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

Seventeenth meeting of the Conference of the Parties
Johannesburg (South Africa), 24 September – 5 October 2016

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Transfer from Appendix I to Appendix II the *Crocodylus acutus* population (Cuvier, 1807) from the Integrated Management District of Mangroves of the Bay of Cispata, Tinajones, La Balsa and Surrounding Areas of the department of Cordoba, Republic of Colombia, according to Resolution Conf. 11.16 (Rev. CoP 15) on the ranching and trade of ranched specimens of species transferred from Appendix I to Appendix II.

Annotation

Inclusion in Appendix II of the *Crocodylus acutus* population in the Integrated Management District of Mangroves of the Bay of Cispata, Tinajones, La Balsa and Surrounding Areas (DMI-BC) in Colombia, with the exclusive purpose of allowing international trade of skins from ranching origin. Such skins shall be marked in accordance with relevant provisions of CITES and in compliance with the unique identification system for *Crocodylus acutus* in the DMI-BC ranching program.

B. Proponent

Colombia[*].

C. Supporting statement

1. Taxonomy

1.1 Class:	Reptilia	
1.2 Order:	Crocodylia	
1.3 Family:	Crocodylidae	
1.4 Species:	*Crocodylus acutus* (Cuvier, 1807)	
1.5 Scientific synonyms:	*Crocodilus acutus* (Cuvier, 1807) and *Crocodylus americanus*	
1.6 Common names:	English:	American Crocodile
	French:	Crocodile d'Amérique, Crocodile Americain
	Spanish:	Caimán, Caimán aguja, Caimán del Magdalena, Cocodrilo Americano, Cocodrilo de río, Lagarto, Lagartoamarillo, Caimán de la costa, Caimáncaretabla, and Kayuüshiamong others

[1] *This document has been provided in these languages by the author(s).*

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

1.7 Code numbers: A-306.002.001.001

2. Overview

The inclusion of the species in Appendix I of CITES and the regulation of trade has enabled the recovery of some natural populations (United States, Costa Rica and Cuba). In 2004, the Parties in CoP 13 approved the proposal for amendment of the population of the Republic of Cuba from Appendix I to Appendix II in accordance with resolution Conf. 9.24 (Rev CoP 12) that allows for the trade of skins of captive breeding and ranching.

In Colombia C. *acutus* has been protected since 1965, which together with other national conservation efforts, has enabled the recovery of some populations in the last decades *et al*, 2006). This is the case of the C. *acutus* population that inhabits in the mangroves of Bay of Cispata, in the area protected within the *Integrated Management District of Mangroves of the Bay of Cispata, Tinajones, La Balsa and Surrounding Areas* (DMI-BC)[2] located in the municipalities of San Antero, San Bernardo del Viento and Santa Cruz de Lorica in the department of Cordoba, Colombian Caribbean zone **(Annex Ia, figure 1b)** (Ulloa-Delgado and Sierra-Díaz, 2012). Since 2003, the local community, in particular the community group (Asocaiman) has been actively involved in research, monitoring, management and environmental education activities directed towards the recovery and conservation of the specie (Ulloa-Delgado y Sierra-Díaz, 2012).

Conservation efforts of DMI-BC have resulted in an increase of C. *acutus* allowing it to obtain a carrying capacity as discussed below (section 4.2) (Ulloa-Delgado, 2015). The conservation and monitoring actions implemented in DMI-BC during a 12 year period by the regional authorities and the local community (Asocaiman) have evidenced a decrease in the pressures, therefore, making it possible to consider the sustainable use of the population, which will allow the improvement of the livelihoods of the local communities, in an orderly and structured way through the ranching strategy based on the harvest of eggs, which is considered a highly conservative and safe strategy (Rice *et al.* 1999, Larriera, 2004,Jenkins*et al*. 2006 McShane *et.al.* 2011).

The controlled harvest of eggs, following the national and international guidelines, is the best strategy to guarantee the sustainable conservation of the recovered population in the DMI-BC. The Competent Regional Environmental Authority and the Regional Autonomous Corporation of the Sinu and San Jorge Valley (CVS for its acronym in Spanish) will lead the program and its implementation will continue with the members of the local communities. In this same sense, the transfer of the Appendix of the C. *acutus* population of DMI-BC, will represent an example of what can be achieved with the involvement of the communities in the management of natural resources, which could eventually be extended in the future to other populations in Colombia.

3. Species characteristics

3.1 Distribution

3.1.1 Populations of *Crocodylus acutus*

C. acutus is the second most widely distributed *crocodile* in the new world. It is naturally distributed in 29 countries from the Tumbes province in the southwest of Peru until the southern tip of Florida in the United States, to Central America (Panama, Costa Rica, Nicaragua, El Salvador, Honduras, Belize, Guatemala and Mexico) and widely distributed in the Caribbean area of South America (Ecuador, Colombia and Venezuela, and the Caribbean (Cuba, Jamaica, Haiti and Dominican Republic) (Ponce-Campos *et al*, 2012) **(Annex I a, figure 2).**

3.1.2 Populations of *Crocodylus acutus* in Colombia

The current distribution of C. *acutus* in Colombia includes the Caribbean - in the Atrato, Las Piedras, Catatumbo, Nuevo Presidente, San Miguel, Sardinata, Sinu and Tibu rivers; in the

[2] *An Integrated Management District is a protected area defined as a "geographic space in which landscapes and ecosystems maintain their composition and function even though their structure hast been modified and whose associated natural and cultural values are placed in reach of the human population for its sustainable use, preservation, restoration, knowledge and enjoyment" (Decree 2372 of 2010). This category seeks to combine actions for the protection and conservation of the reserved area, with possibilities of sustainable use. According to the descriptions of the categories of the management of protected areas of IUCN, the DMI are homologous with category VI: Sustainable use of natural resources (IUCN, 2015).*

Magdalena basin and in the mangroves and deltas of the rivers of the Pacific (Medem, 1981; Rodríguez-Melo, 2000; Ulloa-Delgado, 2011; Morales-Betancourt *et al*, 2013). Some recent reports show established populations of the species in new areas such as the Tayrona Natural National Park located in the department of Magdalena (El Heraldo, 2012; Balaguera-Reina, 2012; Balaguera-Reina *et al*, 2014; Morales-Betancourt, 2013; Gómez-González, 2014; Vargas-Ortega, 2014).

3.2 Habitat

In Colombia C. *acutus* lives in the continental and coastal wetlands, and it is considered a very adaptable species that can be found both in freshwaters as well as in estuaries and brackish waters, at the outfalls of great rivers, lakes, ponds, swamps, mangroves and even some coral atolls far away from the coasts (Thorbjarnarson, 1992; (Thorbjarnarson*et al*, 2006; Morales-Betancourt *et al*, 2013).

3.3 Biological characteristics

C. acutus presents sexual dimorphism in size. Adult males reach total sizes of 5 and 6 meters while females reach slightly smaller sizes (approximately 4 meters); individuals that inhabit in island areas tend to reach smaller sizes than those that live in coastal and wetland areas (Schmidt, 1924; Medem, 1981; Thorbjarnarson, 1992; Ulloa-Delgado and Sierra-Díaz, 2012). The average size of the C. *acutus* hatchings is 25 cm of total size and their size will depend on the size of the eggs (Rueda-Almonacid*et al*, 2007; Meraz*et al*, 2008; Morales-Betancourt *et al*, 2013).

They reproduce sexually (Ross, 1998) and despite the size they reach, sexual maturity differs for both sexes; some authors coincide that for females the minimum is a total size of 2 meters while for males the total size is about 2.5m. Females lay between 14 to 60 eggs per year in excavated nests in the ground or in low height mounds made from the ground, sand, fallen leaves and grass (Medem, 1981; Rueda-Almonacid*et al,* 2007; Thorbjarnarson, 2010; FundaciónBiodiversa, 2011; Morales-Betancourt *et al*, 2013).

The hatch coincides with the start of the rainy season (April to July), after approximately 90 days of incubation and this period will depend on the temperature (Rodríguez-Melo, 2000; Thorbjarnarson, 2010; Fundación Biodiversa, 2011; Gómez-González, 2014). The determination of the sex of the offspring will depend on the incubation temperature with the following particularity; 31.5°C sexes in the same proportion, lower temperatures will increase the proportion of males and higher temperatures will increase the proportion of females. (Morales-Betancourt *et al*, 2013; Medrano-Bitar y Ulloa-Delgado, com. pers. 2014).

There is evidence of a high rate of mortality of eggs in wild nests, due to predation, floods, desiccation and overheating (direct solar radiation). Likewise, the hatchings suffer a high mortality within the first year of life (Ross, 1998; Gómez-González, 2014). It is estimated that only 20% of the eggs will be represented as one-year individuals in the population (Moler, 1992 en Ross, 1998). Taking into account that a female only needs to produce 1-2 surviving progeny in their lifetime to maintain a stable wild population (Ross, 1998; Abercrombie *et al.* 2000), these low survival rates wouldn't be a problem and in fact, it is well known that a large number of eggs can be collected for ranching with a minimum impact in the populations (Rice *et al.* 1999, Jenkins *et al*. 2006). With at least some of the species of crocodile, the effects of the harvest of eggs seems to be offset by survival rates that are density- dependent in hatchlings (Webb and Manolis 1992): the survival rates decrease as the number of hatchlings produced increases.

However, the longevity, the large size of the C. *acutus* and their ectothermic condition are characteristics that convert large size adults in very resistant individuals because they tolerate the environmental fluctuations of their habitats that could be catastrophic for hatchlings (Ross, 1998; Abercrombie *et al*, 2000).

3.4 Morphological characteristics

C. acutus is characterized for having an extended and relatively narrow snout. The typical pattern of the cervical osteoderms consists of two rows where the first row has four large osteoderms and the second row has only two; although it is worth clarifying that there is great variation (Morales-Betancourt *et al*., 2013). Unlike caimans and crocodiles, C. *acutus* are "true crocodiles" and the fifth

mandibular tooth is exposed when the jaws are closed rather than inserted into a socket in the upper jaw cavity (Ulloa-Delgado and Sierra, 2012).

3.5 Role of the species in its ecosystem

As other crocodiles, C. *acutus* is widely considered a top predator, with a wide variety of preys exercising a considerable influence in the trophic nets (Mazzotti and Brandt, 1994). The early stages (eggs, hatchlings and juveniles) constitute important preys for other species; and also, cannibalism is possibly a key factor (engineering and transforming species) in the control of the population and as other crocodilians C. *acutus* may contribute to maintaining the structure and function of the ecosystems of varied forms (Fittkau, 1970; Craighead, 1968; King, 1988; Thorbjarnarson, 1992; Ross, 1998; Ripple and Beschta, 2012). These crocodiles may be an indication of the status of the conservation of their ecosystems (Sergio *et al*.2008).

4. Status and trends

4.1 Habitat trends

The transformation of the land use as a result of the development in Colombia has resulted in the accelerated loss of the C. *acutus* habitat in ground and wetland ecosystems. Factors such as human population and climate change may both aggravate the situation.

In the Pacific coast, Medem (1981) described a discontinuous distribution of the species as a consequence of the conditions of the habitats (rocky coastlines), Balaguera-Reina *et al* (2012) suggest that the water bodies of the occurrence area calculated for the species in Colombia would be more or less connected (Medem, 1981; Thorbjarnarson*et al*, 2006).

4.2 Population trends, size and structure

Recent studies in the country about C. *acutus* that register abundance values, are restricted to populations of the Colombian Caribbean included in the DMI-BC and Portete Bay (Department of La Guajira); for which the community component has been developed, 2010; Balaguera-Reina *et al*, 2012) **Annex I b., table 1**.

Even though the general terms of the national census of crocodiles carried out between 1994 and 1997 by the Ministry of the Environment found isolated individuals and reduced and fragmented populations, Rodriguez-Melo (2000) identifies the Bay of Cispata in the department of Cordoba as one of the areas with environmental and social potential to rebuild and maintain healthy populations of C. *acutus* in the country; despite a relative low abundance and an undetermined structural population in that moment (Rodriguez-Melo, 2000).

In 2002, Ulloa-Delgado and Sierra-Díaz described that the structure and dispersion found corresponded to a fragmented and imbalanced population, characterized by a relative scarcity of the size type of hatchlings and juveniles, but with a sufficient number of adults to recover the population.

Considering the foregoing, in 2003 the regional authority CVS (Regional Autonomous Corporation of the Sinu and San Jorge Valleys) implemented an experimental program for the management of C. *acutus* in the Bay of Cispata(Ulloa-Delgado and Sierra-Díaz, 2012). This has been implemented mainly by local communities, organized as ASOCAIMAN, an association formed by a community group of 18 members mainly former hunters for the monitoring of C. *acutus* through night counts of the wild population and harvest of nests in approximately 80% of the natural habitat. An area of approximately 20% of the wetlands has not been included in the standards for monitoring and harvest of nests, all though there is knowledge of animals, nests and hatches for these areas, which are difficult to access (Ulloa-Delgado and Sierra, 2012-2015).

As part of innovative strategies of conservation, artificial nest banks were designed and built in mangrove areas, which are used by nesting females. On the other hand, the program involving egg harvest, artificial incubation and raising of captive individuals hatchlings, which are for the total release and restocking of the population with successful results (Thorbjarnarson, 2010; Ulloa-Delgado and Sierra-Díaz, 2012).

Between 2004 and 2014, about 8,437 individuals have been released distributed in 2,510, represented mainly in the class II raised juveniles (overall length of 0,7 – 1,2m and a few individuals of classes I and III), also, 1,857 artificially incubated eggs ready to hatch and 4,070 fertile eggs that were reintroduced to the wild some days after their harvest; (incubation mainly in the wild) main difference between the two groups of eggs (Ulloa-Delgado and Sierra- Diaz (2015)). From a sample of eggs that were incubated in a controlled manner, the hatch success of these eggs was extrapolated with an approximate value of 69.6%.

The monitoring activities of wild population and the annual harvest of eggs are developed in an area close to 1,436 Ha of film of water or 112 Km of perimeter. Monitoring results suggest that the individuals abundance of C. *acutus* observed during the regular night counts of sampled areas of the DMI-BC (see section 8.1.5 monitoring), have increased steadily (**Annex I a., figure 3)**, with an average rate of encounter of 0.6 individuals per kilometer.

The structure of the C. *acutus* population in the Bay of Cispata according to night surveys (**Annex I a, figure 4**,), confirms that all size classes (age classes) are represented and juveniles are almost always more abundant than adults. What is considered in other populations, generally like a population in recovery and equilibrium (Ulloa-Delgado and Peláez-Montes 2011), these results shows the importance of continuous monitoring and follow-up of the population.

When it is considered that during these night survey there is no exposed bank or flooded border vegetation due to high water tides and crocodiles are widely extended in the mangroves, it can be expected that the proportion of the real population sighted during night counts can be expected to be very low (visible fraction) (Messel*et al.* 1981).

For the case of DMI-BC, the estimated size of the population is between 800 and 2 356 individuals, calculated with a formula of basic population estimations in the case of various repetitions and assuming that an annual monitoring is a repetition (King *et al*. 1990 and Cerrato, 1991 in Morales-Betancourt *et al.* 2013). Likewise, it could be estimated that the population with a visible fraction between 7 to 20% (calculation from a sample or a year); noting that the % could be lower, underestimating the population; this corresponds to the evaluations in other experiences with crocodiles where the values of the visible fraction are lower than 1% Alejandro Larriera GSC-UICN com pers.

The annual harvest of nests carried out by the community is intense and independent from the night monitoring (census) of the wild population. Between 2004 and 2014 an average of 54.6 nests (observed variability between 47 and 67) (**Annex I a, figure 5a**), which is notably stable and consistent with the stable adult population (Ulloa-Delgado and Sierra-Díaz 2012). The fact that the clutch size has not increased could be related to the social domination and exclusion of females from the population (Hines and Abercrombie, 1987). The average size of nests between 2003 and 2013 has increased from 28.4 to 30.46, with an average of 27.11 eggs in 56.4 nests found on average **(Annex I a, figure 5b**).

As a result of the monitoring of the program, in the last three years small clutche have been found that suggest that some females have been recruited at the parental stock of the wild population. Nevertheless, every year of sampling can be found in small clutch that could indicate uninterrupted positions or small females (Mazzotti 1989).

Implementation of artificial nesting sites has been one of most relevant strategies for the management, given that in the 13 years of track nests abundance, the community has obtained close to 64% of the nests (400 nests). Likewise, its implementation has contributed as a mitigation and adaptation measure to counteract the effects of access from sea level on natural areas of oviposition.

The continuous monitoring by the community of the abundance, structure and size of the C. *acutus* population will provide continuity in the establishment of actions for the conservation and information about a possible detriment within the community management area DMI-BC.

4.3 Geographic trends

The distribution of C. *acutus* in Colombia has changed over time. There is information that suggests possible local disappearances from the 70's (Medem 1981), including areas such as Isla Fuerte, Tortuguilla and the Archipelago of Nuestra Señora del Rosario and San Bernardo (National Park). On

the contrary, recent studies have reported the presence of the species in new areas such as the Tayrona Natural National Park, in the department of Magdalena and interestingly in the department of the Islands of San Andres (Balaguer-Reina and González-Maya, 2008; El Heraldo, 2012; Morales-Betancourt *et al,* 2013; Balaguera-Reina *et al,* 2014; Gómez-González, 2014; Vargas-Ortega, 2014). The current distribution limits of the species in Colombia are: to the south (in the inter-Andean valleys) Villavieja in the department of Huila; and to the northeast Hondita and Castilletes Bay in the department of La Guajira (Medem, 1981; Balaguera-Reina *et al*, 2014), as well as in the river basin of the Catatumbo river that registered a border population (Ulloa-Delgado and Pelaez-Montes 2011).

5. Threats

The main threat for the C. *acutus* is degradation and the loss of their habitat. Other threats include incidental catch (Castaño-Mora 2002; Fundación Biodiversa, 2011; Ulloa-Delgado and Sierra-Diaz 2012; CORPORGUAJIRA and INVEMAR, 2012), however, its implication are unknown. (Thorbjarnarson*et al*, 2006; Balaguera-Reina *et al*, 2012; Morales-Betancourt *et al*, 2013). Likewise, climate change may constitute a threat, as well as the rise of sea level, which could also affect the stability, and continuity of the habitat and the increase in environmental temperature perhaps affecting sex determination and sex ratios (Ulloa-Delgado y Sierra, 2012).

6. Use and trade

6.1 National utilization

The specimen, like other *crocodiles*, is traditionally used by some local communities as a source of protein and occasionally, as a source of some raw materials for handicraft and traditional medicine (Morales-Betancourt *et al*, 2013; Gómez-González, 2014). Its main historical use has been in the leather goods industry (wild skins) which has generated an international trade that has been mainly regulated by CITES in recent years. Other types of recent uses have identified the C. *acutus* as a tourist attraction, which allows for initiatives in the areas like the DMI-BC (Thorbjarnarson, 2010; Ulloa-Delgado and Sierra-Díaz, 2012; Morales-Betancourt *et al*, 2013).

6.2 Legal trade

Since the 90's, Colombia has promoted the establishment of captive breeding for the production of C. *acutus* skins. After the registration before CITES as captive breeding' for Appendix I species, the first 100 skins were exported in 2001 (Ulloa-Delgado and Sierra, 2012; De La Ossa *et al*, 2013). From 2012 to July 2015, the Management Authority has granted permits to export 5,502 C. *acutus* skins from captive breeding operations (MADS, 2015). It is estimated that between 1976 and 2011, Colombia has exported about 16,191,679 crocodile skins, of which 95.8% come from captive breeding. Of these, 97.7% are represented by the *Caiman C. fuscus*, 2.07% by *Caiman C. crocodilus* and only 0.03 % are C. *acutus* (De La Ossa *et al*. 2013).

Currently, in Colombia there are seven (7) captive breeding farms registered by the CITES Secretariat and two (2) that are in process of registration (**Annex I b., table 2**)(MADS, 2015). According to available information, it is estimated that up to date there are 43,709 specimens of C. *acutus* (including parental stocks) that are housed in those farms (MADS, 2015).

6.3 Parts and derivatives in trade

According to the export records of the Management Authority (Ministry of the Environment and Sustainable Development of Colombia), the products from C. *acutus* exported by Colombia are exclusively skins; mainly raw or salted products (MADS, 2015). All exported skins have been identified according to the registration code of each captive-breeding farm as establishments that breed in captivity for commercial purposes for animal species included in Appendix I and the main destinations have been France, Italy, Japan and Singapore.

6.4 Illegal trade

In the past there has been punctual illegal trade and of low magnitude of C. *acutus*. Given the reduction of the species in the national territory and the fact that since 1965 the first prohibition was declared, it could be mentioned that there are no wild populations for an illegal trade. Nevertheless and of low magnitude, some customary uses have been identified that are unique to local

communities (indigenous people, Afroamerican communities and farmers). Currently, strict national control measures such as the requirement of genotyping of parentals of all nurseries by the part of the Ministry of the Environment, Housing and Territorial Development (Resolution No. 1772 of 2010; Medrano-Bitar, com. pers. 2014; Resolution 1316 of 2014). In protected areas such as the DMI-BC, the involvement and appropriation of the community, suggest that the probability of trade is low.

6.5 Actual or potential trade impacts

Currently, there is wide evidence globally that ranching, based on the use of early stages such as eggs, is safe and sustainable as one of density-dependent answers that compensate the harvest of eggs (Ross, 1998; Abercrombie *et al*. 2000; Larriera *et al.* 2004; Jenkins *et al.* 2006). Even when 50-80% of the eggs laid are harvested or 5-10% of the adult population is within sustainable levels (David, 1994; Webb *et al.* 1992 in Ross 1998; Woodward *et al*., 1992 in Ross, 1998; Jenkins *et al.* 2006).

In Australia, the ranching based on the maximal harvest of *Croocodylus porosus* eggs in some areas (2000 per year) does not stop the wild population from continuing its recovery (Webb *et al*. 1992 in Ross, 1998). Other ranching programs of crocodile such as *Alligator mississippiensis* in Florida (USA) (Rice *et al.* 1999), or *Caiman latirrostris* of the Republic of Argentina (Larriera and Imhof 2006) have implemented different percentages in the harvesting models.

In this sense, trade of products from captive breeding programs based on the controlled harvesting of eggs of C. *acutus*, in accordance with CITES guidelines, Colombian legislation and the involvement of the community, will benefit local populations, lower the probability of any illegal use and evidencing tangible benefits in the conservation of C. *acutus,* wetlands and other fauna and flora species with whom it shares those habitat.

7. Legal instruments

7.1 National

Colombia has a robust legal framework that regulates the management, use and trade of wild fauna, including laws with special emphasis in the use and trade of *Crocodylus acutus*. First, the Constitution of Colombia of 1991 mandates that the State protect the natural resources of the nation and requires state planning for the management and use of natural resources in the pursuit of sustainable development and conservation, among others (Article 8 and 80). The country also has local policies, laws and guidelines directed toward the protection of natural habitats, such as mangroves, which require that these are subject to conservation activities and regulation of ecosystems (Ulloa-Delgado and Sierra-Díaz, 2012).

In addition to the regulation derived from the Natural Resources Code and Decree 1608 of 1978 that regulated such Code in matters of wild fauna, there is also Law 611 of 2011, that establishes basic laws for the sustainable management of species of the wild and aquatic fauna, whose purpose is to regulate the sustainable management of wild and aquatic fauna and the use of the same and its products, which could be carried out through the direct harvesting of the environment or captive breeding andd/or open cycle.

On the other hand, Decree 2372 of 2010 that establishes that the administration of the integrated management of the district is within the jurisdiction of the Environmental Authority and the same authority is in charge of granting permits, licenses and approvals about natural resources, among others, which for this case is the Regional Authority - CVS-. Other current laws, decrees and agreements for the conservation, use, management and control of species are summarized in **Annex I b table 3, Annex II Res. 11.16 (b,ii, d,iii).**

If the proposal for amendment is approved, other supplementary specific national measures about the regulation and management of the ranching program will be developed as an additional safeguarding measure.

7.2 International

The trade of C. *acutus* is regulated by CITES, which guarantees that both Colombia as well as the Parties have sufficient instruments to implement the provisions of the Convention. Additionally,

Colombia is also Party to the Convention on Biological Diversity - CDB-, and the RAMSAR Convention; which have the sufficient legal framework to guarantee their compliance in the national territory, including matters on conservation and distribution of benefits, international conventions of which Colombia is a party to.

8. Species management

8.1 Management measures: Proposal for farming based on the controlled harvest of eggs (ranching)

The program for the management and conservation of C. *acutus,* established since 2003 by the competent regional authority in the Bay of Cispata -today DMI-BC-BC- (CVS) and with the involvement of local communities, has carried out the harvest of eggs (ranching) and breeding in captivity of juveniles that subsequently have been released with the exclusive purpose of conservation. The success of this program can be evidenced in the significant increase of the visible fraction of the population and the heterogeneity and representation of size classes of the population **(Annex Ia, figure 4**).

The main objective of the proposal for amendment shall also be to give continuity to the program by optimizing the process of sustainable use (Dutton *et al.* 2004) of the C. *acutus* species through the leadership of CVS in the defined area (DMI-BC) and the involvement of the local communities. The proposal will strengthen and make viable the economic and conservation aspects through the egg ranching program and skins trade. This model of use of the species in the DMI-BC will continue with the information from the monitoring of the populations, which will support the decisions of the values for quotas for ranching.

8.1.1 Harvest of eggs and establishment of quota

The ranching program shall be exclusive and restricted to C. *acutus* eggs of the DMI-BC population. Local community groups such as ASOCAIMAN, will be exclusively responsible for the harvest, which will be approved by local environmental authorities and national Scientific Authorities. This operation will not be authorized to private persons or any other entity.

As known from other experiences in crocodile ranching programs (Hutton and Webb, 1992; Ross, 1998; Jenkins *et al*. 2006, Larriera y Webb, com. pers.), the restricted harvests of eggs can be compensated by the increase in the survival of births of individual eggs not collected.

In crocodiles, there are different models of ranching both in *Alligator missipensis* in Florida (Rice *et al.* 1999), C. *porosus* in Australia (Webb *et al.*, 1992 in Ross, 1998) and in *Caiman latirostris* in Argentina (Larriera y Imhof 2006). In the case of the ranching model for the DMI-BC for the harvest of C. *acutus* eggs and taking into account the findings from the group of experts with respect to the ranching of Crocodylia, it is recommended that "in those places where the harvest is considered high, management programs may require the return to the natural environment of individuals with sizes in which predation is unlikely in an amount that represents between 5-17% of the number of collected eggs" (Ulloa com. pers.). This compensation reduces the impact of the harvest and has a clear possibility to exercise a positive effect in terms of the wild population (Hutton and Webb. 1992).

Considering the foregoing, for the DMI-BC eggs will be harvest from the sample area, according to the management plan that will be developed for the sustainable use of C. *acutus*. Collected eggs will be taken to controlled incubation at the facilities of the Research Station CIMACI Amaya of CVS, located within the DMI-BC; to obtain individuals from both sexes so that there is a contribution both to the reintroduction of individuals in the wild as well as for trade. The experience of the DMI-BC monitoring program considers an initial experimental percentage of 10% for releases to the wild.

This 10% of individuals will be raised for their subsequent release into the wild according to a management plan that includes: size (100 cm approximately), sexes and its origin. This percentage will be reviewed according to the adjustment processes of the monitoring and the review of population trends with appropriate biological criteria.

Currently, the program has an inventory of 857 juveniles and subadults at the facilities of the CVS regional authority (**Annex I a, figure 6**), recognizing also that the capacity building for

communities should be strengthened for animal sacrifice. The initial export quota proposed is an experimental quota of 200 skins per year until the inventory is exhausted (2019-2020).

After the current inventory, the definition of trade quotas will be established and based on scientific information of the monitoring of the populations led by CVS, accompanied by local communities and with the articulation and review by experts and the CITES Authorities in Colombia. The quota definition will be analyzed and adjusted every year to apply it according to the biological and legal contexts so that the necessary measures can be adopted so that extractions do not cause a detriment to the populations and contribute to the conservation of the species.

8.1.2 Identification and marking

Eggs harvested from nests will be collected and individually incubated and each egg will be numbered in an ascending sequence without repetition for each one of the yearly harvests.

These will be taken to the incubator at the facilities of the CIMACI Amaya Research Station of CVS, located within the DMI-BC.

All animals will be marked at birth, with the amputation of tail scutes with an individual number indicating the egg number and harvest year **Annex II resolution 11.16 b (ii). Figure 1**. All animals will be raised at the facilities at CIMACI Amaya Research Station.

A detailed description of the identification of captive breeding species and the ranching program are included in **Annex II resolution 11.16 b (ii).**

8.1.3 Produced/trade products

Products that can be obtained are C. *acutus* skins. These will be marked at the specific moment of the sacrifice in accordance to universal tagging system for the identification of crocodillian skins, and will include a specific mark of origin printed CITES label: ACUTUS CISPATA COLOMBIA (Res. Conf. 11.12, Rev. CoP 15). Any such other innovative methods for traceability recommended by the Parties to CITES will be included.

8.1.4 Sacrifice and humane treatment

The sacrifice will be carried out at the appropriate facilities within the CIMACI Amaya Research Station, using humane methods that guarantee that there is no cruelty and complying with the corresponding national legislation. Several codes for humane treatment practices for captive crocodiles are available (NRMCC, 2009; CFAZ2012; LDWFY LSU 2011). Specific regulations on humane treatment are included in **Annex II, resolution 11.16 d (iii)).**

8.1.5 Population monitoring

The standardized monitoring methodology (that includes night census and collection of nests) that is currently applicable, takes into account the national developments (Inderena 1994) and the advise from experts of CSG-UICN (John Thorbjarnarson, Wayne King and José Ayarzagüena), in addition to documents such as the Ayargüena (1983) “Ecology of the spectacled caiman in the Apure plains". Of the total area of the DMI-BC, approximately 1436 ha of film of waters are sampled or 112 km of perimeter that corresponds to the crocodile's habitat. The sampling of the population is carried out by night counts in nine standardized routes where the observed individuals are recorded and of which trained members of the community and biologists are a part of **(Annex I a, figure 1b)**. Both the census as well as the collection of nests is carried out once a year, at different times of the year. The laying season starts in February and goes for 3 months and the monitoring is carried out during 20 days between the months of July and December, mainly.

The monitoring activities through the tracking of nests and night census of wild population could be strengthened with other methodologies. As part of *ex situ* management protocols in the captivity model, a record of the inventory of animals (updated) will be made and through a sample, a follow-up will be made until the sacrifice (homogeneous groups and adjustments to

nutrition tables). CITES Management Authority will have permanent access to the information.

The program will deliver an annual report to CVS, the Scientific and Management Authority of Colombia, with detailed information about the program including, but not limited to, population monitoring results (data, trends and structure), the number of nests and harvested eggs, hatchling success rates, number of animals of different sizes within captive stocks, mortality rates, number of sacrificed animals, skins produced (and their identification data) and, in accordance with the safeguards, in the event of a decline in population due to ranching program, number of animals released (with their record information).

The Ministry of Environment and Sustainable Development of Colombia, as the Management Authority before CITES, will submit an annual report to the CITES Secretary as required under Resolution Conf. 11.16 (Rev. CoP 15); said report will be attached to the annual report presented by the Republic of Colombia for the corresponding year.

8.2 Population supervision

The direct protection of species at a national level is ultimately the responsibility of the Ministry of the Environment and Sustainable Development, the Management Authority of Colombia CITES, with support from of the CITES Scientific Authorities and Regional Environmental Authorities (the Regional Autonomous Corporations of the country).

In the particular case of the C. *acutus,* population subject to ranching in the DMI-BC, CVS will be the environmental authority directly responsible for ensuring the health of the resource, coordinating the use program and providing the permits to local communities, including Asocaiman. Reports about the program will provide information to the national environmental authorities to demonstrate the compliance of the quotas and measures imposed to ensure its benefits for the conservation of the population, without causing a detriment to the wild populations.

8.3 Control measures

8.3.1 International

Control measures at the international level provided in CITES Convention will be a priority and will provide the tools to implement control measures, among which the reduction of illegal trafficking is included (Ulloa-Delgado and Sierra-Díaz, 2012).

Additionally, all countries in the C. *acutus* distribution area are Parties to CITES and its trade is regulated according to this convention. In addition, the SPAW Protocol provides additional international measures for C. *acutus* according to the subprogram to support the conservation and sustainable use of endangered species.

8.3.2 National

Colombia has a legal framework that regulates the use of wild fauna, which has allowed for the enactment of a series of laws directed towards the use of crocodiles, among other biodiversity components, (**Annex I b, table 3, Annex II Res. 11.16 (b,ii, d,iii)**. The country also has several public institutions that are responsible for the management, protection, conservation, use and handling of natural renewable resources who are responsible for strictly implementing different management, control and supervision measures at a local, regional and national level. These include the Ministry of the Environment and Sustainable Development (CITES Management Authority), the National Authority for Environmental Licenses (ANLA), the Regional Autonomous Corporations (CAR), the five research institutes that constitute the CITES Scientific Authority of the country, the Environmental Police, the Highway Police and the Comptroller's Office (MAVDT 2005).

Considering the above, other control measures that will ensure a sustainable harvest of C. *acutus* specimens are:

- A development program that will have a Management Plan/Business Plan that will provide guidelines for development and financial management; as well as functions, obligations and distribution of benefits of the program.

- Authorized personnel to carry out the harvesting of eggs and farm breeding are selected based on criteria defined by the scientific and environmental Authorities and shall be dully authorized. This operation will not be authorized to private persons or any other entity.

- All products of the program destined for international trade shall be identified with the numbering and marking systems.

- When considered necessary, the CITES Secretary may visit and examine the ranching program.

Sufficient safeguards, including genotyping of individuals of the captive breeding establishments (Resolution No. 1772 of 2010 and 1316 of 2014)will be in place, to make a clear division between trade in products derived from the DMI-BC ranching program, *versus* those originated from closed breeding farms.

8.4 Captive breeding and artificial propagation

In Colombia there are seven (7) captive breeding facilities with commercial purpose of C. *acutus* registered in CITES that are now in the commercial phase. Currently (under review) an average of 800 skins per year are exported, satisfying in part the international trade demand (MADS, 2015).

8.5 Safeguards

C. acutus specimens outside DMI-BC limits, where the ranching program of Appendix II species operate, will remain in Appendix I and will be subject to control regulations, established for Appendix I species in Colombia. These species will be easily differentiated from the specimens obtained from ranching by the exposed marking system **Annex II Res. 11.16 (b(ii) Figure 1)**.

As a precautionary measure, in the event that results of the monitoring of the population indicate a reduction in the populations due to the ranching program, the percentage of individuals that must be reintroduced to the wild (according to section 8.1.1) will be reviewed, as well as the establishment of quotas and, in addition, there will be a review of the population and reproductive parameters as safeguard **Annex II Res. 11.16 (d (i) Table 1)**.

The proposal is restricted to the DMI-BC area of the department of Cordoba and Colombia does not have immediate plans to expand the ranching program to other regions; nevertheless, if there is an interest in implementing a conservation program based on the controlled harvesting of eggs of another national population that is outside the DMI-BC limits, this will not be considered without i) an evaluation of specific criteria on the monitoring of the population, the current local laws and the benefit to populations of species of C. *acutus*, their habitat and that of the inhabitants, which in addition includes the analysis of CITES Authorities and other expert groups, such as the Specialist Group of Crocodiles SSC-IUCN, that in their view they consider would contribute to the conservation of C. *acutus* in Colombia, ii) the evaluation of the cost-benefit by local Environmental Authorities and iii) the approval by the CITES Standing Committee.

9. Information on similar species

Colombia is habitat to six of the 23 species of crocodilians of the world of which only two belong to the Crocodylus *genus: C. actus* y C. *intermedius* (Rodríguez 2000; Martin, 2008). Even so, this proposal would not negatively affect the conservation and/or management of any of the crocodile species in Colombia not included in this proposal. Despite their similarity, the skin of C. *intermedius* has between 20 to 25 transverse rows of ventral scutes, while the C. *acutus* has between 25 and 35 (Fajardo-Patiño *et al.*, 2013). Additionally, C. *intermedius* has a more restricted distribution limited almost exclusively to the Orinoco river basin in Colombia and Venezuela. *Caiman crocodilus, Melanosuchus niger, Paleosuchus. Palpebrosus, and P. trigonatus* have morphological characteristics very different from C. *acutus*, including more osteoderms and therefore, their skin is easily distinguishable in the market and does not give rise to confusion or fraud.

10. Consultations

This proposal has been consulted with the range States for comment (consultation letters are attached).

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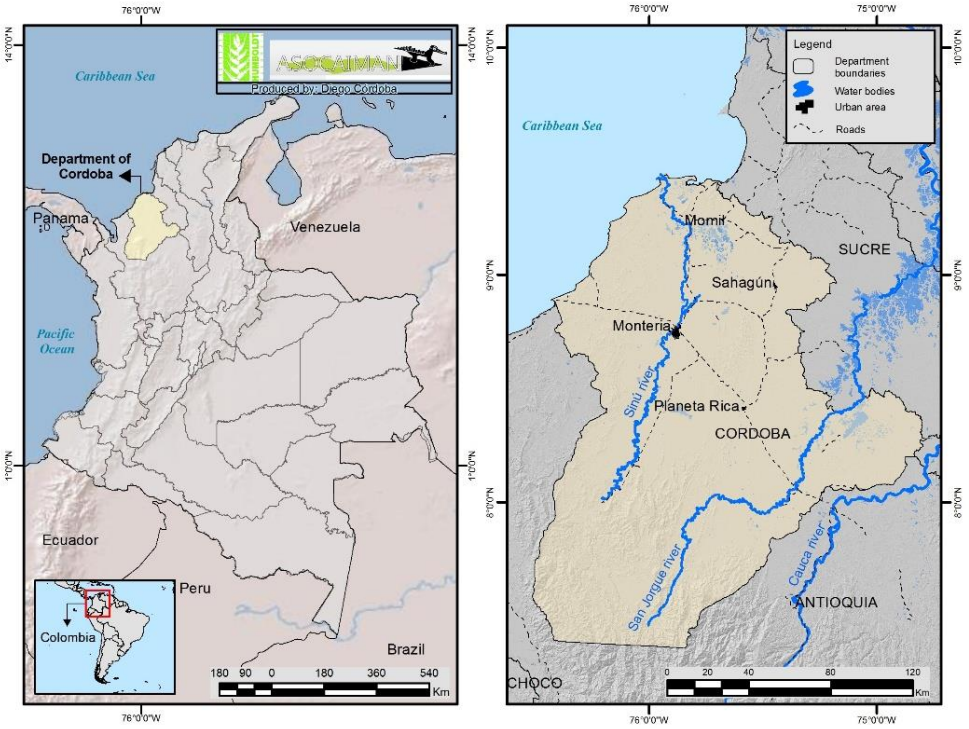
a. Figures

a.



b.

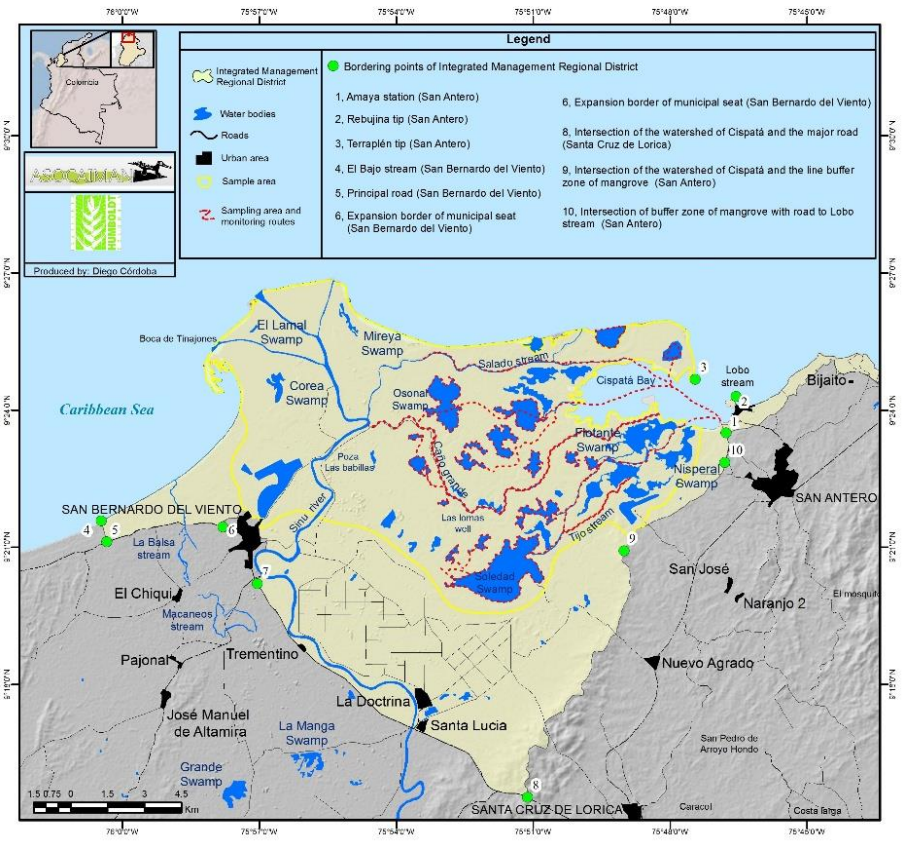


Figure 1. a. Colombia, department of Cordoba with main water bodies **b.** Map of the limits of the Integrated Management Regional District of the Mangrove Area of Bay of Cispata and the Surrounding Area of the Estuary Delta of the Sinu River located in the department of Cordoba,

Colombia, protected area homologous to category IV of IUCN. The sampling area and monitoring routes are shown.

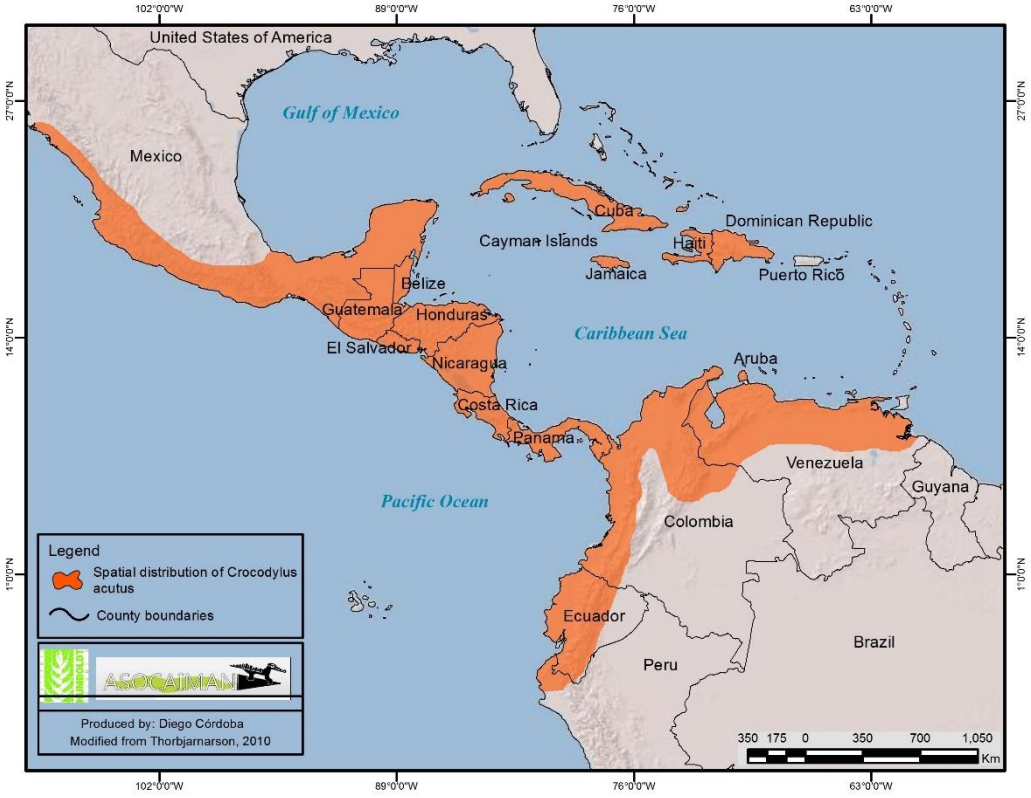
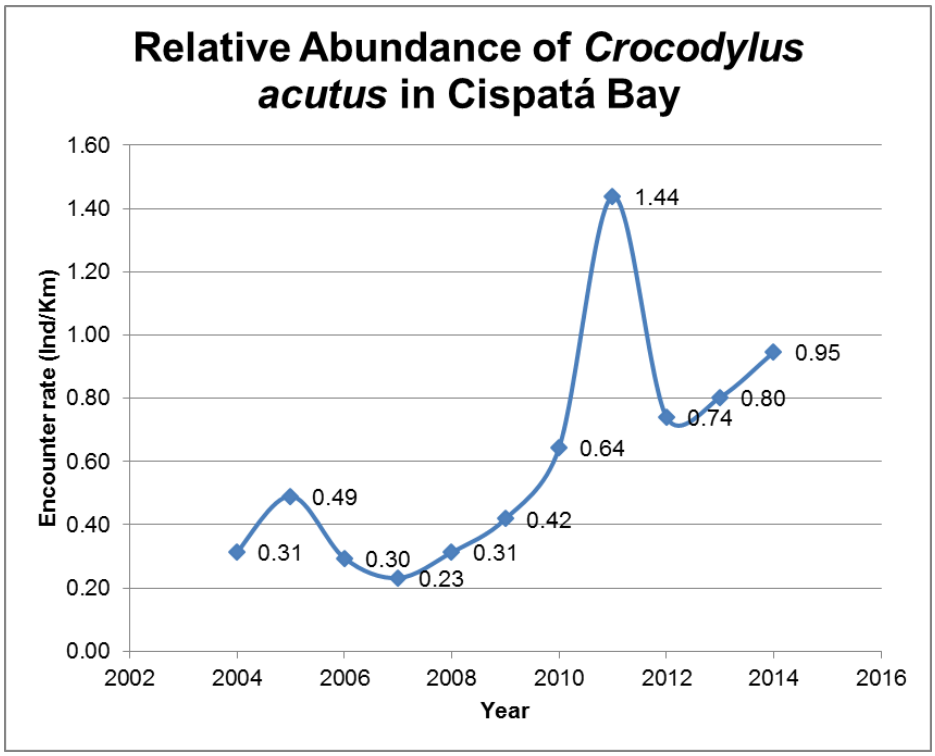


Figure 2. Map of the distribution of *Crocodylus acutus* at a global level (Taken from and modified from Thorbjarnarson, 2010).

a.



b.

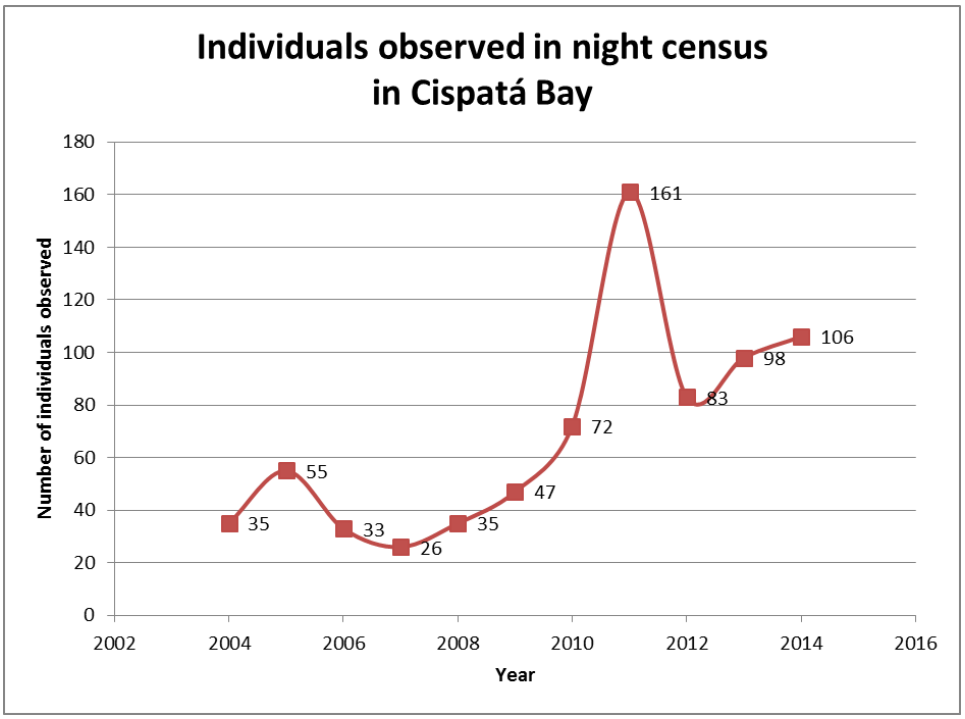


Figure 3. Average encounter rate (relative abundance) of *Crocodylus acutus* obtain from the night monitoring between 2004 and 2014 (a), and the total number of individuals observed (*b*). In both graphics it can be observed that both the encounter rate as well as the total number of individuals observed have been increasing since 2007. Integrated Management District of the Mangroves of Bay of Cispata, Department of Cordoba. Colombia. 2015.

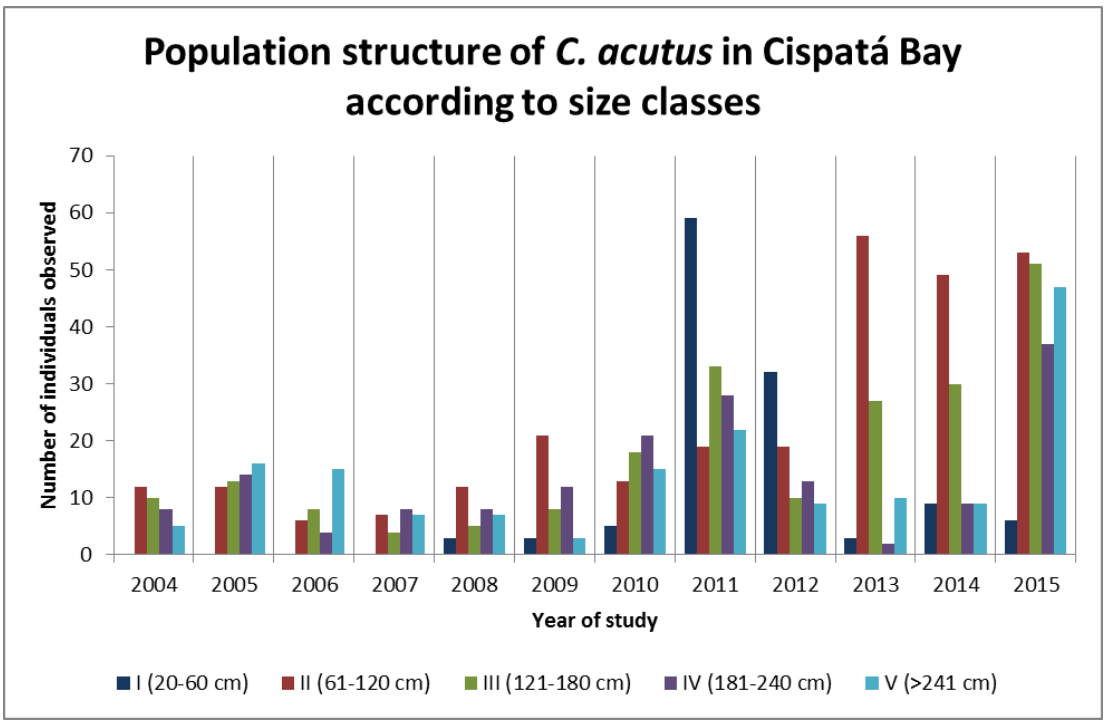
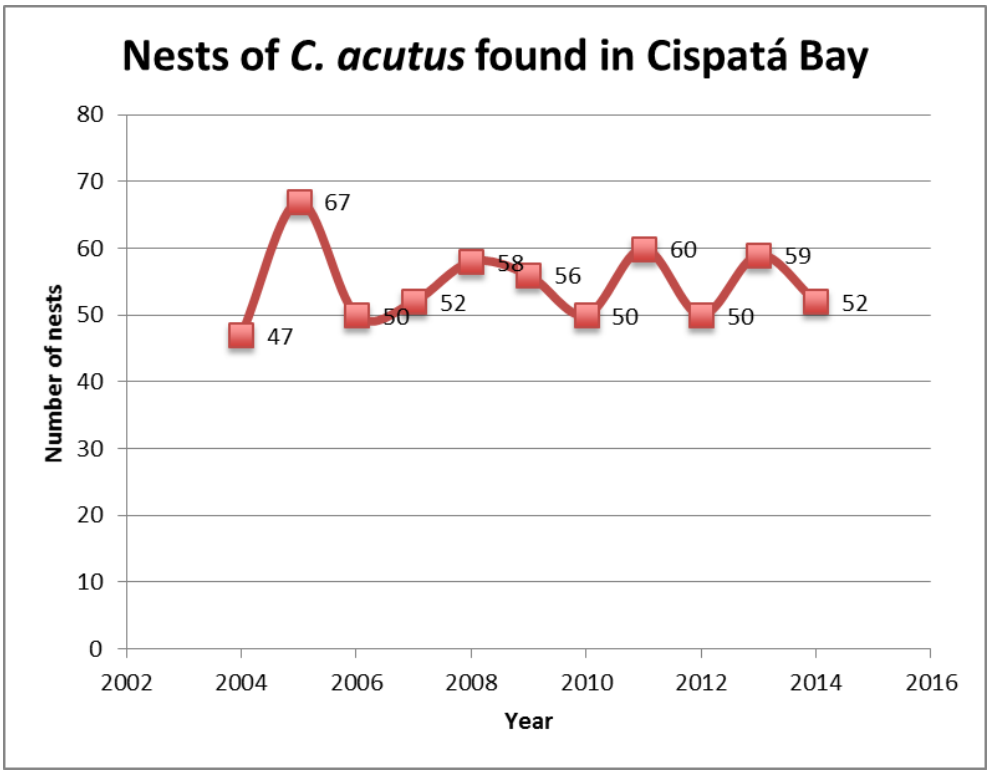


Figure 4. Distribution of the frequency of size classes of individuals of *Crocodylus acutus* observed between 2004 and 2014 during the night census in the Integrated Management District of the Mangroves of Bay of Cispata, Department of Colombia. Colombia. 2015.

a.



b.

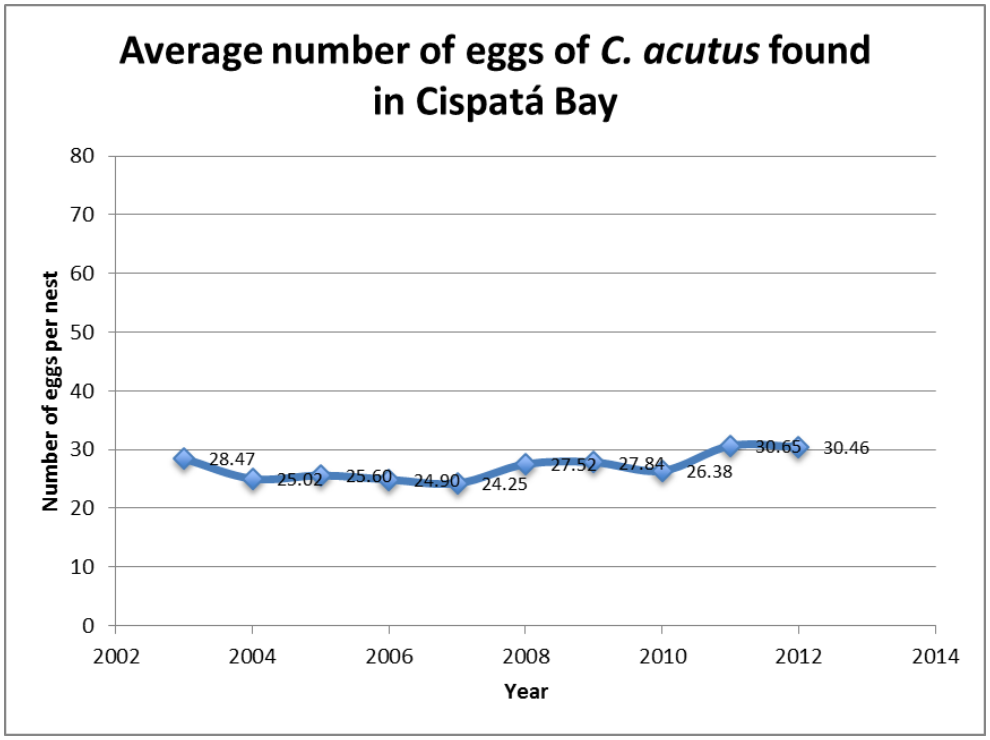


Figure 5. Number of nests found in Bay of Cispata between 2004 and 2014 (a) and the average number of eggs (b). On average, 54.6 nests have been found since 2004, with a standard deviation of 5.9. The average of eggs per nest found has slightly increased. Integrated Management District of the Mangroves of Bay of Cispata, Department of Cordoba. Colombia. 2015.

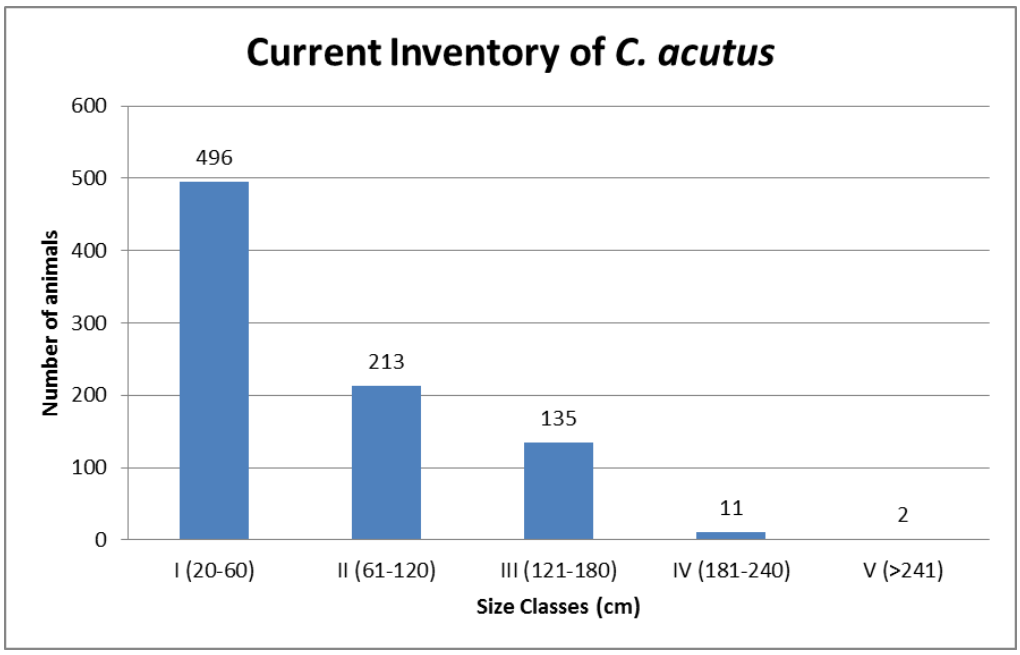


Figure 6. Current inventory (2015) of *Crocodylus acutus* of the conservation and management program of the species in the District of the Mangroves of Bay of Cispata, Tinajones, La Balsa and Surrounding Areas (Ulloa-Delgado, 2015).

b. Tables

Table 1. Relative abundance information, expressed as an encounter rate (Ind/Km), obtained from population studies of *Crocodylus acutus* conducted in Colombia between 1992 and 2012. (*Data to be published; **These abundance values do not include hacthlings; *** the author makes reference to the size of the population between 9 and 10 animals and reports an encounter rate of 19 ind/km without explaining the procedure used to calculate that data)

AUTOR	YEAR OF PUBLICATION	DEPARTMENT	SITE OF STUDY	YEAR OF STUDY	AVERAGE RELATIVE ABUNDANCE (ind/km)
Gómez-Gonzáles	2011	La Guajira	Portete Bay	2011	2.01
Gómez-Gonzáles	2011	La Guajira	Portete Bay	2010	2.71
Gómez-Gonzáles	2011	La Guajira	Portete Bay	2009	0.88
Gómez-Gonzáles	2011	La Guajira	Portete Bay	2008	2.02
Gómez-Gonzáles	2011	La Guajira	Portete Bay	2007	1.73
De la Hoz-Villareal	2008	La Guajira	Portete Bay	2007	1.37
Rodríguez-Melo (ed.)	2000	La Guajira	Portete Bay	1994-1997	0.47
Abadía	1996	La Guajira	Portete Bay	1992	0.09
Patiño *et al.*	2010	La Guajira	Limoncito creek - Dibulla	2009-2010	0
Patiño *et al.*	2010	La Guajira	Limoncito creek - Dibulla	2009-2010	7.58**
Patiño *et al.*	2010	La Guajira	Lagarto creeek - Dibulla	2009-2010	12.12**
Patiño *et al.*	2010	La Guajira	Michiragua creek - Dibulla	2009-2010	7.69**
Rodríguez-Melo (ed.)	2000	La Guajira	Dibulla	1994-1997	3.75
Vargas-Ortega	2014	Magdalena	Tayrona Natural National Park (Los Naranjos, Cañaverales, Arrecifes and Cinto)	2013-2014	1.33
Balaguera-Reina and Gonzáles-Maya	2008	Magdalena	Via Parque Salamanca Island	2006	7.78
Fundación Biodiversa	2011	Bolívar	Puerto Badel - Dique Channel	2011	0.51
Balaguera-Reina	2012	Cesar	Zapatosa swamp and Costilla	2011	0
Ulloa-Delgado	2015	Córdoba	Cispatá Bay	2014	0.95
Ulloa-Delgado	2015	Córdoba	Cispatá Bay	2013	0.8
Ulloa-Delgado	2015	Córdoba	Cispatá Bay	2012	0.74
Ulloa-Delgado	2012	Córdoba	Cispatá Bay	2011	1.44
Ulloa-Delgado	2012	Córdoba	Cispatá Bay	2010	0.64
Ulloa-Delgado	2012	Córdoba	Cispatá Bay	2009	0.42
Ulloa-Delgado	2012	Córdoba	Cispatá Bay	2008	0.31
Ulloa-Delgado	2012	Córdoba	Cispatá Bay	2007	0.23
Ulloa-Delgado and Sierra-Díaz	2006	Córdoba	Cispatá Bay	2006	0.74
Ulloa-Delgado and Sierra-Díaz	2006	Córdoba	Cispatá Bay	2005	0.49
Ulloa-Delgado and Sierra-Díaz	2006	Córdoba	Cispatá Bay	2004	0.3
Ulloa-Delgado and Sierra-Díaz	2006	Córdoba	Cispatá Bay	2003	0.94
Ulloa-Delgado and Sierra-Díaz	2006	Córdoba	Cispatá Bay	2002	1.25
Ulloa-Delgado and Sierra-Díaz	2006	Córdoba	Cispatá Bay	2001	0.5
Rodríguez-Melo (ed.)	2000	Córdoba	Cispatá Bay	1994-1997	19.00***
Ulloa-Delgado and Cavanzo-Ulloa	2009	Sucre	La Caimanera swamp	2008-2009	0.36
Rodríguez-Melo (ed.)	2000	Sucre	La Caimanera swamp	1994-1997	7.29
Barrera	2004	Boyacá and Santander	Ermitaño river	2004	1.07
Ulloa-Delgado	2011	Norte de Santander	San Miguel river, Sardinata, Nuevo Presidente and Tibú	2010	1.32
Barahona *et al.*	1996	Cundinamarca	Bogotá river	1994-1995	1/sin distancia
Promedio					**2.52**
Desviación Estándar					**3.99**

Table 2. Registered captive-breeding operations and in process of being registered before CITES a captive breeding of *Crocodylus acutus* for commercial purposes.

NAME	REGISTRATION CODE	PHASE
Krokodeilos S.A.	A-CO-501	COMMERCIAL
Tropical Fauna LTDA.	A-CO-502	COMMERCIAL
CaicsaS.A.S.	A-CO-503	COMMERCIAL
Cocodrilos de Colombia S.A.	A-CO-504	COMMERCIAL
Zoofarm LTDA.	A-CO-505	COMMERCIAL
Exotika Leather S.A.	A-CO-506	COMMERCIAL
El PrietoLTDA	A-CO-507	COMMERCIAL
Lirica	In process	COMMERCIAL
Reptibol	In process	COMMERCIAL

Table 3. Colombian environmental laws for the use of wild fauna with special emphasis in crocodiles, by chronological order

TYPE	NUMBER	YEAR	PURPOSE
Resolution	573	1969	Pursuant to which a ban on the hunt and capture of the Aguja or Caretabla Crocodile (*Crocodylus acutus*), Caimán Llanero (*Crocodylus intermedius*), Yacaréassu or Caimán Negro (*Melanosuchus niger*) is established in all the territory where INDERENA has jurisdiction.
Resolution	564	1970	Pursuant to which values (monetary costs) are set for the restitution of some species of wild animals originated from faunal territories of INDERENA: Caimán Aguja (*C. acutus*), Caimán Negro (*M. niger*) $ 200 pesos per individual; Babilla (*C. crocodilus*), Cachirre (*P. palpebrosus* and *P. trigonatus*) $ 30 pesos per individual.
Decree-Law	2811	1974	Pursuant to which the Code of Renewable Natural Resources and Protection of the Environment is established.
Decree	1608	1978	Pursuant to which the National Code of Renewable Natural Resources and the Protection of the Environment and Law 23 of 1973 are regulated with respect to wild fauna.
Law	17	1981	Pursuant to which the Convention on International Trade in

TYPE	NUMBER	YEAR	PURPOSE
			Endangered Species of Wild Fauna and Flora –CITES was approved.
Agreement	039	1985	Pursuant to which the list of vertebrae belonging to the species of wild fauna that can be the subject to hunting for the purpose of the promotion of captive breeding is established. The vertebrae species that belong to the wild fauna included cannot be hunted without the corresponding hunting promotion permit obtained according with the provisions of Decree 1608 of 1978
Resolution	17	1987	Pursuant to which Agreement 039 of 1985 is regulated.
Law	84	1989	Pursuant to which the National Statute for the Protection of Animals is adopted and some contraventions are created and its procedure and competence is regulated.
Resolution	242	1990	Authorizes the sale of individuals from the species *Crocodylus acutus*, obtained in the fauna stations of INDERENA, for the assembly and development of nurseries within the National Territory, certified as second generation specimens and marked with a special code.
Law	99	1993	Pursuant to which the Ministry of the Environment is created, the Public Sector is reorganized and is in charge of the management and conservation of the environment and the renewable natural resources, the National Environmental System SINA is organized and other provisions are enacted. *Regulated by Decree 1713 of 2002, Regulated by Decree 4688 of 2005, partially Regulated by Decree 3600 of 2007, Regulated by Decree 2372 of 2010*
Agreement	355	1994	Pursuant to which the exchange and loan of breeding stock of the American Crocodile (*Crocodylus acutus*) species is authorized and its sale is regulated.
Decree	1401	1997	Pursuant to which the Management Authority of Colombia before the Convention on International Trade in Endangered Species of Wild Fauna and Flora –CITES is appointed and its functions are determined.
Decree	1420	1997	Pursuant to which the Scientific Authorities of Colombia before the Convention on International Trade in Endangered Species of Wild Fauna and Flora –CITES are appointed and its functions are determined.
Decree	125	2000	Pursuant to which Decree 1420 of 1997 is modified.
Resolution	1317	2000	Pursuant to which some criteria for the granting of the hunting license for promotion purposes and for the establishment of nurseries are established and other provisions are adopted.
Decree	1909	2000	Pursuant to which the maritime and river ports, airports and other places for the international trade of wild fauna and flora specimens are designated.
Law	611	2000	Pursuant to which laws for the sustainable management of Wild and Aquatic Fauna species are established.
Resolution	438	2001	Pursuant to which a National Single Safeguard for the movement of species of the biological diversity is established.

TYPE	NUMBER	YEAR	PURPOSE
Resolution	611	2004	Pursuant to which the procedures to set quotas for the use of nurseries are established.
Resolution	1172	2004	Pursuant to which the National System for Identification and Registration of Wild Fauna Specimens in Ex Situ conditions is established.
Resolution	1173	2004	Pursuant to which the National Registry of Suppliers of Markings defined in the National System for Identification of Specimens of Wild Fauna in Ex Situ conditions is regulated.
Resolution	221	2005	Pursuant to which articles 3 and 6 of resolution 1172 of October 7, 2004 are modified.
Resolution	1660	2005	Pursuant to which the procedure and methodology that the Regional Autonomous and Sustainable Development Corporations are established for the purpose of the annual calculation of the amount of specimens to use in closed nurseries of the *Caiman crocodilus fuscus* species and the subspecies *Caiman crocodilus crocodilus* and other provisions are enacted.
Decree	4688	2005	Pursuant to which the National Code of Renewable Natural Resources and the Protection of the Environment, Law 99 of 1993 and Law 611 of 2000 are regulated in matters of commercial hunting.
Resolution	1263	2006	Pursuant to which the procedure is established and the costs is set to issue the permits referred to in the Convention on International Trade in Endangered Species of Wild Fauna and Flora –CITES and other provisions are enacted.
Resolution	2352	2006	Pursuant to which Resolution 0221 of February 18, 2005 is modified with respect to the definition of deadlines for the marking of parental stock for the captive breeding facilities of the *Caiman crocodilus fuscus* species and other provisions are adopted.
Resolution	923	2007	Pursuant to which Resolution 1172 of October 7, 2004 is modified and other provisions are adopted.
Law	1333	2009	Pursuant to which the environmental punitive procedure is established and other provisions are enacted.
Resolution	1772	2010	Pursuant to which the requirements to proceed with the commercial phase and its registration before the CITES Secretary of the captive breeding that manage species included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora – CITES are established and other provisions are adopted.
Resolution	2064	2010	Pursuant to which the subsequent measures for the preventive prehension, restitution or confiscation of specimens of wild ground and aquatic fauna and flora species are regulated and other provisions are enacted.
Decree	3570	2011	Pursuant to which the objectives and the structure of the Ministry of the Environment and Sustainable Development are modified and is integrated with the Administrative Sector for the Environment and Sustainable Development. It also delegates the direction of the Forests, Biodiversity and Ecosystemic Services as an CITES Management

TYPE	NUMBER	YEAR	PURPOSE
			Authority for Colombia.
Resolution	1316	2014	Pursuant to which Resolution number 1772 of 2010 is added and the genotyping of C. *acutus* parentals are conditions until the moment in which the environmental authority publishes the specific molecular markings for the species.
Decree	2041	2014	Pursuant to which Title VIII of Law 99 of 1992 about environmental licenses is regulated
Decree	1076	2015	Pursuant to which Sole Regulatory Decree for the Environment and Sustainable Development Sector is issued.
Resolution	2651	2015	Pursuant to which measures for the control and follow-up of the cutting of skins of *Caiman crocodilus* in duly authorized establishments such as nurseries, tanneries, distribution centers and manufacturers that work with this species are established.
Resolution	2652	2015	Pursuant to which the measures for the control and follow-up of the skins and parts or fractions of skins of the species *Caiman crocodilus,* to be exported are established.
Law	1774	2016	"Pursuant to which the Civil Code, law 84 of 1989 is modified. The Criminal Code. The Criminal Procedure Code and other provisions are enacted.

Additional information

Table 4. Multi-year effectiveness of the *artificial* nesting areas for *Crocodylus acutus* built in mangrove areas. Integrated Management District of the Mangroves of Bay of Cispata, Department of Cordoba. Colombia. 2015.

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NESTING PARAMETERS	NESTING YEARS												
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
Total surface areas	0	10	70	100	100	100	100	100	100	100	100	100	100
Total nests	0	15	47	35	37	40	37	36	40	34	41	32	394
Used areas	0	6	29	19	22	25	27	21	26	23	28	25	24.4
Range of nest per platform	0	0-4	0-5	0-7	0-5	0-6	0-6	0-4	0-4	0-3	0-3	0-3	0-7
Natural nests	15	33	20	15	15	18	19	14	18	16	18	20	221
TOTAL OF NESTS PER YEAR	15	47	67	50	52	58	56	50	60	50	59	52	616

Resolution Conf. 11.16 (Rev. CoP15)

b) in order to be considered by the Conference of the Parties, any proposal to transfer a population to Appendix II in order to conduct a ranching programme satisfy the following general criteria:

i) The programme must be primarily beneficial to the conservation of the local population (i.e., where applicable, contribute to its increase in the wild or promote protection of the species's habitat while maintaining a stable population);

Main aspects of the contribution to the conservation of the local population of C. *acutus*:

- Standardized monitoring processes and adaptive management scheme that can be the methodological basis in other distribution areas of the species in Colombia such as the population found in 2011 in the Catatumbo river basins in the Colombian region.
- The research and conservation processes developed for more than 10 years in Cispata and that have had as a result the increase in its population and the visible fraction, suggest the possibility of migrations of released individuals, which can suggest that released individuals by the program are contributing outside the sampling area in the DMI-BC or even as a center for breeding and recruiting and in which, taking the controlled incubation of eggs as a reference, a portion of individuals of 50% male and 50% female is suggested.
- Prior genetic characterization, individuals of the DMI-BC could be used in reintroduction and repopulation programs in sites that have appropriate habitat and community conditions.
- Conservation and sustainable use processes that provide benefits to the local communities that incorporate other activities such as ecotourism, education and research, can be replicable models in other populations of C. *acutus* in Colombia.

ii) all products (including live specimens) of each operation must be adequately identified and documented to ensure that they can be readily distinguished from products of Appendix-I populations;

Identification of registered captive breeding specimens

Within the framework of Resolution Conf. 12.10 (Rev. CoP15) Registration of facilities that breed captive species of fauna included in Appendix I with commercial purposes, Colombia has requested the registration of 7 Captive Breeding of the species *Crocodylus acutus,* (A-CO-501 to A-CO-507).

For the marking both of breeding stock as production, the following resolutions have been developed:

1. Resolution 1172 of October 7, 2004 “pursuant to which the national system for identification and registration of wild fauna specimens in ex ***situ*** conditions are established:, establishing the microchip as the electronic marking system for the Crocodylia Order, among others.

2. Resolution 1173 of October 7, 2004 “Pursuant to which the National Registry for Suppliers of Markings defined in the National System for Identification of Wild Fauna Specimens in *Ex Situ conditions is regulated*, whose purpose is the Registry of suppliers of marking elements of the National System and Identification and for wild fauna specimens in “*ex situ* conditions" issued by the Ministry of the Environment and Sustainable Development.

3. For the marking of productions from nursery facilities of C. *acutus,* resolution 0923 of May 27 of 2007, establishes that individuals of the productions born as of January 1, 2007, through the

system of whorl cutting, the cutting will be made in the same manner as previously mentioned, but whorl number 11 shall be limited by the borders of scale 10 (before) and 12 (after).

4. Resolution 1772 of September 14, 2010, Pursuant to which the conditions to authorize the commercial phase and registration of nurseries for commercial purposes in captive breeding that manage species included in Appendix I of the CITES Convention are established, among other aspect, section 9 of Article 2 Requirements for the commercial phase.

Identification of ranching specimens in the DMI-BC

1. Identification of eggs and individuals

According to the methodology that has been implemented in the project for more than 10 years, harvested eggs will be incubated in a controlled manner and marked with an individual and consecutive numbering, separated in units of incubation by independent nests. Prior to the hatching, they will be individualized and after, marked through the amputation of scales with an individual number that indicates the egg number and the harvest year. Therefore, in each animal or in each skin obtained by ranching the egg number will reflected and together with the scale of the double line, the year of the harvest will be known, which will also allow to know the characteristics of the nests in terms of geographic location and dates of harvest and/or egg-laying **(Figure 1)**.

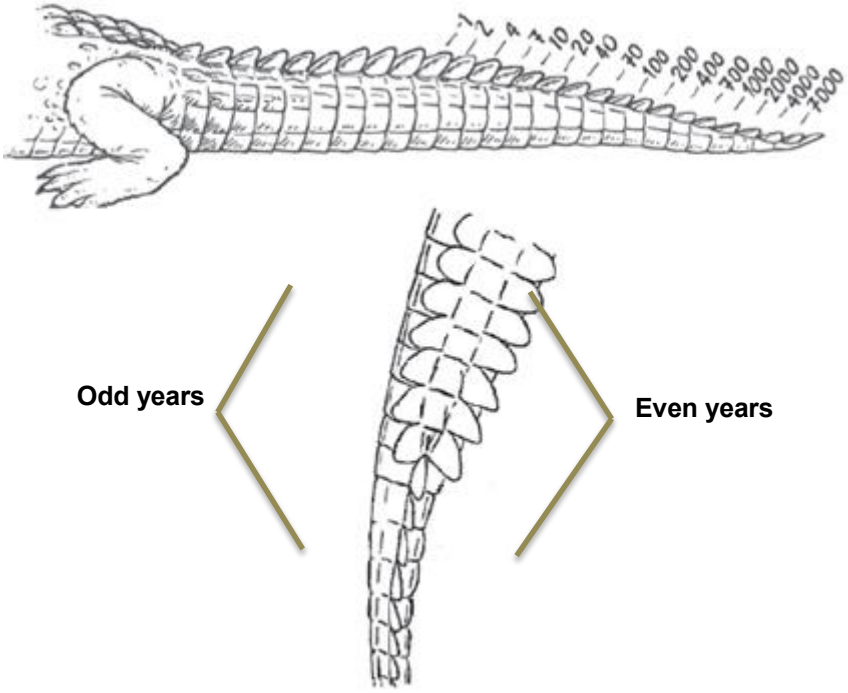

Figure 1. Diagram about the marking system of individuals originated from ranching. 1) amputation of scales in the caudal peduncle that will correspond to the number of the egg and 2) in the double amputation line of one scale that corresponds to the harvest year and will start at the 1st left for 2017. The combination of scales allows to build a numbering system based on unit quartets, tens, hundreds and thousands: for example, the animal or skin No. 99 is built by amputating scales 2-7 and 20-70, while No. 2 simply with the amputation of scale 2. Taken and modified from De la Ossa *et al.*2001in Morales *et al. 2013*.

Identification of skins and products

1. Resolution 1172 of October 7, 2004 "pursuant to which the national system for the identification and registration of wild fauna specimens in *Ex Situ conditions is established".*
2. Resolution 1173 of October 7, 2004 "Pursuant to which the National Registry of Suppliers of Markings defined in the National System for the Identification of Wild Fauna Specimens in *Ex Situ conditions is regulated".*
3. Res.Conf.11.12 (Rev. CoP15) Universal marking system to identify crocodile skins and include a CITES label with the label: ACUTUS CISPATA COLOMBIA (Res. Conf. 11.12, Rev. CoP 15).

iii) the programme must have in place appropriate inventories, harvest-level controls and mechanisms to monitor the wild populations and

The methodology of night census and standardized monitoring that currently applies takes into account national developments (INDERENA 1994) and advise from CSG-UICN experts (John Thorbjarnarson, Wayne King and José Ayarzagüena), as well as documents such as the Ayargüena (1983) "Ecology of the American crocodile in the Apure plains". These methods have been successfully tested in C. *acutus* in other countries such as Mexico (Sánchez -Herrera *et al.* 2011).

Currently, for the monitoring, the total DMI-BC area sampled is about 1436 ha of film of water or 112 km of perimeter. Samplings of the population are conducted by night counts in 9 standardized routes in which the observed individuals are registered and for which the trained members of the community and biologists are a part of the team **(Annex I a, figure 1b)**. In the case of census and collection of nests these are carried out once a year during the egg-laying season that starts in February and of which peak activity is in March in the same routes previously described in which all encountered eggs are collected.

For the case of DMI-BC the estimated size of the population is between 800 and 2356 individuals, calculated based on a formula of basic population estimates, in the case of several repetitions and assuming that one annual monitoring is one repetition (King et al, 1990 and Cerrato, 1991 in Morales-Betancourt et al, 2013). Likewise, the population could be estimated with a visible fraction between 7 to 20% (calculation based on one sample or year); noting that the % can be even lower, underestimating the population; this corresponds to what has been evaluated in other experiences with crocodiles where values of the visible fraction are lower than 1% Larriera *com pers.*

If the proposal for amendment is approved for C. *acutus* and according to the progresses in the ranching program, the possibility of using supplementary methods and adjustments in the monitoring methodology will be used: two annual monitoring, develop a correction factor for tides and maintain consistency and training of the team that is a part of the program.

iv) there must be sufficient safeguards established in the programme to ensure that adequate numbers of animals are returned to the wild if necessary and where appropriate;

For the DMI-BC the eggs from the nests of the sampled area will be collected in accordance to the management plan that will be developed for the sustainable use of C. *acutus*. Collected eggs will be taken to incubation where the proportion of sexes will be analyzed so that they contribute both to the reintroduction of individuals in the wild and to the trade process. The experience of the monitoring program of the DMI-BC considers a initial experimental percentage of 10% (for releases taking as additional reference the discussions of the group of specialists for a value between 5 and 17% (Ulloa com pers.).

This 10% of individuals will be raised to 100 cm for subsequent release into the wild according to the specified management plan. This percentage, which is reserved to contribute to the wild population,

will be reviewed according to the processes for the adjustment of the monitoring and the review about the population trends with appropriate biologic criteria.

The program currently has an inventory of 857 juvenile and subadult individuals at the CVS regional authority facilities (**Annex I a, figure 6**).; Considering that the capacity of the communities should be strengthen in sacrifice activities, it is proposed to start the development with an experimental quota of 200 annual skins until the stock has been exhausted (2019-2020).

d) any proposal for the transfer to Appendix II of a Party's population or a smaller geographically separate population of a species, for the purpose of ranching, not be approved by the Conference unless it contains the following:

i) evidence that the taking from the wild will have no significant detrimental impact on wild populations;

As it has been known from other experiences in ranching programs of *crocodiles* (Hutton and Webb, 1992; Ross, 1998; Jenkins *et al*. 2006, Larriera y Webb, com. pers.), the restricted harvest of eggs can be compensated by the increase of the survival of birth of non-harvested eggs. In crocodiles there are different ranching models (*Alligator missipensis*) in Florida (Rice *et al.* 1999), C. *porosus* in Australia (Webb et al, 1992 in Ross, 1998) or *Caiman latirostris* in Argentina (Larriera y Imhof 2006). In the case of the ranching model for the DMI-BC for the harvest of C. *acutus* eggs and taking into consideration the discussions of the group of experts on the ranching of Crocodylia, it is recommended that "in those places where the harvest is considered high, the management programs may require the return to the natural environment of individuals with sizes in which predation is unlikely in a number that represents between 5-17% of the number of harvested eggs. This compensation minimizes the impact of the harvest and has a clear possibility of exercising a positive effect in terms of the wild population (Hutton, J. M. & G. J. W. Webb. 1992).

Table 1. Assessment of the viability or reliability indicator parameters for the development of the conservation and sustainable use project. Sub-population of *Crocodylus acutus* of the Bay of Cispata. Department of Cordoba. Colombian Caribbean region. Agreement No 15-15-0075-107 Office of the Major of San Antero-Instituto Alexander von Humboldt-ASOCAIMAN-CVS. 2015.

PARAMETER		(1) OPTIMAL	(2) NORMAL	(3) UNDER OBSERVATION	(4) UNDER INVESTIGATION
POPULATION	Structure I (20-60) II(61-120) III (121-180) IV (181-240) V (>241)	Representation of the 5 types of sizes and evidence of reproduction and recruiting	Representation of the 5 types of sizes	Absence of types 2 or	Absence of
	Density ani/k^2	7,1	1,8-7,1	<1,8	<0,9

REPRODUCTIVE	No. Nests/year	67	47-67	< 47	< 23
	eggs/nest	30	24-30	< 24	< 20
	% fertility	95	90-95	< 90	< 45
	% hatching	80	60-80	<60	<30

The ranching program will be exclusive and restricted to C. *acutus* eggs of the DMI-BC population. Local community groups such as ASOCAIMAN, will be exclusively responsible for the harvest, and such groups will be approved by the environmental and local and national scientific Authorities. This operation will not be authorized to private persons or any other entity.

In addition, there will be a review of the population and reproductive parameters (Table 1).

ii) an assessment of the likelihood of the biological and economic success of each ranching operation;

The assessment of the natural ecosystems in economic terms and their incorporation to the productive processes is today the most solid tool for the conservation of the habitat, because the sustainability of such productivity results from the general interest (Larriera e Imhof, 2000).

From a technical point of view, the project in the DMI-BC has demonstrated a relative success in the monitoring of the wild population, the collection of nests and the C. *acutus* breeding for the repopulation and suggests having the necessary elements for a long term economic success.

Taking into consideration the ownership by the entities and local communities in the conservation project for more than 10 years; as well as the demonstrated viability in other processes of crocodile use for which the conservation programs that incorporate the sustainable use of the resource allow to internalize costs and be self-sustainable, in addition to not depending on external funding (Larriera 2011).

In parallel to all these actions, the community has developed sustainable use strategies of the population through ecotourism, research and education; which in a certain way is transformed in a real productive alternative that currently generates part of the income for the local community's support. Given that the project has qualified technical personnel for the breeding of species and that skins are highly valuable in international markets, it could be expected that the economic viability will be positive, if it can be taken into account that at a global level the breeding of crocodiles in general is a viable economic activity.

iii) assurance that the operation shall be carried out at all stages in a humane (non-cruel) manner;

Law 84 of 1989 pursuant to which the National Statute for the Protection of Animals was adopted and creates new violations and regulates matters regarding procedures and competence.

Law 1774 of 2016, pursuant to which some conducts are considered punishable related to the mistreatment of animals and a penalty system of police and judicial nature.

iv) documented evidence to demonstrate that the programme is beneficial to the wild population through reintroduction or in other ways; and

In addition to the above information in sections b) iii) and iv). Outlined herein are the main points that show that the program provides a benefit for the wild population in the DMI-BC.

- As part of the innovative strategies for conservation, artificial areas for nesting in the mangrove area were built that are used by adult females for nesting and a harvest program was established, as well as the incubation of eggs and removal of individuals in captivity, which in their totality are for release and repopulation in the area with successful results (Thorbjarnarson, 2010; Ulloa-Delgado and Sierra-Díaz, 2012).
- The community program has increase the availability of nesting areas and 64% of the nests found in the last 13 years has been from these platforms built by the community (about 400 nests).
- The results of the monitoring suggest that the number of individuals of C. *acutus* observed during the regular night counts of the sampled areas of the DMI-BC (see section 8.1.5 monitoring), has increased in a stable manner (**Annex I a., figure 3 and Annex I b., table 2)**, with an average encounter rate during the samplings of 0.6 individuals per kilometer.
- The structure of the C. *acutus* population in the Bay of Cispata according to the data from the night sampling (**Annex I a, figure 4**,), confirms that all size types (different age groups) are represented in which almost always the juvenile are more abundant than adults. What is normally considered in other populations as a population in recovery and equilibrium (Ulloa-Delgado and Peláez-Montes 2011).

- Through community actions, the project has reached two relevant socioeconomic aspects, for the benefit of the wild population of C. *acutus*: 1. educational processes with respect to ecological functions and benefits that have caused changes in local communities for a greater protection of the species and their ecosystem and Conservation works based on the sustainable use with economic benefits for the community that guarantee a greater stability in the long term.

Proposal of amendment to the appendices I and II of the Convention on International Trade in Endangered Species of Wild Flora and Fauna CITES

A. Proposal

To transfer from Appendix I to Appendix II the population of *Crocodylus acutus* (Cuvier, 1807) of the Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia, in accordance with the Conf Resolution. 11.16 (Rev. CoP 15) on Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II

Annotation

1. The population of *C. acutus* by outside the limits of the Regional District of Integrate Management of Mangroves of Cispata Bay and sector area of the Estuarine Delta of the Sinú River (RDIM-BC) will remain in Appendix I.
2. The ranching program of eggs will be exclusive and it will be restricted to the area of the RDIM-BC.
3. The products of the ranching program destined to the international trade will be skins marked according to the Res. 11.12 (Rev. CoP 15) on the system of universal marked to identify crocodile's skins, an exclusive identification of the ranching program, and to the specific regulations of the Republic of Colombia.

B. Author of the proposal

Republic of Colombia.

C. Justification

1. Taxonomy

1.1 **Class:** Reptilia
1.2 **Order:** Crocodylia
1.3 **Family**: Crocodylidae
1.4 **Species:** *Crocodylus acutus* (Cuvier, 1807)
1.5 **Scinetific Synonymy**: *Crocodilus acutus* (Cuvier, 1807) and *Crocodylus americanus*
1.6 **Common Names**:
Spanish: Caimán, Caimán aguja, Caimán del Magdalena, Cocodrilo Americano, Cocodrilo de río, Lagarto, Lagarto amarillo, Caimán de la costa, Caimán caretabla.
English: American Crocodile.
French: Crocodile d'Amérique, Crocodile Americain.

1.7 **Number of code**: A-306.002.001.001

2. General vision

Crocodylus acutus, like most of the crocodiles of the world, mainly underwent great population declines between the 30´s and 70´s, in all its rank of distribution - including Colombia- due to the extensive hunting, motivated by its skin commerce of first quality (Thorbjarnarson, 1992; Ross, 1998; Thorbjarnarson, 2010). The inclusion of the specie in Appendix I of CITES, as a measured to regulate the international trade of their skins, have allowed the recovery of some natural populations in all their rank of distribution, to such point to have healthy populations in countries like the United States, Costa Rica and Cuba, that allow to make a sustainable

use, like Cuba with the amendment proposal presented and approved in CoP 13 in the 2004(Thorbjarnason, 2010).

In Colombia the specie has been protected since 1969, this condition, among other national efforts of conservation, has allowed the recovery of some populations in the last decades (Martín, 2008; Thorbjarnarson *et al*. 2006). This it is the case of the population of *C. acutus* that inhabits the mangroves areas of Cispata Bay, which is under protection in the Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River (RDIM-BC)[1], located in the municipalities of San Antero, San Bernardo del Viento and Santa Cruz de Lorica, in the Department of Cordoba (to see **figure 1** of **Annexed the 1 a.)** (Ulloa - Delgado & Sierra - Díaz, 2012). At this place, a community group of crocodiles of former hunters of illegally use of crocodiles, today organized in association known as -Asocaiman- since 2003 are part of investigation, monitoring, habitat management and environmental education activities, aimed to the recovery and conservation of the specie (Ulloa-Delgado & Sierra-Díaz, 2012).

12 years of conservation processes and monitoring demonstrate that the pressures that threatened the survival of the Cispata's crocodile population in the past (as the hunting) has diminished remarkably, favoring its recovery, which is evident in the increase as much of the rate of encounter (in a 203%), as the population structure heterogeneity (showing more representation of all the different classes of size of the individuals, in agreed proportions with its growth) (Ulloa -Delgado, 2015).

At the moment, the accelerated loss of habitat constitutes the main threat for the survival of *C. acutus* in the country and at all its rank of distribution. This emphasizes the importance of implementing strategies of sustainable use that increase the economic value of the species and its habitat in natural conditions, thus contributing to the conservation of the species, its habitat ecosystems, and the flora and fauna associate (Larriera, 2004).

In this sense, to transfer the population of *C. acutus* of the DRMI-BC of Appendix I to Appendix II allows the implementation of management and conservation species strategies that additionally, promote the conservation of its habitat ecosystem and that simultaneously has a positive effect on local communities' livelihoods due to the sustainable economic alternative for communities (McShane *et.al*. 2010). The transference of Appendix represent the generation of economic benefits for members of the local communities that, at the moment, coexist and protect the population of *C. acutus* of the DRMI-BC, derivatives of the commercialization of its skin, obtained through a ranching program and enables local development.

This program is based on controlled harvesting of eggs (following the national and international guidelines that guarantees the conservation of the species in wild), led by the Competent Regional Environmental Authority - in this case the Autonomous Regional Corporation of the Valley of the Sinú and San Jorge (CVS) -, and implemented with the support of members of the local communities with limited resources like Asocaiman. Additionally, the change of Appendix would encourage the monitoring of other natural populations of the species with a view to the implementation of similar strategies of sustainable use.

3. Characteristics of the species

3.1 Distribution

[1] *A Regional District of Integrate Management*, is an protected area defined like a "geographic space, in which the landscapes and ecosystems maintain their composition and function, although its structure has been modified and whose, associated natural and cultural values are put within reach of the human population to destine them to their sustainable use, preservation, restoration, knowledge and enjoys" (Decree 2372 of the 2010). This category looks for to combine protections and conservation strategies as sustainable use. In agreement with the descriptions of the categories of protected areas of the UICN, the RDIM are homologous to the category IV: Sustainable use of natural resources (UICN 2015).

3.1.1. *Crocodylus acutus* Global Populations

The caiman aguja or American crocodile (*Crocodylus acutus*) is the second most widely distributed crocodylidae in the new world. It occurs naturally from the Tumbes province in Peru until the southern tip of Florida in the United States, passing through Ecuador, Colombia and Venezuela, in South America; Panama, Costa Rica, Nicaragua, El Salvador, Honduras, Belize, Guatemala and Mexico, in Central America. Also is located in some of the islands of Caribbean, such as Jamaica, Haiti, Cuba and Dominican Republic. (Ponce-Campo *et. al.,* 2012) (**to see figure 2 of Annexed I a**.).

3.1.2 *Crocodylus acutus* Colombia´s Populations

The present distribution of *C. acutus* in Colombia includes the Caribbean - in the rivers Atrato, La Piedras, Catatumbo, New President, San Miguel, Sardinata, Tibú and Sinú; in the Magdalena basin, and in mangroves at the deltas of large rivers at Pacific and Caribbean coast (Medem, 1981; Rodriguez, 2000; Ulloa, 2011; Morales-Betancourt *et. al*., 2013). Some recent reports give account of the presence of the species in new areas: at the National Natural Park Tayrona located in the department of the Magdalena (Caribbean coast), and at San Andrés Island (Heraldo, 2012; Balaguera-Reina, 2012; Balaguera-Reina *et. al*. 2013; Morales – Betancourt, 2013; Gomez-González, 2014; Vargas-Ortega, 2014) (**to see figure 3 of Annexed I a**.).

3.2 Habitat

C. acutus use a great variety of terrestrial and aquatic habitats for the provision of its requirements during its life cycle. It is quite adaptable, so that, it is found as much in freshwater, as brackish water swamps and, in the outfall of great rivers, lagoons, swamps, and even in coralline atolls far from the coasts (Thorbjarnarson, 1992; (Thorbjarnarson et. al. 2006; Morales – Betancourt, 2013). Even so, it generally inhabit in coastal wetlands mangroves and estuaries.

3.3. Biological characteristics

C. acutus presents sexual dimorphism. The males reach size between 5 and 6 meters in total length whereas females are smaller (near 4 meters); although it has been reported that individuals that habitat at islands tend to be smaller (Schmidt, 1924; Medem, 1981; Thorbjarnarson, 1992; Ulloa-Delgado & Sierra – Díaz, 2012). The hatchling measures in average 25 cm in total length (Rueda - Almoacid *et.al*. 2007; Meraz et. al., 2008; Morales-Betancourt *et. al*., 2013).

They are multiparous s organisms (Ross, 1999) that reproduce sexually and, according to diverse studies, reach the sexual maturity after exceeding the 2 meters of total length, although this size is not yet well established (Morales-Betancourt *et. al*. 2013). The female lay between 14 to 60 eggs in a nest builds usually in a hole of approximately 40 cm depth or in low mounds build with soil, sand, fallen leaves and grass (Medem, 1981; Rueda - Almoacid *et.al*. 2007; Thorbjarnarson, 2010, Foundation Biodiversa, 2011; Morales – Betancourt, 2013; Ulloa-Delgado, 2015).

The eggs hatch at the beginning of rainy season, usually between April and July and after an incubation period that can takes between 70 and 90 days (Rodríguez-Melo, 2000; Thorbjarnarson, 2010; Foundation Biodiversa, 2011; Gómez-González, 2014). The sexual determination by temperature of incubation has a pattern female-male-female, with a temperature pivot between 31•C and 32,5•C in where females and males are produced (Morales – Betancourt, 2013; Medrano-Bitar and Ulloa-Delgado, com. pers., 2014).

The early stages of the specie's cycle life are exposed to a relatively high mortality, due to: wildlife nest predation, environmental variables impacts (e.g floods, driest periods and direct solar radiation) on nest, and

hatchlings' mortality due to its low capacity to tolerate environmental fluctuations (e.g. thermal) or to predators, among others (Ross, 1999; Gómez - González, 2014). As a result the nests and hatchlings (first year) survival rate are up to 20% approximately (Moler, 1992 *in* Ross, 1999). However, the fact that a female produces during its reproductive life at least one young that reach adult size, allows the population to maintain stable (Ross, 1999; Abercrombie et.al. 2001).

Despite of this, the longevity, the great size of *C. acutus* and their ectothermic condition turns as characteristics that shows full-size individuals highly tolerant to the environmental fluctuations, which could be catastrophic for neonates (Ross, 1999; Abercrombie *et. al.,* 2001). Among this, the multiparous characteristic provides a high capacity to recover natural populations from the impact generate by extraction, either of the youngest individuals (eggs or juveniles) or large and old ones (male adults) (Ross, 1999).

3.4 Morphologic characteristics

C. acutus is characterized to have an extended and narrow snout. The typical pattern of the cervical osteoderms consists of two rows in where the first row has four great ones and the second only two, although it is worth to clarify that great variation can exists (Morales – Betancourt, 2013). Like most of the crocodiles, *C. acutus* have the fifth mandible tooth more developed (Ulloa-Delgado & Sierra – Díaz, 2012).

3.5 Function of the species in the ecosystem

C. acutus, like other crocodiles, is considering as one of the greatest predators and it is been recognize by its great influence in the food web because to the abundance and composition of its prey (Mazzotti & Brandt, 1994). The early stages (eggs and hatchlings), constitute important prey for other species, suggesting an important role for nutrient cycle and the energy flow within their habitat ecosystem.

Additionally, the crocodiles are considering key, engineer and responsible transformation species; contribute to the maintenance of the structure and function of the ecosystems (Craighead, 1968; King, 1988; Thorbjarnarson, 1992; Ross, 1998; Ripple and Beschta, 2011). And, the specie can become indicator of the ecosystem conservation status, or sentries of environmental changes given its great sensitivity (Sergio *et. al*. 2008).

4. Status and Trends

4.1 Habitat Trends

Although *C. acutus* is adaptable and inhabits a great variety of terrestrial and wetland habitats, the transformation of the land use, derived from the human and economic development at the country has result in the accelerated habitat loss rate for the species. Factors as the overpopulation and climate change aggravate the tendency.

On the other hand, although Medem (1981) at the Pacific coast, registered a discontinuous distribution of the species as a result of the inherent conditions of the habitats e.g rocky coasts, Balaguera-Reina *et. al*. (2013) suggest that the water bodies, within the area of species occurrence estimate in Colombia, provide certain connectivity, which suggests an increase in the viability of the populations (Medem, 1981; Thorbjarnarson *et. al*. 2006).

4.2 Population Trends, Size and Structure

Although, recent studies on *C. acutus* at the country that includes abundance values are few*;* their mainly the DRMI-BC populations and Portete Bay (located in the department of the Guajira, Caribbean coastal area),

since in both places communitarian programs for the conservation of the species have established (Thorbjarnarson, 2010; Balaguera-Reina *et. al.,* 2013). The studies that provide information on the relative abundance of *C. acutus* from 1990 summarizes in **table 1** of **Annexed I b**.

On the other hand, and although in general terms, the crocodiles national census between 1994 and 1997 completed by the Ministry of Environment, found isolated individuals and populations very reduced and fragmented, the results emphasizes the neediness of population management oriented to the conservation of the specie. Rodriguez-Melo (2000) identifies the Bay of Cispatá at the Department of Cordoba, as one of the three areas with ecological and social potential to maintain healthy populations of *C. acutus* in the country. At that moment, it was reported a low relative abundance and an undetermined population structure for this population (Rodriguez-Melo, 2000). In 2002, Ulloa-Delgado & Sierra-Díaz, describe Cispatá Bay structure and dispersion of *C. acutus* as a fragmented and unbalance population, characterized by a relative scarcity of hatchlings and juveniles size class.

Taking into consideration the above account, since 2003, the Autonomous Regional Corporation of Valleys of the Sinú and San Jorge - CVS- has coordinate a program of conservation of *C. acutus* at the Cispatá Bay , which has been implemented including local communities organized as Asocaiman, a local community association formed by a group of 18 crocodile former hunters which illegally took advantage of crocodiles populations in the past, and which are now part of population monitoring through nocturnal counts and tracking the nests, in almost the 80% of the natural habitat within the protected area (Ulloa-Delgado & Sierra-Díaz, 2012). Also and as part of complementary conservation strategies at Cispata Bay, artificially nesting areas in mangroves had been design and adapt, and a program of egg harvest and artificial incubation and grows of juveniles has been established, to become part of the release animals that maintain the recuperation program (Thorbjarnarson, 2010; Ulloa-Delgado & Sierra – Díaz, 2012).

In accordance with Ulloa-Delgado (2015), the program has return to natural habitat near 8.437 individuals between 2004 and 2014, mostly represented, animals of a meter or more of total length (between 2 and 3 years old), and other individuals of 70 cm in total length, as well and some eggs (reintroducing a few days before hatching takes place).

The monitoring activities results, suggest a recovering of *C. acutus* population at the RDIM-BC, because since 2008, the total number of individuals observed during the nocturnal surveys, and therefore the rate of encounter, has increased continuously (special at Caño Salado and at the external mangroves area at the bay) (to see **figure 4** of **Annexed I a**. and **Table 2** of **Annexed I b**.), giving as result a rate of multiannual average encounter of $0{,}60 \pm 0{,}4$ individuals per kilometer.

Ulloa-Delgado and Peláez-Montes (2011), register that a healthy and balance population of *C. acutus* is that shows individuals in all size classes (or ages groups) in where it is observed a greater number of young individuals and less individual adults; a decreasing stair structure. The population structure of *C. acutus* at Cispatá Bay indicates an increase in the representativeness of smaller sizes (class I and II) and in general terms all classes from the nocturnal counts carried out since 2008, reinforcing population heterogeneity size (to see **figure 5** of **Annexed I a**.) (Ulloa - Delgado, 2012). This reinforces the argument that the population is recovering and that the monitoring and investigation efforts has been key evidence of this. It is important also to highlight that Asocaiman members confirm the presence of acutus at some water bodies in which it had not been registered before (Ulloa-Delgado pers. Com).

Based on the data provide by the monitoring activities, the population estimate size could be between 800 and 2.356[2] animals, considering that the visible fraction corresponds to 7% or 20% of the established total population, as it has been suggested by some experts (Ulloa-Delgado, 2013; Morales-Betancourt et. al. 2014). Even so, there are evidence that indicates that this value could be underestimating population size because the individuals of approximately sized of a meter of total length (2.510) is greater to the population size estimated.

On the other hand, the average of nests found from 2004 is 54,6, with a standard deviation of 5,9 nests (to see **figure 6** of **Annexed I a**.) (Ulloa - Delgado, 2015). Ulloa-Delgado & Sierra - Diaz (2012) confirm that this small nest variation, indicates a population stability. Social exclusion phenomena is also possible inhibit adult female's reproduction (Hines and Abercrombie, 1987). Nevertheless, understanding that the nesting availability zones is one of the main causes that limits the size and distribution of the populations of *C. acutus*, the program has increased the nesting available areas, by creating nesting platforms. 65% (400) of the nest found during the monitoring held at the last 13 years, has been found in these platforms.

Nevertheless, it is important to strengthen the information with more accurately number and tendency of nesting female population of *C. acutus* at the DRMI-BC. Smaller clutches records, less than 20 eggs, during the last 3 years, suggest the recruitment of females on the wild parental breeding stock.

4.3 **Geographic Trends**

Available information to date shows that the distribution of the species in the country has changed. There are local extinctions records Medem (1981) since the 70s, including areas such as Isla Fuerte, Tortuguilla, and San Bernardo and a possible disappearance of the Swamp Zapatosa and Costilla reported in 2012 by Balaguera-Reina. Despite of this, recent studies have reported the presence of the species in new areas like Tayrona´s National Park, at the department of Magdalena, and San Andres Island (El Heraldo, 2012; Morales-Betancourt, 2013; Balaguera-Reina et al, 2013; Gómez-González, 2014; Vargas-Ortega, 2014). The species distribution limits for Colombia today are: south (in the interandean valleys) Villavieja at the department of Huila; and northeast Bay Hondita and Castilletes at the department of La Guajira (Medem, 1981; Balaguera-Reina et al, 2014).

5. Threats

The main threat to the species is the degradation and habitat loss (Thorbjarnarson et al, 2006; Morales-Betancourt et al, 2013; Balaguera-Reina et al, 2013). Climate change also constitutes a threat; on one side the sea level rise restricts posture areas affecting the habitat stability, and on the other side the increase in environmental temperature affects the sex ratio (increasing the males proportion) during the incubation period (Ulloa-Delgado y Sierra, 2012). Other threats include incidental fish catch (Fundación Biodiversa, 2011; Ulloa-Delgado, 2012; CORPORGUAJIRA e INVEMAR, 2012).

6. Use and trade

6.1 Use at national level

As other crocodilians, the species is an important source of protein to local communities, and raw material for handcrafts and occasional and local use for traditional medicines (Morales-Betancourt et al, 2013; Gómez -

[2] This value was calculated with base in the population basic estimation formula, when several repetitions exist, assuming that each annual monitoring data is a repetition: Estimate population number = (maximum Value observed x 100)/% Population visible (King *et.al*. 1990 and Cerrato, 1991 in Morales-Betancourt et.al., 2014). The multiannual average of animals seen between the 2004 and the 2014 were 68.

González, 2014). Although its main use focus in pelt industry for international trade purposes, *C. acutus* has also been use as a focal species for community ecotourism initiatives in areas such as DRMI-BC (Thorbjarnarson, 2010; Ulloa-Delgado y Sierra-Díaz, 2012; Morales-Betancourt *et. a*l, 2014).

6.2 Legal trade

After the ban in 1969 and from the 90s, Colombia established captive breeding farms for skin production of *C. acutus*, which in 2001 exported first 100 skins (Ulloa-Delgado y Sierra, 2012; De La Ossa *et al*, 2013). The **figure 7 (Annex I a.)** shows the amount of *C. acutus* skins exported by Colombia between 2001 and 2013, the fluctuations are due to the demand of the international market. Between 1976 and 2011, Colombia has exported approximately 16,191,679 skins of crocodilians, 95.8 % coming from captive breeding farms and only 0.03 % of this belongs to *C. acutus* (De La Ossa *et al*, 2013). From 2012 to July 2015 the Management Authority has granted permission to export 5,502 skins of *C. acutus* from captive-breeding operation (MADS, 2015).

Colombia currently has seven (7) *C. acutus* captive-breeding farms registered to CITES Secretariat and two (2) in process of registration to the Convention (see **Table 3 of Annex I b**.) (MADS, 2015). According to available information, 43.709 specimens of *C. acutus* (including parental) is the estimated stock to date for captive breeding operation (MADS, 2015).

6.3 **Parts and Derivatives in Trade**

According to exporting records of the Management Authority (Ministry of Environment and Sustainable Development of Colombia), *C. acutus* products exported by Colombia are exclusively skins; primarily tanned, raw or salted (MADS, 2015). Skins produce are exported mainly to France, Italy, Japan and Singapore; and are identified in accordance with the registration code of each captive-breeding farm.

6.4 Ilegal trade

Historically the illegal trade of *C. acutus* in the country focused on the sale of females, meat, eggs and neonates for multiple uses. However, this trade is of low magnitude because, among other things, the poor state of wild populations of the species in the country, except for populations such as the DRMI-BC. However, Colombia has measures such as parental genotyping requirement for all captive breeding operation (Resolution No. 1772 of 2010).

6.5 Actual or potential trade impacts

Taking into account the crocodiles biology, sustainable use programs are based on the premise that the use of early stages (eggs and neonates) replace part of the natural mortality that these early stages are exposed to during the life cycle of crocodiles (Ross, 1999; Abercrombie et al, 2001; Larriera et al, 2004). Different programs established for commercial harvesting around the world have shown that crocodilians can tolerate the sustainable use either for ranching eggs or catching some adults, even where the annual removal was 50-80% of the eggs laid or 5-10% of the adult population; which it has had no inhibitory effects on population growth (David, 1994; Webb et al, 1992 and Woodward et al, 1992 in Ross, 1999). In Australia, for example, more than 2000 eggs of *Crocodylus porosus* were removed each year with evidence that did not show a populations decline (Webb et al, 1992 in Ross, 1999)

In this sense, trade products coming from ranching programs based on controlled egg harvest and in accordance to CITES guidelines and Colombia´s regulations, will continue benefit *C. acutus* wild populations conservation, its habitat, and other species of fauna and flora. As part of the positive effects of trade, taking

into account, existing mechanisms and control of traceability globally and within the country ia and in the world, revenue that would positively impact the livelihoods of marginalized local communities and discouraging illegal trade would be generated. Also it is suggested that the implementation of such strategies help to increase the knowledge of other national populations of *C. acutus*

7. Legal instruments

7.1 National

Colombia has a robust legal framework to regulate biodiversity management, including regulations regarding wildlife use and trade, as well as specific rules for use, management and trade for *C. acutus* (see **Table 4 of Annex I b.**). This legal framework is supported by provisions referring mainly to the National Constitution of 1991 that legal bond the state to protect the National natural wealth and demands the state planning for the management and use of natural resources in the pursuit of sustainable development and conservation, among others. (Articles 8 and 80).

In the same sense the Environmental Policy Guidelines for Wildlife Management in Colombia (MMA, 1997) established a Line of Action on Sustainable Use, according to which the use of wildlife must be framed within the Principles of Biological Sustainability and Economic, seeking to reconcile natural resource supply versus demand and the development possibilities for the optimization of its use, in order to incorporate the sustainable use of wildlife in production and economy, carry out actions to identify promising species, evaluate and strengthen community initiatives and effectively integrate resource use in rural production systems.

Moreover, the country also has rules, guidelines and specific national policies aimed to protected habitats, such as wetlands and mangroves, which oblige that those ecosystems should be subject to conservation and sustainable management activities (see **Table 1 of Annex I b**.) (Ulloa-Delgado & Sierra-Diaz, 2012).

With regards to the regulatory framework, the Law 611 of 2000 (for sustainable management of Aquatic and Wild Fauna species rules are establish) and Decree 2372 of 2010, according to which the administration of the Integrated Management Districts is competence of the Regional Environmental Authority and it corresponds to the same environmental authority granting permits, licenses and authorizations, among others, for natural resources use. Other laws, decrees, resolutions and agreements related to conservation, use, management of wild species, and control are summarized in **Table 4** of **Annex I b**.

7.2 International level

C. acutus trade is regulated by CITES, ensuring that both Colombia and other parties have sufficient legal framework to implement the provisions of the Convention. In addition, Colombia is also a party to the Convention on Biological Diversity -CDB-, and the RAMSAR Convention; for those who also have enough legal framework to ensure compliance on the national territory.

8. **Species management**

8.1 **Management measures: Ranching proposal based on controlled collection of eggs harvest.**

Based on the positive results of the management and conservation program of *C. acutus* established since 2003 in Cispatá´s Bay today DRMI-BC, the obtained monitoring data, and understanding ranching as a widely accepted and use strategy taking into account the advantages in conservation processes. Ranching program is propose for commercial purposes based on the controlled eggs harvesting of the population of *C. acutus* from

BC DRMI-producing skins and juveniles, that contributes to rural communities livelihoods as well as conservation of the species (Hutton and Webb, 1992). This program will be coordinated by the Regional Environmental Authority competent CVS and implemented with the support of members of local communities.

8.1.1. Egg Harvesting and Establishment of Quota

Ranching program will be for exclusive for egg ranching of *C. acutus* population at the DRMI-BC. The harvest will be exclusively in charge to local community groups as Asocaiman, which will be approved by local environmental authorities and national Scientific Authorities. Individuals or any other institution shall not be authorized to carry out this operation.

To harvest 100% of the eggs from nests found in the DRMI-BC will be collected at first stage of the program, in agreement to other ranching operations (Hutton y Webb, 1992; Ross, 1999; Larriera y Webb, com. pers.). The egg harvest quota will be recalculated and could be modified according to the data obtained from population surveys in subsequent years.

Taking into consideration that to the date the program has 857 individuals of C. acutus in captivity at the Regional Authority (CVS) station and that capacity building for communities should be take in place for animal sacrifice, obtaining and handling skins activities, the initial quota proposal of 200 annual skins until exhausting stock (2019-2020) according to the existing units in each class (to see **figure 8** of **Annexed I a**.). Subsequent to this, the trade quota definition should be establish according to the populations monitoring data and according the experts committee led by the CITES scientific authorities of the country establish.

8.1.2. Identification and Marking

Eggs harvested from nests will be marked with a specific number associated with the number of nest, and a controlled incubation will be take place at the CVS installations in CIMACI Research Station located at Amaya, Municipally of San Antero within the DRMI-BC.

All animals will be marked at birth with the amputation of caudal peduncle, both single line indicating the number of the egg, and the double line of scales used to refer to the year of production. Each individual is assigned a unique number. All animals will raise at the installations of the Research Station CIMACI in Amaya, Municipally of San Antero, within the DRMI-BC.

All animals in the program will have a unique additional mark.

8.1.3 Produced / Trade Products.

The products for international trade will be skins of *C. acutus.* These will be marked at the time of sacrifice in accordance to universal tagging system for the identification of crocodilian skins in force, and will include a specific mark of origin: ACUTUS CISPATA COLOMBIA (Res Conf 11.12 Rev. CoP15.). Additionally, other innovative methods of traceability CITES approved will be included.

8.1.4 Sacrifice

The sacrifice will be made in appropriate facilities within Research Station CIMACI at Amaya, Municipally of San Antero, within the DRMI-BC., using humane methods to ensure that no cruelty, and complying with the respective national regulations.

8.1.5 Population Monitoring

Monthly records and systematic inventory of each individual, which will be reviewed at sacrifice or release, with permanent access to the CITES Management Authority. Activities of nest tracing and monitoring of the population from census night, including other methodologies that can strengthen the data on population trends will continue.

The program will provide an annual report to the CVS, the CITES Scientific Authority and CITES Management of Colombia, with detailed information on the program including (but not limited to this) population monitoring results (data and trends, including structure), number nests and harvested eggs, number of births and number of animals in breeding stock, sacrifice animals, skins produced (and their identification data) and, in accordance with the safeguards in the event of a population decline due to the ranching program, number of animals released (with the information in its records).

The Ministry of Environment and Sustainable Development, as CITES Management Authority, will submit a summary of the information as well as export as part of the annual report to the CITES Secretariat submitted by the Republic of Colombia in the corresponding year.

8.2 Supervision of population

The direct protection of the species at the national level is in charge of the Ministry of Environment and Sustainable Development, CITES Management Authority, with the support of the CITES Scientific Authorities, and Regional Environmental Authorities (Autonomous Regional Corporations of the country).

In the particular case of the population under ranching program, the Autonomous Corporation CVS will be directly responsible as environmental authority to ensure the resource, to give to Asocaiman and other local community members approved corresponding use permit. And to national environmental authorities the reports and compliance with quotas and measures imposed to ensure that the ranching program has no detrimental impact on the wild population.

8.3 Control Measures

8.3.1 International

Control actions at the international level obey the CITES Convention regulation which provides tools to implement control actions, including the reduction of illegal trafficking (Ulloa-Delgado and Sierra-Diaz, 2012).

In addition to this, all range countries for *C. acutus* are Parties to CITES and its trade is regulated under this convention. The SPAW Protocol also applies *to C. acutus*, so that also contributes to exert stricter control of international trade because some species range countries, including the Republic of Colombia, are also Parties this protocol.

8.3.2 National

Colombia has a legal framework that regulate the use of crocodilians, among other components of biodiversity, at the national level (see **Table 4** of **Annex I b**.). The country also has various public institutions responsible for the management, protection, conservation, use and management of renewable natural resources in charge of implementing various actions of strictly management, control and monitoring, both locally, regionally and nationally. These include the Ministry of Environment and Sustainable Development (CITES Management Authority), CITES Scientific Authorities of the country, the National Environmental Authority Licenses (ANLA),

the Regional Autonomous Corporations (CAR), the Environmental Police, the vial Police and the Control institution (MA, 2002).

Considering the above, other control actions to ensure *C. acutus* sustainable harvesting are:

- The program will have a Management Plan, which includes an analysis of biological and economic viability and will provide guidelines to development and financial management; and also duties, obligations and distribution of benefits.
- Authorized people to carry out the harvest of eggs and breed in farm, besides Asocaiman will be chosen based on criteria defined by the scientific and environmental authorities, and must have an authorization. Individuals or any other entity shall not be authorized to perform this operation.
- All the program products that are intended for international trade will be identified with the numbers and with the special mark.

When considered necessary, the CITES Secretariat is invited to visit and examine the ranching program.

Additionally, due to the importance and size of the industry in crocodilian skins in the country (meaning that it is the largest producer of crocodilian skins in the world), Colombia has measures such as requiring genotyping of parental breeding stock of all the farms (Resolution No. 1772 of 2010), which contribute to strengthening the traceability of products of each establishment, including the DRMI-BC program and the control of trade.

8.4 Captive- breeding

In Colombia there are seven (7) captive-breeding farms with *C. acutus* operations object registered in CITES (Section 6.2).

8.5 Safeguards

Specimens of *C. acutus* not the subject of the ranching program at DRMI-BC, remain in Appendix I and subject to the control regulations established for these. These include wild populations outside the limits of DRMI-BC; neonates and other specimens within the DRMI-BC other than eggs object of ranching; and individuals breeding in captivity and others. These specimens will be easily differentiated from specimens obtained from ranching by the marking system explained above (section 8.1.2).

Additionally and as a precautionary measure in the event that due to the ranching program it is note an obvious decline in the population (according to the monitoring program), an initial figure of 10% of the eggs collected will be used to release to natural environment. In order to keep the gene pool of the population, few individuals from each nest harvested and differentiated brand when they hatch will be chosen. This is expected to offset the impact of harvesting, and contribute to the recovery of the natural population (Hutton and Webb, 1992). Also a series of population parameters to determine the condition of the population according to defined thresholds (e.g. optimal, normal, observation or study) will be defined; this in order to determine the viability of the program, guiding the management of the program and ensure the survival of the population (see **Table 5** of **Annex I b**.).

Moreover, interest due on implementing a conservation program based on the controlled harvest of eggs at other national population, national environmental authorities must ensure that this complies with population monitoring process endorsed by specialists coordinated with the CITES Scientific Authority, complies the requirements of Res. 11.16 CITES and current national legislation and in which the benefit for conservation *C. acutus* populations, its habitat and livelihood of local people are included.

Once Colombia´s CITES Management and Scientific Authorities verify compliance with the above, they will consult the proposal to formalize a program of conservation, management and repopulation that allow

sustainable use based on the controlled harvest of eggs in the new population *C. acutus* with SSC-IUCN Crocodile Specialist Group and will present in the Fauna Committee. Once it is consulted, it will be put in consideration of the Standing Committee of CITES presenting a detailed and justified proposal.

When the results of population surveys indicate a decline in populations is due to ranching program, a percentage of individuals who should be returned to the wild (according to section 8.1.1) will be established.

9. **Information on Similar Species**

Colombia inhabits six of the 23 species of crocodilians in the world of which only two do belong to the genus *Crocodylus*: *C. acutus* and *C. intermedius* (Rodríguez 2000; Martin, 2008). Even so, this proposal would not adversely affect the conservation and / or management of any species of crocodilians in Colombia not included in this proposal. On the other hand and despite of the skin similarity of *C. intermedius* is between 20 and 25 transverse rows of ventral plates, while that of *C. acutus* are between 25 and 35 (Patiño et al, 2013). Additionally, *C. intermedius* is limited almost exclusively to the Orinoco basin in Colombia and Venezuela more restricted distribution. Meanwhile, *C. crocodilus, Melanosuchus niger, Paleosuchus palpebrosus* and *P. trigonatus* have very different morphological characteristics to *C. acutus*, so do not give rise to confusion or impersonation.

10. **Consultations**

This proposal has been consulted to countries of distribution (see consultation formal request attached).

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ANNEX I

a. Figures

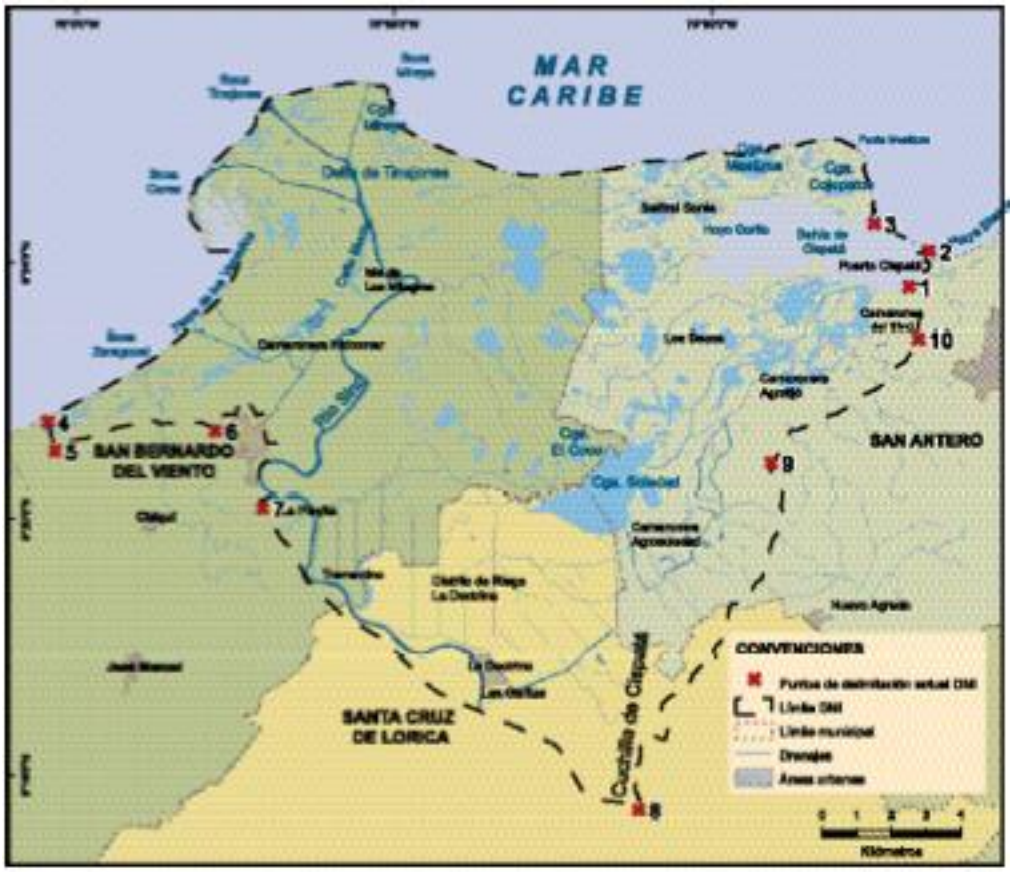


Figure 1. Map of the limits of the Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. A protected area accredits to category IV of the UICN. (Taken from CVS and INVEMAR, 2010).

Figure2. Map of distribution of Crocodylus acutus at world-wide level (Taken from Thorbjarnarson, 2010).

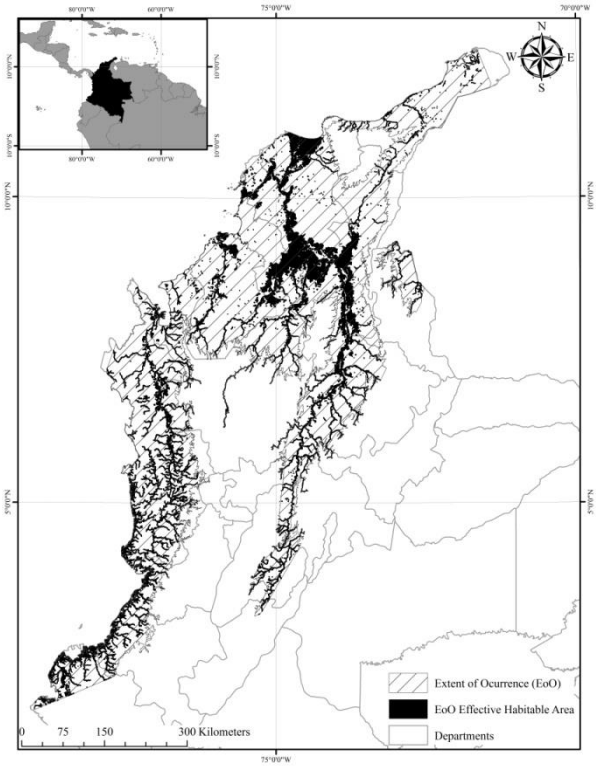
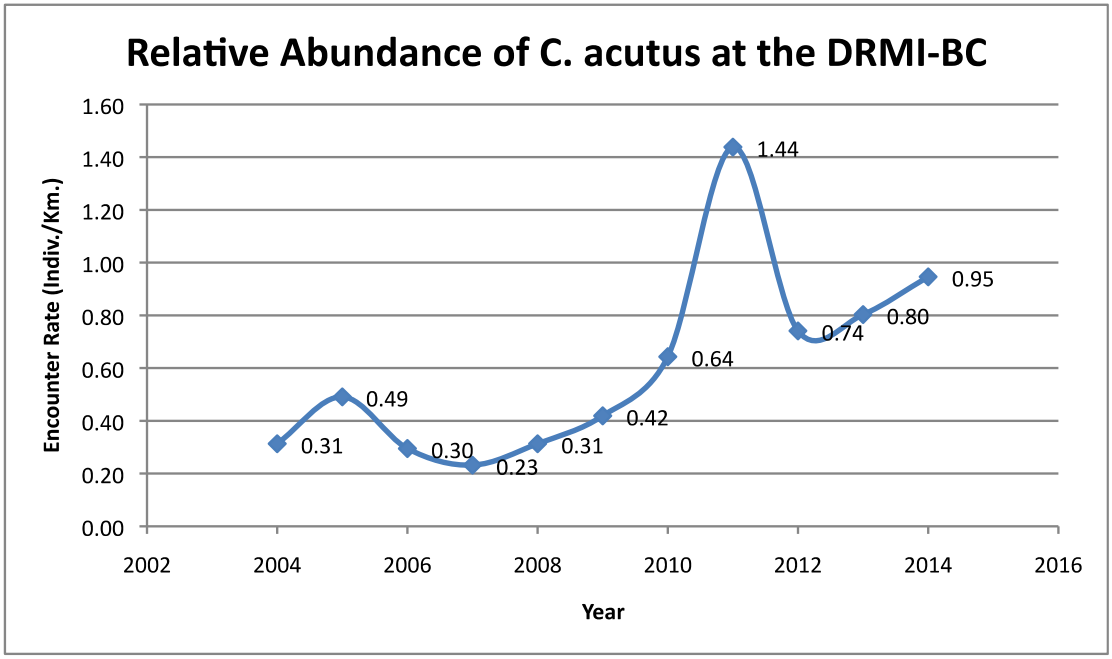


Figure 3. Inhabitable effective area (with a zone buffer of 1 km) with base in the *Extent of Ocurrence* (EoO) estimated that reflects the optimal habitat and the connectivity between these habitats due to the presence of water bodies. The authors maintain that this figure way sample needs the area inhabited by *Crocodylus acutus* in Colombia (Balaguera-Reina *et.al*. 2013).



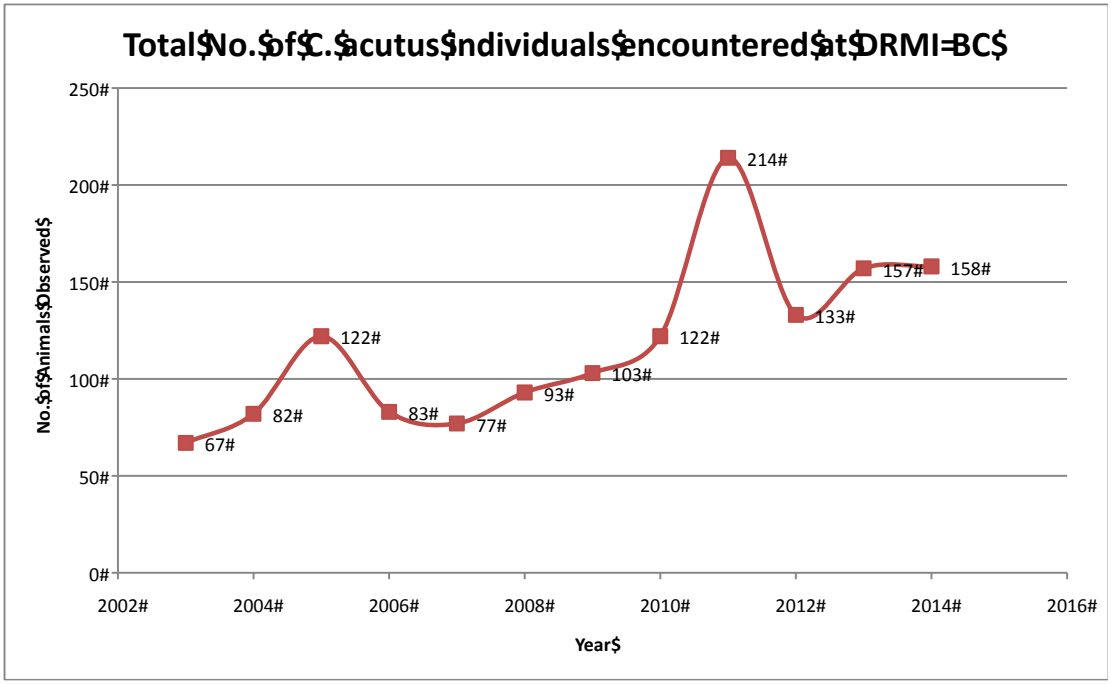


Figure 4. Rate of encounter average (relative abundance) of *Crocodylu acutus* obtained in the nocturnal monitoring between 2004 and 2014 (a), and total number of observed individuals (b). In both graphs the rate of encounter is observed as much that as the total number of observed individuals is increasing from the 2007. Regional District of Integrate Management of Mangroves of Cispata Bay of and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. 2015

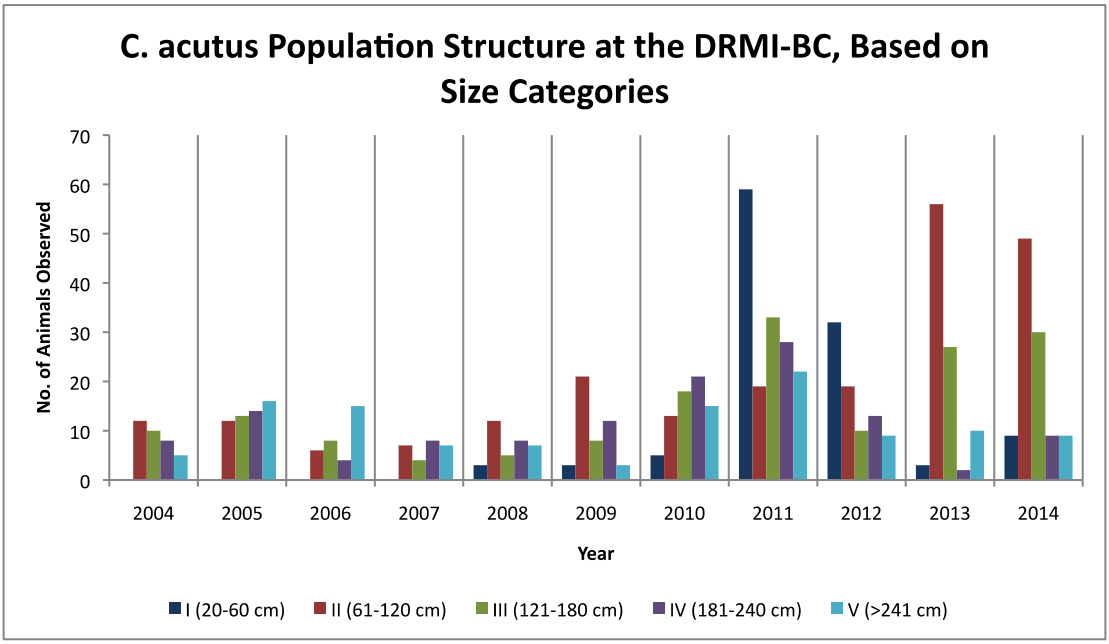


Figure 5. Frequency allocation of classes of sizes of individuals of *Crocodylus acutus* observed between the 2004 and the 2014 during nocturnal censuses at the Regional District of Integrate Management of Mangroves of Cispatá Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. 2015

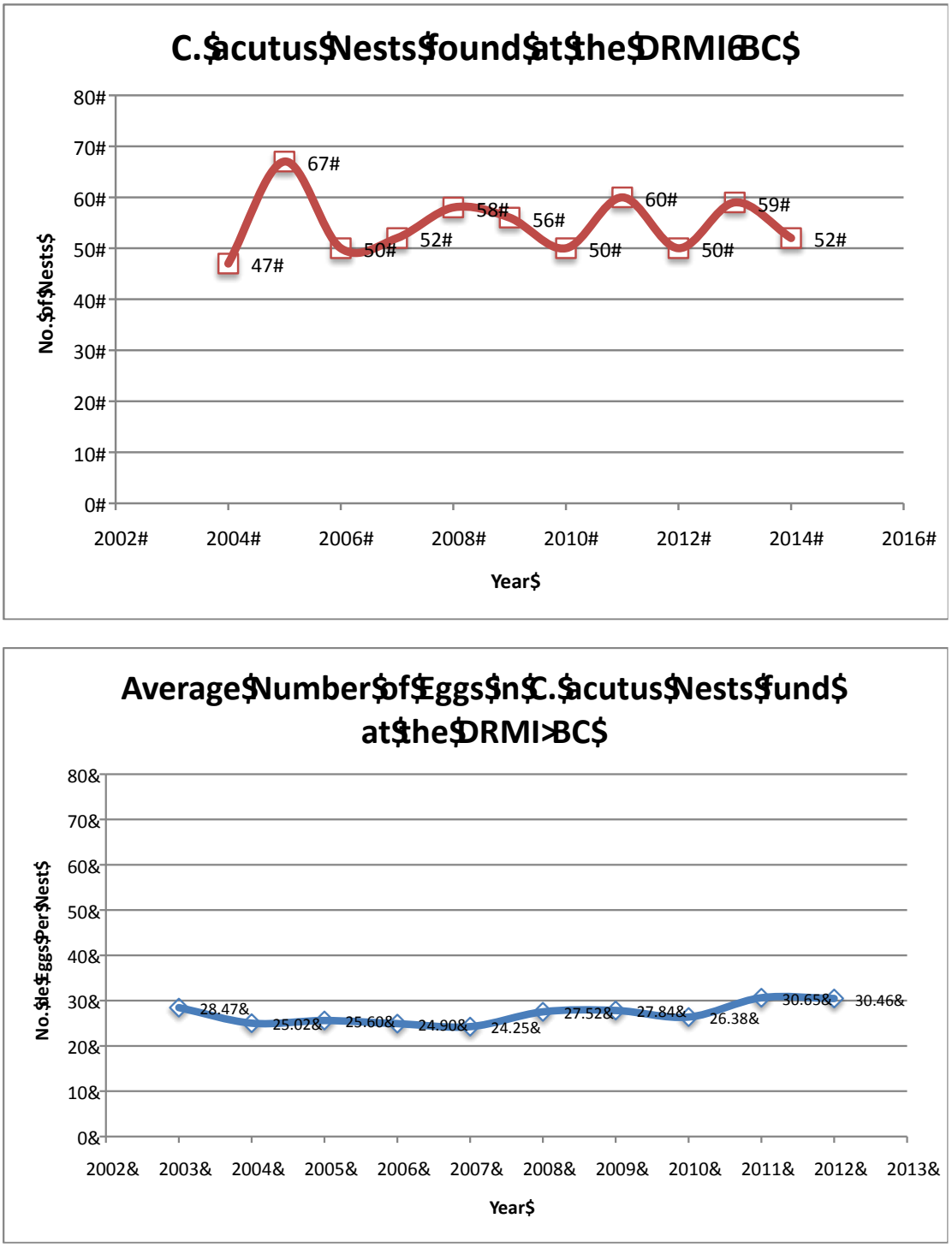


Figure 6. Number of nests found in Cispatá Bay between 2004 and 2014 (a) Average of eggs (b). In average 54,6 nests have been from the 2004, with a standard deviation of 5.9. The average of eggs by nest found has increased slightly. Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. 2015

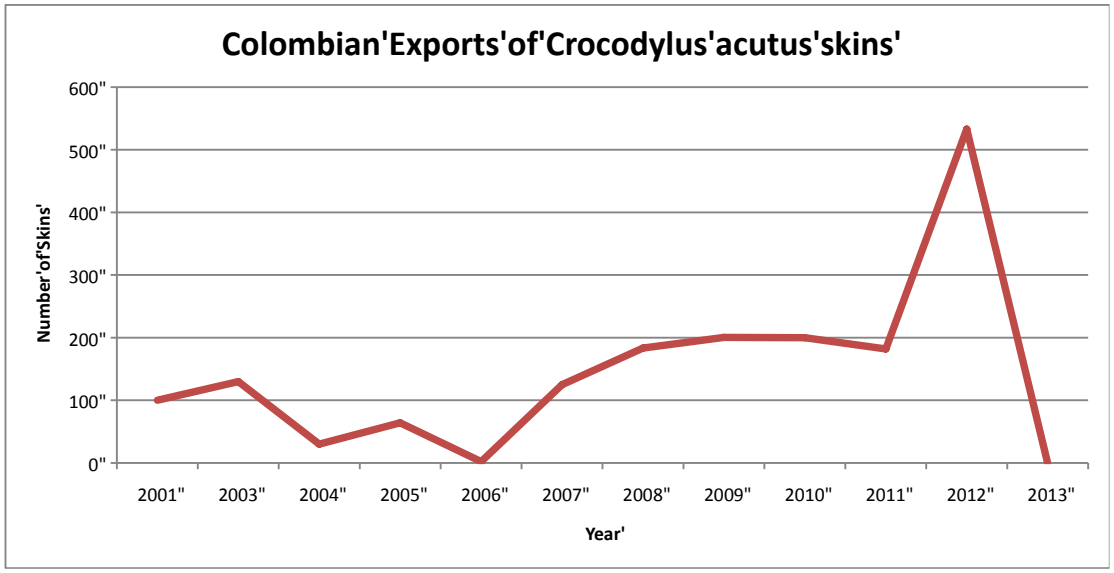


Figure 7. Annual average of the exports of skins of *Crocodylus acutus* registered in CITES trade database for Colombia between the 2001 and the 2013 (http://trade.cites.org/#).

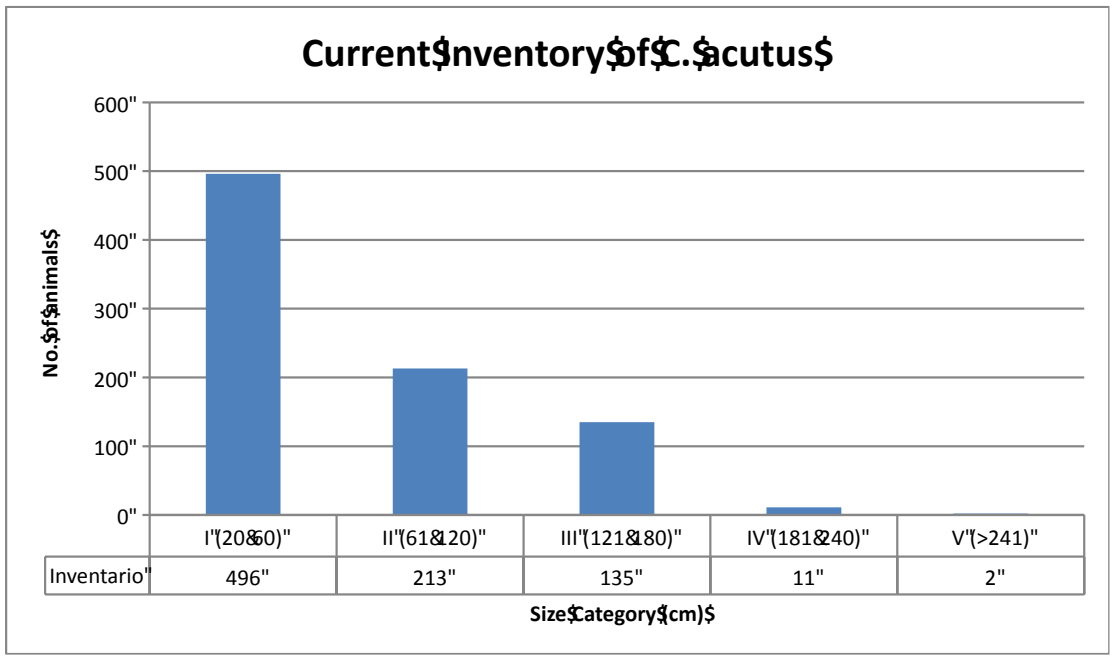


Figure 8. Present inventory (2015) of *Crocodylus acutus* at the conservation program, handling at the Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. (Ulloa-Delgado, 2015).

ANNEX I

b. Tables

Table 1. Relative abundance information expressed as rate of encounter (Ind/Km), obtained of the population studies of *Crocodylus acutus* in Colombia between 1992 and 2012. (*Unpublished data; ** These values of abundance do not include hatchlings)

AUTHOR	PUBLICATION YEAR	COLOMBIAN DEPARTMENT	STUDY SITE	YEAR OF STUDY	AVERAGE RELATIVE ABUNDANCE (ind/ km)
Gómez-González	2011	La Guajira	Bahía Portete	2011	2.01
Gómez-González	2011	La Guajira	Bahía Portete	2010	2.71
Gómez-González	2011	La Guajira	Bahía Portete	2009	0.88
Gómez-González	2011	La Guajira	Bahía Portete	2008	2.02
Gómez-González	2011	La Guajira	Bahía Portete	2007	1.73
De la Hoz-Villareal	2008	La Guajira	Bahía Portete	2007	1.37
Rodríguez-Melo (ed)	2000	La Guajira	Bahía Portete	1994-1997	0.47
Abadía	1996	La Guajira	Bahía Portete	1992	0.09
Patiño *et al.*	2010	La Guajira	Caño Limoncito -Dibulla	2009-2010	0.00
Patiño *et al.*	2010	La Guajira	Caño Limoncito -Dibulla	2009-2010	7.58**
Patiño *et al.*	2010	La Guajira	Caño Lagarto -Dibulla	2009-2010	12.12**
Patiño *et al.*	2010	La Guajira	Caño Michiragua -Dibulla	2009-2010	7.69**
Rodríguez-Melo (ed)	2000	La Guajira	Dibulla	1994-1997	3.75
Vargas-Ortega	2014	Magdalena	Parque Nacional Natural Tayrona (Los Naranjos, Cañaverales, Arrecifes y Cinto)	2013-2014	1.33
Balaguera-Reina y González-Maya	2008	Magdalena	Vía Parque Isla de Salamanca	2006	7.78
Fundación Biodiversa	2011	Bolívar	Puerto Badel - Canal del Dique	2011	0.51
Balaguera-Reina	2012	Cesar	Ciénaga de Zapatosa y Costilla	2011	0.00
Ulloa-Delgado	2015	Córdoba	Bahía de Cispatá (DMIBC)	2014	0.95
Ulloa-Delgado	2015	Córdoba	Bahía de Cispatá (DMIBC)	2013	0.80
Ulloa-Delgado	2015	Córdoba	Bahía de Cispatá (DMIBC)	2012	0.74
Ulloa-Delgado	2012	Córdoba	Bahía de Cispatá (DMIBC)	2011	1.44
Ulloa-Delgado	2012	Córdoba	Bahía de Cispatá (DMIBC)	2010	0.64
Ulloa-Delgado	2012	Córdoba	Bahía de Cispatá (DMIBC)	2009	0.42
Ulloa-Delgado	2012	Córdoba	Bahía de Cispatá (DMIBC)	2008	0.31
Ulloa-Delgado	2012	Córdoba	Bahía de Cispatá (DMIBC)	2007	0.23
Ulloa-Delgado y Sierra-Díaz	2006	Córdoba	Bahía de Cispatá (DMIBC)	2006	0.74
Ulloa-Delgado y Sierra-Díaz	2006	Córdoba	Bahía de Cispatá (DMIBC)	2005	0.49
Ulloa-Delgado y Sierra-Díaz	2006	Córdoba	Bahía de Cispatá (DMIBC)	2004	0.30
Ulloa-Delgado y Sierra-Díaz	2006	Córdoba	Bahía de Cispatá (DMIBC)	2003	0.94
Ulloa-Delgado y Sierra-Díaz	2006	Córdoba	Bahía de Cispatá (DMIBC)	2002	1.25
Ulloa-Delgado y Sierra-Díaz	2002	Córdoba	Bahía de Cispatá (DMIBC)	2001	0.50
Ulloa-Delgado y Cavanzo-Ulloa	2009	Sucre	Ciénaga de la Caimanera	2008-2009	0.36
Rodríguez-Melo (ed)	2000	Sucre	Ciénaga de la Caimanera	1994-1997	7.29
Barrera	2004	Boyacá y Santander	Río Ermitaño	2004	1.07
Ulloa-Delgado	2011	Norte de Santander	Río San Miguel, Sardinata, Nuevo Presidente y Tibú	2010	1.32
Barahona *et al.*	1996	Cundinamarca	Río Bogotá	1994-1995	1/sin distancia
Average					**2.05**
Estándar Deviation					**2.86**

Table 2. Relative abundance expressed as rate of encounter of *Crocodylus acutus* (Individual observed by crossed kilometer) observed in the nocturnal counts in the DRMI-BC between the 2004 and the 2014, and the changes positive that suggest a population increasing. Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. (Ulloa-Delgado, 2015).

YEAR	ENCOUNTER RATE (Indv/Km)	TOTAL NUMBER OF OBSERVED INDIVIDUALS	CHANGE WITH RESPECT TO INMEDIATELY PREVIOS YEAR	
			ENCOUNTER RATE	TOTAL NUMBER OF OBSERVED INDIVIDUAL
2004	0.31	35	-0,19	15,00
2005	0.49	55	0,40	40,00
2006	0.30	33	-0,34	-39,00
2007	0.23	26	-0,10	-6,00
2008	0.31	35	**0,17**	**16,00**
2009	0.42	47	**0,08**	**10,00**
2010	0.64	72	**0,20**	**19,00**
2011	1.44	161	**0,89**	**89,00**
2012	0.74	83	**-0,70**	**-78,00**
2013	0.80	98	**0,06**	**15,00**
2014	0.95	106	**0,14**	**8,00**
	0.60	**Average**		
	0.36	**Estándar desviation**		

Table 3. Captive-breeding farms registered to CITES Secretariat and in process to register of *Crocodylus acutus* in Colombia.

NAME	REGISTER CODE	FASE
Krokodeilos S.A.	A-CO-501	COMERCIAL
Tropical Fauna LTDA.	A-CO-502	COMERCIAL
Caicsa S.A.S.	A-CO-503	COMERCIAL
Cocodrilos de Colombia S.A.	A-CO-504	COMERCIAL
Zoofarm LTDA.	A-CO-505	COMERCIAL
Exotika Leather S.A.	A-CO-506	COMERCIAL
El Prieto LTDA	A-CO-507	COMERCIAL
Lirica	In process	COMERCIAL
Reptibol	In process	COMERCIAL

Table 4. Colombian environmental legislation related to management, and trade of wildlife species, with special emphasis on *Crocodylus acutus*.

Type	Number	Year	OBJETIVE
Resolution	573	1969	By which the ban on the hunting and capture of Needle Cayman or Caretabla (*Crocodylus acutus*), Caiman Llanero (*Crocodylus intermedius*), Jacare assu or Black Caiman (*Melanosuchus niger*) throughout the country where the INDERENA exercising its jurisdiction is established.
Decree-Law	2811	1974	By which the Code of Renewable Natural Resources and Environmental Protection is enacted.
Decree	1608	1978	By which the National Code of Renewable Natural Resources and Environmental Protection and the Law 23 of 1973 is regulated wildlife. (Refers to permit hunting promotion: For the purposes of this Agreement, understood as promoting hunting activity, this act led to the arrest of individuals or animals of wild fauna for the establishment and development of commercial and farms building, authorized by the INDERENA.)
Law	17	1981	By which approves the Convention on International Trade in Endangered Species of Wild Fauna and Flora -CITES.
Law	99	1993	By which the Ministry of Environment is created, the public sector responsible for the management and conservation of the environment and renewable natural resources is rearranged, the National Environmental System, SINA, organized and other dispositions are dictated. Regulated by the National Decree 1713 of 2002, regulated by National Decree 4688 of 2005, partially regulated by the National Decree 3600 of 2007, regulated by National Decree 2372 of 2010.
Law	165	1994	By which the Convention on Biological Diversity, done at Rio de Janeiro on June 5, 1992 is approved.
Resolution	1602	1995	Through which actions to ensure the sustainability of mangroves in Colombia are issued.
Resolution	020	1996	Through which Resolution No. 1602 of December 21, 1995 clarified and other provisions related to forest harvesting are held and specifically the Mangrove.
Decree	1401	1997	For which the Management Authority of Colombia is designated to the Convention on International Trade in Endangered Species of Wild Fauna and Flora -CITES-, and their

			functions are determined.
Decree	1420	1997	By which scientific authorities of Colombia to the Convention on International Trade in Endangered Species of Wild Fauna and Flora -CITES- are designated, and their functions are determined.
Resolution	233	1999	Through which Resolution 924 of October 16, 1997 amending and the period specified in Article 4 of Resolution 1602 of December 21, 1995 is extended.
Decree	125	2000	By which the Decree 1420 of 1997 is modified.
Decree	1909	2000	By which sea and river ports, airports and other places for international trade in specimens of wild fauna and flora are designated.
Resolution	438	2001	By which the Single National Safe Conduct for the mobilization of specimens of biological diversity is established.
Resolution	721	2002	By which is emitted a pronouncement about studies and zoning proposals in mangrove areas presented by the Autonomous Regional Corporations and Sustainable Development and other determinations are made.
Resolution	1172	2004	By which the National System of Identification and Registration of Wildlife Specimens in Ex situ conditions is established.
Resolution	1173	2004	By which the National Register of Providers markings defined in the National Identification System Wildlife Specimens ex situ is regulated.
Resolution	1263	2006	By which it establishes the procedure and the value is set to issue permits under the Convention on International Trade in Endangered Species of Wild Fauna and Flora -CITES- to, and other dispositions are dictated.
Agreement	056	2006	By which reserves, declares and defines as District Integrated Management the Mangrove Area of Cispatá Bay and Adjacent Sector Delta Estuary of Sinú River by the Regional Autonomous Corporation of Valleys of Sinú and San Jorge - CVS -
Resolution	923	2007	By which the Resolution 1172 of October 7, 2004 is modified and be adopt other regulations.
Law	1333	2009	By which the environmental sanction procedure is established and other dispositions are dictated.

Resolution	1772	2010	By which requirements for advance on the level of trade and registration before the CITES Secretariat of the farms in closed cycle that handle species included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora - CITES and other provisions are adopted.
Resolution	2064	2010	By which subsequent actions to preventive arrest, restitution or forfeiture of specimens of wild fauna and terrestrial and aquatic flora are regulated and other dispositions are dictated.
Decree	2372	2010	By which the Decree Law 2811 of 1974, Law 99 of 1993, Decree 165 of 1994 and Decree 216 of 2003 and Decree concerning to the National System of Protected Areas, management categories that comprise it are regulates and dictate other provisions.
Agreement	138	2010	By which Integral Management Plan for the District of Integrated Management -DMI- Cispatá Bay -La Blasa -Tinajones and Area near Delta Estuary Rio Sinú, declared by Agreement 056 of 2006, approving its area expands and other determinations are made.
Decree	3570	2011	By which the objectives and structure of the Ministry of Environment and Sustainable Development are modified and Administrative Sector of Environment and Sustainable Development is integrated. Also delegates to the direction of forests, biodiversity and ecosystem services as CITES Management Authority of Colombia.
Agreement	173	2011	By which the homologation of the District Integrated Management the Mangrove Area of Cispatá Bay and Adjacent Sector Delta Estuary according to the categorization of Decree 2372 of 2010 management is performed.
Resolution	1316	2014	By which is added to the resolution 1772 of 2010, and parental genotyping of *C. acutus* is conditioned to the time when the environmental authority publish specific molecular markers for the species.
Resolution	0192	2014	By which the list of endangered wild species of Colombian biodiversity found in the country is established, and other dispositions are dictated.
Decree	1076	2015	By which the Single Regulatory Decree of the Environment and Sustainable Development Sector is issued.

Table 5. Viability population parameters taking in account at the conservation program of *Crocodylus acutus* at Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. (Ulloa - Delgado, 2015).

	Viability parameters
Populations	Population structure
	Relative abundance (Indiv/km cross)
Reproductive	No. Nest/year
	No. de Eggs/nest
	Fertility percentage
	Hatching percentage

Additional information

Table 6. Multiannual effectiveness of the nesting platforms areas, for *Crocodylus acutus,* constructed in mangroves areas. Regional District of Integrate Management of Mangroves of Cispata Bay and nearby sectors of the Estuarine Delta of Sinú River, located in the department of Cordoba, Republic of Colombia. (Ulloa - Delgado, 2015).

	Nesting years												
NESTING PARAMETERS	**2003**	**2004**	**2005**	**2006**	**207**	**208**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**TOTAL**
Superficial total areas	0	10	70	100	100	100	100	100	100	100	100	100	100
Tota Nest	0	15	47	35	37	40	37	36	40	34	41	32	394
Areas used	0	6	29	19	22	25	27	21	26	23	28	25	24,4
Rank of nests by platform	0	0-4	0-5	0-7	0-5	0-6	0-6	0-4	0-4	0-3	0-3	0-3	0-7
Natural nest	15	33	20	15	15	18	19	14	18	16	18	20	221
Total nest per year	15	47	67	50	58	58	56	50	60	50	59	52	616