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HANDBOOK ON
CITES AND LIVELIHOODS
CASE STUDY

Crocodylus acutus



Sustainable Use of American Crocodile
Crocodylus acutus in Cispata, Colombia



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I. General Description¹

Scientific Name	<i>Crocodylus acutus</i>
Common Names:	
Inglés	– American Crocodile
Spanish	– Cocodrilo Americano, Caimán, Caimán de costa, Caimán aguja, Cocodrilo de Río, Lagarto Amarillo, Lagarto Real, Caimán caretabla and Kayuushi among others.
French	– Crocodile d'Amérique, Crocodile Americain
Synonym:	<i>Crocodylus acutus</i> Cuvier, 1807 y <i>Crocodylus americanus</i>
CITES Appendices:	CITES provides three levels of restrictions called appendices and cover only previously registered or listed species with a level of threat. These refer to natural populations endangered or threatened with extinction due to trade. It implies a special regulation for its use, where the direct use of the species is restricted. <i>Crocodylus acutus</i> is listed in Appendix I (Except for the population of Cuba which is included in Appendix II since 12/01/05).
Taxonomic Notes:	There are documented cases of hybridization with <i>Crocodylus moreletii</i> in Belize (Ray <i>et al.</i> 2004) and the Yucatan of Mexico (Cedeno-Vasquez <i>et al.</i> 2008, Rodriguez <i>et al.</i> 2008) and with <i>Crocodylus rhombifer</i> in Cuba.
Range Description:	<p>The American Crocodile is the most widely distributed of the New World crocodiles, spanning the Atlantic from the southern tip of Florida and the Caribbean islands of Cuba, Jamaica and Hispaniola (Haiti and Dominican Republic), to Mexico Yucatan peninsula up to the south of Colombia and Venezuela. An isolated subpopulation is found in the Rio Grijalva basin in Mexico. Along the Pacific coast it is found from Northern Sinaloa in Mexico to the limits of mangrove coastal habitats in northern Peru. This species is found up to 1,200 m above sea level.</p> <p>In Colombia the species was recorded in large quantities along the Magdalena Valley, in the Sinú, San Jorge, Cauca rivers and some of its tributaries and wetlands complex of the Caribbean coast, especially in mangrove and river deltas. In the Pacific coast its distribution is discontinuous, but it is also found in mangroves and river deltas (Medem 1981; Rodriguez-Melo (ed) 2000;.. Ulloa-Delgado & Sierra-Diaz 2002)..</p>
Countries:	Native of: Belize; Colombia; Costa Rica; Cuba; Dominican Republic; Ecuador; El Salvador; Guatemala; Haiti; Honduras; Jamaica; Mexico; Nicaragua; Panama; Peru; United States (Florida); and the Bolivarian Republic of Venezuela.

¹ Ponce-Campos, P., Thorbjarnarson, J. & Velasco, A. (IUCN SSC Crocodile Specialist Group) 2012. *Crocodylus acutus*. The IUCN Red List of Threatened Species. Versión 2014.3. <www.iucnredlist.org>. Descargado 9 Diciembre 2014.

<p>Population:</p>	<p>Overexploitation from the 1930s to the 1960s led to a severe decline in the abundance of this species. In the USA the population is recovering and now inhabits most of their remaining habitat in southern Florida over a larger area than in 1978, when it was protected (Mazzotti <i>et al.</i> 2007). In the other countries of its range, protection has resulted in some recovery, but overall numbers are still depleted in some countries, such as Colombia and Ecuador. Considerable recovery has taken place in other areas including Cuba, Costa Rica, Mexico and Venezuela (Thorbjarnarson <i>et al.</i> 2006). In Colombia the species has contracted with multiple sites and isolated individuals or small isolated groups. It is worth though mentioning that the subpopulation of Cispatá Bay is recovering since nearly 12 years ago, by implementing a community recovery program, which is expected to consolidate the sustainable use of the species, prior approval of an amendment of Appendices at COP-17.</p>
<p>Habitat and Ecology</p>	<p>This species mainly occurs in coastal habitats such as lagoons, mangrove swamps and other brackish water; however, it can also inhabit freshwater and landlocked reservoirs. Eggs are laid in nests on elevated beach ridges, preferably bordered by brackish lagoons to serve as hatchling habitat (Platt and Thorbjarnarson 2000).</p> <p><i>Crocodylus acutus</i> is a hole-nesting species, but is adaptable in terms of nesting ecology, creating in some areas elevated mounds of substrate into which eggs are deposited (Thorbjarnarson 1989). Clutch size is typically 14 to 60 eggs; although in some populations mean clutch size is in the low 20s (Platt and Thorbjarnarson 2000). As with most hole-nesting species, <i>C. acutus</i> nests during the annual dry season, with eggs hatching around the beginning of the annual rainy period (Thorbjarnarson 1989, Casas-Andreu 2003). The American Crocodile is adept at using man made areas for nesting, and this is one of the reasons behind its population recovery in parts of its range (Mazzotti <i>et al.</i> 2007). Specifically for the conservation project of the Cispatá Bay, about 60% of nests are obtained in artificial nesting platforms (Ulloa-Delgado & Sierra-Diaz, 2015).</p> <p>In Colombia they are of aquatic habits, and within crocodilya they are relatively large, with males that can reach a total length of 5-6 meters and females a little smaller (3-4 meters). Those growing in island environments in brackish or salt water tend to be smaller. The food consumption is varied, and they are considered as one of the largest predators in the wild, provided that small size individuals eat insects, small fish and shellfish, and as they grow, they tend to consume larger vertebrates (Ulloa GA & Sierra-Delgado Diaz, CL, 2012). Among the species that consume as adults are turtles, iguanas, birds and mammals.</p>
<p>Major Threat(s):</p>	<p>This species was hunted and overexploited for its skin in the 1930s until it was protected in the 1970s, however, illegal hunting still occurs. It is also threatened by habitat degradation from coastal development, including destruction of nesting grounds and the destruction of mangrove swamps for shrimp aquaculture. In the Dominican Republic overharvesting of fish has contributed to the declines of this species (Ross 1998). Young individuals of this species may also be preyed by birds, raccoons, coati, dogs, and by adult crocodiles (i.e., cannibalism).</p> <p>Globally, sea level rise poses limits to the areas of crocodiles and affect the stability and permanence of habitat with negative consequences for the populations. Additionally, the increase in environmental temperature makes the natural incubation process generate a higher proportion of males, culminating in extinction or local disappearance; although artificial nesting platforms would offset part of the downside of the rise of the sea level (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).</p> <p>Other threats considered of low magnitude in Colombia are related to isolated cases of poaching, subsistence hunting, and gathering eggs for local consumption and bycatch in fishing gear. (Ulloa-Delgado Sierra Diaz & 2005; Sanchez-Paez <i>et al.</i>, 2004; Sierra Ulloa Diaz-Delgado & 2006-2010). In a way these anthropogenic threats are exacerbated by the lack of a strategy that gives value to the conservation of the species. Sustainable use could be part of the solution.</p> <p>The International Union for Conservation of Nature (IUCN 1994) in their red book, considered endangered species under the category of Vulnerable (VU). The Red Book of Colombia categorized the species as Critically Endangered (CR) but the latest revision of the species was proposed only in Danger (personal Comm, GA Ulloa_ Delgado, 2015).</p>

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Conservation Actions:	<p>There are protected areas and sanctuaries for this species, as well as captive breeding programmes and a few commercial farming operations have been established.</p>
Use and Trade:	<p>Captive breeding farms are registered by CITES in Cuba, Honduras and Colombia. The main historical uses are the skins to produce belts, wallets and shoes; head trophy hunting or collection; fat and parts used in traditional medicine (eg. squamous bone, bile, gallbladder, teeth (CITES 2002)) and meat for consumption and tourism. Given the scarcity of the species there are no extensive and widespread uses, and these could be considered locally artisanal (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012). In Colombia, skins that have been produced on private farms have been exported to France, Italy, Japan, and Singapore, as the main destinations. (Ulloa-Delgado G. & A. Diaz-Sierra, C. L., 2012).</p>
Main users:	<p>Rural communities with low resources situated usually away from urban centers mainly use the species, and in other cases close to protected areas. In areas for example such as: those adjacent to the western bank of the River Tempisque in Costa Rica (Valdelomar, V et.al 2012) communities in the Bay of Cispata in Colombia; indigenous communities of Embera-Katíos located in the upper basin of the River San Jorge in Colombia (Racero, J 2008); and rural communities on the southwest coast of Jalisco, Mexico (Pena-Mondragon,J, 2013). Zookeepers with breeding and reintroduction operations have been established in several countries, including Colombia and Peru, creating job opportunities for local citizens.</p>
	<p>In Colombia populations of farmers, indigenous and afro-Colombian communities are the main users. The meat and eggs are used for food, while the remains are discarded, including the skin. Mesenteric fat is used to counteract diseases of the airways. Teeth and bones are used for ceremonies in witchcraft and shamanism (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).</p>





II. Introduction and Objective²

This case study has two objectives. The first is to document and demonstrate mitigation measures and promotion of sustainable uses due to restrictions on trade of American Crocodile -*Crocodylus acutus*- used in Cispatá, Department of Córdoba in Colombia. The second is to review the applicability of the Handbook on CITES and Livelihoods developed in August 2015 and led by CITES and the General Secretariat of the Organization of American States (GS-OAS)³.

The work for the conservation of *C. acutus* in Cispatá Bay was the result of a collaborative process dating 15 years and supported by several institutions including: the Regional Autonomous Corporation of Valle del Sinu - CVS-, the mayor of San Antero, the fishing community - Asocaiman-, other community organizations, educational institutions, and private enterprise. Currently the species is found in Appendix I of CITES given the impact due to overexploitation for international trade in skins (Ulloa-Delgado GA & Sierra-Díaz, CL, 2012).

The Colombian government has proposed to transfer *C. acutus* from Appendix I to Appendix II, justifying that the recovery of the populations of the species allows for controlled international trade in skins benefitting fishing communities.

2 2015. General Secretariat of the Organization of American States. Published by the Department of Sustainable Development. All rights reserved. Financial support from Canada and the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) to this initiative as well as the technical support of Rodrigo Martínez, Giovanni Ulloa and Isis Márquez and all thanks community actors Bay Cispatá who collaborated in preparing this case study.

3 The Handbook on CITES and Livelihoods has two parts. Part I: How to rapidly assess the effects of the implementation of the decisions of listing species in the Appendices of CITES livelihoods of poor rural communities; and Part II Addressing and mitigating the effects of the application of CITES decisions on poor rural communities.





III Background

In Colombia, in the past century, and until 1950, the species was the subject of massive manhunt as international markets demanded its skin. Subsequently, the reduction of its populations as a result of the destruction of its natural habitat worsened the situation of the species.

Commercial hunting of *C. acutus* lasted 37 years, trading internationally around two million skins, until 1965 when commercial whaling was banned by Resolution No. 125. Subsequently, the Ministry of Agriculture confirmed the ban in Colombia by Resolution No. 411 of 1968 and included other species: *Crocodylus intermedius* and *Melanosuchus niger*. These bans were ratified on July 24, 1969 under Resolution No. 573, issued by the National Institute of Natural Resources (INDERENA), and “establish a definitive ban on hunting and catching throughout the national territory” as a result of the drastic reduction in natural populations. In 1976 it was protected with the national ban on all *Crocodylia* promulgated by the INDERENA. In 1984 the CITES agreement was approved and the commercial animal breeding program was initiated, and in 2000-2001 the first skins from commercial animal breeding were exported.


In 1985 the government of Colombia decided that the order of the *Crocodylia* could be hunted for sustainable use. In 1994 there were 43 programs in experimental stage; currently there are 8 programs and 6 farms registered in CITES, and authorized to produce and export skins. In total, 647 skins from this activity have been exported (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

In 2000 a pilot project for the recovery and conservation of the species began in Cispatá Bay in order to determine a methodological model that was easy to implement for other wild populations of the country, and to establish guidelines for a National Program of Conservation of *C. acutus* (Ulloa-

Delgado GA & Sierra-Diaz, CL, 2012). Cispatá Bay is one of the best mangrove areas studied of the country and it is the largest mangrove area of the Department of Córdoba, Colombia. It is considered one of the most important natural areas of the country for its ecological importance and biodiversity, and known for the ordering processes where different national and international entities have participated. The extent of mangroves is approximately 11,513 ha, of which 1,436 ha (12.5%) are identified as wetlands or bodies of water that provide habitat for crocodiles (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

Since 2005 the implementation of a Comprehensive Management Plan with community involvement, fishermen and alligator hunters began. The plans were based on previous characterization and diagnosis studies done by scientists of mangrove forests. Among the investigations it was found that the commercial, craft and sustainable use of wood extracted from mangroves along with fishing and gathering of crustaceans and molluscs are the basis for the livelihoods of more than 600 families (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

In 2006 the mangrove area along with the surrounding areas were declared as a protected category by the regional environmental authority (CVS) with the recognition of a District Integrated Natural Resources Management Area, providing a greater degree of protection of the natural habitat (Gil-Delgado Torres-Ulloa & 2001; Sanchez-Paez *et al.*, 2004; Sanchez-Paez *et al.*, 2005; Ulloa Delgado *et al.*, 2005; Delgado & Ulloa-Sierra-Diaz 2005 and Ulloa-Delgado & Sierra-Diaz 2006). It is worth noting that this year, and based on the experience of the Cispatá Bay, National Program for the Conservation of the Magdalena Caiman (*Crocodylus acutus*) was proposed, although not yet under implementation,



which consists of eight sub-programs covering scientific, technical, ecological, social, economic, legal, educational and financial aspects. During the development of the program, criteria set by the International Union for Conservation of Nature (IUCN) for the Crocodylia order were taken into account; including censuses of wild populations, recovery activities, monitoring, research, local and economic benefits, social arrangements, traffic control and usage strategies (Ulloa-Delgado & *et al.*, 2006).

For the conservation activities of the population of *C. acutus* of the Cispatá Bay, a Specific Management Plan was established and articulated with integrated management plans for mangroves. This plan is implemented by the regional environmental authority (CVS) and communities that use resources from the mangroves (mangleros) and the fishermen (Sanchez-Paez & *et al.*, 2005; Ulloa-Delgado *et al.*, 2006).

Given the promising results of the breeding and reintroduction program, the government of Colombia presented a transfer request of CITES population of *Crocodylus acutus* of the Cispatá Bay, municipality of San Antero, Córdoba Department, Colombia, from Appendix I to II, that may allow for international trade under a strict management criteria specified in a Non-Detriment Findings Report. (Ulloa-Delgado G. & A. Diaz-Sierra, C. L. 2012). This proposed amendment is supported by the “Resolution Conf. 9.24 (Rev. CoP15)” and accordingly to Annex 1 , 3 , 4 and 6. The CITES acceptance of this transfer will stimulate trading of surplus animals internationally, including activities such as egg ranching and farming projects on community farms. The economic benefits could be generated not only for former hunters’ members of Asocaiman, but also for other fishermen and potential actors part of the value chain of skin. This can be achieved if a comprehensive support by national entities is established to strengthen community initiatives and add value products, including support in technologies, market access and legal advice coming from CVS, NGOs and commercial intermediaries of the fur industry. (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).



IV. Applicability of the Handbook on CITES and Livelihoods

While the design and implementation of the Conservation of *C. acutus* began in 2000, during the course of the following years a series of activities, which may correspond in general to the steps that are on the Handbook on CITES and Livelihoods were developed. In Part I of the Handbook: How to rapidly assess the effects of the implementation of decisions to list species in the Appendices of CITES on livelihoods in poor rural communities, the following was found:

Step 1: Select the scale and the taxon or taxa for evaluation. The selection of the species *C. acutus* by CVS was given as a specific objective of the project to recover the populations in decline.

Step 2: Collect biological and trade information on the taxon or taxa. The biological information was a process that was documented over several years, with considerable detail by GA and Ulloa-Delgado Diaz-Sierra, CL (2012). The research and monitoring has shown the recovery of the species due to conservation activities carried out under the project.

Step 3. Map out the value chain. The study of the skin trade was conducted, and the main users were identified from which the most vulnerable were identified.


Step 4. Identify indicators to assess livelihoods. For

over 17 years, the project collected the types of use of the species, where it was found that it is mainly used by peasants, indigenous and Afro-descendants. These groups use meat and eggs as food, and the remaining, including the skin, is discarded. Mesenteric fat is used as palliative for diseases of the airways. Teeth and bones are used for ceremonies in witchcraft and shamanism (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012). Other uses are related to the production of leather belts, wallets and shoes that have yielded great economic potential, and also head trophy hunting or to be used by collectors. Non-consumptive uses are related to ecotourism.

Step 5. Develop participatory rural appraisals in major towns. These were made under the design and development of management plans that included the participation of communities throughout the design and implementation of the project. The plans defined the possibilities and benefits for the livelihoods of communities.

Regarding

Step 6: Monitor and evaluate the impacts; the project has focused most of its efforts in monitoring the biological recovery of the species, and emphasized the change in attitude of the former hunters, now Asocaiman members, who currently operate within the law's jurisdiction, and have benefited from revenues from tourism activities.



Considering the steps of the Guide on CITES and Livelihoods in relation to this case study, in Part II of the Guide: Addressing and mitigating the effects of the application of CITES decisions in poor rural communities, the following was found:

Step 1. Identify priority species and review existing legislation on the use of the species. Under the project, a rigorous count of CITES regulations on the use of wildlife at the international and national level was performed for the Conservation Project of *Crocodyle acutus*.

Step 2. Generate the basis of scientific and technological information for sustainable use of the species. The main focus of the project was to generate scientific information and extraction protocols, reproduction, use and reintroduction of the species in the wild, which has benefited from the scientific and technological knowledge of the agreements with various organizations, including CVS, universities and research institutes.

Step 3. Empower poor rural communities. The processes of grouping ex-hunters in Asocaiman helped strengthen ties and legalize the productive initiatives. With the support of the National Service Learning these former hunters were trained in the development of ecotourism. The process of education and awareness has been constant in this project with an education and outreach program implemented by Asocaiman and with the support of government and non governmental institutions.

Step 4. Design incentives and develop marketing strategies to promote in-situ and ex-situ production.

En terms of market information due to the existence of export groups in the country, demand for skins is within reach of the project. The project is not intended to create new marketing channels, but rather, use the existing ones. However, the development of the community initiative will be viable if continued state support is given during the first year of marketing outreach.

Step 5. Promote engagement and cooperation between relevant governmental agencies; The project had a number of different organizations supported by national, regional and local levels, including Regional Autonomous Corporation of Valle del Sinu –CVS–, the municipality, education institutions, community associations, private companies, universities and research institutes.

Step 6. Monitor and evaluate the impacts of mitigation and sustainable use promotion measures. In addition to the measures already explained above, the communities expect to start licit marketing of the skins, but this can not be done until the species is transferred from Appendix I to Appendix II in Colombia. Thus, no records of sales have been reported.

V. Impact on communities of fishermen and hunters due to CITES listing of *C. acutus*

The Cispatá Bay is an area of high poverty where communities of fishermen, farmers and hunters derive much of their livelihoods from mangrove resources. Overexploitation of mangrove resources in general and its transformation has impacted the quality of life of communities and locals (Ulloa-Delgado GA & Sierra-Díaz, CL, 2012). Inclusion in Appendix I of CITES of *C. acutus*, together with the national ban, affected several links in the local supply chain that benefited for years from the exploitation of the species. Fishermen and specialized hunters, gatherers and skin traders and industrialists were among the most affected. Until 12 years ago, the ex-hunters of *C. acutus* of

the Cispatá Bay used to earn revenues from the sale of eggs, meat, fat, skin and live animals (Ulloa-Delgado GA & Sierra-Díaz, CL, 2012).

After the ban in Colombia, the situation of the species worsened given that considering the species disuse, it lost interest in the communities, in addition to a lack of a recovery plan. The destruction of the natural habitat, and the killings due to fear of the animal, led to declaring the species endangered (Ulloa-Delgado GA & Sierra-Díaz, CL, 2012). One of the biggest drawbacks to the conservation of the species is the loss of the skills of the community to cohabit with the crocodiles.



Fotografía: Fredy A. Ochoa



VI Methodology of intervention used by the Regional Environmental Authority

The project was developed in Cispatá Bay seeking to establish a methodological model of easy implementation for other wild populations and a program for the country, taking into consideration the sustainable use of the species and the involvement of poor communities (Ulloa-Delgado GA & Sierra-Díaz, CL, 2012; 2015). This project has been gathering information for about 17 years (1998 to 2015) as set in the guidelines of the Integrated Management of Mangrove of Cispatá Bay, under two components namely:

A. A methodological standardization that covers six scientific aspects in an uninterrupted way and several years of research work:

1. Census and monitoring of the wild population (15 years)

2. Habitat Management (11)
3. Collection of nests (13)
4. Controlled incubation (13)
5. Management of ex situ neonates and juveniles (13 years)
6. Release into the wild program (12)

B. Development of five strategies to achieve conservation of the population:

1. Declaration of protected areas
2. Education and Outreach Program
3. Support for Community Development
4. Requests for amendments to CITES
5. Specific management plan for the population of C.



Fotografía: Fredy A. Ochoa



VII. Monitoring Project Impacts

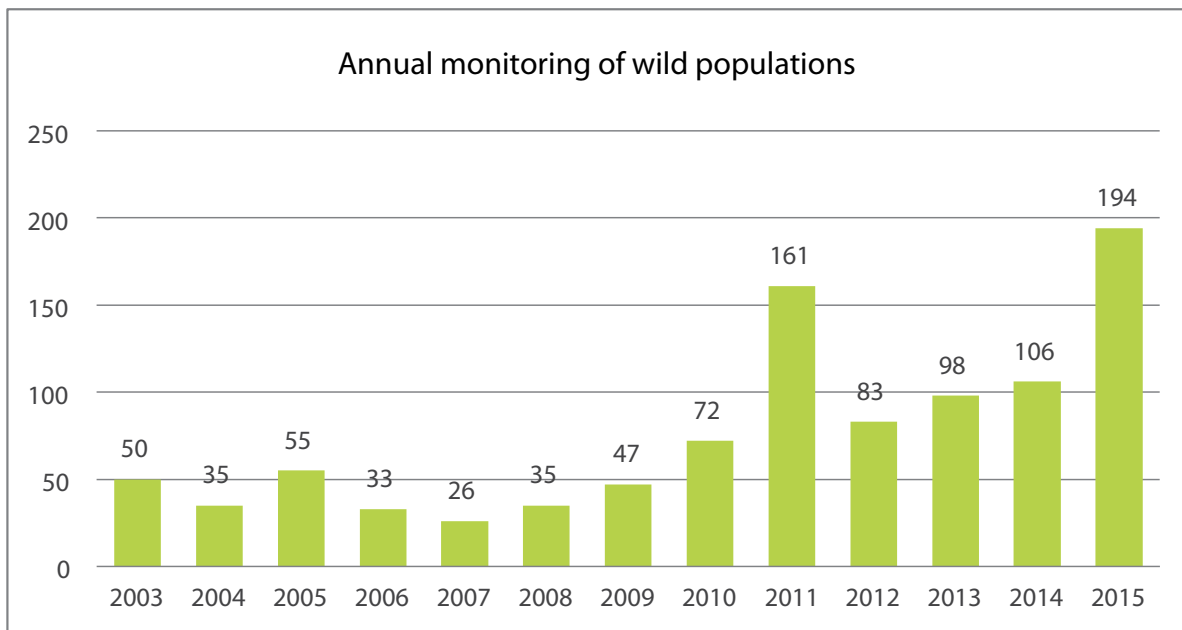
The total sightings of *C. acutus* wildlife from years 2002-2015 were 1084 with an annual average of 77 individuals. Since 2003, 666 nests (18058 eggs) were collected with an annual average of 54 nests during the years of standardized collection (2004-2015).

In 2015 and taking into account only the animals over 60 cm total length and the methodological standardization from 2003 to 2015, an increase of nearly 300% was registered from 50 animals in 2002 to 194 total specimens or 188 with over 60 cm in 2015. This population increase is directly related to the liberalization program that started about 10 years ago, but in the last years it has had its greatest impact, reaching a cumulative figure close to 9787 units represented in 5132 fertile eggs; eggs about to hatch or neonatos 1857; and 2798 juveniles between 70 to 110 cm total length (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012; 2015).

From 1999 to 2015, 14 monitoring activities took place, and since 2003 they have been uninterrupted and standardized, recording postures in 80% of the natural habitat (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012). The total number of *C. acutus* observed during the monitoring of 14 years is shown in the table below, noting that the observation methodology has been the same, but the intensity, uniformity and standardized routes are comparable for only the years 2004-2015. In other words this route was monitored once a year with a field trip (Ulloa-Delgado & Sierra-Diaz 2004, Ulloa-Delgado & Cavanzo-Ulloa 2004; Ulloa-Delgado & *et al*, 2005; Ulloa-Delgado & Sierra Diaz 2005 ; Sanchez-Paez *et al*., 2004; Sierra Ulloa Diaz-Delgado & 2006; & Sierra_Diaz Ulloa-Delgado, 2015).

Synthesis of the results of the evaluation of the population dynamics of the subpopulation of *Crocodylus acutus* for 14 years of sampling (2002 to 2015 total) and 12 years under standardized and comparable methodologies (2004-2015). Cispatá Bay, Department of Córdoba. Colombia. Asocaiman. 2015.

Sight sightings sampling	Size Classes (cm)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	X	Total
	(20 -60)	3	0	0	0	0	0	3	3	5	59	32	3	9	6	9	123
	(61-120)	24	3	12	12	6	7	12	21	13	19	19	56	49	53	22	306
	(121-180)	14	6	10	13	8	4	5	8	18	33	10	27	30	51	17	237
	(181-240)	23	13	8	14	4	8	8	12	21	28	13	2	9	37	14	200
	(> 241)	25	28	5	16	15	7	7	3	15	22	9	10	9	47	16	218
	Sub-total	89	50	35	55	33	26	35	47	72	161	83	98	106	194	77	1084



The monitoring scheme, which is being repeated for the last eight years has sought to standardize five programs in order to form a basis of comparable data for monitoring the population (Ulloa-Delgado GA & Sierra-Díaz, CL, 2012, 2015).

The achievements accomplished in 2015 for the Conservation Program of *C. acutus* are summarized as:

- (a) Monitoring wild populations over 15 years
- (b) Collection of 666 nests
- (c) Production of around 8,000 crocodiles
- (d) The release of 9787 units (2798 animals, 1857 and 5132 neonates fertile eggs)
- (e) An inventory of about 850 animals
- (f) The potential to produce annually 1500-3000 animals or skins
- (g) The increase of nearly 200% of the wild population indicate that the stock is recovering and may be subject to sustainable management by the Colombian government and local communities (Ulloa-Delgado GA & Sierra-Díaz, LC, 2012; 2015)

(Ulloa-Delgado G. A. & Sierra-Díaz, C.L., 2012; 2015).



VIII. Markets

Illicit trade

Illegal exploitation in general is very specific and of low magnitude. Illegal trade is represented by barter or sale of eggs and meat for local consumption of fishermen or for medicinal or shamanic uses. The nature of the illegality does not allow gathering information of the volumes and the individuals responsible in illicit trade. However, it is important to note as previously mentioned, that subsistence hunting by poor communities is legal in Colombia (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

Since the species is listed in Appendix I of CITES its trade is governed by regulation and is authorized only in special circumstances. Since 2001, commercial activities of the species began when the first 100 skins from a closed cycle farm were exported (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012). It is noteworthy to mention that paragraph 4 of Article VII of the text of the Convention refers to matters relating to specimens of species included in Appendix I bred in captivity (animals) and artificially propagated (plants) "for commercial purposes", and provides that such specimens have to be considered specimens of species included in Appendix II and therefore require an export permit upon fulfillment of the conditions set out in paragraphs 2 and 5 of Article IV (Ulloa-Delgado GA & Sierra-Diaz, LC, 2012).

Currently there are guidelines of the procedure of registration and control of operations for commercial activities that breed animals in captivity from Appendix I. An establishment may only be registered under the procedure set out in resolution 1210 if specimens produced by that operation qualify as "bred in captivity" according to the conditions set out in Resolution of the Conference of Parties 10.16 (Rev.) (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

The responsibility for authorizing breeding in captivity pursuant to paragraph 4 of Article VII shall rest mainly on the Management Authority of each Party in consultation with the scientific authority of that Party. In Colombia the administrative authority is the Ministry of Environment, Housing and Territorial Development under the Ecosystem Management Division. Currently there are seven (7) registered breeding operations by the CITES Secretariat for *C. acutus* and two are pending. Since 2012 to July 2015 the management authority has granted export permits for 5,502 skins of *C. acutus* from closed loop breeding operations (MADS, 2015).

Given that the amendment presented at the moment to CITES by the Colombian government mainly focuses on the population of *C. acutus* of Cispatá Bay and community development, commercial supply of the farms will not be affected. However, if the conditions are set up in the future for local communities of Cispatá to exploit commercially the population, the levels of ranching of eggs would represent a very small fraction of the market to have any impact on the trade already established (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012). At the international level, implementing a model of sustainable use of *C. acutus* could improve the overall reputation and the marketing and business where

communities would be the first benefiting. Nowadays, there is a community interest motivated by expectations of the project and supported by ecotourism programs, whose main objective is to showcase the project, the species, and the natural habitats (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012; 2015). It is expected in the future when wild populations show more signs of recovery, the use or ranching by the communities could be between 50 to 150 nests per year. This means 1500-4500 of skins per year, if reproductive parameters remain the same as recorded in the experiments up to date (Ulloa-Delgado GA & Sierra-Diaz CL, 2012; 2015).





IX. Social and Community Management

The conservation project has helped strengthen the various local and regional actors, including the municipal government, educational institutions, community associations and private initiatives. The steps and strategies implemented by the project aimed at benefitting the community and social participation are summarized, as follows:


A series of workshops were held for the preparation phase of actors and consultations to analyze the problem of endangered species and the sustainable use done by former hunters. With the results of these workshops, activities took place to build a social network that empowered stakeholders (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012). The workshops were held with:

- Educational institutions in order to strengthen the capacity of students to analyze and comprehend the problems and their ability to participate in different levels of intervention
- Control entities in order to take legal action against offenders
- Community associations that use mangrove resources, such as crab, chipi-chipi snail, oysters etc.;
- Creation and strengthening of the Community Association for the Conservation of *C. acutus* formed by ASOCAIMAN. The project is supported by a community group of former hunters who received training on species conservation and were legally grouped (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).
- Implementation of strategies following public policies: biodiversity and ecosystems, environmental education, mangrove conservation, community involvement, ecotourism, gender and solidarity economy (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

- Control and Monitoring with the participation of the National Police, Local Harbor Police (capitania de puerto), General Prosecution Office (Fiscalia), Attorney General's Office for Agrarian and Environment issues at the national, regional and local level (Procuraduria Agraria y de Medio Ambiente) (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).
- Community participation: 15 community associations involved in the implementation of the Integrated Management Plan of Mangroves (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).
- Implementation of research plans with universities and research institutes. In particular with the University of the Andes, through the Faculty of Economics, where work was done on the economics of community use of biodiversity and valuation of natural resources (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

Education and Ecotourism

In addition to the surplus of animals that could have an export potential, for over seven years ASOCAIMAN members work educating and informing tourists and students from various regions of Colombia and international visitors about the advantages of the project for the species and communities. Among the education activities, the fishermen tell visitors how the breeding of crocodiles takes place and the conservation objectives. In addition to ecotourism activities, ASOCAIMAN generates additional income through other activities, such as honey production in mangrove areas and handicraft production using mangrove resources (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).



The training in ecotourism has been supported by the National Apprenticeship Service (SENA) headquartered in Córdoba, emphasizes the following four pillars (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012):

1. Strengthening training processes and expertise of the local community,
2. Design and implementation of models of environmental awareness and education in the community
3. Adequacy of local infrastructure for visitors
4. Design and production of communication materials

Progress in environmental planning in the municipalities of San Antero, San Bernardo and Lorica involve an innovative strategy that articulates the actions of sustainable tourism with wildlife conservation, sustainable development options (plans for comprehensive management of mangroves in the Cispatá Bay, Delta Tinajones and La Balsa), and implementation of public policies on environmental education and protected areas (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).

The ecotourism model developed by ASOCAIMAN and CVS has contributed to environmental education initiatives at the regional and national level, and it is expected that the innovation and development experience for over a decade will influence public policy community tourism associated with wetlands in the Caribbean (Ulloa GA & Sierra-Delgado Diaz, CL, 2012).

Behavioral changes:

One of the most remarkable achievements is the change of perception and behavior of former hunters, which has led them to conduct their activities within the law's jurisdictions, and follow sustainable use criteria for conservation. The former hunters describe themselves today as "defenders of the alligators," and their work has led them to receive national conservation awards. Nowadays, this experience is clearly a role model for other communities that also have livelihoods expectations from the sustainable use of biodiversity in their regions (Ulloa-Delgado GA & Sierra-Diaz, CL, 2012).





X. Lessons learned and major achievements

1. This project demonstrated that within an environmental ordering and ecosystem mangrove management the population of *Crocodylus acutus* of the Cispatá Bay was recovered and can be managed sustainably. The country currently counts with a nationwide program that engages in outreach and socialization activities using information from more than 17 years of research, with standardized monitoring and management of ex-situ and in-situ programs.
2. CITES enabled the use of species through animal breeding systems, benefiting traders and industrialists primarily that have the resources for infrastructure investments. For the fishermen of the Cispatá Bay this has not yet translated into concrete benefits. Neither has it been beneficial for the species population.
3. For projects like Cispatá with communities already trained and populations recovered, CITES becomes a partner that can play a very important role, and depending on its perception, it can have positive and negative aspects. For example, CITES is perceived positively in regards to the standards being high and complex, which guarantees the viability of the species for the future, promotes market regulation and inclusion of poor communities. The negative aspects considered include the delayed management mechanisms of CITES, which depend on the Parties institutionality and the administrative and legal processes within each country.
4. Each listing of a species in CITES should be accompanied by recovery strategies. If it affects the economy of poor communities, mechanisms for mitigation and compensation should be set up to the highest standards. For example, a technical committee of specialists could approve projects, such as the one in the Cispatá Bay that have the component of a strong community and a conservation proposal supported by rigorous technical information.
5. It is important to have evaluations and indicators to show stakeholders the community process in a transparent manner. The monitoring is key to building trust between the communities and authorities and academia.
6. With nearly 50 years of permanent ban in the country, and according to some recent research, certain wildlife populations have shown signs of recovery.

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