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

Fifteenth meeting of the Conference of the Parties
Doha (Qatar), 13-25 March 2010

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Transfer of the Morelet's crocodile (*Crocodylus moreletii*) from Appendix I to II with a zero quota for wild specimens, on the basis of Article II, paragraph 2 (a), of the text of the Convention and on the non-compliance of the species with the biological criteria for inclusion in Appendix I, as defined in Resolution Conf. 9.24 (Rev. CoP14).

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:

Danish - Morelets krokodille
Dutch - Bultkrokodil
English - Belize Crocodile; Morelet's Crocodile
Finnish - Kyhmykrokotiili
French - Crocodile de Morelet
German - Beulenkrokodil
Italian - Coccodrillo di Morelet
Spanish - Caimán de Morelet; Cocodrilo de Morelet; Cocodrilo de pantano
Swedish - Moreletkrokodil

1.7 Code numbers: L-306.002.001.005

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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.*

2. Overview

The Morelet's crocodile (*Crocodylus moreletii*) was included in CITES Appendix I in 1975. However, the status of the species in the CITES Appendices has not been reviewed since then.

In 2000, the species was classified as Lower Risk – Conservation Dependent in the IUCN Red List, based on an assessment by the Crocodile Specialist Group, which recorded the species in more than 40 localities in the Gulf of Mexico. Surveys and observations indicated moderate densities, the presence of the species in all historical localities, and more than 10,000 mature individuals in the wild.

The Morelet's crocodile is widely distributed in low slopes and coastal plains of the Gulf of Mexico and the Yucatan Peninsula (85 % of its natural range), Guatemala, and Belize. Estimates indicate a potential global population of more than 100,000 wild individuals, about 20,000 of which are adults.

Throughout the species's range, there is currently no evidence that disease, native or alien predator species, tourism, or scientific activities represent negative factors or threats for the wild populations of the Morelet's crocodile.

At present, commercial harvest of wild specimens of the Morelet's crocodile is forbidden by domestic legislation in the three range States of the species. In addition, Mexico has an abundant captive population of the species (closed-cycle operations) that satisfies domestic commercial demand and part of international demand. In Mexico, current regulations and law enforcement directly or indirectly related to the Morelet's crocodile have proven to be adequate and sufficient as shown by the recovery of wild populations, supported by systematic field data. Belize and Guatemala have similar legal systems that contribute to the protection of the species throughout its range.

The species's intrinsic ability to recover, which is now evident, coupled with conservation efforts, the ban on wild harvests of the species, the designation of new protected areas, and the promotion of closed-cycle operations, have all contributed to the recovery of the Morelet's crocodile. This is attested by its presence throughout its range in historical localities and areas where it was heavily hunted in the past.

A review of the species's status in the CITES Appendices based on Resolution Conf. 9.24 (Rev. CoP14) has led to the conclusion that the Morelet's crocodile is not a threatened species for the following reasons:

a) The wild population is not small and is assumed to form a single population estimated at a minimum of 102,434 individuals (about 19,462 adults) using a global analysis protocol.

b) The wild population does not have a restricted area of distribution. In Mexico, potential distribution is estimated at 396,455 km^2. Adding the Guatemalan Petén and Belize, the total potential distribution of the Morelet's crocodile adds up to about 450,000 km^2; and

c) After 39 years with no commercial harvest of wild specimens in Mexico, the population of the species in the country has shown indices of abundance (ind./km) that reflect healthy populations since the beginning of the 21st century.

According to the precautionary measures listed in Resolution Conf. 9.24 (Rev. CoP14), Annex 4, the species can be transferred to Appendix II in compliance with paragraph 2, because it does not satisfy any of the biological criteria for inclusion in Appendix I. Even though the species is likely to be in demand for international trade, its management is such that implementation of the Convention is secured and appropriate enforcement controls are in place (see section 8). Moreover, based on paragraph 2. c) of the same Annex, the species can be transferred to Appendix II because an integral part of the amendment proposal is an export quota (in this case, a zero quota for trade in wild specimens).

3. Species characteristics

3.1. Distribution

The area of distribution of the Morelet's crocodile includes the Atlantic drainage basin of Mexico, from central Tamaulipas south to Quintana Roo (usually at elevations below 900 m), northern and eastern Guatemala, and Belize. Mexico represents close to 85 % of the global range of the species (see **Map 1** in Annex 1).

The potential distribution of the species was calculated by means of Desktop GARP software, on the basis of records of the species, to produce a map of the area of highest probability of occurrence of the Morelet's crocodile. The surface covered by intermittent water bodies, large rivers, and large water bodies with direct influence of salt or sea water was not included, as the species is considered unlikely to occur in such areas. The result yielded a total area of 450,000 km^2 (Belize, Guatemala and Mexico), of which 396,455 km^2 correspond to the species's potential area of distribution in Mexico (see **Map 2** in Annex 1). The shore length of water bodies (permanent rivers and lagoons) in the estimated potential area was calculated and resulted in 49,465 km. Areas disturbed by agriculture – including livestock farming – and urban areas (see **Map 3** in Annex 1) were subtracted from this figure. According to the final results, at least 51 % of the area of distribution is covered by original vegetation (202,169 km^2), and a minimum of 25,277 km provide optimum habitat (permanent rivers and lakes) for the Morelet's crocodile in Mexico.

3.2. Habitat

The 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, 2000a; Platt, 1996; Casas-Andreu and Guzmán, 1972), and is commonly seen 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).

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 *et al.*, 2004). 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. Females collect fallen leaves to form a mound (Britton, 2005). They lay between 20 and 45 eggs, an average of 35 per nest (Britton, 2005; Álvarez del Toro, 1974). Females are the main keepers of the nest during incubation, and may help the hatchlings leave it. Both parents protect juveniles against predators and other adult crocodiles for some time (Hunt, 1975). Although the longevity of the species is not well documented, unpublished data on captive and semi-captive specimens indicate 30 years or more.

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 well as the opportunistic consumption of carrion.

The Morelet's crocodile clearly seems to be a highly resilient species, given that, since the commercial harvest of wild animals was eliminated, populations depleted by almost one hundred years of over-exploitation have been able to recover almost on their own.

3.4. Morphological characteristics

Maximum size reported for the species is between 3,000 and 3,400 mm in length, reaching up to 4,160 mm (Levy, 1991; Pérez-Higareda *et al.*, 1991). Average length is 2,000-2,500 mm, 220-290 mm in hatchlings (Smith and Smith, 1977). Experts from the Technical Advisory Subcommittee for the Conservation, Management and Sustainable Use of Crocodilians in Mexico (COMACROM, see section 7.1) mentioned a maximum size of 3,500 mm. 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 is preyed upon by birds and medium-sized mammals in juvenile stages and by the jaguar (*Panthera onca*) as an adult.

4. Status and trends

In 2003, the Mexican CITES Scientific Authority (CONABIO, the National Commission for Knowledge and Understanding of Biodiversity) asked the Natural History and Ecology Institute of Chiapas (IHNE) to develop a study on 'Determination of the status of the wild populations of the Morelet's crocodile (*Crocodylus moreletii*) in Mexico and evaluation of its status in CITES' (CoPan Project). The study was completed in 2004. In 2006, CONABIO organized an expert workshop to analyse the field data and all the information available on the species and re-evaluate the status of the Morelet's crocodile according to the criteria of the IUCN Red List, the Mexican Endangered Species List (*Norma Oficial Mexicana* NOM-059-SEMARNAT-2001), and the United States Endangered Species Act (ESA). Participants included internationally renowned academics, biologists with expertise in ecology and herpetology, members of the IUCN-SSC Crocodile Specialist Group, COMACROM, government staff from the Mexican CITES Authorities, commercial breeders and other stakeholders interested in the conservation of the species. The results of the CoPan Project and the expert workshop were used to build static and dynamic models to estimate the global population of the species and predict long-term trends (see section 4.4).

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. Over the last 60 years, industrial development in Mexico has required construction of infrastructure in some portions of the range of the Morelet's crocodile. Fortunately, since 1988 with the enactment of the General Act on Ecological Balance and Environmental Protection (LGEEPA, *Ley General de Equilibrio Ecológico y Protección al Ambiente*), changes in land use are restricted and every new project has to fulfil strict environmental risk assessment protocols before it can be approved. In northern Guatemala, the Petén region is the most important stronghold for the species. According to Castañeda-Moya (1998), an official colonization programme started in 1961 has caused environmental alteration as well as an increase in interactions between humans and crocodiles. The same author estimated that slightly over 50 % of potential habitat for the species in Mexico is now altered. In Belize, it seems that the whole country contains optimal habitat for the Morelet's crocodile. The type of economic development of the country so far has not significantly altered the species's habitat. The CoPan project recorded suitable habitat for crocodiles in 35 (55 %) of a total of 63 localities in various areas of the species's 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 (see **Map 3** in Annex 1).

4.2. Population size

Methods applied during the CoPan Project were those commonly accepted worldwide such as nocturnal spotlight surveys along river banks and lake shores (Sánchez, 2000), rating intensity depending on field conditions and visibility at each particular site (J. Domínguez-Laso and P. Ponce, pers. comm.). Fieldwork included 10 Mexican States and a total of 63 sampled localities (see **Map 4** in Annex 1) between 2000 and 2004. Relative abundance indices averaged 5.76 ind./km, with a Mode of 3 ind./km (with the exception of an extreme case, a locality with more than 35 ind./km; see **Figure 1** in Annex 2). Using the Mode of the sample of 62 localities as a guideline, the abundance index obtained for the Morelet's crocodile in Mexico was 917 individuals/290 km = 3.16 ind./km. Although there is no intention of making a strict or direct comparison, the magnitude of the abundance index for the species in Mexico was similar to that estimated for Belize (2.63 ind./km; Platt, 1998) and Guatemala (2.078 ind./km; Lara, 1990). Relative abundance indices were considered along with the length of optimal habitat in Mexico (25,227 km; see section 3.1). For Guatemala, this information was inferred from the literature (6,994.5 km; Castañeda-Moya, 1998); for Belize, it was inferred from the country's geography (3,347 km). For Mexico, the potential number of adult Morelet's crocodiles in the wild was estimated as well. This was done by projecting the percentage of adults observed in the CoPan Project survey (63 localities, 19 % of individuals in Class IV, size >1,500 mm, i.e. breeding adults). This general restriction of 19 % adults was applied to a population with an estimated range in the case of Guatemala and Belize. Results indicate a global estimate of 102,434 individuals of all ages in the wild for the whole species's range, of which 19,462 individuals are adults (Sánchez and Álvarez-Romero, 2006).

4.3. Population structure

In Mexico, a combined field survey that was considered to be representative of the species's area of occupancy obtained the following results: 19 % of adults, a 1.55 to 1 sex ratio biased towards males, and a high proportion of Class I individuals (<1 year) and Class II individuals (2-3 years), representing 64 % of juveniles. These data suggest adequate nesting, hatching, and recruitment rates for the species (Sánchez and Álvarez-Romero, 2006).

4.4. Population trends

Data on the natural history of the species and information obtained about wild populations by the CoPan Project and from literature for Guatemala and Belize were used to perform a Population Viability Analysis (PVA) with the Vortex programme (Version 9.42; Lacy *et al.*, 2003) to generate an exploratory population trend model for the Morelet's crocodile. The software was able to run a simulation for an initial population size of 30,000 specimens (on-third of the total estimated population size). Population extinction was restrictively defined as 500 specimens remaining (deliberately ignoring the fact that such population could well be the basis for a possible recovery programme). The chosen scenario 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, but is very helpful to imagine reactions to extreme pressure) and potential catastrophes (habitat degradation and a decrease in prey availability). After a simulated lapse of 500 years, the estimated probability of extinction was 0.1380 ± 0.015. In other words, the probability of survival obtained was 86 %. 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 during the 500-year period. Heterozygosity at the end of the period was high (0.9865 ± 0.0003 standard error). Current evidence does not suggest any likelihood of genetic bottlenecks in the near future.

Additionally, the CoPan Project included interviews in each of the localities to obtain information about populations in the past, based on the knowledge of human communities in the species's range. Results suggest that the species is present throughout its historic area of distribution and at least in 17 % of known historic localities, with a strong recovery trend.

Since the CoPan Project was implemented, various local studies undertaken have suggested that the presence and abundance of the species are stable.

The Hampolol Wildlife Conservation and Research Centre (CIVS) in Los Petenes Biosphere Reserve, a protected area in north-eastern Campeche with a surface of 100 ha including 6 km of the Verde River, is operated by the Autonomous University of Campeche through the Centre for Studies on Sustainable Development and Use of Wildlife (CEDESU). Between October 2003 and October 2004, the area was surveyed with various methods (observations, capture-recapture, nest monitoring) over a length of 1.5 km. Results yielded 131 sightings, a population size of 15-25 individuals, and a density of 12.92 ± 2.92 ind./km for the Morelet's crocodile. Observed sex ratio was 0.5:1 (F:M), 47 % of individuals captured belonged to Classes I and II, and 19 % were adults.

The ecological status of the Morelet's crocodile is being assessed and monitored in Laguna de Términos Flora and Fauna Protection Area, a RAMSAR site on the coast of Campeche. Preliminary data based on observations indicate a stable population and low anthropogenic impact in the area. The survey has detected significant breeding areas and movement of juveniles and other young individuals, and projects are being implemented with local communities to raise awareness about the importance of conserving the species.

Cedeño-Váquez *et al*. (2006) performed a study on the population status and distribution of *C. acutus* and *C. moreletii* in south-eastern Quintana Roo in Mexico; they obtained 599 records for *C. moreletii* in 205.2 km surveyed (i.e. 2.92 ind./km). The population of *C. moreletii* was mainly composed of sub-adult individuals (27.9 % for *C. moreletii*) with a 1:1 sex ratio. The study concluded that the conservation status of both species is similar to that reported by Platt and Thorbjarnarson (2000a, 2000b) for Belize and that habitat loss in the study area is not considered as a threat because of the low human population density.

4.5. Geographic trends

The species remains present throughout its natural range with reasonably high levels of abundance (see section 4.2). This is valid even for areas of the country historically known for over-exploitation of the species in

the past (Tabasco and Veracruz). From 1851 to 2002, there were records of the Morelet's crocodile in 105 localities in Mexico. The CoPan Project revisited 21.9 % of these localities and found the species in all of them. Moreover, 40 new localities were added to the records, including a first state record for Queretaro. This brings the total number of localities presently known for the species to 145 (Domínguez-Laso *et al.*, 2004).

5. Threats

The main threat to the species is habitat degradation, especially if it involves a reduction in prey availability and possible pollution of water bodies. This threat is currently estimated to be moderate in Mexico and Belize, and slightly more serious in the northern Petén region, in Guatemala.

At the moment, there is no evidence of any pathogen significantly affecting wild populations of the Morelet's crocodile. There are some findings derived from the isolation of bacteria considered potentially infectious for the species, although no crocodile deaths in Mexico have been attributed to them (Lucio-Morán *et al.*, 2002). It is considered important to develop research on the infectious cycles of viral diseases of global importance such as the West Nile Virus.

As for many other crocodilian species, natural predation on the species occurs mainly from the egg stage. Juveniles remain vulnerable to several predators until they reach a total length of 900 mm. From that size, they are preyed upon by few carnivores. In the adult stage, only large predators such as the jaguar may prey on them (Álvarez del Toro and Sigler, 2001).

There is no evidence of any alien or invasive species that have been deliberately or accidentally introduced or that have expanded into the natural habitat of the Morelet's crocodile that can constitute a foreseeable threat for the species, either as predators or as competitors.

Recent molecular studies have detected hybridization between wild populations of *C. moreletii* and *C. acutus* in the Yucatan Peninsula, mainly in coastal areas, where both species occur naturally. Data suggest that some hybridization has always occurred, at least periodically, in areas where both species are sympatric (Cedeño-Vázquez *et al.*, 2008; Rodríguez *et al.*, 2008). The first evidence of hybridization between *C. moreletii* and *C. acutus* was obtained in Belize (Ray *et al.*, 2004; Hekkala, 2004). It is uncertain whether hybridization events in the wild are common or rare, and scientists do not know what contributes to their occurrence or the geographic limits of this phenomenon (Hekkala, 2004). However, evidence suggests that hybridization between *C. moreletii* and *C. acutus* is more frequent than it was believed to be (Cedeño-Vázquez *et al.*, 2008).

Preliminary data suggest that feral populations of *C. moreletii* have become established on the Pacific coast of Mexico, where only *C. acutus* occurs naturally, possibly due to escapes from *ex situ* breeding farms (Rodríguez *et al.*, 2008). It has been suggested that, when hybrids negatively affect the recovery of vulnerable species, their removal from the populations is justified (Rodríguez *et al.*, 2008). However, before removing specimens, it is necessary to undertake ecological and genetic studies to make appropriate decisions on the possible eradication of hybrids (Rhymer and Simberloff, 1996). Based on this, efforts are being made in Mexico to diagnose the presence and potential threat caused by the hybridization of these species on the Pacific coast. The aim is to generate morphological and molecular identification materials and study the population dynamics of *C. acutus*. This effort will include the monitoring and harvest of specimens of *C. moreletii* and hybrids, which will require training field teams to standardize sampling methods and morphological data collection (including the description of the arrangement and order of the scales) (Paulino Ponce, COMACROM, pers. comm.). Captured specimens will be transferred to Wildlife Conservation and Research Centres (CIVS) operated by the Ministry of the Environment and Natural Resources (SEMARNAT, *Secretaría de Medio Ambiente y Recursos Naturales*), where they will be used for scientific research, although elimination or eradication of populations may be decided.

Natural phenomena such as hurricanes may tend to favour the Morelet's crocodile in the long term, since flooding allows crocodiles to move among lakes and even among basins, with consequent benefits for the genetic variability and viability of the species (Dever *et al.*, 2002). However, nests and eggs are potentially more sensitive to the violent effects of hurricanes. Only local cases of disappearance of water bodies during the dry season may cause temporal alterations. Otherwise, on a global scale, evidence suggests that natural phenomena do not represent a threat to the continuity of the species in the long term.

Human activities representing a potential risk for the Morelet's crocodile are the following, in decreasing order of importance: construction of infrastructure in swamp areas, construction and operation of thermal power plants, and operation of chemical and processing plants if improper waste disposal occurs (see section 7).

Even though the operation of infrastructure may lead to potential interaction between humans and crocodiles, the new social attitude towards wild species promotes conflict solutions compatible with conservation.

Interactions between humans and crocodiles in Mexico mainly involve the American crocodile (*Crocodylus acutus*) and few official reports mention the Morelet's crocodile. In the period between 2001 and 2009, reported interactions were related to the expansion of urban areas and natural events. They were dealt with by the Mexican CITES Enforcement Authority (PROFEPA, *Procuraduría Federal de Protección al Ambiente*), mainly in the States of Colima, Guerrero, Jalisco, Quintana Roo, Tamaulipas, Chiapas and Tabasco. Moreover, specific protocols have been developed to deal with wildlife-related contingencies and take appropriate action. As a general rule, when interactions between humans and wildlife are reported to the authorities, the animals are captured and relocated or taken to Wildlife Conservation and Research Centres (CIVS) (see section 7.1) or Wildlife Management Units (known as UMAs) registered for management of the species (see section 8.1) for breeding or exhibition purposes.

6. Utilization and trade

6.1. National utilization

Until the mid-20th century, commercial harvest of the Morelet's crocodile was not subject to specific regulation in Mexico, Guatemala or Belize. This was the main cause of the drastic decrease of its populations. As a consequence of this, concern about the populations increased significantly from 1970, which led Mexican authorities to ban the commercial harvest of wild individuals.

Commercial use.- Currently, all commercial exploitation of the Morelet's crocodile in Mexico must compulsorily involve animals born and raised in captivity (closed-cycle operations, and beyond the second generation) in administrative units known as UMAs (*Unidades de Manejo para la Conservación de la Vida Silvestre*; see section 8.1). Since 2000, the national harvest authorized in Mexico amounts to fewer than 2,000 skins a year. However, total potential production in such farms is about 16,500 individuals and approximately 10,100 skins per year (crocodile farms, pers. comm.; see **Table 1** in Annex 3). In Belize, crocodiles are also officially protected from commercial harvest and poaching, depending on regular surveillance of their areas of occurrence. Reportedly, the species is not subject to commercial activities in Guatemala (see section 6.4), given that the Protected Areas Act prohibits the export of and trade in wild specimens of endangered species.

Recreational use.- Few initiatives are known to offer adventure tourism related to the Morelet's crocodile in the species's area of distribution. In Mexico, they exist in less than 0.01 % of its range. No figures are known for Guatemala and Belize, but there are indications of interest in developing such activities in the future. Far from being a source of concern, if these activities are adequately managed in all three countries, they may represent an additional drive for crocodile conservation and economic development of rural communities.

Scientific use.- In Mexico, collection of biological samples from wild species for scientific use is regulated by the Mexican Endangered Species List (NOM-126-SEMARNAT-2000). The export of samples of any crocodile species for scientific purposes requires the issuance of permits by the authorities in accordance with the List and CITES. In Belize, this type of export is subject to strict protocols and provisions (Wildlife Protection Act). It should be noted that in Mexico, Guatemala, and Belize, research on the Morelet's crocodile has mainly focused on field surveys on the occurrence of the species, relative abundance and habitat quality, which do not require removal of specimens. Research protocols followed so far have been those accepted worldwide and do not imply significant alteration of habitat or behaviour.

6.2. Legal trade

Data on international trade in crocodile skins available from the UNEP-WCMC Trade Database for 1996-2007 (data on 2008 are still being updated), including whole skins and excluding cuts and secondary materials, show an increase in the global market from 1997 to 2000, followed by a considerable decrease around 2002. Reasons for this trend are unclear but reveal a market that is decreasing rather than expanding. A similar phenomenon can be seen in the international trade of the Morelet's crocodile (see **Figures 2**, **3**, and **4** in Annex 2). In the period between 2000 and 2009, 119 CITES export permits were issued in Mexico for a total of 12,276 skins. Out of the total number of skins that are potentially produced in Mexico annually, it is estimated that 2,500 could be exported for international trade every year (see **Table 1** in Annex 3).

6.3. Parts and derivatives in trade

Until 2007, according to the UNEP-WCMC Trade Database, parts and derivatives of the Morelet's crocodile most commonly found in trade were skins, skin pieces and leather products, although other products include specimens, eggs, bodies, scales, skulls and shoes. The largest exporter between 2001 and 2007 was Mexico (8,498 skins, 750 skin pieces and 1,193 leather products), followed by Belize with 116 bodies, 766 eggs and 3,124 specimens for scientific purposes (exported to the United States). The major importing countries were Japan (6,170 skins), Italy (1,219), the Republic of Korea (560), France (375) and Spain (162).

6.4. Illegal trade

The UNEP-WCMC Trade Database shows few illegal movements of parts and derivatives of the Morelet's crocodile between 1975 and 2007 for Mexico, Guatemala and Belize, with the United States as the only importer. Between 1982 and 2005, Mexico mainly exported leather products (308) and shoes (419 pairs). There are records of 8 illegal trade operations from Guatemala (between 1989 and 1997), mainly involving pairs of shoes (27), and one case in Belize, which involved the export of 31 eggs in 1995. Regarding Guatemala, Castañeda-Moya (1998) stated that illegal capture of the species continued in the Petén in that year. However, he admitted that the volume of such activity had decreased compared to the situation 25 years before.

6.5. Actual or potential trade impacts

The current level of international trade in the Morelet's crocodile is around 8,600 individuals in 10 years (860 ind./year). As shown in **Figure 5** (Annex 2), the Morelet's crocodile represents only a small fraction of the global trade in crocodilians, far behind the market leaders: *Caiman crocodilus fuscus, Alligator mississippiensis* and *C. niloticus*. It can be concluded that current trends in international trade do not seem to represent a threat or an obstacle to the recent recovery of the species in the wild, considering that only captive-bred individuals can be exported and that this provision would remain in effect with the zero quota included in the present proposal. Moreover, annual production so far in Mexican farms does not exceed 40,000 individuals of the Morelet's crocodile. The risk of laundering of wild specimens through farms is very low, because the quality of skins produced in captivity is much higher and demand in international trade focuses on such skins (José Carlos Rodarte, COCOMEX Farm, pers. comm.; Manuel Muñiz, CAICROHIS Farm, COMACROM, pers. comm.).

7. Legal instruments

7.1. National

In 1970, Mexico established a total ban on the commercial harvest of crocodiles. The ban had to be backed by surveillance and law enforcement in areas where harvests were concentrated, tanneries, centres of product manufacturing and direct trade, and on the border. In the last 10 years, Mexico has promoted and developed a policy for the creation and maintenance of protected areas to protect the habitat of the Morelet's crocodile in the framework of the National Protected Area System (SINAP) (see section 8.5).

Since 1988, wild plants and animals are protected by the General Act on Ecological Balance and Environmental Protection (LGEEPA), which establishes a framework for the conservation and restoration of ecological balance and environmental protection through sustainable use.

In September 1999, Mexico created COMACROM, the Technical Advisory Subcommittee for the Conservation, Management and Sustainable Use of Crocodilians in Mexico. It is an advisory body for Mexican authorities that focuses on providing guidance to programmes for the conservation and sustainable use of crocodiles in Mexico. It includes scientists, technicians, NGOs, producers, authorities and other stakeholders. COMACROM participates in meetings of the IUCN Crocodile Specialist Group (CSG) and contributes with its publications, besides having representatives in the CSG.

In 2000, Mexico launched the 'Programme for Wildlife Conservation and Productive Diversification of the Rural Sector'. This programme defines the conceptual, strategic, legal and administrative framework that governs any initiative for the conservation and use of wild species. This programme also attempts to give a clear and reliable framework to rural communities, aiming at conservation based on sustainable use of natural resources.

In July 2000, the General Wildlife Act (LGVS, *Ley General de Vida Silvestre*) entered into force. Its objective is the conservation of wildlife and its habitat by protecting both and requiring optimum levels of sustainable use. Such use is aimed at maintaining wildlife and habitat diversity and integrity, promoting their restoration, and

increasing the welfare of the country's citizens. In the case of the Morelet's crocodile, the LGVS only allows the harvest of individuals obtained through controlled captive breeding, which must contribute to the development of wild populations through programmes.

According to the LGVS, alien specimens or populations are those occurring outside their natural range, including hybrids and modified organisms. Such specimens or populations can only be managed in captivity subject to prior authorization from the authorities. There must be a management plan establishing security and contingency measures to avoid any negative effects the specimens may have on the conservation of free-ranging native specimens and populations or their habitat. The Regulation of the LGVS establishes management, control, and remediation measures regarding harmful individuals or populations. Measures may consist of capture/collection for the development of recovery, restocking and reintroduction projects; for research or environmental education activities; for relocation of specimens (subject to prior evaluation of the destination habitat and condition of the individuals); for elimination or eradication of individuals/populations; or of actions or devices to keep the individuals away, disperse them, make access difficult or reduce the damage they cause.

The Mexican Endangered Species List (NOM-059-SEMARNAT-2001) identifies native species of animals and plants at risk in Mexico. the Morelet's crocodile is currently included in the category 'Subject to Special Protection' (Pr), which includes taxa that are not at risk but are of interest for the country and deserve government protection to ensure their continuity and abundance. In Guatemala, Morelet's crocodile is included in the Endangered Species List (Resolution No. ALC/032-99 of the National Council on Protected Areas, CONAP), in Category 2, 'Seriously Endangered', which includes species that are endangered because of habitat loss, trade, the very small size of their populations and/or endemism with limited distribution. In Belize, the Wildlife Protection Act prohibits the hunting of the Morelet's crocodile.

7.2. International

The Morelet's crocodile was included in CITES Appendix I in 1975. Since then, the Convention has proven its effectiveness in controlling international trade in the species and preventing illegal activities that may affect wild populations. Resolutions Conf. 11.12 on the *Universal tagging system for the identification of crocodilian skins* and 12.10 (Rev. CoP14) on *Guidelines for a procedure to register and monitor operations that breed Appendix-I animal species for commercial purposes* have established mechanisms to ensure control of international trade in crocodilians. This is proven by the clear recovery of the species and the few instances of illegal trade reported by Parties.

8. Species management

8.1. Management measures

At present, no ranching operations involving wild specimens exist in Mexico. The only establishments authorized and in operation are closed-cycle captive-breeding farms, which must have proven production of offspring beyond the second generation (F2). These farms are part of an official system (SUMA) of Wildlife Management Units known as UMAs that also include the possibility of sustainable economic development as a disincentive for wild harvest (e.g. ecotourism).

8.2. Population monitoring

In Mexico, efforts are being made to design and implement a country-wide monitoring programme for the populations and habitat of the Morelet's crocodile, considering the possibility of involving Belize and Guatemala. The aim is to build on the experiences and results of the CoPan Project and the suggestions made at the 23rd meeting of the Animals Committee (Geneva, April 2008, see the AC23 summary record) to obtain better information about the status and trends of relevant populations of the species and their habitat. The programme will be developed in the framework of the 'Belize-Guatemala-Mexico Trinational Strategy for the Conservation and Sustainable Use of Morelet's Crocodile (*Crocodylus moreletii*)' (see section 11).

Stage 1 of the project is currently under way. It aims to develop a preliminary design of the programme considering relevant areas in the range of the species. Ideally, areas could be selected in the three countries, based on the CoPan Project and subsequent studies. The design will be reviewed and assessed in a workshop (January 2010, to be confirmed) involving experts and authorities to agree on the most appropriate methods and define time intervals, routes/localities and variables to take into account for crocodiles and their habitat. Manuals will be developed to ensure the effectiveness of fieldwork and training of staff. This stage will also include the design of a database where information will be organized and centralized. To date, the preliminary

design proposes a monitoring effort with biannual sampling throughout the range of the species with at least 3 routes per defined region (e.g. 12 regions in Mexico) in which observations will be made (night-time counts). In addition, one of the three routes per region will be selected for capture-mark-recapture of individuals and standard data/sample collection, as well as nest location and monitoring. Information obtained will make it possible to estimate relative abundance indices to detect variations in the population in time, determine the sex and age ratio and the general status and activity of individuals, and obtain data on the reproductive effort and success of the species, and on habitat critical for breeding.

Once the programme has been published, Stage 2 will consist of implementing the actions decided, including setting up and training the field teams, signing the relevant cooperation agreements, carrying out fieldwork, and developing the database. Information stored in the database will be periodically analysed to produce estimates of the population and its trends in the short, medium and long term.

8.3. Control measures

8.3.1. International

The status of the species in 1970 led the United States to list it as Endangered (E) in the Endangered Species Act (ESA). This measure was helpful to the Mexican policy on protection of the species at the time, since it acted in synergy with the Mexican ban.

During the 10th meeting of the Mexico-Canada-United States Trilateral Committee for Wildlife and Ecosystem Conservation and Management (Zacatecas, May 2005), Mexico officially submitted a proposal to the authorities of the United States to reclassify the Morelet's crocodile in the ESA according to the current conservation status of its populations.

Besides CITES and the ESA, no other international measures are known to be in force to control the cross-border movement of the Morelet's crocodile.

8.3.2. National

Mexico is implementing several programmes to prevent and combat illegal harvest of the species. As mentioned earlier, it has the System of Wildlife Management Units (SUMA) (see section 8.1), based on 6 key elements: 1) registration with the Wildlife Division (DGVS, *Dirección General de Vida Silvestre*-SEMARNAT, CITES Management Authority); 2) proper habitat management; 3) monitoring of wild population of the species harvested; 4) controlled harvest (periodic reports and inventories on each UMA); 5) management plan approved and registered with the Wildlife Division; and 6) certificate of production and marking/tagging methods. SEMARNAT randomly inspects UMAs and, if any inconsistencies are detected in the management plan, carries out population studies, sampling activities, inventories, or produces periodic reports.

In Mexico, there are three marking systems for the Morelet's crocodile registered with the Wildlife Division through the corresponding inventories of UMAs. The first one consists of interdigital tags. The second one is based on the traditional method of cutting notches on tail scales and is only used by some operations. The third one is the Universal Tagging System defined by CITES for the export of skins, which consists of a plastic security tag with the UMA registration number provided by the CITES Secretariat, the species code, a serial number, and the year of production. Any application for a CITES export permit must include the number of the authorized specimen based on the interdigital tag and the skin's plastic security tag.

Periodic reports of UMAs must include an inventory of the captive population of the species subject to management (births, deaths), socio-economic information about the activities undertaken, incidents, contingencies and achievements, based on indicators of success. This information makes it possible to monitor UMAs to determine whether they should be maintained in the register, authorize harvests, and assess their effect on managed populations and their habitat.

Management plans must 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 environmental contingency affects the UMA (species and habitat). Reports on contingencies or emergencies that pose a risk to wildlife, its natural habitat or human health, must be submitted to the authorities within three working days after their occurrence; they should include a description of the incident, measures taken to deal with it (e.g. implementation of the safety and contingency plan or additional measures) and final results. If the escape of one or several individuals is detected, the production manager of the UMA must immediately be notified, draw up an inventory to determine

exactly which individuals are missing (sex, age, size, markings, etc.) and immediately organize a search team to locate and capture the individuals. If the search party does not find the individuals, the offices of the Ministry of the Environment and Natural Resources (SEMARNAT) and the environmental law enforcement authority (PROFEPA) must be contacted to take proper action. Neighbouring communities must also be notified to avoid interactions and locate the individuals faster.

As part of the Programme to Deliver Environmental Justice, PROFEPA implements activities involving control, verification, inspection and surveillance 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 of CITES and other International Agreements in coordination with Customs authorities; inspection of areas of wildlife harvest, 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).

About 50 UMAs (see section 8.1) managing the Morelet's crocodile have been registered in Mexico since the 1980s; 19 of them are still actively managing the species and 3 are registered with the CITES Secretariat (see **Table 1** in Annex 3). The UMAs were created between 1989 and 1993. Some closed-cycle breeding farms have received support from the Mexican Government and are in contact with educational and scientific institutions interested in the conservation of the species. Others belong to or are managed by private investors that wish to support conservation by undertaking sustainable economic activities with the species. This has facilitated cost-benefit oriented technical improvements, which carry advantages both for maintaining economic viability of a reserve for possible reintroduction and for legal commercial operations.

According to more than 15 years' experience of Mexican breeders of the Morelet's crocodile, there are no hybrid specimens in the operations registered with CITES (José Carlos Rodarte, COCOMEX Farm, pers. comm.; Manuel Muñiz, CAICROHIS Farm, COMACROM, pers. comm.). However, in the light of recent studies in the Yucatan Peninsula (Cedeño-Vázquez *et al.*, 2008; Rodríguez *et al.*, 2008), genetic studies will be performed with captive and wild populations to determine possible cases of hybridization.

8.4. Habitat conservation

About 77 federal and certified protected areas in Mexico provide shelter and legal protection to the Morelet's crocodile in its potential range. Of these, 11 have records of the species. There are also 41 RAMSAR sites in the potential range of the Morelet's crocodile, 13 of which have records of the species (see **Map 5** in Annex 1). There are some protected areas for the species in the Petén, in Guatemala, and several in Belize, with legal and administrative measures.

8.5. Safeguards

According to the precautionary measures listed in Resolution Conf. 9.24 (Rev. CoP14), Annex 4, the species may be transferred to Appendix II in compliance with paragraph 2. b), because it does not satisfy any of the Criteria of Annex 1 of the Resolution. Even though there is potential international demand for the species, its management is such that implementation of the Convention is secured and appropriate enforcement controls are in place (see sections 7 and 8 for more information). Moreover, the proposal includes a zero quota to ensure that wild populations of the Morelet's crocodile do not become endangered by international trade.

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

Guatemala was consulted, as it is a range State of the species, and supports the transfer of the Mexican population of the Morelet's crocodile from Appendix I to Appendix II with a zero quota for wild specimens (see **Annex 4**).

The IUCN Crocodile Specialist Group (CSG) was also consulted, and efforts were made to address its observations (see **Annex 5**) in the present proposal.

11. Additional remarks

In April 2006, the 'Belize-Guatemala-Mexico Trinational Workshop on management and conservation of the Morelet's crocodile (*Crocodylus moreletii*) and Review of the status of the Central American river turtle (*Dermatemys mawii*) in the CITES Appendices' was held in Mexico City. The workshop developed and agreed the Belize-Guatemala-Mexico Trinational Strategy for the Conservation and Sustainable Use of Morelet's Crocodile (*Crocodylus moreletii*) through the signing of the 'Cuicuilco Declaration' by the CITES Authorities of the three countries. The Declaration recognizes that the species is not threatened, although the Guatemalan populations are subjected to a certain pressure and information is needed to determine their conservation status.

The Strategy is used as a reference point and guideline for activities aimed at improving the knowledge, conservation, management and sustainable use of the Morelet's crocodile. To this end, efforts are being made to set up a Trinational Coordination Team, which will be in constant communication with three Advisory Groups (Management, Scientific and Law Enforcement) and with an advisory team on Funding and Monitoring. The Groups will liaise between the Trinational Coordination Team and the various institutions, scientists, conservationists and law enforcement groups in each country, which will contribute to the implementation of the technical, administrative and legal activities defined in the Strategy to produce specific results.

Additionally, in the framework of the Mixed Bilateral Cooperation Commissions between Mexico and Belize and Mexico and Guatemala in 2009, two International Cooperation Programmes entitled *Strengthening of CITES implementation* are in progress. They will improve information exchange, law enforcement, capacity building and cooperation with Belize for *Crocodylus moreletii, Dermatemys mawii* and *Palma xate*, and with Guatemala for the first two species. The project planned for the Morelet's crocodile includes efforts to develop a monitoring programme (see section 8.2), implementation of the Trinational Strategy mentioned above, and expert visits, among other initiatives.

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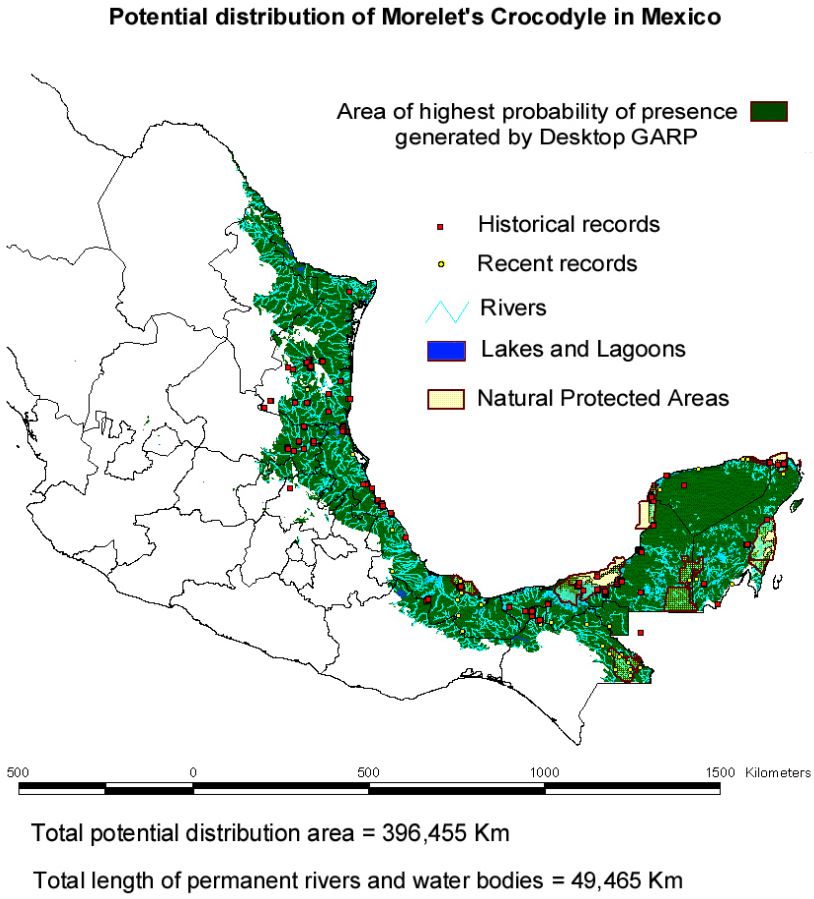
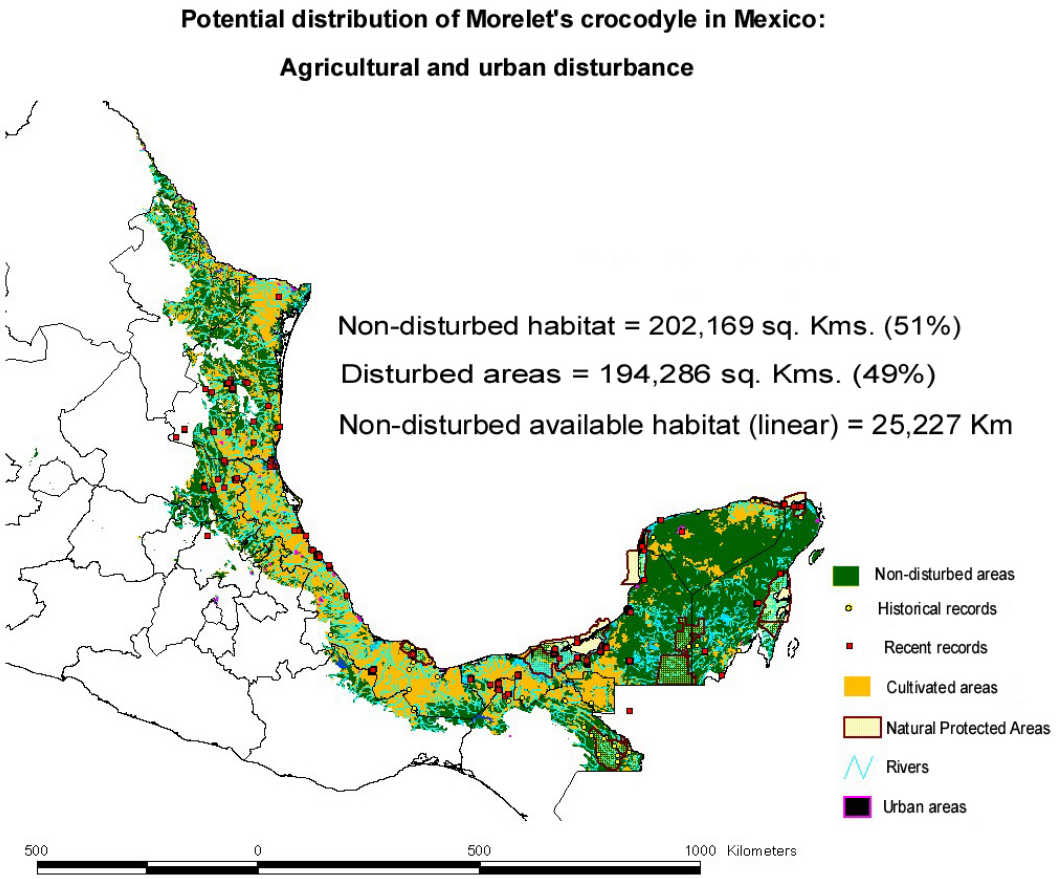
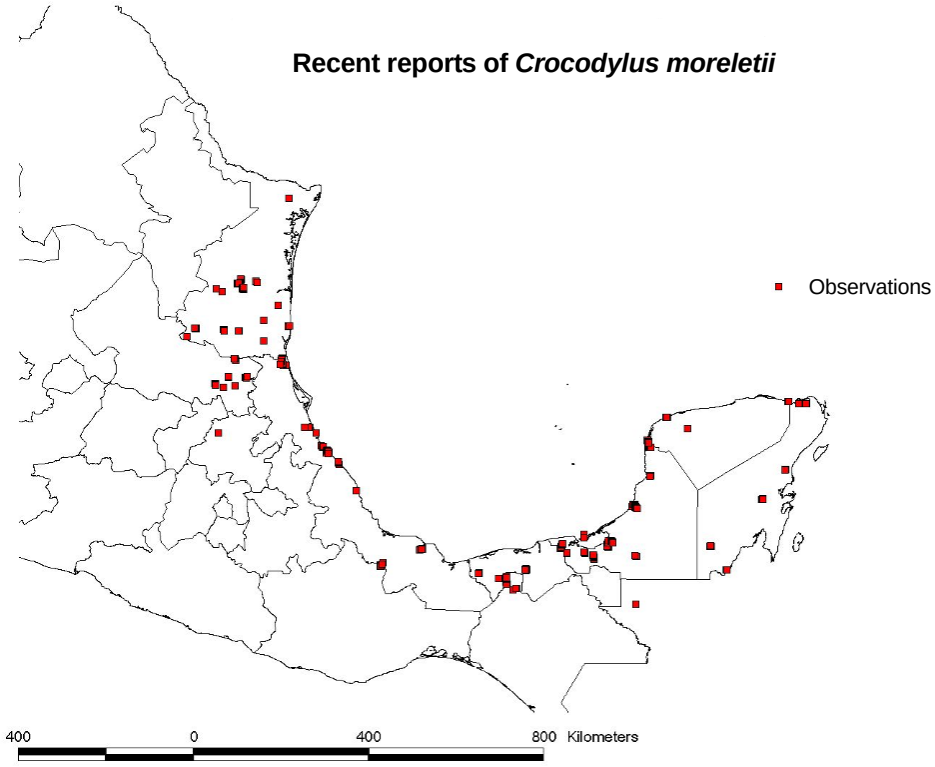
Map 1. General distribution of *C. moreletii*.



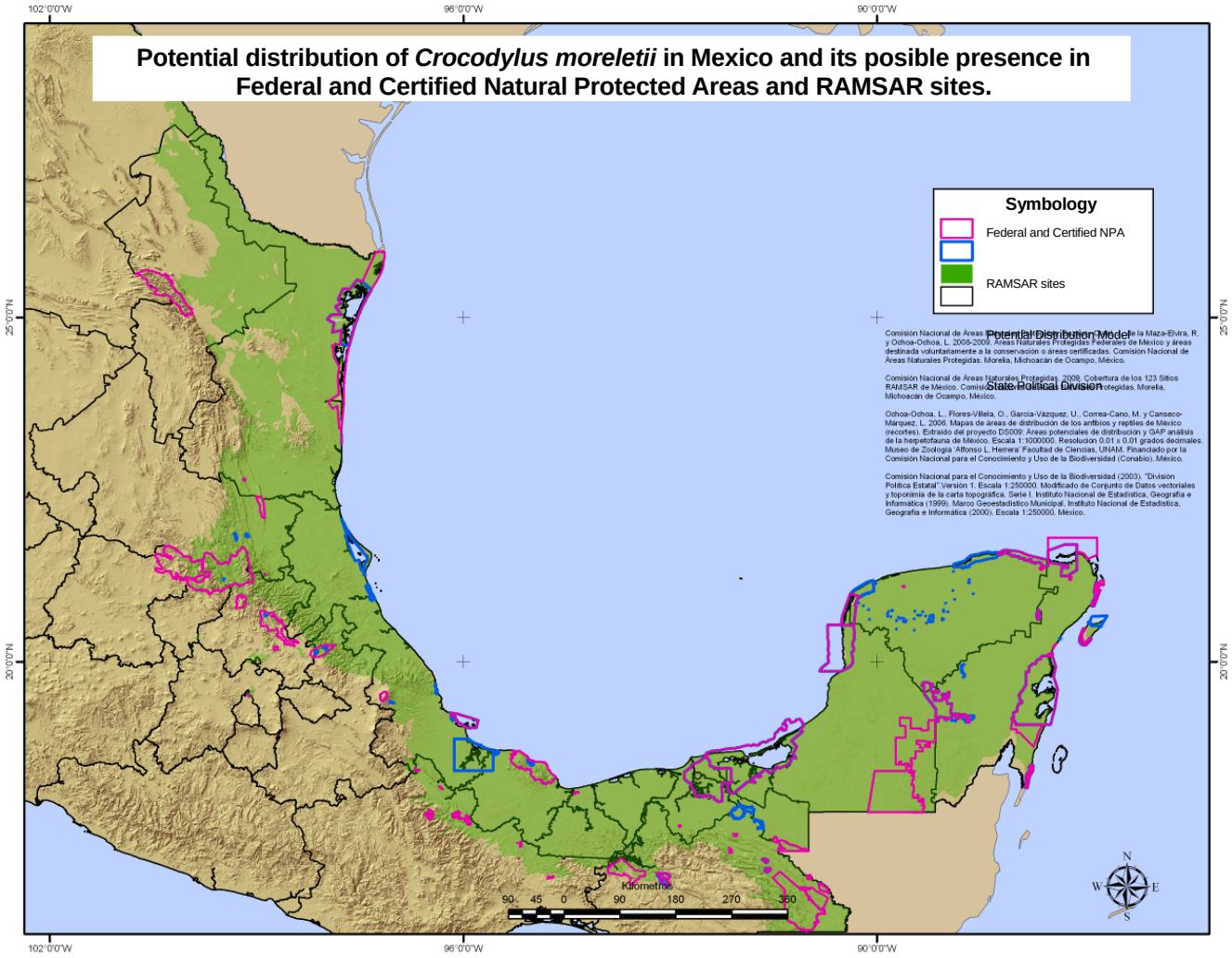
Map 2. Area of highest probability of presence of *C. moreletii* in Mexico (GARP). Raw length of rivers and other perennial water bodies present within the area amount almost 50,000 km (only the simple length of rivers was considered, leaving out the approximately equal length of the opposite banks).



Map 3. Yellow areas depict surfaces modified by agricultural and livestock raising activities, within the GARP area calculated for *C. moreletii* in Mexico.



Map 4. Known localities for *C. moreletii* as of 2004.



Map 5. Natural Protected Areas and RAMSAR sites inside *C. moreletii* potential distribution area. Additional information about Natural Protected Areas and RAMSAR sites is presented in the following tables (those areas and sites with reports for the species are marked in grey):

Natural Protected Area		Category	Surface (hectares)
1	Puerto Morelos Reef	National Park	9,067
2	Cozumel Reef	National Park	11,988
3	Sian Kaan Reef	Biosfere Reserve	34,927
4	Xcalak Reef	National Park	17,949
5	Cerro Azul Communal Area	Certified	175,445
6	Buenos Aires Community Area of Conservation	Certified	218
7	Monte Tinta Indigenous Area of Conservation	Certified	1,932
8	San Pedro Tlatepusco Conservation Area	Certified	5,050
9	San Antonio del Barrio Conservation Area	Certified	1,500
10	Santiago Tlatepusco Conservation Area	Certified	4,300
11	Cajonos Shore of San Agustín Community Conservation Area	Certified	1,765
12	Cajonos Shore of Ejido Nuevo Málzaga Conservation Area	Certified	661
13	Cajonos Shore of Ejido Plan Mata de Caña Conservation Area	Certified	2,033
14	Cajonos Shore of Ejido Plan de San Luis Conservation Area	Certified	1,360

15	San Jacobo Conservation and Protection Area	Certified	986
16	Balaan Kaax	Flora and Fauna Protection Area	128,390
17	Barranca de Metztitlan	Biosfere Reserve	96,043
18	Bonampak	Monumento Natural	4,357
19	Bosques de Buenavista y Bosque de Tierra Nueva	Certified	80
20	Cañón del Sumidero	National Park	21,789
21	Calakmul	Biosfere Reserve	723,185
22	Agua Azul Waterfall	Flora and Fauna Protection Area	2,580
23	Cañón del Usumacinta	Flora and Fauna Protection Area	46,128
24	Chan-Kin	Flora and Fauna Protection Area	12,185
25	Cofre de Perote	National Park	11,700
26	Occidental Coast of Isla Mujeres, Pta Cancun y Pta Nizuc	National Park	8,673
27	Rio Necaxa Hidrological Basin	Área de Protección de Recursos Naturales	39,557
28	Cumbres de Monterrey	National Park	177,396
29	Cacalotepec First Fraction and Second Fraction	Certified	999
30	Cerro Chango	Certified	700
31	Dzibilchantun	National Park	539
32	El Chico	National Park	2,739
33	El Tepeyac	National Park	1,500
34	El Zapotal	Certified	2,358
35	La Encrucijada	Biosfere Reserve	144,868
36	Lacan-Tun	Biosfere Reserve	61,874
37	Laguna de Términos	Flora and Fauna Protection Area	705,017
38	Laguna Madre y Delta del Rio Bravo	Flora and Fauna Protection Area	572,807
39	Los Marmoles	National Park	23,150
40	Los Petenes	Biosfere Reserve	282,858
41	Los Tuxtlas	Biosfere Reserve	155,122
42	Nichupte Mangroves	Flora and Fauna Protection Area	4,257
43	Metzabok	Flora and Fauna Protection Area	3,368
44	Montes Azules	Biosfere Reserve	331,200
45	Naha	Flora and Fauna Protection Area	3,847
46	Otoch Ma_Ax Yetel Kooh	Flora and Fauna Protection Area	5,367
47	Palenque	National Park	1,772
48	Pantanos de Centla	Biosfere Reserve	302,707
49	Rancho Nuevo Beach	Santuario	30
50	Paraje El Frijolillo	Certified	700
51	Plot No 12 Z-1 P1/1 (Ejido Nuevo Progreso)	Certified	30
52	Plot No 21 Z-1 P1/1 (Ejido Nuevo Progreso)	Certified	58
53	Plot No 30 Z-1 P1/1 (Ejido Nuevo Progreso)	Certified	6
54	Plot No 46 Z-1 P1/1 (Ejido Nuevo Progreso)	Certified	19
55	Plot No 51 Z-1 P1/1 (Ejido Nuevo Progreso)	Certified	12
56	Ecological Park Jaguaroundi	Certified	960
57	Ría Celestún	Biosfere Reserve	81,482
58	Ría Lagartos	Biosfere Reserve	60,348
59	Rancho "La Asunción", with Natural Protected Area Yu-Balcah	Certified	572
60	Rancho Griver	Certified	25

61	Rancho Los Manantiales	Certified	53
62	Rancho San Pedro	Certified	805
63	Ecological Reserve El Edén	Certified	1,540
64	Cooperative Reserve Vista Hermosa	Certified	1,000
65	Selva El Ocote	Biosfere Reserve	101,288
66	Sian Kaan	Biosfere Reserve	528,148
67	Sierra del Abra Tanchipa	Biosfere Reserve	21,464
68	Sierra Gorda	Biosfere Reserve	383,567
69	Sierra Gorda de Guanajuato	Biosfere Reserve	236,882
70	Sistema Arrecifal Veracruzano	National Park	52,239
71	Tiburón Ballena	Biosfere Reserve	145,988
72	Tulúm	National Park	664
73	Conservation Land - Ejido Luis Echeverría Álvarez	Certified	800
74	Uaymil	Flora and Fauna Protection Area	89,118
75	Yaxchilan	Natural Monument	2,621
76	Yum Balam	Flora and Fauna Protection Area	154,052
77	Common use zones of Ejido Los Ángeles	Certified	245
		Total Surface	**6,013,009**
		Surface percentage related to potential distribution area of the species	**15%**

	Sitio RAMSAR	**Superficie (hectáreas)**
1	Anillo de Cenotes de Yucatán	300,000
2	Flora and Fauna Protection Area Laguna de Términos	705,016
3	Flora and Fauna Protection Area Naha y Metzabok	7,215
4	Flora and Fauna Protection Area Yum Balam	154,052
5	Streams and Springs of Tanchachin	1,174
6	Balaan Kaax	131,610
7	Texolo Waterfalls and surroundings	500
8	Tamasopo Swamps	1,364
9	Dzilam (State Reserve)	61,706
10	Acuatic Birds Specially Important Conservation Wetland Ría Lagartos Reserve	60,347
11	La Libertad Wetlands	5,432
12	Laguna La Popotera Wetlands	1,975
13	La Mancha y El Llano	1,414
14	Laguna Madre	307,894
15	Laguna de Chichankanab	1,998
16	Laguna de Metztitlán	2,937
17	Laguna de Tamiahua	88,000
18	Nichupte Mangroves	4,257
19	Mangroves and Wetlands of Norht Cozumel Island	46,356
20	Mangroves and Wetlands of Tuxpan	6,870
21	Manglares y humedales of Laguna de Sontecomapan	8,921
22	Otoch Maax Yetel Kooh	5,367
23	State Park Lagunas de Yalahau	5,683
24	National Park Arrecife de Cozumel	11,987
25	National Park Arrecife de Puerto Morelos	9,066
26	National Park Arrecifes de Xcalak	17,949

27	National Park Canon del Sumidero	21,789
28	National Park Sistema Arrecifal Veracruzano	52,238
29	Rancho Nuevo Turtle Beach	30
30	X'cacel-X'cacelito Turtle Beach	362
31	Jalpan Dam	68
32	State Reserve El Palmar	50,177
33	Biosfere Reserve Los Petenes	282,857
34	Biosfere Reserve Pantanos de Centla	302,706
35	Biosfere Reserve Ría Celestún	81,482
36	Biosfere Reserve La Encrucijada	144,868
37	Sian Kaan	652,193
38	Sistema Lagunar Alvarado	267,010
39	Lagunas Interdunarias System of Veracruz City	140
40	Rio Necaxa Hidrologial Basin Dam and Biological Corridors System	1,541
41	Ecological Conservation Zone Sistema Lagunar Catazajá	41,058
	Total Surface	**3,847,609**
	Surface percentage related to potential distribution area of the species	**9%**

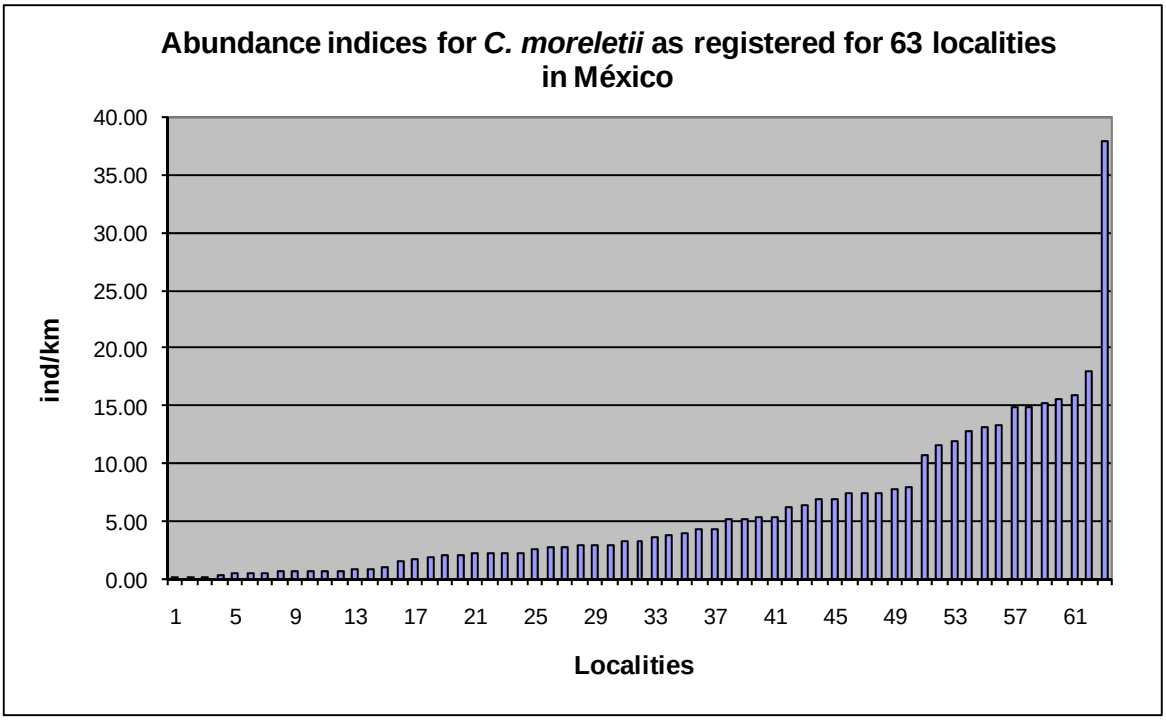


Figure 1. Relative abundance indices for *C. moreletii* as recorded by the COPAN Project (Data from Domínguez – Laso, *et al.*, 2004).

Figure 2. The world market related to crocodiles (UNEP-WCMC, 2009) seems to have passed through a steady increase in the late XX Century, a depression during 2000-2002, an augment up to 2006 and another depression starting on 2007.

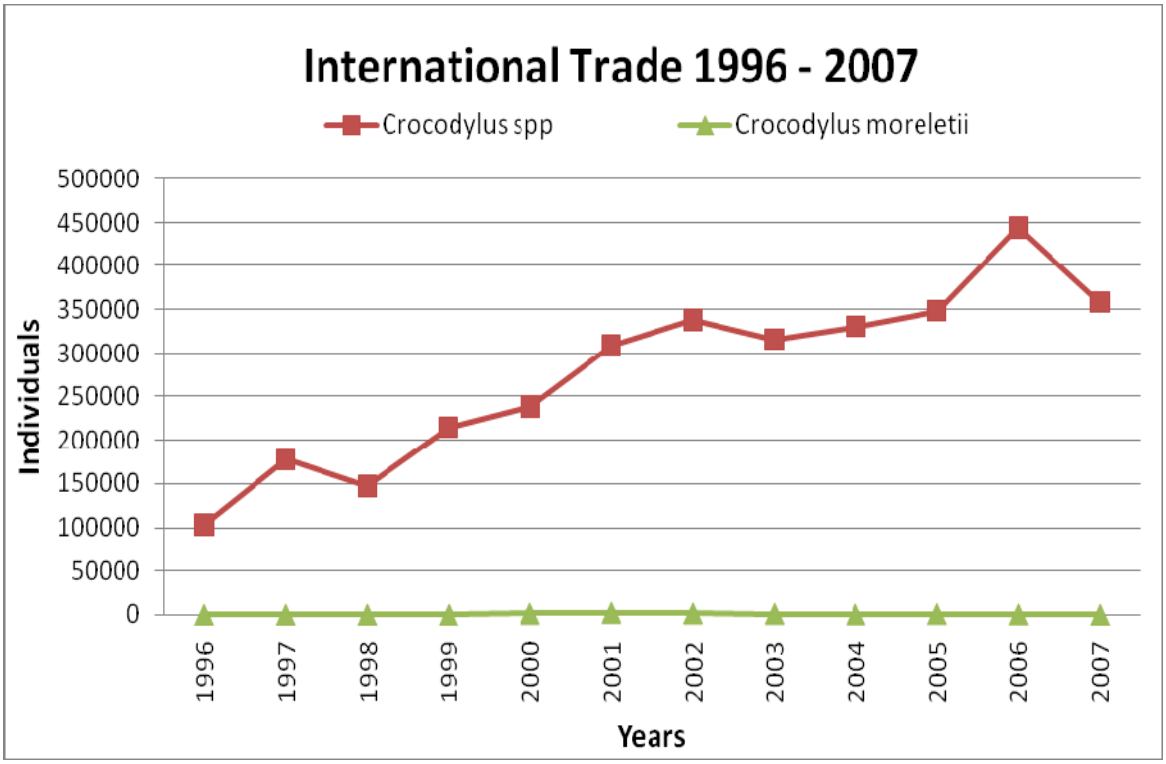


Figure 3. *Crocodylus* spp. has shown a similar increasing pattern through XX and XXI Centuries shifting, though a relative stabilization since 2002 is observed until 2007 (UNEP-WCMC, 2009).

Figure 4. Out of *Crocodylia* and other members of its genera, *C. moreletii* maintains low commercial volumes and, out of an increase in 1999-2001, it shows a recent downward trend (UNEP-WCMC, 2009).

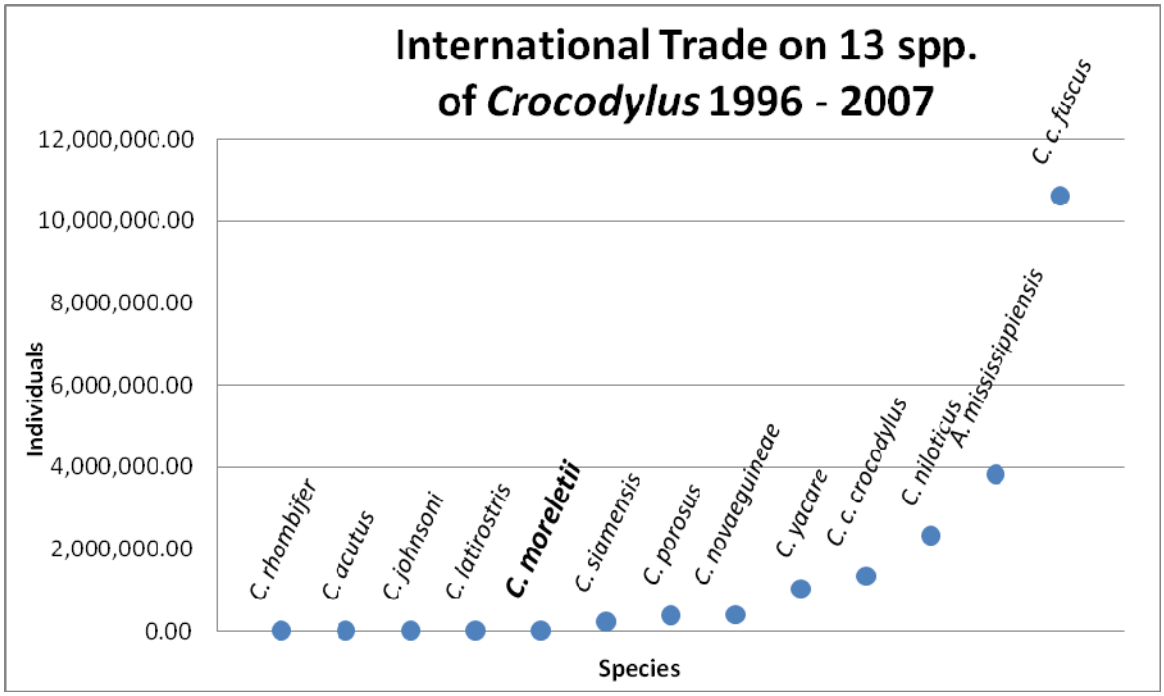


Figure 5. Current trade on *C. moreletii* would not be anticipated to represent a threat for the species. The highest volumes of the world market correspond to *Caiman crocodilus fuscus*, *Alligator mississippiensis* and *Crocodylus niloticus* (UNEP-WCMC, 2009).

Table 1.- Captive breeding operations (UMA) for *C. moreletii* in Mexico. CITES registered operations are shown with its codes in brackets.

	Unit for Management and Conservation of Wildlife (UMA)	Location	Registration Code	Captive population (2008)	Anual production potential	Skin anual production potential	Anual production potential for international trade
1	Cocodrilos mexicanos, S.A. de C.V.	Sinaloa	INE/CITES/DFYFS-CR-IN-0069-SIN./99 **(A-MX-501)**	28,673	12,000	8,000	2000
2	Cacahuatal	Veracruz	INE/CITES/DGVS-CR-IN-0434-VER/99	4,265	2,000	500	0
3	Punta del Este	Campeche	SEMARNAT-UMA-IN-00011-CAMP	2,323	1,250	600	0
4	Industrias Moreletii	Tabasco	INE/CITES/DFYFS-CR-IN-0016-TAB./01 **(A-MX-502)**	1,237	1,250	1,000	500
5	Granja de lagartos	Tabasco	INE/CITES/DGCERN-CR-IN-0043-TAB./99	576	No comercial production	---	---
6	Cococanek		CEVS-UMA-IN-144-TAM	500	Community	---	---
7	Cocodrilario Cetmar-Campeche	Campeche	INE/CITES/DGVS-CR-IN-0519-CAMP./99	156	Research 300	---	---
8	San Fernando	Tabasco	INE/CITES/DGVS-CR-IN-0569-TAB./99	142	1,000	---	---
9	CROCOCUN	Quintana Roo	INE/CITES/DFYFS-CR-IN-0115-Q.ROO	141	Exhibition	---	---
10	Cocodrilos de Palizada	Campeche	SEMARNAT-UMA-IN-00019-CAMP	129	Community	---	---
11	Laguna de Alcuzahue, s.c.l. Soc. Pesquera.	Colima	INE/CITES/DFYFS-CR-IN-0065-COL.	95	No comercial production	---	---
12	Biosistemas Productivos Cocodrilo	Campeche	SEMARNAT-UMA-IN-00016-CAMP	60	No comercial production	---	---
13	Los Sauces	Tabasco	SEMARNAT/CITES/UMA/IN/0013/TAB-05	47	No comercial production	---	---
14	Cocofran	Tabasco	DGVS-CR-IN-0835-TAB/05	25	No comercial production	---	---
15	El Zanjón	Veracruz	SEMARNAT-UMA-IN-CR-0033-VER/03	21	No comercial production	---	---
16	LUCERTAS	Veracruz	SEMARNAT-UMA-EX -CR-VIV-0054-VER/07	20	No comercial production	---	---
17	EL ARCA DE NOE	Tabasco	SEMARNAT-CITES-UMA-IN-0023-TAB/05	18	Exhibition	---	---
18	ALUXES	Chiapas	DGVS-CR-IN-0955-CHIS./07	15	Exhibition	---	---
19	Caimanes y cocodrilos de Chiapas (CAICROCHIS)	Chiapas	INE/CITES/DFYFS-CR-IN-0054-CHIS./03 **(A-MX-503)**	6	Exhibition	---	---
			TOTALES	**38,449**	**17,800**	**10,100**	**2,500**

CLASIFICACION SICAR
3.3.5.0./1.5

03 JUL. 2009

Secretario Ejecutivo

Consejo Nacional de Áreas Protegidas
PRESIDENCIA DE LA REPÚBLICA

Of. 383/2009/CESA/jilp

Guatemala, 25 de junio de 2009.

Excelentísimo Señor Embajador,

Reciba un atento saludo de la Secretaría Ejecutiva del Consejo Nacional de Áreas Protegidas -CONAP-.

En mi calidad de Autoridad Administrativa CITES para Guatemala, tengo el honor de dirigirme a su persona con el objeto de referirme a la propuesta para trasladar la especie *Crocodylus moreletii* del apéndice I al apéndice II de la CITES.

En ese sentido, remito para su consideración el dictamen técnico (No. 2) de fecha 5 de junio de 2009, emitido por la Autoridad Científica CITES de Fauna y Flora No Maderable para Guatemala, del cual cabe destacar lo siguiente:

- Considera procedente únicamente el traslado de las poblaciones *Crocodylus moreletii* de México, reproducidas en granjas, para pasar del apéndice I al apéndice II de la CITES; en virtud que cumplen con lo establecido en Conf. 9.24 (Rev. Cop 14) para pasar al apéndice II.

- Improcedente el traslado de las poblaciones de Guatemala de *Crocodylus moreletii,* del apéndice I al II de la CITES debido a graves presiones sobre la Reserva de Biosfera Maya, a la falta de investigación sobre las poblaciones de cocodrilo y la ausencia de una estrategia de conservación específica para esta especie en nuestro país.

- Recomienda verificar que las poblaciones silvestres de México no se encuentren en riesgo al ser trasladadas sus poblaciones al apéndice II.

- De aprobarse la propuesta de México en la COP 15, a celebrarse en Qatar en marzo del 2010, que las medidas de vigilancia sean muy estrictas en las fronteras con Guatemala.

Secretario Ejecutivo

Consejo Nacional de Áreas Protegidas
PRESIDENCIA DE LA REPÚBLICA

- El marcaje que México realice a los animales vivos que se exporten sea con métodos infalsificables y las pieles con métodos aprobados por la CITES para mantener la cadena de custodia. Los métodos de marcaje para las poblaciones de *Crocodylus moreletii* de México deben ser ampliamente divulgados en los países que integran el área de distribución natural de la especie y con los interesados en importar los ejemplares y derivados; a fin de evitar la extracción ilícita de pieles y ejemplares de Guatemala que podrían ser lavadas por medio de su traslado a granjas legales de México.

Sin otro particular por el momento, me suscribo de usted.

Respetuosamente,

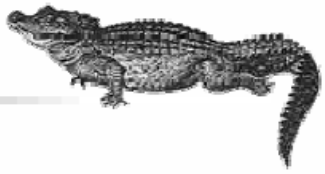
M.Sc. Licda. Claudia Santizo
SECRETARIA EJECUTIVA
CONAP

CONSEJO NAC. DE AREAS PROTEGIDAS
PRESIDENCIA DE LA REPUBLICA
Guatemala, C. A.

Señor
Eduardo Ibarrola Nicolin
Embajador Estados Unidos Mexicanos
Su despacho

IUCN • Species Survival Commission

Crocodile Specialist Group



Chairman: Dr Grahame Webb; Vice-Chairmen: Dr. Dietrich Jelden and Mr. Alejandro Larriera.
Executive Officer: Mr. Tom Dacey, PO Box 530 Sanderson, NT 0813, Australia. E-mail: gwebb@wmi.com.au

13 September 2009

Mr. Hesiquio Benitez Dias
Director de Enlace y Asuntos Internacionales
CONABIO
Autoridad Cientifica CITES de Mexico
Liga Periferico – Insurgentes Sur 4903
Parques del Pedregal
Tlalpan 14010
MEXICO

Email: hbenitez@xolo.conabio.gob.mx

Re: Official Consultation on *C. morletii* Proposal

Dear Hesiquio,

The *C. moreletii* proposal was distributed to CSG members for review, and this letter summarises comments that were received so far. There was some disappointment that issues raised in 2005 by the CSG have yet to be addressed in the proposal. Specific comments are:

A. Future use of wild population

If the proposal is adopted at CoP15, any future change to the proposed zero quota will require the submission of an amendment proposal to CITES.

B. Captive Breeding Registration

If the proposal is adopted at CoP15, Mexico will not be required to register captive breeding operations for *C. moreletii* with CITES. In order to allay any concerns that wild animals will enter farms and trade, more information on production capacities may be useful (e.g. current stocks, annual production, estimated annual skin production).

C. Hybridization between *C. moreletii* and *C. acutus*

On 27 August 2009 CSG Chairman Grahame Webb wrote to Hesiquio Benitez Diaz with particular reference to hybridisation. These comments are reproduced below:

> Given the limited time available, I am taking this opportunity to alert you to one area within the proposal where I believe it will be important for Mexico to provide more information. This concerns HYBRIDISATION with *C. acutus*. This is clearly a complex issue to resolve, although CITES does give some guidance (a little impractical in my opinion). The issue as I understand it is:
>
> 1. *C. moreletii* and *C. acutus* apparently coexist on the east coast of Mexico.
>
> 2. On the east coast hybridisation has probably been occurring "forever". So there are animals which are genetically 100% *acutus* and 100% *moreletti*, and animals that are genetically and phenotypically everything in between. So the farms, to the best of our knowledge should contain pure *C. moreletii* and hybrids, all being captive bred.
>
> 3. On the west coast, where I believe there are Pacific *C. acutus* but no naturally occuring *C. moreletii*. The concern is that "escapee" *C. moreletii* (or hyrids) may compromise the integrity of the 100% pure *C. acutus*. This has two elements:
>   (a) what may have occurred to date; and,
>   (b) what may occur in the future.
>   (c) the actions Mexico will be taking over this (If they are already escaped what? To prevent further escapes what?)
>
> 4. As all farms (east and west) are potentially stocked with *C. moreletii* and hybrid, originating genetically from the eastern population, trade in captive production would need to be treated the same.
>
> 5. In Resolution Conf. 9.24, Annex 6, it does give some specific direction here:
>
>   Point 5 Threats.
>   Specify the nature, intensity and if possible relative importance of human-induced threats (e.g. habitat loss and/or degradation; over-exploitation; effects of competition/predation/disease by introduced species, hybridization, toxins and pollutants; etc.).
>
>   Point 8.4 Captive breeding and artificial propagation
>   Where applicable, provide details of commercial captive-breeding or artificial propagation operations, including plantations, for the species in question within the country in question, including the size of captive stocks and the production, and the extent to which these operations are either contributing to a conservation programme or meeting a demand that would otherwise be met by specimens from the wild. Discuss any management implications of captive-breeding or artificial propagation programmes. Also

provide information on the extent of captive-breeding or artificial propagation outside the country or countries of origin to the extent possible.

6. Farm bred Appendix I hybrids can be traded without needing to go to Appendix II, as Appendix I captive bred (CITES ARTICLE VII (4)) from registered farms (Mexico adheres to Resolution Conf. 12.10), but the tagging requirements that apply (Now?), for hybrids are in Resolution Conf. 11.12 Para (e):"that for the labelling of skins derived from crocodilian hybrids, the designation HYB or, where the parentage is known, the two three-letter codes for the parents, separated by the character =91x=92 (e.g. PORxSIA where the hybrid is a cross between *Crocodylus porosus* and *Crocodylus siamensis*), be used instead of the standard species codes in Annex 1 of this Resolution'.

7. This is clearly complicated (practically), but what is Mexico doing now?

8. With the transfer of *C. moreletii* to Appendix II, hybrids (theoretically) would still need to be treated as Appendix I *C. acutus* and follow this complicated tagging situation.

9. With regard to the establishment of feral populations of *C. moreletii* on the West coast, as a consequence of farming, CITES Resolution Conf. 12.10 is quite clear. The Operational part URGES that: a) Parties, prior to the establishment of captive-breeding operations for exotic species, undertake an assessment of the ecological risks, in order to safeguard against any negative effects on local ecosystems and native species;

   2. ANNEX 1: 15. Description of the inspection and monitoring procedures to be used by the CITES Management Authority to confirm the identity of the breeding stock and offspring and to detect the presence of unauthorized specimens held at or incorporated within the operation or provided for export. 16. Description of the facilities to house the current and expected captive stock, including security measures to prevent escapes and/or thefts. Detailed information should be provided on the number and size of breeding and rearing enclosures, egg incubation capacity, food production or supply, availability of veterinary services and record-keeping.

10. The registrations for the three farms are for *C. moreletti* and not hybrids.

It is obviously difficult from far away to fully understand the situation and to appreciate what may or may not be practical to achieve and implement. However, I believe that Mexico should make these issues very clear in the proposal, as they are clearly of concern to the Parties to CITES and I have little doubt that these issues will be questioned by the EU, USA and others.

In addition, in paragraph 5 of "5. Threats", the proposal states that there is no evidence of hybridization reported outside Belize. One reviewer indicated that some genetic work may have been undertaken in Chiapas [Garcia-Cruz, E.G., Dominguez-Laso, J. and Espinosa-Medinilla, E (2006) - thesis], and that phenotypic differences suggest that hybridisation probably occurs. Another reviewer indicated that genetic

work had been done in the Yucatan Peninsula (see attached papers: Cedeno-Vasquez *et al.* 2008; Rodriguez *et al.* 2008; also Machkour-M'Rabet *et al.* 2009).

D. Area of distribution versus habitat available.

Although area of distribution is given, it does not reflect actual habitat that can be utilised by crocodiles. In 4.2 Population Size, habitat is expressed as "25,227 km". Can this "length" be subdivided into sub-categories of habitat – mainstream river, secondary rivers, creeks, swamps. Application of densities relevant to specific habitats would be more practical.

E. Population Trends

No population trends are shown. Since 2004 it appears that no population monitoring has been undertaken to quantify trends in even a sample of rivers/habitats. The PVA analysis (section 4.4) is useful, but is simply a model that can only be tested in hindsight. With most crocodilians it has been well established that if habitats remain available and hunting pressure is reduced, populations can quickly recover. Equally, high hunting pressure, particularly aimed at adults can quickly reduce populations.

Comparison of densities of *C. moreletii* with other species is not considered scientifically valid. For example, comparison with *Caiman crocodilus* would indicate low populations of *C. moreletii* using this argument. For example: species differ with regard to their tolerance of conspecifics (eg *C. porosus* is very territorial); density for *C. palustris* does not reflect the species' entire range; the density of *C. novaeguineae* in rivers does not reflect the overall population size, as hunting reduces density in accessible areas that are surveyed.

Surveys in a particular year may be influenced (up or down) by environmental conditions at the time of survey, and are not indicative of population trends over time. It is good to see that a monitoring program is being developed that can provide data on population trends over time. The proposal would have benefited from having some trend data available from some areas over the last 5 years since the COPAN project (2002-2004). If data are available, they should be included.

F. Habitat/Threats

At the end of section 4.1, it is indicated that habitat alteration, etc. "would not be expected" to be a threat to the species. At the beginning of section 5 (Threats"), it is stated that "the main threat to the species is habitat degradation" – these are somewhat contradictory.

G. Trade

It is unclear how current trade in *C. moreletii* can e used to indicate "no severe danger to the continuity of the species …" (para 1, section 6.5). Comparison with trade levels and markets during the first half of the 20th century may not be relevant.

In addition, only three farms contribute to international trade (and one of those only has 6 crocodiles; Table 1), and international trade does not necessarily reflect production that is used domestically.

H. Other

It is unclear what the numbers shown in Table 1 are ("Stock Preliminar"). At what date do these figures apply ("as of …. DATE/YEAR ...."). As indicated in B. above, more data on production, etc. may be useful. In addition, the numbers of breeding stock at each farm would provide an index of production.

Any further comments from CSG reviewers will be be sent as they are received.

Yours sincerely

Dr Grahame Webb
Chairman
IUCN-SSC-Crocodile Specialist Group