some of the crocodile nests found. The eggs collected were analyzed to determine the presence and concentration of contaminants and possible endocrine disruptors. Regarding the size structure, the recorded data show a pyramid structure, normal for a population of crocodiles, with more individuals in the smaller sizes and a decrease towards larger sizes. The sex structure shows a ratio of 3.1 males per female. This data coincides with that previously reported for the area. Three bodies of water were identified that may be potential sources of contaminants in which water and sediment samples were taken for the determination of the presence and concentration of pesticide-type contaminants. In the samples, mainly triazine herbicides were found, which are classified as suspect substances of endocrine disruption. In a sample taken from the Tempisque River, the presence of a flame retardant of the tris phosphate group was found at a considerable concentration. This type of substance is also classified as a possible endocrine disruptor. The analysis made on the temperature inside and outside of several of the nests found, reveals that the data are not consistent to determine that the temperature is affecting the sex ratio in the embryonic stage population towards males or females. "
- "Popular knowledge and perceptions about the crocodile (*Crocodylus acutus*) in five coastal locations of the Central Pacific of Costa Rica as a tool for the prevention of possible crocodile attacks". Coordinator: Iván Sandoval, School of Biological Sciences, National University. Final summary not available. For more information on research, consult directly with: Juan Bolaños Montero or Iván Sandoval Hernández.

2. Human-Crocodilians interactions

This is still the priority issue in the country, because although in the last year there have been no fatal attacks, the perception of the human population remains, in general, that there is overpopulation of crocodiles and that is why there are many attacks. The few efforts of both, government and institutions, remains: signaling on sites with the presence of crocodiles, disseminate information about crocodiles: last year a video was made explaining why crocodilians should not feed, which was transmitted via social networks and national television, and this year a book for children that includes information on crocodiles has just been presented. The "lagarteadá" is an activity that involves the capture of a crocodile carried out of the river by the approximately 40 men of the community of Ortega, on Holy Friday, and exhibited in a pool in the center of town. Formerly, the crocodile was sacrificed on Easter Sunday, to use its meat, its skin and especially its fat, which is considered to have healing properties. At present, it is released the next day and returned to the river. For many years it has been trying to prohibit this activity due to the abuse suffered by the crocodile. Last year, the crocodile died while being exhibited which caused the greatest social pressure. After that, the activity was prohibited, but the community said that they will do it anyway, so it is expected that there will be confrontation with the authorities. Several NGOs, the Universidad Nacional, and the Ministerio de Ambiente y Energía, have proposed to the community to change this activity for a crocodile festival, in which no animal is handled, however, this proposal is hardly being considered by the community.

3. Government and national legislation

The Ministry of Environment works with the Advisory Group (a group of crocodilians researchers in the country, some of them members of CSG), and a national work plan is being prepared to integrate all sectors involved in the crocodile issue in the country, mainly population size and human-crocodile interaction. Nowadays, the National Government is currently in demand for not doing research to determine the population size of *C. acutus*. On 12 September 2017, through the resolution R-SINAC-CONAC-092-2017, was established a new list of endangered and threatened species, in which the *Crocodylus acutus* changed its status, now it is in the list of threatened species as well as *Caiman crocodilus*. In the previous listing, *C. acutus* appeared as an endangered species. It is important to point out that, at the legal level, there is no difference between the level of protection received by the species that appear on both lists. During the month of February 2018, the members of Advisory Group that highlighted lack of action by the authorities of the Ministerio de Ambiente y Energía.

Cuba - prepared by Natalia Rossi

Since diplomatic relations between Cuba and the United States started to normalize in 2014, opportunities for academic exchanges and environmental cooperation have increased and been fortified. In December of 2014, an unprecedented *Joint Statement on Environmental Cooperation* was signed between both countries, explicitly calling for environmental cooperation in both the governmental and non-governmental sectors. Since then, a memorandum of understanding was signed establishing sister-sanctuary relationships between Guanacabibes and Banco de San Antonio in Cuba, and Florida Keys and Flower Garden Banks national marine sanctuaries in the United States, and more recently, a Twinning Agreement was signed between the Zapata Swamp and Everglades National Parks. In addition, the issue of poaching is recognized and more openly discussed in Cuba, and there is will to better understand and look for mechanisms to address illegal harvests. Equally important, there are experts in the country that have decades of experience working with Cuban crocodiles, are highly respected by the local communities in the Zapata Swamp, and possess the motivation and dedication to work together to conserve this critically endangered species.

On 5-9 June 2017, the V International Crocodile Workshop of Cuba was held in Playa Girón, Ciénaga de Zapata, Cuba. The workshop was attended by 67 participants: farmers and researchers from Cuba and experts of zoos, organizations and centers for conservation and genetics from different countries. During the workshop, 25 presentations were made and working groups were created to address different issues including wildlife, breeding and zoos, reintroduction, genetics, and community work. Each group developed an analysis on the conservation efforts in the country and to outlined measures to strengthen these efforts establishing priorities. The workshop was very useful to contribute to the construction of a biological station in the Fauna Canales Refuge, this site is identified as a priority for the reintroduction of the Critically Endangered Cuban crocodile (*Crocodylus rhombifer*). During a field trip, 10 *C. rhombifer* from the Ciénaga de Zapata farm were released. These individuals were previously genetically identified as "pure". This reintroduction effort was added to the last reintroduction of 100 *C. rhombifer* in 2016. During the workshop, a video was also made about crocodile conservation work in Cuba, which has served as an international dissemination tool.

In order to support the development of a comprehensive species recovery strategy for *C. rhombifer*; in 2017, two Crocfest events were held to obtain funds for a conservation project elaborated for people from several institutions: Natalia Rossi (World Conservation Society, WCS), Toby Ramos, the Cuban NGO Fundación Antonio Nuñez Jiménez, Dr. Frank Mazzotti (the *Croc Docs*) at Fort Lauderdale Research and Education Center, and Zapata National Park management authorities and staff to carry out this project. The primary activities they will undertake to address these objectives include:

- *Reintroduce captive C. rhombifer into the wild and monitor them.* They will support the reintroduction of genetically pure *C. rhombifer* from the Zapata captive breeding facility into The Wildlife Refuge Channels of Hanabana (WRCH, Refugio de Fauna Canales del Hanábana). Efforts will be made to minimize/prevent hybridization with *C. acutus* and to prevent poaching. A research team lead by Toby Ramos will monitor reintroduced individuals to determine how they adjust to their new environment.
- *Conduct a series of workshops to better understand the drivers and extent of poaching.* Reynaldo Estrada from Fundación Nuñez Jimenez will lead efforts to assess poaching and design first steps to combat it. Reynaldo has over two decades of experience working with local communities in the Zapata Peninsula, and has dedicated his efforts over the last decade to supporting the conservation of Cuban crocodiles in this region. A Community Engagement Workshop and a Law Enforcement Engagement Workshop will be carried out to involve key actors in the poaching crisis. The Community Engagement Workshop will target local communities in the Zapata Peninsula adjacent to poaching areas.
- *Carry out research expeditions to collect information on the wild C. rhombifer population.* There is no available data on wild *C. rhombifer* since last estimates on 2006. they will carry out a series of research expeditions into the Southwestern tip of the Zapata Peninsula to gather data on the wild *C. rhombifer* population.
- *Conduct an education campaign to raise awareness about Cuban crocodiles and the challenges to their conservation.* It will re-initiate an education campaign to raise public awareness about the conservation of *C. rhombifer*, engaging rural communities of the Zapata Peninsula and the broader audience in Havana.

Dominican Republic - prepared by Grecia Mendez

There is an estimate of 200 animals in Lake Enriquillo, however the island has been experimenting a drastic increase in water level due to climate change, possibly putting the population at risk. Also, hunting activity has been increasing in recent years, making the situation one that has to be addressed with more urgency. The baseline information that is available and used as reference by the government is a study that was carried out in 1992, which was published in a CGS newsletter. This study helped to stabilize the hunting occurrences through a confiscation of traps and a subsequent implementation of patrolling programs, although there were still cases where rangers were paid off in order to permit hunting in the lake. Another study using 15 radio telemetry devices reported that these animals spend much of their time in the northern part of the lake. This past data should be taken into account in future research. A Skype meeting occurred on February 7, 2018, which included the presence of CSG members Perran Ross and Marisa Tellez, and 3 key stakeholders from the Dominican Republic Colmar Serra, Jorge Brocca, and Andreas Schubert to discuss the feasibility

and plan for future research and management in regards to the conservation and the implementation of nursery programs of the American crocodile in the Dominican Republic, as well as initiating crocodile-related ecotourism as alternatives for poverty stricken communities.

Research priorities

- Revision of the available population data in order to assess how future research can be supported and improved in the country. Monthly monitoring activities has been carried out for the past 5 years, yet the information still needs to be analyzed.
- Determine the actual presence and size of the crocodile population in Dominican Republic, possibly repeating the study that was done in 1992.
- Marisa has adapted the standard manual (created for the Tri-Country Meeting in 2011 between Belize, Guatemala, and Mexico) for crocodile research given the funds, trained personnel, and other (limiting) resources available in Belize. Marisa has provided recommendations in regards to adopting these methods for surveys in the Dominican Republic given resources currently available in the country.
- Identify the habitat that is most important to crocodiles in the country, and guide protection efforts towards this area or areas.
- Begin the discussion in regards to investigating the population of Lake Azuei in collaboration with stakeholders from Haiti.
- Hold a meeting between Haiti and Dominican Republic once national conservation efforts or crocodile studies are more established. It is intended this meeting can create an island-wide effort in protecting crocodiles and their habitat.

Nursery possibilities

Many areas were mentioned during the meeting for future nursery programs, all of them must be evaluated in order to identify the best habitat for crocodiles. The areas mentioned were: Sabana Bay, Laguna Limón, Laguna Redonda, Laguna Cabral and Monte Cristi. The best choice among them appears to be Sabana Bay since it was habitat for crocodiles but the population became extinct in the 60's. This area is already protected for marine mammals so it has a lot of possibilities for a nursery to thrive. However fishing is permitted and is very abundant, also the acceptance of the communities around is imperative. Probably the ideal places would be where crocodiles are already present, cause it would mean that the habitat is good already.

Crocodiles and communities

The communities around Lake Enriquillo hunt crocodiles for survival, medicinal purposes and also use them as an ingredient for a popular drink called Mama Juana. The ecotourism industry is not developed around the area but it is being carried out in a haphazard way, and crocodiles tend to be the main attraction. There has been reports of tourist bothering hatchlings nests in the lake, particularly in the left side, and people operating without proper license. For this reason, it seems that the best choice to conserve crocodile populations is to provide opportunities for communities to develop a safe and sustainable ecotourism industry. However these plans must be carried out with a strong educational component so as to prioritize the conservation of crocodile populations.

Next Steps

- Discuss current research and data organized by Juana to obtain a more accurate estimate of the current population of the crocodiles in Dominican Republic
- Provide Dominican Republic researchers with an adapted version of conducting a thorough crocodile population survey (similar to Belize)
- Provide training, as well as include graduate researchers in assisting with the Dominican Republic's goal of conservation and management of crocodiles and their habitat.
- Begin to think of funding that incorporates surveys of the whole environment and ecosystem, not just crocs, and that will provide capacity building.

Interesting Information

Cave researchers have recently discovered the remains identified as *Crocodylus rhombifer*. Currently, and in recent historical records, there is no mention or evidence of *C. rhombifer* inhabiting the Dominican Republic. This finding expands the historical known range of *C. rhombifer*.

Ecuador - prepared by Pablo Siroski, Alvaro Velasco, Francisco Villamarin and Sergio Balaguera-Reina

In August 2017, in Quito, Sergio Balaguera-Reina, Alvaro Velasco and Pablo Siroski organized a crocodylian symposium in the frame of XI Congreso Latinoamericano de Herpetología (XI Latinamerican Herpetology Congress; XILHC) with the title of “Crocodylios en Latinoamérica: Pasado, Presente y Futuro” (Crocodylians in Latinamerica: Past, Present and Future). This event was identified as a good opportunity to identify a new generation of people with interest to work on crocodylians. They also make some short presentations about the CSG, explaining its mission, how it operates, how it is organized, the student research assistance scheme (SRAS), Newsletter, website, etc., and extended an invitation to the next CSG working meeting (Argentina, May 2018). They made an update of the “old” local and regional contacts and identified young people working with crocodylians who were interviewed and listed as local CSG contacts (formalized by the CSG regional office).

The visit was also considered a good moment to have a meeting and introduce the CSG members and authorities to national environmental authorities (Instituto Nacional de Biodiversidad and Ministerio of Ambiente), to whom it was discussed the current situation in Ecuador with respect to environmental policies. It was explained that CSG expertise and its abilities to face-off many situations, like cases of conflict between crocodylians and local communities, and how to strengthen efforts to improve public education and increase community participation in conservation, increase support for the organization of local crocodylian groups, communications with researchers to evaluate management plans, etc. Immediately after the Congress, they asked if we could review the Action Plan for *Crocodylus acutus* in Ecuador, which was written in 2006.

In conclusion, the goals of the symposium were achieved; the visit was an important learning experience. It was detected that this kind of activity has high demand in a researching context and they are very important to disseminate CSG issues, to identify new crocs research generations, and keep active and updated the government contacts.

El Salvador - information compiled by Marisa Tellez

In November 2017, Dr. Marisa Tellez was informed by Milena Berrocal from the IUCN Regional Office for Mesoamerica and the Caribbean of funding to conduct crocodile population surveys in Bahía de la Unión. Population surveys will commence in March 2018, and Miss Berrocal will provide a brief report of the findings at the end of April. This information can be discussed and added at the 25th CSG Working Meeting Steering Committee Meeting in Argentina.

Guatemala - prepared by Valerie Corado García and Marisa Tellez

Crocodylus moreletii research

The research about *C. moreletii* distribution and population status is scarce, currently there are no research for any species of crocodylians in Guatemala. The latest study of the Morelet’s crocodile is from Corado 2013, who spotted a total of 301 wildlife crocodiles and she mentions that this is not an indicator to ensure that populations remain constant or that are not endangered. Among the recommendations, Corado mentioned that is important to generate more data to define the conservation status of *C. moreletii* and assess their classification within CITES. Since 1982, Ponciano indicate a decline of *C. moreletii* populations due to illegal hunting (Lara 1990, Castañeda 1998, Castañeda 1999, Corado 2013), illegal use of cast-nets (Castañeda 1998, Castañeda 1999, Castañeda, 2000, Corado 2013), accelerated loss of habitat because of population growth (Castañeda 1998, Castañeda 1999, Castañeda 2000), human settlements in protected areas (Corado 2013), among others.

Guatemala made a Tri-national commitment for the conservation of *Crocodylus moreletii*, however no studies have been conducted since 2013, which does not allow to have a more information about the population of this species. Also, Guatemala cannot make any change in Appendix of CITES from I to II, due to the lack of information of wild populations.

Crocodylus acutus research

Currently, there are no studies about *C. acutus*. The few studies about *C. acutus* only mentions that there is a sympatric distribution with *C. moreletii* in the northern part of Guatemala, specifically in Petén (Sánchez Herrera *et al.* 2011). Since the 1970s it has been reported an accelerated decline of the wild populations, according to Powell 1971 and King *et al.* 1982, caused by illegal hunting and because some specimens were trapped in fishing nets causing their death (Thorbjarnarson *et al.* 1992). Nowadays, its distribution and the status of wild populations are not known with certainty. This species is also classified in Appendix I of CITES, but personal comments of CONAP rangers have mention that their population have been declining due to population growth and illegal human settlements in protected areas, the same problems that *C. moreletii* faces.

Caiman crocodilus research

This species is the least researched of the other two crocodylians species. Its distribution is the southern coast of Guatemala (Escuintla, Suchitepequez and Retalhuleu) (Acevedo 2006). There are no recent studies on the status of wild populations or the exact distribution of this species. Although *Caiman crocodilus* is within Appendix II of CITES, there is no accurate data to confirm the number of wild individuals in its distribution range making it difficult to determine whether it's possible to change its protection status under CITES. In Guatemala, this species was used in breeding farms, however two farms that were registered in Consejo Nacional de Areas Protegidas (CONAP) are no longer in operation (*pers. comm.* Ing. Carlos Mansilla). On the other hand, the Veterinary and Zootecnia Department of San Carlos University (USAC) had a breeding project in San Julian Farm, located in Suchitepequez, but all alligators were donated to a rescue centre called Antigua Exotic. Currently, a company reproduces the species in order to maintain individuals in wildlife (Ing. Carlos Mansilla, *pers. comm.*).

The reason that Guatemala has not pursued any research with caiman is mostly because the government funding is not interested in using funds for the conservation or research of crocodylians. Nevertheless, the effort continues on some researchers to form the crocodile specialist group in Guatemala and try to find the economic resources to pursue research of the crocodylian populations.

Valerie Garcia is currently seeking further funding to conduct population surveys in various locations, however no further investigations of crocodiles have been pursued in the last year. Lack of financial resources is the principal reason for the lack of crocodile research conducted in-country.

Haiti - prepared by Mariza Tellez

Population status, threats and opportunities

The current status of the American crocodile population (*Crocodylus acutus*) in Haiti is relatively unknown, however, relatively recent sightings from key stakeholders suggest the population consists of approximately 100-150 individuals. The last thorough population survey was conducted in 1989 with an estimated population of 450. Despite development, Haiti still possesses many good habitats for a population to thrive provided the protection and conservation of the habitat. It is possible that the greatest concentration of crocodiles are located on the eastern shore of Lake Azuei. A Skype meeting occurred on 19 February 2018, which included the presence of CSG members Perran Ross and Marisa Tellez, and 2 key stakeholders from Haiti Jean Wiener and Joel Timyan, to discuss the feasibility and plan for future research, management and habitat preservation in regards to the crocodile population in Haiti.

During the meeting, potential threats to the crocodile population were discussed. For example, hunting may still be an activity practiced by many communities around the lake. Many of these communities are living in impoverished conditions and these animals can therefore constitute a source of protein. Also, in the last eight years, the water level in Lake Azuei has risen to over 2 meters, with reports of flooding up to the 2nd floor of a hotel since 2003. This phenomenon has been putting a lot of pressure on the mangroves and the iguana population. It is likely having a negative impact on the crocodile population. However the population may be able to adapt to this change. There is no concrete evidence of how rising water levels and changes is affecting the population. Other threats that can be affecting the population to a lesser degree are the proposed building of a dam and gorge in the Grise River and disturbance caused by human impact particularly in Terra Blange.

In regards to finding local organizations or interested key stakeholders to assist in gathering the information of the local crocodile population, as well as local threats, etc.:

- 1) Caribbean Harvest is a Haitian charitable foundation for impoverished villages that surround the lakes of Haiti. In Lake Azuei they have established fish hatcheries that serve as a Co-Op for the approximately 3000 people that are spread around 7 villages that surround Lake Azuei. This foundation may be interested in providing crocodile population data as well as in capacity building.
- 2) Another possible source of funding is the Spanish Cooperation (AECID), which has assisted the Government of Haiti in the establishment of the Trou Caiman and Lac Azuei protected area.
- 3) Grupo Jaragua is a non-governmental organization from the Dominican Republic that works for the sustainable management of the biodiversity of the Hispaniola island, with emphasis on the Jaragua-Bahoruco-Enriquillo Biosphere Reserve. They may have data available regarding crocodiles and/or provide additional assistance for future studies of Hispaniola.
- 4) Contact BID and AECID to express interest in collaborating on any faunal studies associated with Trou Caiman and Lac Azuei.

Next Steps

- 1) Conduct population surveys in order to update the species status within country to provide the legal protection needed.

- 2) Identify key locations where it is most feasible to conserve crocodile populations. Key locations identified from this meeting are Lake Azuei and Trou Caïman as they are connected by a canal; the Baraderres/Cayemites coastal estuaries and the Lagon-aux-Boeufs/Riviere Massacre wetlands and estuaries.
- 3) Once the most suitable places have been identified, studies on the changing hydrological dynamics must be carried out so as to understand these impacts on crocodile habitats. To restore the crocodile population in Haiti, habitat enhancement can be a very promising strategy.

Honduras - prepared by Marisa Tellez

In November 2017, Dr. Marisa Tellez was informed by Milena Berrocal from the IUCN Regional Office for Mesoamerica and the Caribbean of funding to conduct crocodile population surveys in Bahía de Chismuyo. Population surveys will commence in March 2018, and Miss Berrocal will provide a brief report of the findings at the end of April. This information can be discussed and added at the 25th CSG Working Meeting Steering Committee Meeting in Argentina.

Jamaica - prepared by Dr. Marisa Tellez, information provided by Laurence Henriques

Although it is illegal to kill American crocodiles in Jamaica, crocs are being heavily persecuted in Jamaica for both food and fear, and foreign income is driving habitat destruction of crocodile habitat. There is a lack of trained and knowledgeable personal to deal with human-crocodile interactions, which has resulted in a lack of enforcement in regards to the protection of crocodiles, as well as lack of research. As such, crocodile populations have been greatly reduced with few adult crocs anywhere, specifically the former stronghold on Black River is now diminished to a handful and the many small populations in isolated wetlands along the south coast are largely extirpated.

A crocodile sanctuary owned by Laurence Henriques was shut down, however, he has the opportunity to relocate most of his larger breeding crocodiles to a private facility in SE Jamaica, Holland Bay. Here, he can progressively release crocodiles to the wild into private protected areas. Currently, Joe Wasilewski and Frank Mazzotti are in discussion with Laurence in regards to securing habitat and sanctuary for the American crocodiles in Jamaica.

Mexico - prepared by Hesiquio Benítez

1. Research and new information

1.1. Main results of the National Morelet's Crocodile Monitoring Program

Five years into the implementation of the *C. moreletii* monitoring program (2011-2015), the results indicate that the wild populations of the species in Mexico are stable, and have the potential to be the subject of a sustainable productive pilot project for the benefit of local communities, and other key stakeholders of the value chain, whilst promoting the conservation of the species and its habitat. The key findings of the first five years of the monitoring programme (Rivera-Téllez *et al.* 2017) are:

- Average national encounter rate: 3.23±1.46 ind/km.
- Potential habitat for *C. moreletii* (based on the MaxEnt model): 22,833 km.
- Estimated size of the Mexican populations: 73,960 individuals.
- Population trends (based on the data provided by 40% of the sites; or 9/48 sites): 13 show an increasing trend, 5 a decreasing trend and 1 seems to be stable.
- Regarding the population structure per site:
 - o 31% (15/48 sites) showed an increase in individuals of I and V categories (newborns<0.5m, 1 year old, and big adults >2.01m respectively);
 - o 54% (26/48 sites) showed no change and were considered stable; and,
 - o 15% (7/48 sites) showed significant differences in population structure and presented a decrease of the individuals of categories I and V.

2. Management and conservation actions

Leader	Project
Edgar Sarmiento (technical advisor)	1) Conservation and Restoration of Ecosystems (monitoring and species conservation) - Monitoring the Priority Species of Crocodiles and Alligators for Conservation in part of the Damping Zone of the Biosphere Reserve La Encrucijada.
	2) Conservation and management actions of <i>C. acutus</i> and <i>Caiman crocodilus</i> in two priority wetlands in Chiapas Coast.

Giovany A. González (CICBA-UAEMéx.)	3) Management units for wildlife conservation (UMA) and properties or facilities that handle wildlife (PIMMS): evaluation and analysis for conservation of crocodylians in Mexico
Edgar Sarmiento and Community Monitoring Group of San Fernando Huixtla	4) Contingent attention to rescued (<i>C. c. fuscus</i> , in Pijijiapan, Huixtla) death (<i>C. acutus</i> in Acapetahua) and cases of conflict specimens (in Pijijiapan, Mapastepec, Mazatlán, Villa Comaltitlán, Acapetahua and Huixtla) with the proper translocation of specimens (when needed) in Chiapas, México.
María C. Contreras	5) Verification of a report of a large crocodile (4mts) that ate domestic fauna, in the fishing area of Salto de Agua, Pijijiapan Municipality, Chiapas; Mexico - La Encrucijada Biosphere Reserve. Biol. Edgar Sarmiento Marina - Follow-up with talks to a group of fishermen and placarding of information about crocodiles (Pending case).

3. Production and trade

3.1. International framework

The seventeenth meeting of the Conference of the Parties to CITES (CoP17; Johannesburg, October 2016), adopted by consensus Mexico's proposal to delete the "zero quota for wild specimens traded for commercial purposes" from the Appendix II listing of the Mexican population of *Crocodylus moreletii* (<https://cites.org/sites/default/files/eng/E-CoP17-Prop-22.pdf>). This proposal represents a success case of the good practices of conservation, monitoring, management and harvest led by the Mexican Authorities, in close collaboration with local communities.

3.2. National implementation

- a) In parallel to the adoption of Mexico's proposal for CoP17, and within the framework of the Collaboration Agreement celebrated between CONABIO and RESP (*Responsible Ecosystems Sourcing Platform*) in March 2016, a Supplemental Agreement was signed on June 2017 among both parties to establish the terms on which the "Pilot project on sustainability, production systems and traceability of skins of *C. moreletii* in Mexico" will be implemented in selected Management Units for the Conservation of Wildlife (commonly known as UMA within the Mexican legal narrative). Subsequently, a Three-party Agreement is to be celebrated between the community of one of the project's pilot sites (Ejido Chac-Choben, Quintana Roo), CONABIO and RESP, and which will establish the baseline for the project's implementation.
- b) "Pilot project on sustainability, production systems and traceability of skins of *C. moreletii* in Mexico". In March 2017, the first pilot ranching site for Morelet's crocodile was registered as an UMA (DGV5-UMA-VL-3760-QROO), located in the Ejido Chac-Choben, Quintana Roo, Mexico. This UMA has as its main goal the sustainable production of crocodile skins of high quality, through the leadership of local communities. The production system involves ranching activities based on scientific information resulting from a monitoring program specific to nests. With the aim of guiding these activities, CONABIO coordinated the development of a specific Ranching Protocol (*in press*), which is the result of a joint effort among governmental authorities, national and international experts (including the IUCN-CSG), producers, traders, and other key stakeholders of the value chain. The overall objective of this project is to generate socioeconomic benefits, which will yield incentives for the conservation of the species and its habitat (monitoring, management and sustainable use by the communities). This project will be implemented under a similar arrangement to that of the Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) in order to promote the fair sharing of benefits among the actors in the production/value chain. Furthermore, it will be supported by a traceability system, complementary to CITES provisions to ensure the legality and sustainable origin of the skins. In May 2016, a consultant (COMAFFAS A.C.) was hired to monitor the project's pilot sites. The results set the baseline for the establishment of the 2017 harvest limits. Currently, the UMA Chac-Choben holds the first permit for collecting Morelet's crocodile eggs from the wild in Mexico after the more than four decades ban for harvesting any specimen of the species.
- c) Association of Crocodile Producers in Mexico AC. As a whole during 2016, the UMA that make up the association, exported more than 1600 Morelet's crocodile skins (*Crocodylus moreletii*), marketed at the national level about 2000 live specimens and more than 500 skins of *Caiman crocodilus*. By 2017, an estimated 3000 Morelet's crocodile skins will be exported. At the national level, about 500 skins of the two species (*C. moreletii* and *C. crocodilus*) and more than 4500 kg of meat will be traded.

Nicaragua - prepared by Mariza Tellez

According to the Government, a non-profit organization named Fundación Amigos del Río San Juan (FUNDAR) have conducted a countrywide population survey (which includes habitat monitoring and nest surveys) of caiman and the American Crocodile for the last three years. To-date, FUNDAR has not responded to the sub-regional Central America

and Caribbean office in regards to a summary of their findings as the government did not have the data to provide information. Manuel Aranda is currently organizing a small crocodile symposium during the Mesoamerican Society for Conservation and Biology with the assistance of Luis Sigler and Marisa Tellez. Manuel is currently seeking funding to implement this symposium at the conference.

Panama - prepared by *Miryam Venegas-Anaya*

Since 2008, the Government of Panamá has declared crocodiles and alligators as species of national priority for the conservation and development of scientific knowledge that supports the hypothesis that top predators can be used as conservation tools. The Secretaria de Ciencia, Tecnología e Innovación (SENACYT) and Ministerio de Ambiente (MiAmbiente) in collaboration with the National Police, the Universidad Tecnológica de Panamá (UTP), the Smithsonian Tropical Research Institute (STRI) and Texas Tech University (TTU) are supporting the development of a long-term monitoring project for *Crocodylus acutus* (American Crocodile) in the Coiba National Park (World Heritage Site - UNESCO 2005). Over a period of eight years, the consortium has invested in training of Panamanian and foreign personnel, development of doctoral thesis, master's and undergraduate field and laboratory work under the advisor of Miryam Venegas-Anaya. As a result of the development of this project, between 2008-2013, we have developed molecular and ecological tools that have allowed us to better understand the past of these two species and make projections in the future, if the climatic variables continue with the current trend. We have obtained knowledge about the phylogeographic history of Crocodylia of the Neotropic and determined the levels of diversity of *Caiman crocodilus* and *Crocodylus acutus* in the region.

Currently the indigenous populations of the Kuna people, who inhabit the Atlantic part of Panama, have lost part of their territory and are moving to the mainland. The mobilization of human populations increases the human-crocodile conflict, for which Laureano Montero-López, Biologist of the Kuna People and Miryam Venegas-Anaya, supported by SENACYT and STRI have initiated explorations on population dynamics of *C. acutus* in the Comarca. Unfortunately between 2014 and 2017, four fatal attacks; two deaths on the Island of Coiba of poachers and two fishermen in the Panama Canal Basin. The national government is aware that a national population study is required in order to be able to provide solutions to the more frequent problems with *C. acutus*. By mid 2018, we hope to begin the population studies of caiman and crocodiles of the Panama Canal Basin and possibly of the Chucunaque and Tuira river basins. One of the most important issue, due to the expansion of the Panama Canal and the expansion of beach tourism projects, conflicts with crocodiles have increased considerably. We have a report not confirmed by the Ministerio de Ambiente, about a fatal attack of a person in the area of the channel. The Technological University of Panama is opening a doctorate in Biosciences and Biotechnology and we have a line of research on top predators of marine coastal environments and we are including crocodiles. The Panamanian Government is supporting three students to attend the CSG Working Meeting in Santa Fe, Argentina.

Paraguay - prepared by *Frederick Bahuer*

During 2016, caimans have been in the public eye in Paraguay. They were widely believed to be dying en masse – in the thousands due to a heavy drought in the Pilcomayo River region. Drought periods, due to reduced flow of water from the Pilcomayo River headwaters, have occurred in the past (eg in 2001 and 2008), and occurred again in 2016. But the situation in 2016 appears to have been exacerbated by the lack of maintenance by the Ministry of Public Works (MOPC) through the Joint Commission of the Pilcomayo River (COMIP) of the Paraguayan channel, the main channel for diverting the waters of the Pilcomayo River to Paraguayan territory. This situation has been reported at the CSG Newsletter (35(3): 15-16). The massive response on social networks and media caring about the welfare of the Pilcomayo caimans showed the high popularity they have in Paraguay.

On the other hand, a project on caiman populations is being carried out in Paraguay (“Caiman population status in six localities of Paraguay”) with funds from the National Science and Technology Council (CONACYT) for scientific initiation projects. Funds were disbursed in mid-2016 and fieldwork began in September of that year, the project is still ongoing. A review on the distribution and conservation status of the Alligatoridae in Paraguay was presented at the 1st Argentinean-Paraguayan Congress of Herpetology (September 2016), Martha Motte reported a sighting of *Caiman latirostris* at Lake Ypoa, a publication on this subject is under revision.

Perú - information prepared by Alfonso Llobet² (We would like to express thanks for the Information provided by: Pedro G. Vasquez Ruesta, David Montes and Diego Freitas and Gianmarco Rojas)

Research and management

During the reporting period, the "Population Study of Crocodilian Species in Peru" was completed in the framework of the cooperation program signed between the Ministry of Environment and the United States Agency for International Development (PAT-USAID / MINAM) and executed in the field by the National Agrarian University La Molina through the Foundation for Agrarian Development. The objective of this work was to fill in the gaps of updated information on the conservation status of the crocodilian populations present in Peru (*Caiman crocodilus*, *Melanosuchus niger*, *Paleosuchus palpebrosus*, *Paleosuchus trigonatus* and *Crocodylus acutus*).

The planning of the field evaluations were done by analyzing the distribution maps and potential habitat developed for each species, high-resolution satellite images (RapidEye) and national charts. In addition, the work was carried out on sample areas that included natural protected areas (NPAs), regional conservation areas (RCAs) as well as areas outside SINANPE. Two evaluation blocks were determined:

Block I - Tumbes, for the evaluation of *Crocodylus acutus*. It was divided into three zones:

- Zone 1 Mangroves / marshes / tidal channels (including the National Sanctuary of the Mangroves of Tumbes).
- Zone 2 Middle course of the river Tumbes.
- Zone 3 Upper Course of Tumbes and tributaries.

Block II - Loreto, for the evaluation of the Amazonian species (*Caiman crocodilus*, *Melanosuchus niger*, *Paleosuchus trigonatus* and *Paleosuchus palpebrosus*). It was divided into three zones:

- Zone 1 Pacaya Samiria National Reserve.
- Zone 2 Regional Conservation Area Alto Nanay-Pintuyacu-Chambira.
- Zone 3 Lower Amazon River

Field evaluation was conducted during the season from September to November. Field assessments for both blocks included nighttime and daytime assessments, including assessing the overall condition of the habitat, allowing complementary information to better understand the results of population counts.

In Block I, a total of 79 specimens of *Crocodylus acutus* were recorded in the wild, being able to group them by geographic area in high zone and low zone, where were found 55 and 24, respectively. Likewise, the density obtained in the Zapallal - Balseaderos sector of the Puyango/Tumbes River was 4.13 +/- 0.25 crocodiles/km.

In Block II different results were found for each evaluation area. In zone 1 (Pacaya Samiria National Reserve, Yarina sector), densities of 5.12 +/- 0.69 ind / km for *C. crocodilus* and 3.45 +/- 0.45 ind / km for *M. niger*, respectively were recorded. In the Cahuana sector, densities of 4.74 +/- 0.23 and 3.84 +/- 0.40 ind / km were obtained for *C. crocodilus* and *M. niger*, respectively.

In Zone 2 (ACR Alto Nanay-Pintuyacu-Chambira), the number of specimens found is considerable when compared to that obtained in zone 1, since a total of 49 specimens were seen, of which only 14 were identified, this because the individuals submerged before being able to know to which species they belonged. Finally, in zone 3 (Rio Bajo Amazonas) only 3 specimens were found, this result is considered related to the intense anthropic pressure identified in the area, mainly due to the recorded fishing activity.

<http://cdc.lamolina.edu.pe/Descargas/Especies/EstudioPoblacionalCrocodilidos.html>

Captive management

a) *Crocodylus acutus*

During the year 2017, Gianmarco Rojas made a visit (unofficial) to the facilities of the La Tuna Carranza breeding zoo. Improvements were observed in the facilities and in the management of the crocodilians, however there are still some problems of overcrowding and lack of reproductive management control. In the Park Las Leyendas (1 adult female senile, over 50 years old and two adult males of small size), no attempt at reproductive management has been reported. In the Huachipa Zoological Park there is an adult male and three subadult females that are ready to join them with the male, which is scheduled for the beginning of 2018. The project contemplates incubation at a controlled temperature for exclusive reproduction of females. According to Gianmarco Rojas, this was already been done with other species of crocodilians in the zoo.

b) *Melanosuchus niger*

In the Huachipa Zoo, 4 juveniles, females and all in excellent condition and with constant growth, currently have 1.4 to 1.8 m in length. It is in search of a male to build a reproductive nucleus. There are two male juveniles 1.2 to 1.8 m long,

also in the Quistococha Zoo in Iquitos, these are kept in a lagoon and they do not perform any type of management. There is also a small collection of this species within the Arapaima Breeding Center, is composed of females and juvenile males and subadults, the exact number has not yet been determined.

Other activities

Within the framework of the management of the Güeppi - Sekime National Park, *Melanosuchus niger* (among other species) has been monitored in three sampling units corresponding to two sections of the Lagartococha River and a lagoon complex of its floodplain, covering a distance of 20.9 linear km, and accounting for a total of 679 individuals.

Venezuela - prepared by Alvaro Velasco B

1. *Caiman crocodilus crocodilus* wild harvest

The sustainable use of *Caiman crocodilus crocodilus* through wild harvest still implement in Venezuela. The crop in 2016 was 29,698 individuals and in 2017 were 47,538 Babas (Data obtained from General Direction of Biological Biodiversity). The taxes for the Licenses for Commercial Harvest increase in 2016 in 39%, in 2017 in 69% and in 2018 in 67%. The harvest season in 2018 start in January and would finish on 31 May.

2. *Crocodylus intermedius* conservation program

In 2016 we liberated 334 *Crocodylus intermedius* breeding in captivity in Masaguaral ranch, Hato El Frio ranch, Agropecuaria Puerto Miranda ranch and Regional Office of Ministry of Environment Cojedes state, in Caño Guaritico Wildlife Refuge, National Park Santos Luzardo and Cojedes River In 2017, 255 *C. intermedius* was liberated from Masaguaral ranch, Hato El Frio ranch and Agropecuaria Puerto Miranda ranch in Caño Guaritico Wildlife Refuge and National Park Santos Luzardo. In 2018, El Cedral ranch liberated 42 juveniles and Masaguaral ranch 250 in El Cedral ranch and National Park Santos Luzardo.

3. *Crocodylus intermedius* National survey

In October 2016 start the National survey of *Crocodylus intermedius* with main goal to determinate the status of wild population in the country, with the financial support of Crocodile Specialist Group IUCN/SSC, CrocFest and Rio Verde. At the moment we having visited 15 locations of 27 programmed. Two important discoveries have been carried out, the first are the establishment of a third reproductive population in Estero de Camaguán Guárico state, generated with Cayman liberated in the year 2008-2009 and the second the increase number of nest in Capanaparo River. We estimate finished the fieldwork in 2018.

4. Courses in Ecology and Conservation of the Crocodylia of Venezuela.

During 2016 and 2017 four courses was do it, two for students of Biology, Veterinary science, Zootechnics and Engineers of Natural Resources and other two for National Park guards and government officials. In MArch 2018, only we do it the student course and in next October we offer another course for National Park Guards and government officials. Ten courses were implemented by Venezuela Crocodile Specialist Group.

5. Second Venezuelan Symposium on Ecology and Conservation of Crocodylia.

On 29 November 2017, the “Second Venezuelan Symposium on Ecology and Conservation of Crocodylia” was held in Caracas. Fifty-one participants, including researchers from Colombia and Venezuela, participated in the symposium, sharing the latest unpublished research on the conservation of the Orinoco (*Crocodylus intermedius*) and American (*C. acutus*) crocodiles. Twenty-two original works and current research advances were presented, relating to the history of commercial hunting, conservation efforts, captive breeding, bacteriology, ecology and habitat use, professional and technical training, conflicts, and environmental education of local communities living with these species. Two topics were particularly novel, from the traditional Venezuelan viewpoint, within a comprehensive crocodile conservation policy in Venezuela. The first was the promotion by D.O.C. Restaurant (<http://www.doc-restaurant.com/>) of the market of gourmet dishes based on fresh meat of wild *Caiman crocodilus*, opposed to the traditional and generalized use of meat preserved in salt, which ostensibly reduces its value as an economic resource. The second was the program of tourist trips carried out by Rio Verde, a publishing and audiovisual company (<http://www.rioverde.com.ve>), in order to publicize the conservation program of the Orinoco crocodile as an emblematic species of the Llanos bringing direct economic benefits to local people who cohabitate with this critically threatened species. All of the presentations will be published in the next Bulletin of the Academy of Physical, Mathematical and Natural Sciences (in Spanish with English abstracts) and will be available in PDF format.

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