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

Nineteenth meeting of the Conference of the Parties
Panama City (Panama), 14 – 25 November 2022

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Transfer of the Philippine population of Saltwater crocodiles (*Crocodylus porosus*) in Palawan Islands, Philippines from Appendix I to Appendix II, with a zero export quota for wild specimens, in accordance with Resolution Conf. 9.24 (Rev. CoP17).

B. Proponent

Philippines*

C. Supporting statement

1. Taxonomy

1.1 Class: Reptilia

1.2 Order: Crocodylia

1.3 Family: Crocodylidae, subfamily Crocodylinae

1.4 Genus, species or subspecies, including author and year: *Crocodylus porosus* (Schneider, 1801)

1.5 Scientific synonyms: *Crocodilus biporcatus*, *Crocodilus oopholis*, *Crocodylus raninus*, *Oopholis pondicherianus*

1.6 Common names: English: Saltwater Crocodile, Estuarine Crocodile, Indo-Pacific crocodile
French: Crocodile d'estuaire, Crocodile marin
Spanish: Cocodrilo marino

1.7 Code numbers: A-306.002.001 .009

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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

2.1 Technical justification

The Palawan population of *C. porosus* has recovered significantly from its historically depleted state in 1992, from less than 200 individuals (mostly small juveniles) to the current population of 5,000+, with 52% >2 m in length.

The population, no longer meets the criteria for Appendix I of Resolution Conf. 9.24 (Rev. CoP17), but does meet the criteria for Appendix II. There are compelling reasons [Resolution Conf. 9.24 (Rev CoP17) Annex 2b, criterion B] for transferring the Palawan population to Appendix II. The conservation rationale for split-listing the Philippine *C. porosus* population [Resolution Conf. 9.24 (Rev. CoP17) Annex 3] is the same as for *Crocodylus acutus* in Colombia (CoP17, Proposal 21), which received unanimous support from the Parties.

An Appendix-II listing of the Palawan population will not adversely affect the national *C. porosus* population [precautionary measures in Annex 4 of Resolution Conf. 9.24 (Rev. CoP17). Palawan is geographically isolated, the local *C. porosus* population retained the capacity to recover from depletion, immigration and emigration from nearly islands occurs but not with Mindanao stronghold. *Crocodylus mindorensis* does not occur on Palawan. Captive-breeding farms registered with the CITES Secretariat are separated from Palawan.

Despite public education there is growing hostility towards *C. porosus,* which are large and dangerous predators, generally feared, causing fatal and non-fatal attacks on local people. Since 2012, at least 23 known “problem” crocodiles have been relocated or destroyed, and 70% of these have been local communities taking action to safeguard community safety.

A paradigm shift in management approach is needed to overcome growing hostility. Creating positive, tangible incentives for local communities to tolerate *C. porosus* is the main “compelling reason” [Annex 2,2b criterion B of Resolution Conf. 9.24 (CoP17)], as implemented with *C. porosus* in Australia and Sarawak. Paying local communities to protect *C. porosus* nests and hatchlings as a trial did alter attitudes and tolerance.

Proposed management will start with a trial ranching where nesting occurs, but new approaches (perhaps involving juveniles) will be needed in areas without local nesting. Management flexibility is beyond the prescriptive Resolution Conf 11.16 (Rev. CoP15)(ranching) and better matched to Appendix II under Resolution Conf. 9.24 (Rev. CoP17).

Crocodiles throughout the Philippines will remain protected under the Philippines Wildlife Resources Conservation and Protection Act of 2001, and the Philippines will retain stricter domestic measures than CITES (CITES Article XIV) with regard to trade in CITES-listed specimens. Export for commercial purposes of wild-caught *C. porosus* is prohibited throughout the Philippines, and will remain so, with the zero quota of *C. porosus* from Palawan, until the adaptive management approaches are tested and meet the approval of the Parties to CITES.

In pursuing improved management in Palawan, cooperation with diverse stakeholders and experts (eg IUCN SSC Crocodile Specialist Group) will occur. The experience gained in Palawan will provide practical insights into *C. porosus* management in other parts of the Philippines, where public and political opposition *C. porosus* populations are building.

2.2 General

The Philippines is an archipelago nation in SE Asia, with a land area of some 300,000km^2, comprised of 7,640 islands, in three major island groups [Luzon (which includes Palawan), Visayas and Mindanao]. The island of Palawan, is the westernmost part of the Philippines, and is 450 km long, 50 km wide, with a land area of 14,650 km^2. The many rivers, creeks and wetlands on Palawan do not include large meandering rivers generally considered prime habitat for *C. porosus* in other places (eg. Messel et al. 1979-87; Fukuda et al. 2007).

Historical distribution and abundance is only vaguely known. It was widely distributed, but likely heterogeneous in density linked to wetland productivity (CoP5 Prop. R1. Appendix 2; Webb et al. 1984; Fukuda et al. 2007). Areas of high local abundance did exist historically (Van der Ploeg et al. 2011) and

crocodile were incorporated into the culture of local peoples in complex ways, as occurs today (Van der Ploeg et al. 2011).

Colonial social values from the 1500s onward favored eradication of crocodiles as pests. Commercial markets for skins started in the 1920s, collapsed during WWII, and increased after WWII throughout the species' range (eg Webb 2022). In the Philippines, *C. porosus* became rare in areas they had once been common, as elsewhere (Fukuda et al. 2011). In 1950-51, a Philippine hunter estimated 2000 skins were taken from Palawan Island (Regoniel 1992; Ortega and Regoniel 1994). Opportunistic hunting continued until the 1970s and 1980s despite serious declines in abundance (Ortega and Regoniel 1994).

Where habitats are intact and hunting minimized, recovery has stemmed from remnant, surviving adults, wary and well hidden (Fukuda et al. 2011). The largest mangrove forest areas in the Philippines with associated swamps are in Palawan, Sulu and Zamboanga Peninsula.

In cooperation with the Government of Japan, the Philippines developed a Crocodile Farming Institute (CFI) in 1988 (Ortega 1992). *C. porosus* founder stock (N= 301) were drawn from various areas, mostly from Palawan (N= 140). At that, this was considered a bold, positive conservation action, because of limited protection in the wild. Captive breeding and raising technologies developed successfully at CFI ultimately provided founder stock for the local crocodile farming industry in the Philippines. The wild population on Palawan clearly recovered, and the captive population is around 35,000.

Legislative responsibilities for *C. porosus* and its habitats in the Philippines are diverse, and adequate for implementing proposed management in a precautionary and responsible way, with safeguards. The Department of Environment and Natural Resources (DENR) is responsible for CITES compliance. Wildlife resource management and protected areas, which includes *C. porosus* and its habitats, are controlled under various Philippine national laws: Forestry Reform Code of the Philippines (PD 705); National Integrated Protected Area Systems Act of 1992 (RA 7586) as amended by RA 11038 (Expanded National Integrated Protected Area Systems Act of 2018); Strategic Environmental Plan (SEP) for Palawan Act (RA 7611); and, Wildlife Resources Conservation and Protection Act of 2001 (RA 9147).

A further tier of legislation exists at the Provincial level and in Palawan through the Palawan Council for Sustainable Development (PCSD), supporting the proposed initiative (PCSD 2020). RA 9147 prohibits the collection and/or trade of threatened wild fauna including its by-products and derivatives listed in DENR DAO 2019-09. PCSD Resolution No. 15-521 lists Terrestrial and Marine Wildlife in Palawan, assigned to categories pursuant to RA 9147, in accordance with wildlife laws, rules and regulations. Further support is via the Philippine Biodiversity Strategy and Action Plan (PBSAP) under DENR Administrative Order No. 2016-12 (DENR 2019a). Technical Bulletin No. 2020-02 issued by the Biodiversity Management Bureau (BMB) of DENR, provides protocols for managing human-crocodile conflict (HCC). Local people still take action when conflicts occur, especially immigrants that never co-existed with *C. porosus.*

The implementation of a sustainable use model, for incentivizing communities to value and coexist with *C. porosus,* is considered essential for countering the growing intolerance of *C. porosus* linked to HCC.

3. Species characteristics

3.1 Distribution

Crocodylus porosus are widely distributed: Australia, Bangladesh, Brunei Darussalam, India, Indonesia, Malaysia, Myanmar, Palau, Papua New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Timor Leste, and Vanuatu (Annex 5). Status is highly variable from country to country, with the species essentially extinct in the wild in Thailand, Vietnam and Cambodia, but at carrying capacity in Australia. Regardless of status, large size (<6+ m total length) and predatory habits create management challenges everywhere.

Intense historical hunting left remnant breeding populations largely restricted to southern Philippines, Palawan, Mindanao (Annex 1), but also the northeast coast of Luzon (CPPI 2020). Efforts to stock CFI (1988-1992; Annex 1)(Regoniel 1992; Ortega and Regoniel 1994) relocated 301 individuals, from which a captive stock of 35,000 has resulted.

In Palawan Province, with 271 mostly short rivers, *C. porosus* occurred at low densities in rivers, mostly draining to east (Regoniel 1992). The current population is largely restricted to 56 locations (Annex 7), particularly in southern Palawan. The rivers tend to be short and lined with fringing mangroves from the mouth to a few kilometres upstream. Immigration and emigration between Palawan and north Borneo, where *C. porosus* occurs in Pulau Balambangan, an island within the Pulau Banggi group off northeastern Borneo, is only 36 km from the Balabac group of islands of Palawan (Das and Hee 2008).

In Mindanao, strongholds of recovering populations are in the Provinces of Surigao del Sur and Surigao Del Norte, Agusan Marsh Wildlife Sanctuary, the coastal surrounds of Davao Oriental and Davao del Sur, provinces bordering the Ligawasan Marsh Game Refuge and Bird Sanctuary, the coast of Zamboanga Peninsula, and the Islands in the Sulu Archipelago, including the Turtle Island Wildlife Sanctuary.

3.2 Habitat

C. porosus in the Philippines are mostly in riverine mangrove forest, estuaries and coastal areas. In Palawan, *C. porosus* extends to lowland irrigation canals in the south. In Mindanao, they are most abundant in inland freshwater marshes of central and eastern Mindanao (Regoniel 1992; Ortega and Regoniel 1994; Pomares *et. al.* 2008; Manalo *et al.* 2012, 2016).

Species Distribution Modelling (SDM) predicted 11 core habitats for *C. porosus* in the Philippines (Binaday *et al.* 2020)(see Annex 2). Palawan Province had the highest subtotal area, of 282,787 ha, and the largest interconnected habitat for *C. porosus* in the Philippines (Binaday *et al.* 2020). The entire river system network of Palawan, including island tributaries and lowland elevation above mean sea level, is 7,143km of waterways (PCSDS 2020). Some 35% of predicted habitats for *C. porosus* in Palawan are under some degree of protection (Binaday *et al.* 2020).

3.3 Biological characteristics

There is an extensive literature on *C. porosus* biology, population processes and management, much of which applies to *C. porosus* in the Philippines (eg Webb and Messel 1977, 1978; Webb et al. 1977, 1978, 1983; Taylor 1979; Messel et al. 1979-87; Whitaker 1984; Messel and Vorlicek 1985, 1986; Burbridge et al. 1987; Taplin 1987, 1990; Webb and Manolis 1989, 1992; Bayliss and Messel 1990; Webb et al. 1991; Stuebing et al. 1993; Fukuda et al. 2011, 2019; Grigg and Kirshner 2015). *C. porosus* are generalist water's edge predators, with juveniles preying on insects, crustaceans, frogs, small reptiles and fish, while larger crocodiles (2<6 m total length) shift to large prey including freshwater and marine turtles, snakes, birds, monkeys, wild pigs, and when opportunity presents, livestock and humans. Cannibalism is common and plays a critically important role in population processes (Fukuda et al. 2020). Long distance movements at sea are known, but poorly understood (eg Brackhane et al. 2018). Sexual maturity in wild males occurs around 3.4 m and 16 years of age, and for females at 2.3 m and 10-12 years (Webb et al. 1978). In the Philippines, mating and egg laying seasons vary geographically, but generally occur between February and September (PWRCC 2008; CAVFI 2020; JKMSAEI 2020). Breeding is restricted to rivers and wetlands, and even in estuarine areas, requires freshwater input. Females make mound nests from vegetation and mud, and lay 40-60 eggs per clutch. The sex of hatchlings is determined by temperature, with 32.0°C producing near 100% males, and <31.0°C and >33.0°C both producing females.

Survival rates among juveniles in the wild vary with size and age (Webb and Manolis 1992; Fukuda et al. 2020) and other parameters. Basic estimates are: 25% of eggs survive, 54% of hatchlings, 30% of yearlings, 60% of 2-3-year-olds and 56% of 3-4-year-olds, etc. Less than1% of hatchlings may survive to maturity (Webb and Manolis 1992).

3.4 Morphological characteristics

Crocodylus porosus is the largest extant reptile, with some males reaching up to 6+ m in length and weighing up to 1100kg. The species is specialist water's edge predators. Ridges from the eye orbits to the center of the snout are distinctive, as are the lack or minimalization of enlarged post-occipital scutes on the neck. Jaws contain 66-68 teeth and generate the strongest bite force known in the animal kingdom (Erickson *et al.* 2012). Juvenile coloration is affected by background. In the Philippines they are generally yellow in color with black stripes and spots. With increasing size and maturity, the skin darkens with light grey areas and a yellowish ventral (belly) surface. Dark bands occur on the lower

flanks. The skin lacks osteoderms (bone) in the ventral scales. The scales on the flanks and belly are oval and squarish in shape (Cogger 1993; Grigg and Gans 1993; Cooper-Preston and Jenkins1993).

3.5 Role of the species in its ecosystem

Crocodilians are considered apex predators and indicators of ecological health, but Somaweera et al. (2020) recently concluding the majority of claims about the important ecological roles (eg Fittkau 1970) are anecdotal, untested assumptions. The impact of extreme population depletion on local ecological systems has not been studied, and evidence-based approaches to replace the uncertainty and speculation are needed. Irrespective of ecological or commercial value, their intrinsic value is and should be more than enough to ensure they are conserved and managed.

4. Status and trends

4.1 Habitat trends

Many wetlands in the Philippines have been adversely affected over time from the increasing human population (112.5 million in 2022, increasing at 1.35% per year). Active intervention has seen mangrove forest of Palawan expand from 50,602 ha in 1992, to 63,532 ha in 2010 (rate= 700 ha/year) land cover maps for 2005 (PCSDS) and 2010 (NAMRIA). In 2014, mean mangrove density in Palawan was considered 'adequate stock' (2779 trees/ha) whereas in 2004 it had been considered "inadequate stock" (1428 trees/ha) (PCSDS 2015).

A graded system for protection of coastal and terrestrial habitats in Palawan, and the Environmentally Critical Areas Network, both components of Republic Act 7611 (Strategic Environmental Plan for Palawan Act) has improved protection of Palawan's extensive mangrove forest cover. Natural regeneration is compensating for mangrove losses due to aquaculture conversion and giving a positive rate of expansion of mangrove cover in the province.

In FAO Global Forest Resources Assessment (FAO 2007; 2020) Philippines mangrove deforestation was identified as a problem, despite the rate of loss being reduced. The Philippines total gross mangrove-covered area of 268,996 ha in 1990 has decreased to 240,824 ha (10.5%) in 2010 at an annual rate of 0.52% (Long *et al.* 2014). Important inland freshwater marshes, like Ligawasan and Agusan Marshes River basins in Mindanao, also suffer from farmers converting herbaceous swamp vegetation to rice fields and small fishponds, increasing siltation.

4.2 Population size

The Palawan Wildlife Rescue and Conservation Center (PWRCC; formerly CFI), in collaboration with CPPI, have conducted *C. porosus* population surveys in Palawan from 2014 to 2019.

In 19 rivers on the mainland (N= 8) and nearby islands (N= 11), mean spotlight count (relative) density) was 2.94±1.23 (SE; N= 19) individuals sighted per km of river surveyed (Annex 4). Highest relative density (24.2 sightings/km) was on Bugsuk Island in the Balabac Group of Islands where an extensive swampland is associated with the river (Manalo *et al.* 2016). Tidal rivers with associated inland vegetated swamps had higher densities and larger complements of juvenile crocodiles (Annex 4). In other places, *C. porosus* recruitment has involved rivers with intrinsic breeding and local recruitment, and dispersal of juveniles 2+ years of age from these breeding rivers to areas with limited or no breeding, as elsewhere (Messel et al. 1979-87).

If the highest density river (Bugsuk Island) is excluded, the mean density is 1.76 ± 0.38. Of the entire river and creek systems in Palawan (N= 271; 7143 km), current records establish *C. porosus* in 21% of rivers (N=56; 1500 km). The visible population if all were surveyed by spotlight is estimated as 2,640 individuals (1500 x 1.76), and with Bugsuk added, about 3,000. This estimate is considered conservative: it ignores scattered individuals throughout the other 215 waterways, and the population within vegetated swamps where spotlight counting is impractical.

The proportion of the total population in navigable tidal rivers seen during spotlight surveys at low tide rarely exceeds 60% among juveniles, and declines with both increasing crocodile size and increased vegetation at the water's edge (Bayliss et al. 1987; Webb et al. 1988). The real population in tidal rivers, based on applying a 50% correction, is estimated crudely at 6,000 individuals. The extent of the

population outside navigable tidal streams can be expected to be significant (Webb et al. 1984 Appendix 6).

That *C. porosus* can travel long distances at sea is well known but poorly understood (*eg* Manolis 2005; Campbell *et al*. 2010; Brackhane et al. 2019; Spennemann 2021), with barriers to dispersal apparent in some locations (Fukuda et al. 2019). The close proximity of Palawan to Pulau Banggi islands in the Kudat District of Sabah (>36 km) suggests interchange between the two populations may occur, with such distances potentially traveled in 2-3 days (Read et al. 2007). The Sabah *C. porosus* population is estimated at 13,000 to 15,000 individuals (Chong 2019). No such interchange is known, and the genealogical relationships between these populations (Russello et al. 2007) are only now being quantified.

Recent phylogeographic analyses (Roño 2021) (Annex 3 & 6) indicate Palawan samples of *C. porosus* are shared with the Sulu Archipelago (Annex 3-A). A separate and distinct cluster exists between Simunul and Sibutu Islands in Tawi-tawi (Annex 3-B). A further cluster defines *C. porosus* largely from Mindanao (Annex 3-C). Gene flow between these clusters occurs and potential exchanges with north Bornean seem likely. A juvenile *C. porosus* caught in the Philippine jurisdiction of the Turtle Island Wildlife Sanctuary (Lacson 2020;TIWS 2020) may well have emanated from areas under the jurisdiction of Sabah.

4.3 Population structure

Based on recent surveys in Palawan (Annex 4), in which “Eyes Only” were confirmed as being mostly large individuals (>2m), crocodiles>2 m TL, which includes adults and sub-adults, were 52.3% of crocodiles sighted (123 of 235); 27.6% of these (34 of 123) were greater than 3 m TL. Hatchlings and 1-year-olds (<1 m TL) constituted 11.9% of all crocodiles sighted (28 of 235). These age classes do not disperse far from breeding sites (Webb and Messel 1978); 89.3% (25 of 28) were found in 3 rivers. The survival rate of this size class, particularly 1-year-olds (60-70 cm TL), declines sharply as numbers of crocodiles >2 m increase, due to cannibalism (Webb and Manolis 1992). Juveniles between 1 and 2 m TL were 35.7% of crocodiles sighted (84 of 235), and are the main size class that disburses (Messel et al. 1979-87) from breeding areas. Many more disburse than are recruited in adjoining rivers, and mortality during dispersal may exceed 70% (Messel et al. 1979-87). The population structure with 53.2% of animals over 2 m TL is consistent with advanced rather than early stages of recovery (Messel et al 1979-87, Fukuda et al. 2020).

4.4 Population trends

Commercial hunting since the 1920s, which intensified 1950-1970, resulted in obvious depletion. One estimate is that 2000 crocodiles were harvested in Palawan 1950-51 (Ortega and Regoniel1994). In addition to commercial hunting, habitat conversion, private collection and negative public attitudes towards crocodiles were all implicated in population declines up to the 1970s (Regoniel 1992). Between March 1987 and October 1992, 140 *C. porosus,* mainly juveniles, were relocated from the wild in Palawan for CFI. CFI developed technologies for captive breeding for both conservation and commercial purposes. By 1992, the wild population on Palawan was estimated at 57-131 individuals with 16 to 38 non-hatchlings (Regoniel 1992). Spotlight counts in Palawan averaged 0.05 sightings per km versus 2.95 per km in 2019. If the total population in Palawan in 1992 was 200 individuals, and the current population is 5,000+, the mean rate of increase would be 12.7% per annum; a significant recovery since 1992.

4.5 Geographic trends

In southern Palawan *C. porosus* are mostly in tidal rivers, with old-growth and/or secondary-growth mangrove forests, and varying levels of inland marsh or swamp (Regoniel 1992; Bucol 2014; Manalo et al. 2016; Binaday et al. 2021). They have been rarely been encountered in inland waters elevated above sea level, or in waterways with rapid or turbulent water that characterize midstream sections of some rivers. Lowland habitats, including shorelines, coastal mangrove areas, tidal and freshwater sections of rivers, and inland marshes are the main areas. In both Palawan and Mindanao, population recovery is known locally, and sightings of *C. porosus* in new coastal locations are consistent with increased dispersal of recovering populations (Messel et al. 1979-87). The presence of small and large *C. porosus* individuals in the southern islands of Tawi-Tawi, may well reflect exchanges with neighboring countries.

4.6 Other populations in the Philippines

A survey in four locations in Tawi-tawi, Sulu Archipelago, resulted in a relative density of 1.65 individuals sighted per/km. Opportunistic records of *C. porosus* at sea (off Simunul, Sibutu, Sitangkai and Turtle Islands, and Mindanao) indicate ocean dispersal is occurring. In Mindanao, *C. porosus* has been confirmed in 50 locations (Annex 7), particularly in Zamboanga Peninsula, Ligawasan Marsh (Mindanao), and Agusan del Sur and Surigao del Norte in northeastern Mindanao. Recent new locations for *C.porosus* have been reported on the south coast of the Davao Provinces. Mindanao is the most important stronghold for *C. porosus* outside of Palawan (Annex 1), but because of civil unrest a program of formal surveys has not been possible. Low densities of *C. porosus* are known from north eastern Luzon.

5. Threats

Human-crocodile conflict is the major constraint on rebuilding *C. porosus* numbers in much of the Philippines, as in Thailand, Cambodia and Vietnam and other densely populated nations. In the Philippines the rate of crocodile attacks on people is increasing in areas where the *C. porosus* population has been recovering (Table 1): 32% of reported attacks (2000-2020) are fatal, and 68% of all attacks are in Palawan.

Table 1. Reported human-crocodile incidents in the Philippines (2000-2020).Data from CrocBite (2016) and CPPI (2020)

YEAR	**OUTCOME**		**TOTAL**
	FATAL	**NON-FATAL**	
2000 - 2005	-	1	1
2006 - 2010	4	8	12
2011 - 2015	4	13	17
2016 - 2020	10	24	34
TOTAL	**18**	**46**	**64**

The Philippine human population (112+ million in 2022) is increasing rapidly (annual rate of growth of 1.35%) and waterways, riparian habitats and inland wetlands outside of protected areas are widely used for sustaining livelihoods. Communities which attribute high cultural and spiritual value to crocodiles exist (Van der Ploeg et al. 2011), but culturally-based values and tolerance wane with increasing fatal attacks on local people (Brackhane et al. 2019, 2020).

In Palawan most local communities depend on fishing, with fisherfolk living in stilt houses in coastal areas. Crocodile sightings at these communities are increasing and fishers, pets and livestock, all potential food, attract *C. porosus.* Coastal communities pressure local authorities to cull *C. porosus* and sometimes do so themselves (unauthorized) to protect their families. Sustainable incentives for local people to tolerate *C. porosus* are critical to sustaining the recovering since 1992.

6. Utilization and trade

6.1 National utilization

The wild *C. porosus* population in the Philippines is protected by law, and no domestic or international trade in wild animals occurs. All trade, domestic and international, is restricted to farms registered and authorized by DENR as wildlife facilities, and/or registered with the CITES Secretariat as commercial captive-breeding operations for Appendix-I species (pursuant to CITES Article VII.4). Current farm stocks are around 35,000 individuals.

6.2 Legal trade

There are currently three CITES-registered farms, which export raw skins - all exports have been to Singapore (eg Caldwell 2020), overseen by DENR, and compliant with CITES including universal tagging [Resolution Conf. 11.12 (Rev. CoP15)]. Exports are summarized on Table 2.

Table 2. Captive-bred and farm raised *C. porosus* skins exported from the Philippines (2006 to 2020) in compliance with CITES. JKMSAEI and CAVFI are the two exporting farms, which originally used CFI as the origin of crocodiles (A-PH-502), prior to receiving their own registration with CITES (A-PH-503 and A-PH-504).Data from DENR-BMB, the PH CITES Management Authority.

YEAR	**No. of *C. porosus* skins exported(whole skins)**				**TOTAL**
	A-PH-502 (JKMSAEI)	**A-PH-502** (CAVFI)	**A-PH-503** (JKMSAEI)	**A-PH-504** (CAVFI)	
2006 - 2010	28	1,793	0	0	1,821
2011 – 2015	0	18,177	1,748	0	19,925
2016 – 2020	0	4,795	2,907	13,403	21,105
TOTAL	28	24,765	4,655	13,403	42,851

A CITES Electronic Permitting and Management Information System (CEMPIS) for terrestrial CITES-listed species (eCITESPH) is being developed. A project to develop an eCITES national Master Plan for the CITES Management Authority is being pursued in cooperation with DENR, ADB and GEF. PCSD in partnership with USAID (Protect Wildlife Project) and the US Department of Interior (USDOI), has developed and operationalized a Biodiversity Resources Access Information Network (BRAIN) System digital platform for wildlife permitting.

6.3 Parts and derivatives in trade

Exports of *C. porosus* specimens from the Philippines are largely restricted to raw salted skins (Table 2), with an occasional skull and teeth as souvenirs. Crocodile meat is restricted to the domestic market. Tanned crocodile leather products (mainly belts, bags, wallet and key holders) are made with re-imported Philippine skins, and are marketed in selected souvenir stores with an accompanying authenticity card, inspected by DENR-BMB.

6.4 Illegal trade

There are no (post-CITES accession) records of illegal trade in crocodile skins, products or meat originating from the Philippines.

6.5 Actual or potential trade impacts

Regulated trade from the crocodile farming industry had a positive impact on wild populations and does not constitute a threat - the opposite is the case. The Philippines has essentially two separate populations of *C. porosus,* the closed captive-breeding farm population and the wild population. They are managed separately and have different management problems and solutions. International trade mainly involves raw, farm skins, with by-products used domestically. No trade in wild skins or by-products is known.

Crocodile farms, whether established and exporting or still in the development phase, formed an Association (Crocodylus Porosus Philippines Inc.; CPPI), which strongly supports conservation initiatives for the wild population (Manalo and Alcala 2013). CPPI invest a proportion of revenues gained from farming in conservation action, for no financial benefit. A highly successful CPPI initiative produced Philippine crocodiles (*C. mindorensis*) through captive breeding, and successfully re-established a wild population, now breeding, where local people and enterprises benefit commercially (through tourism

related industries). CPPI conservation funds have been used to support *C. porosus* survey programs (eg Annex 4) and to support students, research initiatives and field research in southern Philippines, for more than 20 years. A mandatory CITES permitting remittance, 3% of crocodile skin export value, is allocated to a national wildlife management fund for conservation and management initiatives.

6.6 Proposed utilization

The proposed utilization will be managed by the National Crocodile Conservation Committee (NCCC) in which DENR, PCSD and CPPI are all involved. It is an experimental program needing commitment, investment and resources. Facilities at the PWRCC (CFI) will be used. An Appendix-II listing is essential for engaging industry partnership and investment. Linking farms to the wild population and livelihoods of local people will assist sustainability.

The zero quota for wild *C. porosus* specimens is an interim precautionary measure [Resolution Conf. 9.24 (Rev. CoP17, Annex 4)]. Government can ensure management interventions achieve their goals before seeking the ability to trade internationally. The restriction to Palawan is a further precautionary measure. The initial action will be to expand the successful nest protection incentive scheme implemented on Palawan in 2017, specifically to:

a) encourage more local communities to identify wild *C. porosus* nesting sites on Palawan,

b) protect more nests until hatching, quantify nest success, and release hatchlings – all in exchange for financial support.

c) test whether strategic habitat interventions can increase *C. porosus* nest abundance (Vashistha et al. 2021; Ulloa-Delgado and Sierra-Diaz 2012, 2015); and,

d) identify local communities and sites with the best potential for future ranching.

The transition from the first phase (anticipating as taking a minimum of 2 years), to a formal ranching program, will require increased commitment and investment from stakeholders. It will be trialed in sites and with communities deemed to have the best potential for success. The technologies are within the existing industry, and information from other ranching programs (Jenkins et al. 2006; ICFA 2022) is readily available. Key focal points for action are:

e) artificial versus natural incubation (hatchling survival, fitness and sex);

f) hatchling care and maintenance (survival and optimal growth rates); and,

g) strategies for involving of local people in all aspects

The proposed initiative on Palawan will allow Government and all stakeholders to evaluate sustainability and determine how best to use commercial incentives to foster tolerance and stewardship to wild *C. porosus* -rather than calling for their eradication. By necessity it will be an adaptive program. No extension of the scheme beyond Palawan is anticipated, but may occur in the distant future based on the results from Palawan.

7. Legal instruments

7.1 National

The Philippine population of *C. porosus* is listed under CITES Appendix I. The widespread global population of *C. porosus* meets the IUCN Red List criteria for Least Concern (LC)(Webb et al. 2010, 2021). Pursuant to Section 22 of the Republic Act 9147, otherwise known as the “Wildlife Resources Conservation and Protection Act”, the Philippines updated the list of threatened species and their categories established under DENR Administrative Order No. 2019-09 (DENR, 2019b) as well as the PCSD Resolution No. 15-521 or the “List of Terrestrial and Marine Wildlife in Palawan and their Categories Pursuant to RA 9147”, the *C. porosus* is listed as Critically Endangered (CR) for enforcement purposes but not based on extinction risk. Under this category, illegal acts are punishable by 6 months to 12 years of imprisonment or a fine of Php 5,000 ($US100) to Php1,000,000 ($US20,500).

DENR Technical Bulletin No. 2020-02 entitled, “Protocol for Managing Human-Crocodile Conflict (HCC) in the Philippines”, which provides among other things, a decision tree for local managers to follow in case of an HCC incident. Future plans include elevating the Technical Bulletin into a Department Administrative Order (DAO) to strengthen its implementation.

7.2 International

C. porosus is listed on Appendix II in Australia, Papua New Guinea, Indonesia and Malaysia, where management programs involving sustainable use for commercial purposes have been implemented. It is on Appendix I in other range states. Within the Appendix-I range states, commercial captive breeding farms registered with the CITES Secretariat produce and export *C. porosus,* but to limited destinations. The implementation of CITES in the Philippines is embodied in the Philippines Wildlife Resources Conservation and Protection Act of 2001and other wildlife-related Department Administrative Orders, Circulars, and Memoranda. *C. porosus* is also listed under Appendix II of the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention/CMS), although the extent to which it is truly migratory is unclear.

8. Species management

8.1 Management measures

Problems created by the building numbers of *C. porosus* (Table 1) are genuine, and neither crocodile conservation nor the well-being of local people benefit from conflict situations now occurring. Government will test ways of creating tangible commercial incentives for local people in cooperation with industry, including micro-financial management for local communities. Non-Detrimental Findings (NDF) will precede any proposed exports. The *C. porosus* sustainable conservation plan of actions is consistent with the Philippine Biodiversity Strategy and Action Plan (PBSAP) 2015-2028 (BMB-DENR 2016). The Philippine Government reconstituted the NCCC under DENR Special Order 2015-1010 which developed the “Crocodile Conservation Action Plan of the Philippines, 2020-2028”. A sub-national “Conservation Strategies for Crocodiles in Balabac, Palawan, Philippines 2019-2029” has been developed by PCSD with technical assistance from USAID – Protect Wildlife, and provides guidelines for conservation, management and HCC in Balabac.

“Critical Habitat” has been identified in Canipaan, Rizal and Catagupan, Balabac in southern Palawan, where *C. porosus* nesting occurs. A nest protection scheme utilizing local people was piloted in this area and resulted in more nests being found, monitored through incubation and hatchlings released, for monetary compensation. A national protocol on managing HCC incidents (DENR BMB Technical Bulletin No. 2020-02) equips the Provincial Wildlife Quick Response Team (PWQRT) nationwide, with a step-by-step process for response and management of HCC incidents. Community Education and Public Awareness (CEPA) programs in collaboration with academic and local government agencies in Palawan and Mindanao have been initiated. An intensive quad-media campaign has contributed to mitigating HCC. National fora, workshops, and public consultations about crocodile conservation and management were having been conducted. Technical advice from the IUCN SSC Crocodile Specialist Group has been sought when needed.

The Philippines is committed to legal trade under CITES. The Philippine Operation Group on Ivory and Illegal Wildlife Trade (POGI-IWT) – Enforcement Team has been recognized by the UN for successful apprehensions of illegally traded CITES and non-CITES listed wildlife species.

8.2 Population monitoring

Monitoring has confirmed significant population increases from 1992 to 2014 (see 4.2 above). The Government and CPPI have committed to increase monitoring, and a citizen science initiative (CrocCountPH) has been launched in Palawan, with uniformed law enforcers involved. DENR Provincial Wildlife Quick Response Team (PWQRT) will facilitate nationwide population survey within respective regions.

8.3 Control measures

8.3.1 International

The implementation of CITES in the Philippines is embodied within Section 11 of R.A. 9147 "Wildlife Resources Conservation and Protection Act". CITES import and export permits are required for trade, and international trade non-CTES species requires an export permits.

8.3.2 Domestic

The collection, possession, and transport of any wildlife, including its by-products and derivatives, within the country are regulated by specific permitting systems embodied within R.A. 9147.

8.4 Captive breeding and artificial propagation

The commercial breeding or propagation of wildlife resources in the country requires a permit as stipulated under Section 17 of R.A. 9147. DENR Administrative Order No. 99-45 on the "Rules and Regulation on the Sale and Farming of Saltwater Crocodile" provides a guideline and regulates the Saltwater Crocodile farming industry in the Philippines (DENR 1999). Penalties for violations committed in relation to captive breeding of *C. porosus* in the country are very steep with fines ranging from Php 5000 to Php 300,000 ($US100 to $US6000) or imprisonment of up to five years.

There are three CITES-registered facilities for *C. porosus* in the country:

a) A-PH 502: Palawan Wildlife Rescue and Conservation Center (PWRCC), 1997

b) A-PH 503: JKMercado & Sons Agricultural Enterprises Inc. (JKMSAEI), 2009

c) A-PH 504: Coral Agri-Venture Farms Inc. (CAVFI), 2016

Aside from CITES-registered facilities, there are five (5) other establishments holding *C. porosus,* that are registered as farms by Government, but only two of the CITES registered farms with established crocodile abattoirs certified by the Department of Agriculture are exporting

8.5 Habitat conservation

A Philippine *C. porosus* habitat modelling study estimated there were 1,137,351 ha of suitable habitat left in the country, mostly in the southern Philippines (Binaday et al.2021). Of this area, 35% is protected under national legislation. Palawan Province has the highest area coverage of the predicted suitable habitats, with 93% of land legislated as protected areas (Annex 2) with well-established management plans. Section 25 of R.A. 9147 designates the establishment of "critical habitats" to be protected, in coordination with local government units and concerned stakeholders. Currently, there are several proposals for the establishment of *C. porosus* critical habitats in Palawan and Mindanao being assessed.

8.6 Safeguards

The zero quota for wild specimens, and the restriction of management experiments to Palawan, are significant safeguards. The species' biological capacity to recover is established. The focus on ranching eggs is a conservative and "safe" option (Jenkins et al. 2006). It may limit the ability to provide incentives in non-nesting areas, hence future ranching may extend to juveniles on a trial basis. *C. mindorensis* does not occur on Palawan and cannot be adversely affected.

9. Information on similar species

The endemic Philippine Crocodile (*C. mindorensis*) inhabits freshwater habitats in upland areas, and rarely coexists with *C. porosus.* Current population estimates are 92-137 (van Weerd *et al.* 2016) mature individuals, patchily distributed in northern Luzon, Negros Island and Mindanao. It is easily distinguished from *C. porosus* by size and scale pattern. The International Philippine Crocodile cooperative breeding and conservation programs established in USA, Australia and Europe have resulted in progeny being repatriated in 1993, 2014 and 2020 respectively. Recent repatriation of *C. mindorensis* from Cologne Zoo in partnership

with the Philippine government and the CPPI supports the World Association of Zoos & Aquariums (WAZA) One Plan Approach to conservation. CPPI have allocated significant conservation funds to *C. mindorensis* conservation and re-establishing wild populations of *C. mindorensis.*

10. Consultations

The PCSD Resolution No. 21-782 was issued adopting the PCSD – Environmental and Natural Resources Committee (ENRC) Resolution No. 2021-02 for downlisting of *C. porosus* Philippine population from Appendix I to II. The proposal to CoP19 will be discussed by the IUCN-SSC CSG at their 26th Working Meeting in Mexico (July 2022). Some CSG members within and outside the Philippines have commented on an early draft. The proposal was circulated to all range states seeking feedback and comment. Only Cambodia and Myanmar provided written expression of support/no objection to the proposal before the submission date, but later comments from other range states will be reported at CoP19.

11. Additional remarks

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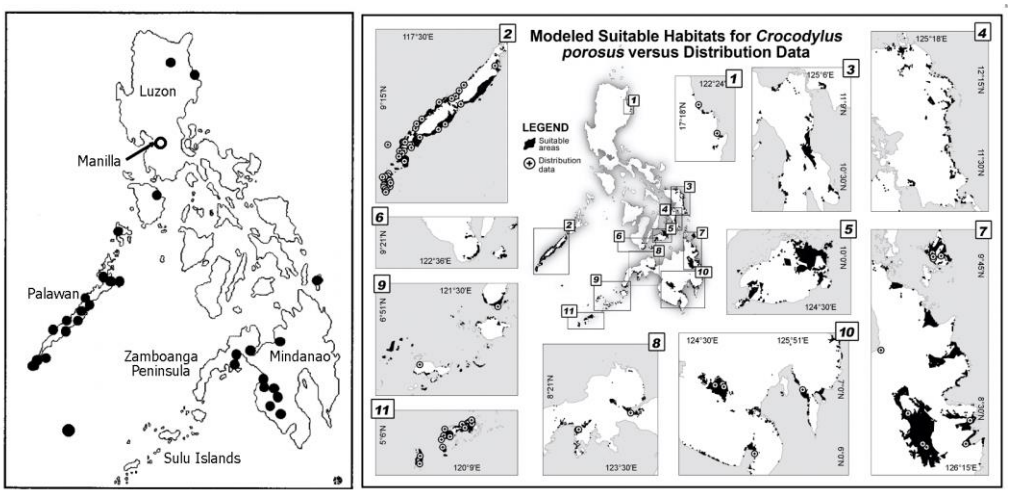
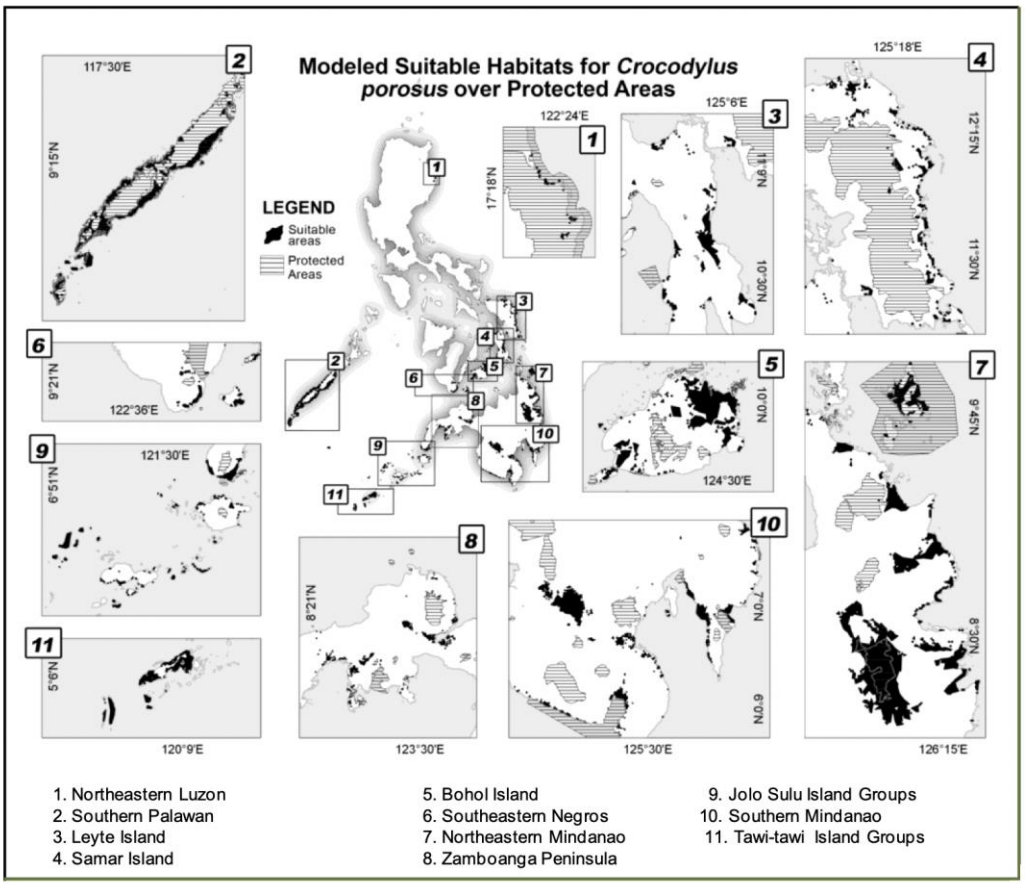
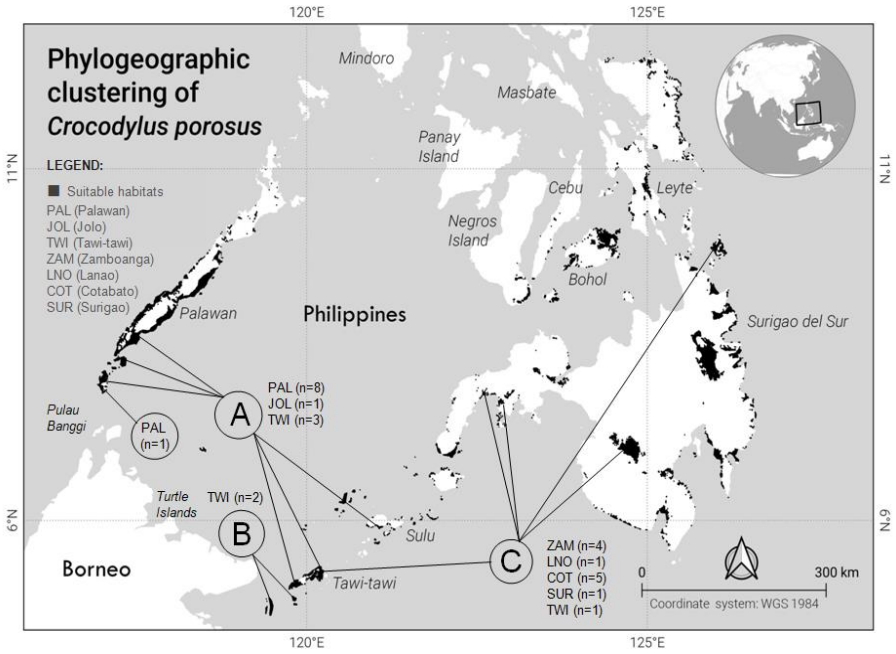
Annex 1. Distribution of *C. porosus* based on 1988-1992 CFI records (A), and on current known records (B).



Annex 2. Figure 1B showing suitable habitat for occupation of *C.porosus*in the Philippinesbased on an optimal threshold of 52% of suitability value (black), overlaid with existing protected areas (stippled)



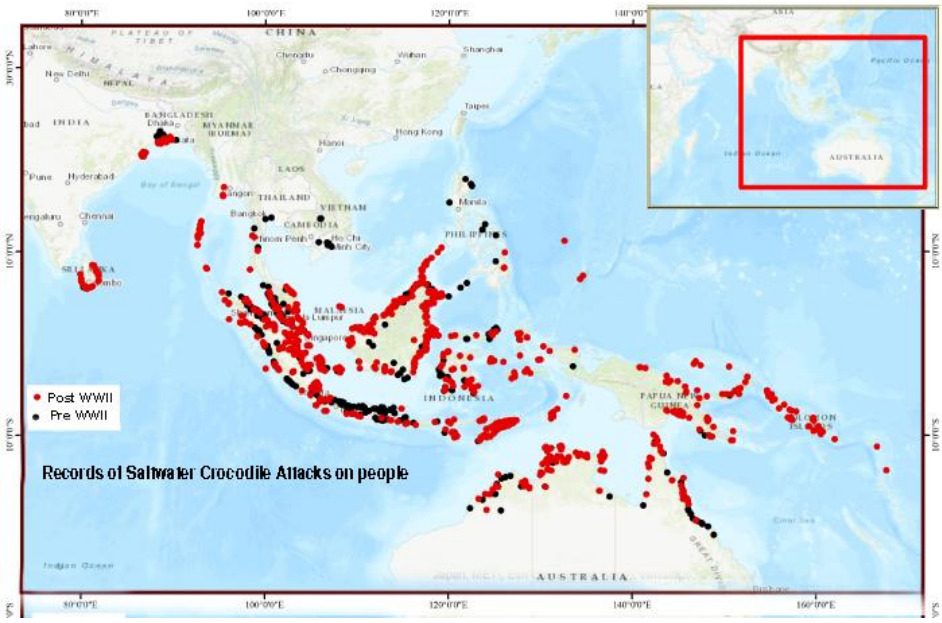
Annex 3. Geographic origin and phylogeographic clusters of Philippine *C. porosus* based on the TIM3+G Maximum likelihood tree of the samples (DBL Case No. 2020-00002), overlaying suitable *C. porosus* habitats in the Philippines (Roño 2021).



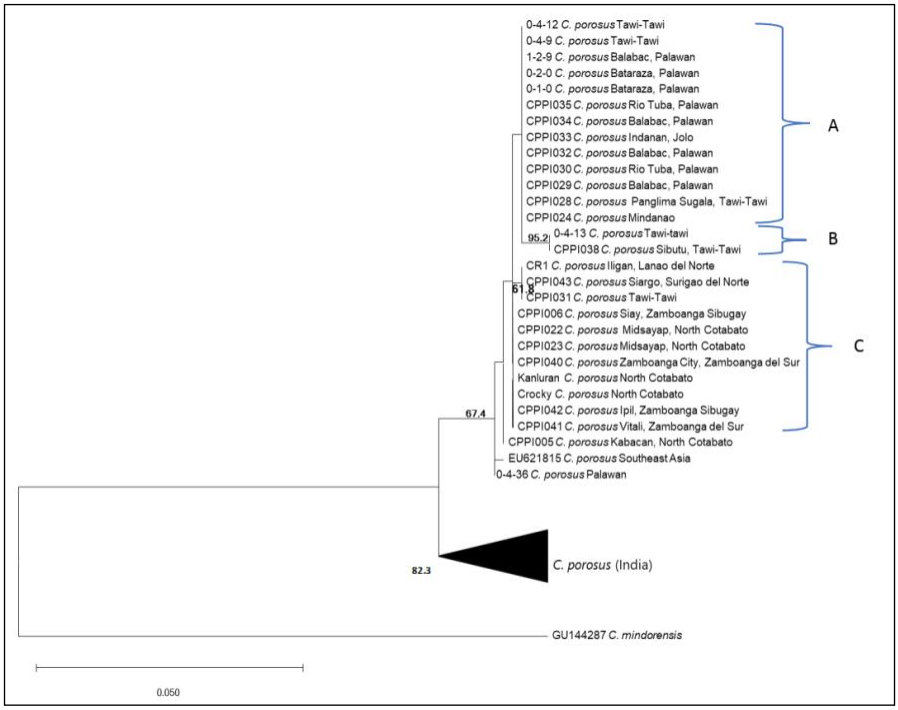
Annex 4. Summary of 2014 to 2019 *C. porosus* population surveys in southern Palawan (CPPI 2020). Relative density of crocodiles sighted (per km) includes "eyes only" (EO), which are assumed to be >200 cm TL (Webb et al. 1988). That 52.3% of sighted animals are >2.0 m TL is consistent with an advanced recovery (Messel et al. 1979-87)

Ref. No	LOCATION	Year Survey Updated	Total Distance (km)	Size Class (cm.)						No. of Sightings	Relative Density
				< 100	100 -150	150 < 200	200 ≤ 300	> 300	EO		
	Mainland Rivers										
1	Maasin River, Quezon	2017	6.87	0	0	1	0	1	3	5	0.73
2	Quinlogan, Quezon	2016	1.45	0	0	0	0	1	0	1	0.69
3	Panalingaan River, Rizal	2017	6.47	0	1	0	1	1	0	3	0.46
4	Canipaan River, Rizal	2019	8.49	3	3	3	0	1	6	16	1.88
5	Rio Tuba River, Bataraza	2017	6.25	0	1	0	1	0	0	2	0.32
6	Sumbiling River, Bataraza	2016	8.23	0	1	0	1	1	1	4	0.49
7	Malitub River, Bataraza	2018	1.45	0	0	1	0	0	0	1	0.69
8	Sowangan River, Quezon	2018	2.48	0	0	2	0	1	0	3	1.21
Sub-total			**41.69**	**3**	**6**	**7**	**3**	**6**	**10**	**35**	**0.81 (SE ± 0.18)**
	Rivers in Small Islands										
1	Bugsuk River, Bugsuk Is.	2019	5.17	12	24	25	38	11	15	125	24.18
2	Tukanigalo, Balabac Is.	2016	2.91	0	0	0	3	2	2	7	2.41
3	Dalit River, Balabac Is.	2016	4.91	0	0	0	3	1	1	5	1.02
4	Agutayan River. Balabac Is.	2016	2.64	1	0	0	2	1	1	5	1.89
5	Rabor River, Balabac Is.	2017	1.06	1	1	0	2	1	0	5	4.72
6	Pasig River, Balabac Is.	2016	3.27	0	2	0	0	1	0	3	0.92
7	Monsod River, Balabac Is.	2016	4.77	0	1	0	0	0	3	4	0.84
8	Catagupan, Balabac Is.	2019	4.56	11	13	0	2	2	0	28	6.14
9	Rampang, Balabac Is.	2019	2.06	0	1	0	0	3	0	4	1.94
10	Calibunan, Balabac Is.	2019	4.81	0	3	1	3	0	0	7	1.46
11	Kalugkog, Ramos Is.	2019	1.77	0	0	0	1	6	0	7	3.95
Sub-total			**37.93**	**25**	**45**	**26**	**54**	**28**	**22**	**200**	**4.50 (SE ± 2.04)**
OVERALL TOTAL			**79.62**	**28**	**51**	**33**	**57**	**34**	**32**	**235**	**2.95 (SE ± 1.23)**

Annex 5. Distribution of *Crocodylus porosus*



Annex 6. TIM3+G Maximum likelihood tree of the samples with GenBank accessions and samples from case file 2019-00013. Only statistical bootstrap values above 50 are shown (DBL Case No. 2020-00002).



Annex 7. Sources of presence data of *Crocodylus porosus* in the Philippines (Binaday*et al*. 2021).

Island Group	**No. of Points**	**Data Source**
Luzon	2	Brown *et al.* 2013
Palawan	56	Field surveys (2016-2020); Bucol *et al.* 2014; Manaloet *al.* 2016; Corvera*et al.* 2017; verified human-crocodile interactions; grey literature
Mindanao	50	Field surveys 2011-2020 (CPPI); Ross 2008; Tabora 2008; Pimentel *et al.* 2008; Pomares*et al.* 2008; Manalo *et al.* 2012; verified human-crocodile interactions; grey literature
Total	**108**	