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

To delete the "zero quota for wild specimens traded for commercial purposes" from the Appendix II listing of the population in Mexico of *Crocodylus moreletii*, based on the stable conditions of the wild population shown by monitoring data, the adequate management plans in force, and the adequacy of the checks and surveillance carried out by the Mexican authorities relating to sustainable utilization of and legal and traceable international trade in the species.

B. Proponent

Mexico*.

C. Supporting statement

1. Taxonomy

1.1	Class:	Reptilia	
1.2	Order:	Crocodylia	
1.3	Family:	Crocodylidae	
1.4	Genus and species:	*Crocodylus moreletii* (Bibron & Duméril, 1851)	
1.5	Scientific synonyms:	*Crocodilus americanus moreletii*	
1.6	Common names:	Spanish:	cocodrilo de pantano, cocodrilo de Morelet
		French:	Crocodile de Morelet
		English:	Morelet´s crocodile, Belize crocodile

2. Overview

Based on a **proposal for amendment** presented by Mexico (CoP15 Prop. 8), the Fifteenth Conference of the Parties (Doha, March 2010) approved the transfer of the populations of *Crocodylus moreletii* in Mexico and Belize from Appendix I to Appendix II with a zero quota for wild specimens traded for commercial purposes, taking the view that the species no longer met the criteria for it to remain in Appendix I. The zero quota was set up as a precautionary measure to allow the generation of additional information on the wild populations and enhance decision-making on their management and sustainable utilization.

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* *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.*

Six years after the transfer of the population in Mexico to Appendix II and the establishment of the zero quota, the information available on *C. moreletii*, based mainly on a national monitoring programme with methods and results agreed and validated by experts from Mexico and from other countries, indicates that the wild populations of it in Mexico are in a satisfactory state and have the potential to allow the running of sustainable productive projects for the benefit of local communities and the conservation of the species and its habitat.

The data from the monitoring programme on *C. moreletii* over the past five years (2011-2015) suggest that the population in Mexico is approximately 76,000 wild specimens with an average encounter rate of 3.34 ind/km, and a population structure with a high production of hatchlings and a good proportion of reproducing juveniles and adults (1M:0.71F). Also, 79% of the males and 75% of the females caught appear to demonstrate a good state of health and 78% of the monitoring sites have a conservation status that is evidently good or very good. Those results have been submitted periodically to the CITES Animals Committee (AC26 inf. 11, Geneva, March 2012; AC28 Doc. 22.2, Tel Aviv, September 2015) and to the IUCN Crocodile Specialist Group (CSG-IUCN) at its meetings in Manaus in 2010, Manila in 2012 (CSG, 2012) and Louisiana in 2014 (CSG, 2014).

The situation of the wild populations of the species is also reflected in various listings, being currently classified in the IUCN Red List in the category of "Least Concern", having been removed from the United States Endangered Species Act in 2012, and being in the category of least risk in Official Mexican Standard NOM-059-SEMARNAT-2010 ("Subject to special protection").

To date, the exploitation of the species in Mexico has been carried out exclusively under a closed-cycle captive breeding programme within the Management Units for Conservation of Wildlife (UMAs), operating intensively, which has contributed in a limited and indirect way to the conservation of wild populations of *C. moreletii* and its habitat.

Consequently, since 2013 the Government of Mexico has been pursuing, in cooperation with the Responsible Ecosystems Sourcing Platform (RESP) a "Pilot project on sustainability, production systems and traceability of skins of *C. moreletii* in Mexico" at various sites in the country in order to launch sustainable ranching activities (in coming years) with local communities, together with hatcheries and other actors in the production chain. The aim of this project is to generate socioeconomic benefits so as to create incentives for the conservation of the species and its habitat (monitoring, management and sustainable use by the communities). This will be implemented under an arrangement of Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) in order to promote the fair sharing of benefits among the actors in the production chain, and will be backed up by a system of traceability, which will complement the CITES provisions, to ensure the legal provenance and sustainable origin of the skins.

In the light of the foregoing, Mexico has been careful to assemble the necessary evidence on the status and trends of the wild populations of *C. moreletii* for decision-making both on its status under CITES and concerning management of it at national level. In this context, the zero quota for wild specimens traded for commercial purposes is no longer considered necessary and it is proposed to the Conference of the Parties that it should be eliminated for the Mexican population of Morelet's crocodile.

3. Species characteristics

3.1 Distribution

Crocodylus moreletii is distributed in the Atlantic drainage basin of Mexico, from the centre of Tamaulipas to the Yucatan Peninsula, in the north of Guatemala and the centre of Belize (Cedeño-Vázquez *et al*., 2012). Mexico accounts for around 88% of the overall range of the species (Sigler and Domínguez, 2008; Sigler and Gallegos, 2016; **Annex 1, Figure A**).

In 2006 a potential area of distribution was calculated using the Desktop GARP software package (CoPan Project; see details of the method in CoP15 Prop. 8; Domínguez-Laso, 2006). The result indicated a total of 450,000 km^2 (Belize, Guatemala and México), of which 396,455 km^2 constitute its potential area of distribution in Mexico and at least 25,277 km provide optimal habitat (not disturbed, permanent rivers and lagoons) for *C. moreletii i*n México (**Annex 1. Figure B**).

The most recent (2016) estimate of the potential area of distribution was performed by CONABIO using the MaxEnt model (version 3.3; Phillips *et al*., 2004; 2006) with 359 records including data cleaned and validated by experts, from the CoPan Project (Domínguez-Laso, 2006), the national

monitoring programme (Sánchez *et al.*, 2011, 2012, 2015; CONABIO, 2016) and the National Biodiversity Information System (SNIB; CONABIO, 2015). The model made use of the Bioclim variables updated for Mexico (Cuervo-Robayo *et al.*, 2013) a digital relief map (INEGI, 2013) and strata of bodies of water and rivers in México (INEGI, 2014). An accessible area (M) was delimited based on the distribution of the species according to IUCN (Cedeño *et al.*, 2012). The modeling parameters were randomseed processed (30%) with 30 returns in a sub-sample without replacement. For generating binary maps, the value of the "minimum training presence" was taken as the cutoff threshold, given that all the records passed through various validation processes. As the outcome, the area values under the curve of operating characteristics (AUC) of the model were 0.93 (test) and 0.90 (training) (where 0.05 = precision not greater than chance and 1.0 = perfect discrimination).

From the MaxEnt model, it is estimated that the potential area of distribution of *C. moreletii* in Mexico is 332,921 km^2. As a precaution, this area was subjected to three additional reductions: (a) elimination of 124,472 km^2 (63% of the total area) used for agriculture, stock-breeding and urban areas (although it is known that the species is present in disturbed zones), (b) superposition of the network of rivers and bodies of water within the potential area of distribution and treatment as available habitat only the edges of the bodies of water and the length of the rivers, and (c) elimination of intermittent bodies of water (17,381 km, 43% of the potential area of distribution) (**Annex 1, Figure C**). In this way, the linear extent of the habitat available for the species in each of the 30 maps generated by the model was estimated, averaging 22,833 ± 24 km (n=30; CI 95%).

3.2 Habitat

Morelet's crocodile lives in areas once covered by tropical forest or savannah, particularly those with slow-flowing water bodies (rivers or streams), swamps and lagoons (Platt and Thorbjarnarson, 2000; Platt, 1996; Casas-Andreu and Guzmán, 1972), and is common in shallow stagnant or slow-flowing clear or muddy water with no sudden changes in temperature. Its natural habitat often has floating submerged or emerged plants and continuous availability of aquatic and terrestrial prey (Ross, 1998; Álvarez del Toro and Sigler, 2001; Lee, 1996, 2000). When the ground surrounding the swamps where it lives become flooded, *C. moreletii* widens its area of activity, living in flooded forests and even in habitat modified by the oil industry (Álvarez del Toro, 1974; Álvarez, 2005; Sigler and Gallegos, 2016). The types of vegetation in which the species lives are very diverse and include coastal dunes, mangrove swamps, tular, popal, palm groves, pastureland and flooding medium evergreen and sub-evergreen forest, low deciduous forest and aquatic and subaquatic vegetation (Casas, 2002).

3.3 Biological characteristics

In general terms, the species reaches sexual maturity between 6 and 8 years of age, with an approximate length of 1,500 mm, although sexual maturity may be reached by younger individuals between 4 and 6 years old and 1,350-1,500 mm long (Domínguez-Laso, 2006; Platt *et al.*, 2009). Reproductive activity starts with the construction of the nest at the beginning of the rainy season (April to June) and ends with hatching of the eggs in September-October. The females of the species collect and pile up fallen leaves, forming mounds (Britton, 2005) in which they lay between 11 and 60 eggs, on average 30 per nest (López-Luna *et al.*, 2011; López *et al.,* 2010; Britton, 2005; Casas and Rogel, 1986; Hoil *et al.,* 1986; Álvarez del Toro, 1974). The nest is watched over mainly by the females during incubation (75-90 days; Hoil *et al.*, 1986; Platt *et al.,* 2008), and they may help the hatchlings to leave the nest. Both parents protect juveniles against predators and other adult crocodiles for some time (Hunt, 1975).

There are isolated data that indicate a longevity of the species in captivity of around 50 years (Weigl, 2014) and Merediz (1999) estimated a maximum age in the wild of 76 years, based on the von Bertalanffy model. Small individuals feed mainly on insects and spiders, medium-sized ones eat molluscs, fish and crustaceans, and adults prey on reptiles, mammals and birds (Pérez-Higareda *et al.*, 1989; Pooley and Gans, 1976). Fish are an important source of food in the different life stages of the species, as there is also opportunistic consumption of carrion.

3.4 Morphological characteristics

The maximum size for the species is usually between 3,000 and 3,400 mm in length, although specimens up to 4,160 mm have been reported (Levy, 1991; Pérez-Higareda *et al.*, 1991). The average is 2,000-2,500 mm. Neonates average 220-290 mm (Smith and Smith, 1977). Adults present a clearly rounded snout (Smith and Smith, 1977), whose width in its distal constriction is equal to or

less than the length from that point to the end of the snout (Meerman, 1994). The neck region has 4 or more post-occipital scales and 6 or more nuchal scales (Navarro-Serment, 2004). Dorsal osteoderms are arranged in 16 or 17 transverse rows and 4 to 6 longitudinal rows. Scale rows on the limbs are even and flat. The tail has scales inserted in the ventrolateral and ventral region between the complete transverse rows of scales around the tail. The colour of adults is olive-yellow on the dorsal area, with large black markings on the tail and back, which may be entirely black. The ventral area is pale with a creamy-yellowish tone (Álvarez del Toro, 1974).

3.5 Role of the species in its ecosystem

The Morelet's crocodile facilitates a number of ecological processes, especially in smaller water bodies, where it regulates populations of fish and other species, fertilizes water with its faeces, and transports plant propagules and microorganisms by moving from one swamp to another (Aguilar, 2005). It constitutes a food resource for various species that naturally prey on it, such as other adult crocodiles that occasionally eat eggs and juveniles. From the juvenile size upwards, they are preyed upon by few carnivores, while in the adult stage, only large predators such as the jaguar may attack them (Álvarez del Toro and Sigler, 2001).

4. Status and trends

4.1 Habitat trends

The Spanish conquest of Mexico in the 16th century brought about massive clearing of forests to introduce livestock and intensify agriculture on the Gulf coast (Barrera, 1996). Industrial development required the creation of infrastructure in parts of the range of *C. moreletii*, but after 1982, with the promulgation of the General Ecological Equilibrium and Environmental Protection Act (LGEEPA), restrictions on changes in the use of the ground were put in place, and any new project is required to comply with strict protocols concerning assessment of environmental impact before it can gain approval (INE, 2000). Domínguez-Laso (2006) recorded suitable habitat for crocodiles in 35 (55 %) of a total of 63 localities in various areas of the species' range in Mexico, and excellent habitat in 15 of them (24%). Based on these data, a correlation analysis did not show a clear relation between habitat quality and the number of crocodiles observed. In fact, continuous presence of the species was recorded even in areas with intermediate or poor habitat quality and areas subject to historical disturbance. Similarly, the monitoring programme shows that on average 78% of the sites sampled in the five years of the programme (2011-2015) demonstrate an apparently good to very good conservation status, and that the species is present even at the sites with modified habitat (Sánchez *et al.*, 2012, 2015; CONABIO, 2016).

4.2 Population size

As part of the CoPan Project (Domínguez-Laso*,* 2006), the results of which were analyzed in a workshop of experts in 2006 (including members of the CSG-IUCN, CITES Authorities and producers), samples were taken from 63 locations in 10 States in Mexico between 2002 and 2004. The average encounter rate was estimated as 3.16 ind/km and was examined relative to the length of optimum habitat in Mexico, estimated with the Desktop GARP Software package (25,227 km; see **section 3.1**), to project the percentage of individuals observed in the sample (e.g., 19% of the individuals belonged to Class IV, size >1500 mm, reproducing adults). The estimates suggested a population size for the species in Mexico of 80,000 individuals at all ages in the wild, including around 15,000 adults (Sánchez and Álvarez-Romero, 2006).

Subsequently, pursuant to the recommendations of AC23 (Geneva, 2008), CoP15 (Doha, 2010) and the CSG-IUCN, since 2011 CONABIO has been financing and coordinating in Mexico the monitoring programme for Morelet's crocodile (*Crocodylus moreletii*) Mexico-Belize-Guatemala (Sánchez *et al.,* 2011; see details in **section 8.2**). The results of the programme suggest that the national encounter rate at the monitoring sites over the five years (2011 to 2015) averages 3.34 ind/km (min. 2.38 – max. 4.49 ind/km).

Based on the figure for the national encounter rate, and taking into account the potential extent of distribution obtained by means of MaxEnt (22,833 ± 24 km; see **section 3.1**), an average population size has been estimated as 76,262 ± 80 wild individuals in the five years (min. 54,343 ind. in 2011 – max. 102,520 ind. in 2016) (**Table 1**), of which some 14,250 are reproducing adults (adults and large

adults; min. 10,503 – max. 18,951) and some 6,000 of those are reproducing females (given the sex ratio observed in catches; min. 4,380 – max. 7,903).

Table 1.- Individuals sighted, encounter rates recorded and estimated population size in the monitoring programme for *C. moreletii* in Mexico

Year	Individuals sighted * (ind.)	National encounter rate (ind/km)	Estimated population size (ind.)	Encounter rate for reproducing adults (ind/km)	Estimated population size for reproducing adults (ind.)	Estimated population size for reproducing females **
2011	891	2.38	54,343	0.59	13,471	5,618
2012	1,257	3.28	74,892	0.6	13,700	5,713
2013	1,267	2.98	68,042	0.64	14,613	6,094
2014	1,502	3.58	81,742	0.46	10,503	4,380
2015	1,753	4.49	102,520	0.83	18,951	7,903

*Includes all sizes plus individuals recorded as "Eyes only" (indeterminate size), which numbered as follows: 2015 = 200, 2014 = 199, 2013 = 140, 2012 = 222, 2011 = 123
**Given the average sex ratio recorded in catches (M1:F0.71) between 2011 and 2015

4.3 Population structure

The combined field sampling of the CoPan Project in Mexico (2002-2004; Domínguez-Laso, 2006), considered representative of the area occupied by the species, contained 19% of both adults and subadults. Also, a males-to-females ratio was calculated of 1 to 0.64 and a high proportion of Class I individuals (<1 year) with 35% of hatchlings and Class II (2-3 years), representing 28% of juveniles. These data permit adequate nesting, hatching, and recruitment rates to be inferred for the species (Sánchez and Álvarez-Romero, 2006).

The nocturnal observations (DVN) of the monitoring programme (2011-2015) show a pyramid-shaped population structure (**Figure 1**), that has remained stable and reflects a healthy population with a high production of hatchlings (37.8% of the individuals observed) and a good proportion of juveniles (25.2%), subadults (17.2%) and reproducing adults (19.6%), matching the records of the size structure of the individuals caught under the programme. Also, a total of 697 specimens were caught in the five years (395 males, 279 females, 23 not determined), of which 12 were recaptures.

The individuals caught presented an average sex ratio of 1 male to 0.71 female (min. M1:F0.6 – max. M1:F0.8). Approximately 79% of the females and 75% of the males caught demonstrated an apparent state of health considered normal based on a general fitness index (ratio between perimeter of the base of the tail/total length relative to the mean and 1, 2 or more standard deviations (SD)); (Sánchez *et al.*, 2012).

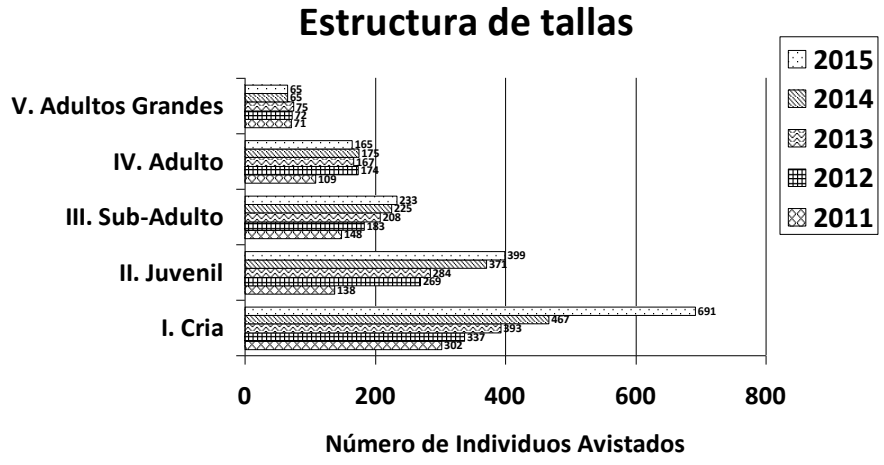

Figure 1.- Size structure of the individuals sighted per year in the monitoring programme for *C. moreletii* in Mexico (Sánchez et al., 2012, 2015; CONABIO, 2016). Hatchlings = <0.5 m (except neonates), Juveniles = 0.51 m to 1.0 m,

Subadults = 1.01 m to 1.5 m, Adults = 1.51 m to 2.0 m, Large adults = >2.01 m. The totals by year do not include individuals recorded as “Eyes only” (indeterminate size)[1]

4.4 Population trends

The data on the natural history of the species and the information obtained from the CoPan Project (Domínguez-Laso, 2006) were used in 2006 to develop a population viability analysis (PVA) by means of the Vortex program (version 9.42; Lacy *et. al*., 2003), and to generate an exploratory model of a population trajectory for *C. moreletii* (Sánchez and Álvarez, 2006). An assumption was made of a starting population of 30,000 individuals (~1/3 of the total estimated population size) and an extinction figure defined as 500 individuals. The scenario chosen was based on high stress, including a progressive and continuous decrease in carrying capacity of 0.15% per year (i.e. a global decline of 75% after 500 years, which is unlikely to happen in reality, and potential catastrophes (habitat degradation and a decrease in prey availability). At the end of the simulated run of 500 years, the estimated extinction probability was 0.1380 ± 0.015, in other words, an 86% probability of survival. After 500 runs (of 500 years of simulation each) none of the final populations had fewer than 4,500 individuals. In the model, genetic diversity remained statistically very high throughout the period of 500 years (heterozygosity of 0.9865 ± 0.0003 standard error). Current evidence does not suggest any likelihood of genetic bottlenecks in the near future.

The most recent assessment by the IUCN (Cedeño-Vázquez *et al*., 2012) indicates that the overall trends of the species are stable. Similarly, the data from the CoPan Project (2002-2004; Domínguez-Laso, 2006) and the monitoring programme (2011-2015) suggest that the population of Morelet’s crocodile in Mexico has remained between 54,000 and more than 100,000 individuals over the past 12 years (Sánchez *et al.,* 2012, 2015; CONABIO, 2016).

4.5 Geographic trends

The species remains present throughout its natural range with reasonably high levels of abundance (see section 4.2). From 1851 to 2002, there were records of Morelet's crocodile in 105 localities in Mexico. Under the CoPan Project (Domínguez-Laso, 2006), 21.9% of these localities were revisited and the species was encountered in all of them, as well as in 40 new localities, including a new State record (Querétaro). Currently 169 localities are known (Sigler and Domínguez, 2008; Mejenes-López and Hernández-Bautista, 2013).

5. Threats

According to the assessment by the IUCN, although it is considered minimal, the principal threat to the species is illegal hunting in some areas, as well as the exposure of the broods to pollutants in some populations (Cedeño-Vázquez *et al*., 2012). The human activities entailing potential risk to *C. moreletii* could be listed in descending order of importance as: the construction of infrastructure in swampy areas, construction and operation of thermoelectric plants, and operation of chemical and processing industries, unless waste is adequately disposed of. Interactions between humans and crocodiles in Mexico mainly involve the American crocodile (*Crocodylus acutus*) and few reports mention the Morelet's crocodile. According to information from the DGVS, between 2005 and 2016 a total of 27 control authorizations for *Crocodylus moreletii* were registered. Furthermore, the CrocBITE database (2016) reports approximately 50 incidents, most of them non-fatal (only 7 fatalities) between 2005 and 2015. In order to deal with this type of situation, various institutions in Mexico have developed and are operating a national protocol of response to conflicts with crocodilians (SEMARNAT, 2013).

[1]

Spanish	English	Spanish	English
Estructura	Size structure	Juvenil	Juveniles
Adultos grandes	Large adults	Cría	Hatchlings
Adultos	Adults	Número de Individuos Avistados	Number of individuals sighted
Sub-Adultos	Subadults		

6. Utilization and trade

6.1 National utilization

At national level, the species is used principally as a source of skins and meat (mostly for export), and also of oil/fat, internal organs, excreta, head, feet and teeth both at national and at international level (United Nations, 2014). At the present time, in Mexico only captive-reared specimens of *C. moreletii* are utilized (from closed-cycle breeding and starting from the second generation), within Management Units for Conservation of Wildlife, operating intensively (intensive UMAs; see **sections 8.1, 8.3.2 and 8.4**).

6.2 Legal trade

Based on the data on international trade in *C. moreletii* available in the UNEP-WCMC database for the period 2005-2014 and export records held by the CITES Management Authority in Mexico, (DGVS-SEMARNAT) for 2015, a total of 7,708 skins and 15,699 small skin products, and also 243 live individuals, have been authorized for export in the last 10 years, primarily from Mexico. In accordance with the verification records of PROFEPA (CITES Enforcement Authority in Mexico), 7,692 small leather products, 2,886 skins and 10 live individuals were actually exported from Mexico (**Table 2**).

Table 2.- Exports of specimens of *Crocodylus moreletii* in the period 2005-2015 (UNEP-WCMC, 2016; DGVS-SEMARNAT)

Products	Quantity exported	Principal importing countries	Origin	Purpose
Small leather products	15,699	US, HN, JP, IT	D, C, O, P	T
Skins	7,708	US, GT	D, C	T, S
Live	243	FR, JP, KR, RU, US	D, C	T
Specimens	195	US	W, O, C	S
Teeth	10	AN, DE	O	Q
Bodies	1	US	C	P
Skin pieces	1	US	C	T

The main importing countries are: United States (US), France (FR), Japan (JP), Italy (IT), Korea (KR), Russia (RU), Honduras (HN), Guatemala (GT), Netherlands (EN) and Germany (DE). Also, the majority of the specimens in trade are originally from captive breeding (codes C and D), and there were 195 records of wild specimens for scientific purposes (biological samples); the overriding purpose of the transactions was commercial.

6.3 Parts and derivatives in trade

Based on the information noted in section 6.2, the commonest parts and derivatives of *C. moreletii* in international trade are skins and small leather products, although there are also reports of live individuals, specimens, teeth, bodies and small pieces of skin.

6.4 Illegal trade

The UNEP-WCMC trade database (2016) shows only 11 cases of illegal trade in *C. moreletii* between 2005 and 2015 in which Mexico or Belize was the exporter or re-exporter (the country of origin being unknown) and the United States and Spain were reported as importers, mainly of small leather products (32), live specimens (3), bodies (1), skulls (1), meat (1 kg) and shoes (2) for commercial purposes for personal use.

On the other hand, PROFEPA (the CITES Enforcement Authority in Mexico) has indicated that there are no records of seizures of materials intended for illegal international trade in the period 2009-2015. Furthermore, only 10 seizures on national territory have been reported, covering a total of 16 items between 2013 and 2015.

6.5 Actual or potential trade impacts

The current level of exports of *C. moreletii* is around 8,500 individuals in 10 years (2005-2015) (775 ind/yr. on average), comprising skins (the majority), live specimens, bodies and skulls (**Figure 2**). Furthermore, the international trade in *C. moreletii* represents a small fraction of the global trade in crocodiles, in which the principal species are *Caiman crocodilus fuscus* (~600,000 skins a year),

Alligator mississippiensis (~400,000 skins a year) and *C. niloticus* (~200,000 skins a year), according to information from the CITES Secretariat (CITES Trade Data Dashboards).

According to Ross (1999), numerous studies of the natural history of crocodilians show their extreme resilience to the removal of young specimens (e.g. eggs or hatchlings) or adults (e.g. large males) and many utilization programmes around the world for different crocodile species suggest that an annual removal rate of 50–80% of eggs or 5–10% of adults does not have an inhibitory effect on population growth. Similarly, Ross indicates that recruitment in the wild (entry of new individuals to the adult population) depends on the density, structure and size of the adult population, and is not very sensitive to the number of eggs or hatchlings that survive; under such circumstances, maintaining the population of reproducing females and their habitat is essential to the survival of the populations.

As noted earlier, to date only captive-bred specimens of *C. moreletii* in Mexico have been utilized or exported. Although the population information on the species shows potential for the sustainable use of the species in all size categories, the coming years will see the start of activities exclusively comprising ranching (removal of eggs from the wild for incubation in captivity), the rate of removal being estimated based on the monitoring of populations and nests at the sites authorized for such activities, in line with national legislation, and observing the provisions of the protocol that Mexico is developing in cooperation with national and international experts (see **section 8.1**) to ensure sustainability.

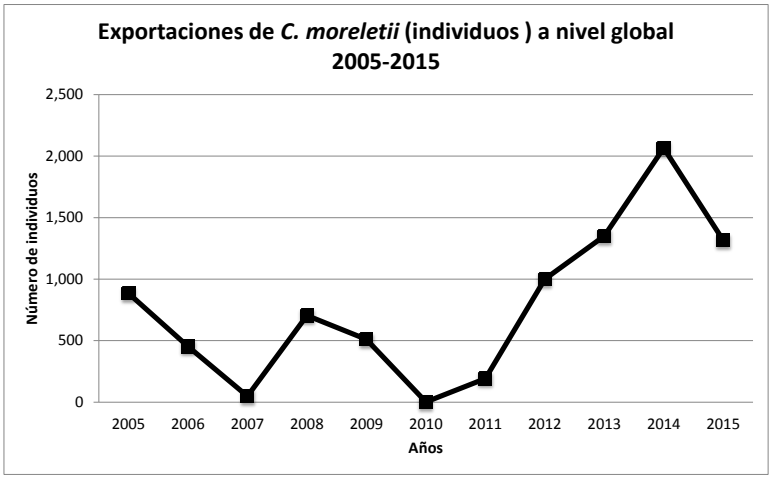

Figure 2.- Exports of *C. moreletii* (individuals) worldwide, covering skins, live specimens and skulls in the period 2005-2015 (UNEP-WCMC, 2016; DGVS, 2015).[2]

7. Legal instruments

7.1 National

Within the framework of the relevant legislation currently in force, and the implementation of inspection and surveillance programmes in areas where catching of the species was concentrated, at centres for skinning, manufacture of items and direct sales, as well as at the frontiers, from 1970 to the present time there have been no authorizations issued for commercial exploitation of wild specimens of *C. moreletii,* and all exports originate from captive-bred specimens.

2

Spanish	**English**
Exportaciones de *C.morelettii* (individous) a nivel global 2005- 2015	Exports of *C. Moreletii* (individuals) worldwide 2005- 2015
Número de individuos	Number of individuals
Años	Years

In the past 15 years, Mexico has promoted and developed policies for creating and maintaining natural protected areas, which provide protection for the habitat of *C. moreletii* (see **section 8.5**).

Mexico's wild flora and fauna have been protected since 1988 by the General Ecological Equilibrium and Environmental Protection Act (LGEEPA), which sets out the framework for the preservation and restoration of ecological equilibrium and for protection of the environment, recognizing that sustainable use is one of the mechanisms for achieving this.

Mexico has been implementing since the year 2000 the "Programme for Conservation of Wildlife and Productive Diversification of the Rural Sector", which sets out the conceptual, strategic, legal and administrative framework with which any initiative for the use or conservation of wild species must comply. It also seeks to provide clarity and security to assist the rural communities, in securing conservation based on sustainable use of natural resources.

July 2000 saw the entry into force of the General Wildlife Act (LGVS), which has as its objective the conservation of wildlife and its habitat by means of protection and by requiring optimum levels of sustainable exploitation, which in turn seek to maintain and promote the restoration of its diversity and integrity and enhance the wellbeing of the people living in the country. In the case of *C. moreletii*, the LGVS only allows utilization of specimens from controlled reproduction in captivity, insisting on a contribution to the conservation of the species.

Regulation NOM-059-SEMARNAT-2001 identifies the native species of wild flora and fauna at risk in Mexico, and currently lists *C. moreletii* in the category of "Subject to Special Protection" (Pr), which includes taxa that are not at risk, but that are of interest for the country and merit the protection of the Government to ensure their conservation and sustainable use.

7.2 International

C. moreletii was listed in CITES **Appendix** I in 1975, and in 2010 the Fifteenth Conference of the Parties (Doha, March 2010) agreed to transfer the populations in Mexico and Belize to **Appendix** II, taking the view that they no longer met the criteria for remaining in **Appendix** I. The transfer was accompanied by a zero quota for wild specimens traded for commercial purposes. At the present time, the CITES provisions only allow the export and import, for commercial purposes, of captive-raised specimens of *C. moreletii*.

8. Species management

8.1 Management measures

In Mexico, the owners of properties where wildlife is distributed can register their lands as Management Units for Conservation of Wildlife (UMAs) with the Directorate-General for Wildlife (DGVS; CITES Management Authority) of the Ministry for the Environment and Natural Resources (SEMARNAT), to carry out activities of conservation, management and sustainable exploitation. To that end, they need to submit a management plan for authorization by the DGVS and to provide annual reports on their activities. Similarly, if they intend to exploit any species, they have to present population monitoring reports and estimates of extraction rates, which are then evaluated and authorized, as appropriate, by the DGVS.

UMAs may operate intensively (hatcheries) or with wild specimens, but Mexico does not currently have any establishments that undertake exploitation or ranching of wild specimens of *C. moreletii*. The only hatcheries authorized and in operation are those working in a closed cycle, which are required to prove that they have bred animals beyond the second generation (F2). There are approximately 86 intensive UMAs (hatcheries) officially registered for management of *C. moreletii* in Mexico, of which 34 undertook exploitation activities between 2005 and 2015. Out of those, only 10 were working for commercial purposes and only five exported during that period (**Annex 2**; see **section 8.4**).

In the coming years it is intended to initiate ranching activities at some sites as part of the "Pilot project on sustainability, production systems and traceability of skins of *C. moreletii* in Mexico" being pursued by the CITES Authorities (CONABIO, DGVS and PROFEPA) in cooperation with the Responsible Ecosystems Sourcing Platform (RESP). The objective of the project is to set up an integrated production system for high-quality skins and derivatives of *C. moreletii,* based on

conservation of the species and its habitat, as well as sustainable, legal, traceable use with fair and equitable sharing of the derived benefits among the actors in the production process.

In general, it is intended to involve local communities in the conservation of the species and its habitat through ranching (establishment of UMAs for free wild animals), supported by sustainable exploitation rates and non-detriment findings in accordance with national legislation and CITES. The hatchlings obtained by the communities will be sold to farms (Intensive UMAs) to produce high-quality skins for export in collaboration with fashion companies.) This will be implemented under an arrangement of Prior Informed Consent (PIC) and Mutually Agreed Terms (MAT) in order to promote the fair sharing of benefits among the actors in the production chain, and will be backed up by a system of traceability, which will complement the CITES provisions, to ensure the legal provenance and sustainable origin of the skins.

The CITES Scientific Authority in Mexico (CONABIO) is financing the production of a protocol on ranching in cooperation with national and international experts to support the implementation of the pilot project in the coming years. That protocol re-utilizes the information available and ranching experiences in other countries and details aspects on monitoring of populations and nests; monitoring and management of habitat; estimation of sustainable exploitation through ranching; nest management, extraction and movement of eggs; incubation (including details on the infrastructure, equipment and materials needed); and care of hatchlings from birth to sale. The protocol will be the basis for implementing the management and capacity-building plans of the UMAs working with wild specimens (in the communities) that will carry out the ranching activities. It is hoped that the protocol will be concluded in mid-2016 for presentation as an information document to CoP17.

In addition, the ranching activities to be started in Mexico with *C. moreletii* will entail the removal of individuals from the wild (as eggs) that will not be covered by the provisions of Resolution Conf. 11.16 (Rev. CoP15) on “Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II”, and consequently the origin code W (wild) will be used in the CITES documentation that will be issued for the export of the skins taken from those individuals.

8.2 Population monitoring

As noted in section 4.2, starting in 2011 Mexico began implementation of the monitoring programme for Morelet’s crocodile (*Crocodylus moreletii*) Mexico-Belize-Guatemala (Sánchez *et al*., 2011), coordinated by the Scientific Authority (CONABIO) in cooperation with experts from academic institutions and NGOs. This programme is operating at 73 permanent sampling sites over the range of the species in Mexico, that were identified by national experts as representative wild populations for tracking the status and trends of the species at national level and over the long term (**Annex 1, Figure D**).

In the first five seasons of the programme (2011-2015) 1,110 runs were made, totaling 11,120 km covered, in which four standardized methods were applied, that were published in a Manual drawn up by experts (Sánchez *et al.,* 2011), to carry out nocturnal observations (visual nocturnal detection procedure – VND), catches (marking and recapture procedure), sampling of nests (location and tracking of nests) and habitat (evaluation and monitoring of habitat); Sánchez *et al.,* 2012, 2015; CONABIO, 2016). The distance covered for the VND procedure, on which the estimates of population size and size structure are based, was 3,319 km over the five years, an average of 664 km per year (min. 612 km – max. 729 km), as well as 15.3 km on average per monitoring site per year (0.21 km min. – 54.6 km max.), covering almost 3% of the potential area of distribution (see **section 3.1**) of the species in each season.

The average national encounter rate at the monitoring sites during the five years was 3.34 ind/km (min. 2.38 – max. 4.49 ind/km), this being estimated by averaging individual encounter rates of each monitoring site, rather than considering the total sightings spread over the total kilometres traversed, with the aim of reflecting the particular situation of the different sites sampled and the scale at decisions are taken on the management of the species (Sánchez *et al.,* 2012, 2015; CONABIO, 2016).

The results of the programme (see estimates of population size in **section 4.2**) have been presented periodically to the CITES Animals Committee (AC26 inf. 11, Geneva, March 2012; AC28 Doc. 22.2, Tel Aviv, September 2015) and to the IUCN Crocodile Specialist Group (CSG-IUCN) at its meetings in Manaus in 2010, Manila in 2012 (CSG, 2012) and Louisiana in 2014.

In addition, in 2016 there will be intensive monitoring (which will continue in subsequent years) and capacity-building of communities, in the areas intended for registration of UMAs working with wild specimens to carry out ranching activities, with the objective of obtaining detailed information on nests and eggs, on the basis of which the rates of sustainable exploitation will be estimated for coming years, in accordance with the methods established in the protocol that is currently being produced (see **section 8.1**).

8.3 Control measures

8.3.1 International

Apart from CITES, no other international measures are known for controlling international trade in specimens, parts and derivatives of *C. moreletii*. Resolution Conf. 11.12 (Rev. CoP15) establishes the "Universal tagging system for the identification of crocodilian skins", that creates a tool to distinguish the skins entering international trade by their country of origin.

8.3.2 Domestic

Mexico is implementing various programmes to ensure legal exploitation of and trade in *C. moreletii*, as well as to prevent and combat the illegal use of this species. As noted above, it has the system of UMAs (see **section 8.1**), that is based on seven underlying elements: (1) registration with the with the Directorate-General for Wildlife (CITES Management Authority), (2) management plan approved by the DGVS, (3) management and conservation of habitat, (4) monitoring of wild populations of the species that are in use, (5) provision of periodic reports and inventories by each UMA, (6) technical surveillance visits, and (7) marking/tagging.

The management plans must include the objectives and goals that the UMA intends to achieve from the ecological, social and economic points of view, and indicators of success for assessing how they have been met. Also, they must describe in detail the methods that will be used to track the populations and produce estimates. They must also include a safety and contingency plan describing the strategies to follow to prevent forest fires, monitor pests and diseases, and establish measures for the re-establishment, protection and management of specimens in the event that any contingency affects the UMA (species and habitat).

The periodic reports of the UMAs must include an inventory of the population in captivity (e.g. numbers entering and exiting) or results of monitoring the wild population of the species being managed, socioeconomic data on the activities they are carrying out, and the impacts, contingencies and achievements of the management plan, based on success indicators. This information makes it possible to monitor UMAs to determine whether they should be maintained in the register, to evaluate the authorizations for utilization, and assess their effect on managed populations and their habitat.

The DGVS randomly inspects UMAs and, if any inconsistencies are detected in the management plan, carries out population studies, sampling activities or inventories, or produces periodic reports. Also, as part of the Programme to Deliver Environmental Justice, PROFEPA implements control, verification, inspection and surveillance activities at international points of entry and exit of goods and people located at ports, airports and borders, and also throughout Mexico. It implements the Environmental Inspection Programme at ports, airports and borders, and the Wildlife Inspection Programme, monitoring all stages of the use of wild species and ensuring their protection. Specific actions include the verification of cross-border movements in compliance with CITES and other international agreements, in coordination with Customs authorities; inspection of areas of wildlife utilization, stockpiling, distribution, and sale; surveillance of areas of wildlife distribution and harvest; and special operations in areas of wildlife harvest, stockpiling, distribution and sale, in coordination with public law enforcement and judicial authorities. Such actions may lead to: (1) the precautionary immobilization of specimens, products and by-products, following the detection of an irregularity; and (2) the final sequestration of goods as a result of an administrative process started from (1).

In the case of Morelet's crocodile there are three marking systems in Mexico, registered with the DGVS by the UMAs: (1) interdigital tags, (2) cutting of the caudal scutes (this is still used only by a few establishments) and (3) universal tagging system defined by CITES for the export of skins. When requesting a CITES export permit, the applicant must indicate both the marking on the specimen authorized based on the UMA's marking system and also the code from the plastic tag in the CITES universal tagging system.

As part of the pilot project (see **section 8.1**), Mexico is cooperating with the Responsible Ecosystems Sourcing Platform (RESP) to try out an innovative traceability system for skins of *C. moreletii*, based on biometric image recognition using an application designed for mobile devices. This system will be used as an adjunct to the provisions of CITES (universal tagging system), to form a double control to ensure traceability of the skins produced in Mexico and of the derived products in the value chain from the beginning to the final consumer. Details on the traceability system car be examined in the working document that Mexico will submit for consideration by CoP17.

8.4 Captive breeding and artificial propagation

As has been said above (see **sections 8.1 and 8.3.2**), there are around 86 intensive UMAs (hatcheries) officially registered with the DGVS for management of *C. moreletii* in Mexico, of which 34 undertook exploitation activities between 2005 and 2015. Out of those, only 10 were working for commercial purposes and only five exported during that period. It should be noted that three of the hatcheries were formerly registered with the CITES Secretariat when the species was listed in **Appendix** I (A-MX-501, A-MX-502 and A-MX-503).

The captive population of the commercial intensive UMAs is around 28,000 individuals, and since 2005, the national authorized exploitation in Mexico represents about 4,500 individuals a year, although the total production potential of the commercial hatcheries is located around 15,700 individuals and 6,800 skins per year, approximately 5,600 of which have the potential to be in international trade (Manuel Muñiz in consultation with producers, personal communication; Rolando Coral, personal communication, Marco Novelo, personal communication, Mauricio García, personal communication; **Annex 2**).

Some hatcheries have been supported by the Government of Mexico and are in contact with educational and scientific institutions concerned with the conservation of the species. Others belong to or are managed by private investors that wish to support conservation by undertaking sustainable economic activities. Generally speaking, the hatcheries undertake environmental education, exchange of experience and training, and cooperate with the Government in the initiatives for the management and conservation of the species.

8.5 Habitat conservation

Around 118 natural protected areas in Mexico (39 Federal and 79 State) offer shelter and legal protection to *C. moreletii*, and cover 13% (43,095 km^2) of its potential range (332,921 km^2). Also, a total of 35 RAMSAR sites in Mexico are located within the potential range of *C. moreletii*, covering 6% of that area (19,126 km^2) (**Annex 1, Figure E**).

8.6 Safeguards

The information available on *C. moreletii* in Mexico suggests its potential for sustainable use in all size categories. However, in the coming years initiatives will be started exclusively involving the extraction of eggs from the wild (ranching) at some sites, as part of the pilot project referred to earlier (see **sections 8.1 and 8.3.2**). At those sites, the communities will register their properties as UMAs and will be required to comply with the relevant provisions (management plan, annual reports, monitoring of populations, nests and habitat, etc.; see **sections 8.1 and 8.3.2**). Furthermore, they will be required to carry out their activities in line with the protocol on ranching that is being produced in cooperation with experts to ensure the sustainability of exploitation (see **section 8.1**) and to use the CITES universal tagging system and the traceability system now under development as an adjunct to it (see **section 8.3.2**). Those two systems will make it possible to identify the specimens originating from ranching and from captive breeding.

9. Information on similar species

Similar species to *Crocodylus moreletii* in international trade include *C. acutus, C. rhombifer, C. niloticus, C. novaequineae* and *Osteolaemus tetraspis*. However, *C. moreletii* can be distinguished from other Mesoamerican species by its incomplete and transverse series of sub-caudal scales. Moreover, the Morelet's crocodile has 6 nuchal scales of similar size, while all the similar species mentioned above only have 4 scales (*O. tetraspis*) or 4 large and 2 small scales (*C. acutus, C. novaeguineae, C. rhombifer* and *C. niloticus*). Detailed information with morphological characteristics, parts and derivatives in trade, and identification keys on CITES-listed crocodile species is available in the CITES Identification Guide – Crocodilians (Environment Canada, 1995). According to this guide, it is possible to distinguish between species similar to *C. moreletii* even without special training. Distinctive characteristics can be easily observed in whole skins, which are the main product of the Morelet's crocodile in trade (see section 6.3).

10. Consultations

Given that the present proposal refers exclusively to the population in Mexico, there were no consultations with other countries.

11. Additional remarks

None.

12. References

See Annex 3.

Figuras

Figura A.- Área de distribución de *Crocodylus moreletii* en México, Belice y Guatemala (IUCN, 2012)

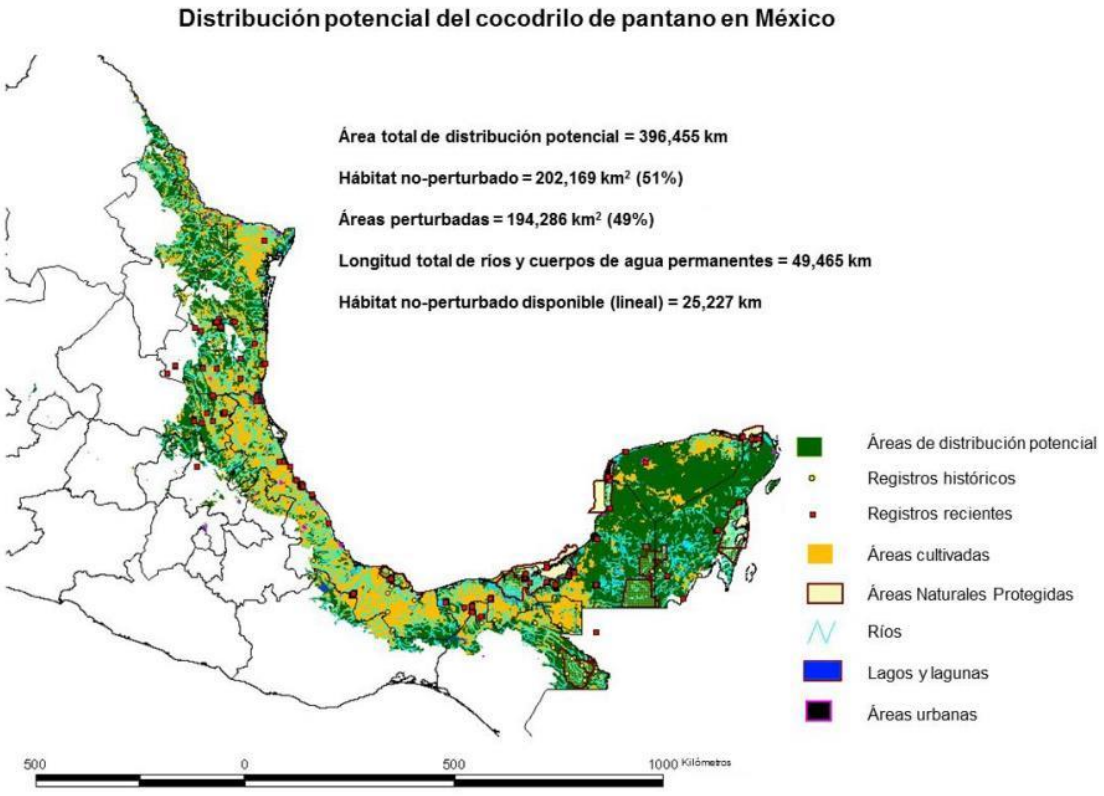

Figura B.- Área de mayor probabilidad de presencia de *C. moreletii* en México estimado mediante Desktop GARP en 2006 (Domínguez-Laso, 2006).

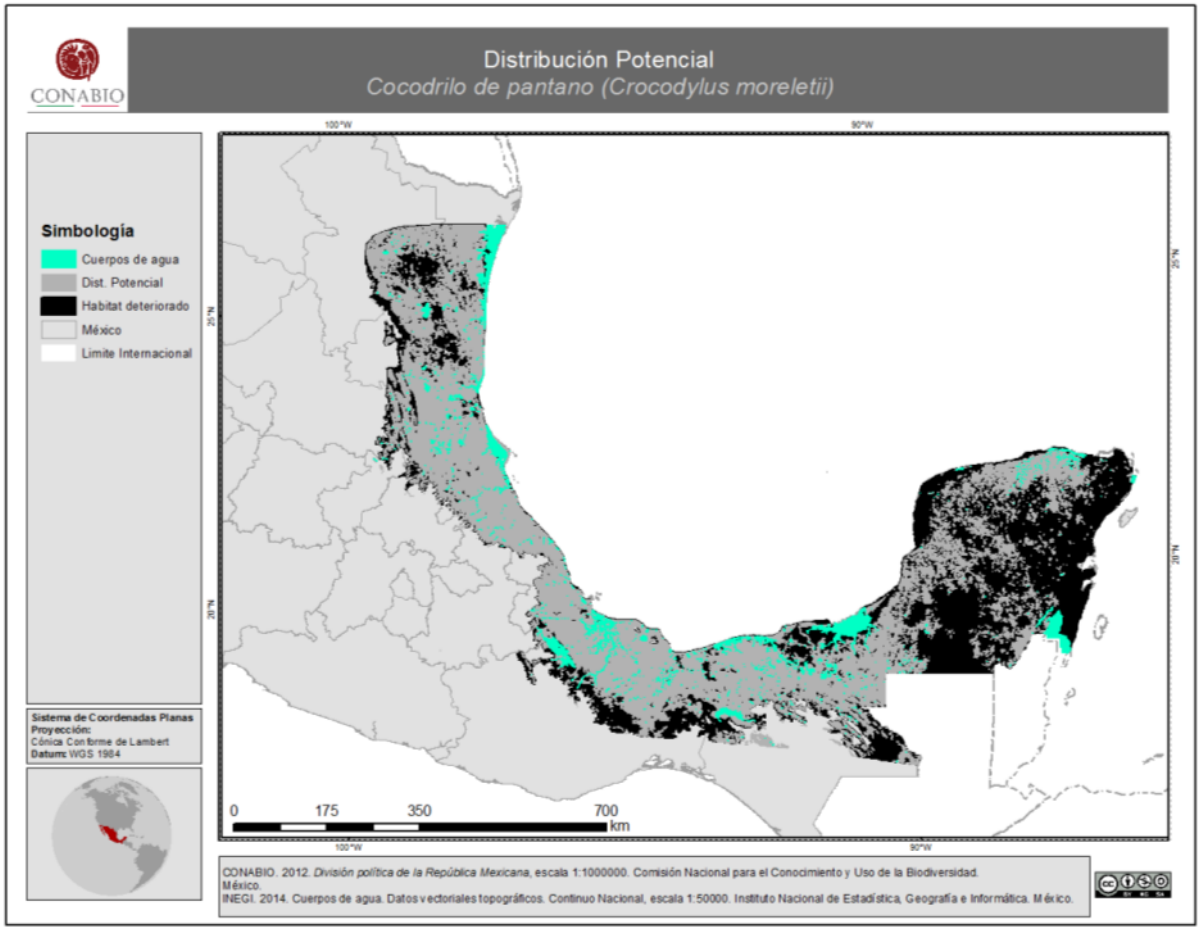

Figura C.- Mapa del área de distribución potencial y hábitat disponible de *C. moreletii* en México estimado mediante MaxEnt en 2016. CONABIO.

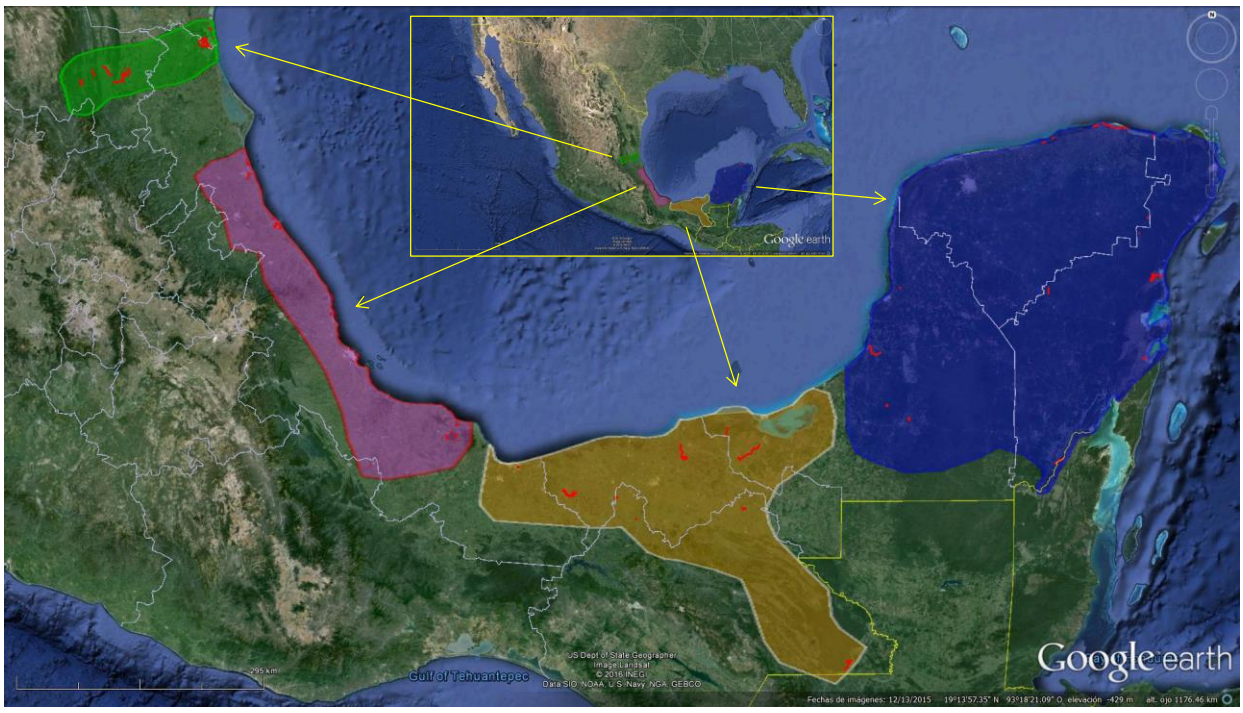

Figura D.- Regiones de coordinación (polígonos) y sitios de muestreo (líneas) del Programa de Monitoreo de *C. moreletii* en México (CONABIO, 2016; mapa base de *Google Earth*, 2016)

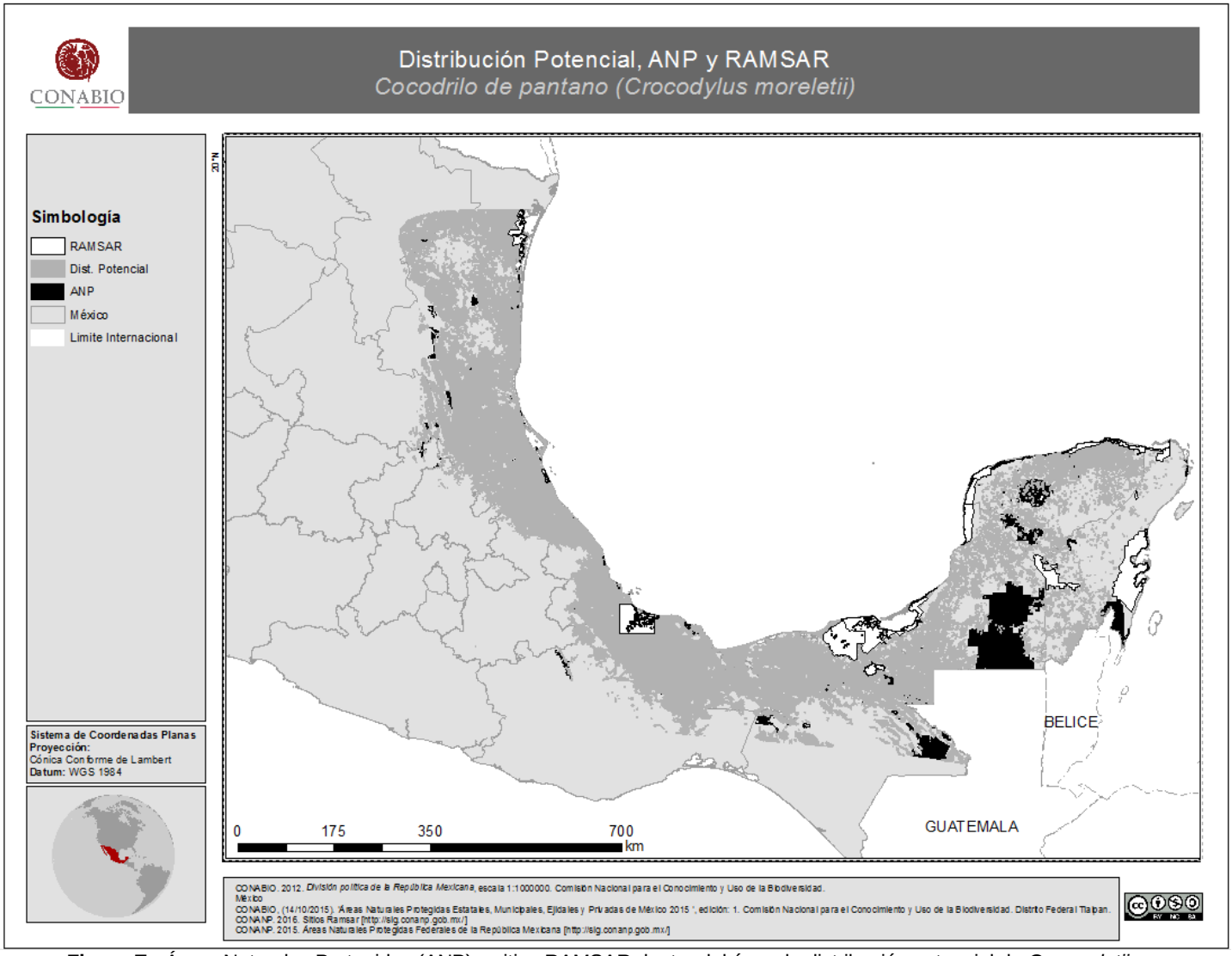

Figura E.- Áreas Naturales Protegidas (ANP) y sitios RAMSAR dentro del área de distribución potencial de *C. moreletii* en México (CONABIO, 2016).

Cuadro A.- Criaderos (UMA intensiva) de *Crocodylus moreletii* en México con aprovechamiento en los últimos 10 años (2005-2015), población cautiva y producción potencial (DGVS, 2016; Productores, com. pers.). En gris se indican los criaderos comerciales, las demás realizan actividades principalmente de exhibición, investigación o no cuentan con ejemplares aunque tienen en registro para manejarlos.

	Estado	Nombre de la UMA	Clave de registro de la UMA ante DGVS	Población cautiva (ind.)	Prod. anual potencial (ind.)	Prod. anual potencial de pieles	Prod. anual potencial de pieles para comercio internacional
1	Campeche	Biosistemas Productivos Cocodrilo	SEMARNAT-UMA-IN-0016-CAMP/12	60			
2		Cocodrilos de Palizada	SEMARNAT-UMA-IN-00019-CAMP	480	1,000	100	100
3		Isla Arena Wotoch Aayin	SEMARNAT-UMA-IN-0054-CAMP/12	250			
4		Punta del Este / Cocodrilos Maya	SEMARNAT-UMA-IN-00011-CAMP	9,806	5,000	3,000	3,000
5	Chiapas	Aluxes	DGVS-CR-IN-0955-CHIS./07	20			
6		Caimanes y Cocodrilos de Chiapas (Caicrochis)	INE/CITES/DFYFS-CR-IN-0054-CHIS./03	950	500	250	0
7		Zoologico Regional Miguel Alvarez del Toro (ZooMAT)	INE/CITES/DGVS-ZOO-E-0009-01-CHIS	70			
8	Ciudad de México	Reptilia AC	DGVS-PIMVS-EA-P-0074-DF/08				
9	Jalisco	Zoológico Guadalajara	DFYFS-ZOO-E-0030-99-JAL				
10	Michoacán	Parque Zoológico Benito Juárez	DFYFS-ZOO-E-0026-99-MICH				
11		Zoológico El Sabino	INE/CITES/DGVS-CR-IN-0636-MICH/00 (PIMVS)				
12	Morelos	Promotora Zoofari, S.A. de C.V.	INE/CITES/DGCERN-CR-IN-0006-MOR./97	4			
13	Nuevo León	Parque Zoológico La Pastora	INE/CITES/DGVS-ZOO-E-0038-99-NL				
14	Puebla	Zoológico Africam Zafari	INE/CITES/DGVS-ZOO-P-0003-00-PUE				
15		Zoológico Parque Loro Puebla	DGVS-ZOO-P-0072-02-PUE				
16	Quintana Roo	Cocodrilos del Sur (Cocodrilia)	DGVS-CR-IN-1328-Q.ROO/11	7,267	5,000	2,000	2,000
17		Jardín Zoológico Payo Obispo	DGCERN-ZOO-E-0028-03-Q ROO				
18		Parque Zoológico Bel-Air Animal Park	DGVS-PIMVS-ZOO-P-0121-QROO/12				
19		Ecopark Xpu Ha	INE/CITES/DGVS-ZOO-P-0048-97-Q.ROO				
20		Interactive Aquarium Cancún	INE/CITES/DGVS-EF-P-0031-QROO-00 (PIMVS)				
21	Tabasco	El Arca de Noé	SEMARNAT-CITES-UMA-IN-0023-TAB/05	18			

	Estado	Nombre de la UMA	Clave de registro de la UMA ante DGVS	Población cautiva (ind.)	Prod. anual potencial (ind.)	Prod. anual potencial de pieles	Prod. anual potencial de pieles para comercio internacional
22		Granja de Lagartos	INE/CITES/DGCERN-CR-IN-0043-TAB./99	576			
23		Industrias Moreletii	INE/CITES/DFYFS-CR-IN-0016-TAB./01	4,000	1,250	1,000	500
24		Los Sauces	SEMARNAT/CITES/UMA/IN/0013/TAB-05	47			
25		San Fernando	INE/CITES/DGVS-CR-IN-0569-TAB./99	142	1,000		
26		La Encantada	SEMARNAT/UMA/INT/0006-TAB/02				
27	Tamaulipas	Parque Zoológico de Altamira	CEVS-UMA-IN-ZOO-0311-TAM				
28		Zoológico Tamatán	INE/CITES/DFYFS-ZOO-E-0032-99-TAM				
29	Veracruz	Acuario de Veracruz	INE/CITES/DGVS/CR-IN-0360-VER/98				
30		Cacahuatal / El Colibrí de la Antigua	INE/CITES/DGVS-CR-IN-0434-VER/99	4,500	2,000	500	0
31		Lucertas	SEMARNAT-UMA-EX -CR-VIV-0054-VER/07	20			
32	Yucatán	Parque Zoológico El Centenario	INE/CITES/DGVS-ZOO-E-0041-00-YUC				
33		Hacienda Kancabchen	INE/CITES/DFYFS-CR-IN-027-YUC/07				
34		Blanca Flor	DGVS-PIMVS-CR-IN-1577-YUC/12				
			TOTALES	**28,210**	**15,750**	**6,850**	**5,600**

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