VKM Vitenskapskomiteen for mat og miljø
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Preparation of the opinion

The Norwegian Scientific Committee for Food and Environment (Vitenskapskomiteen for mat og miljø, VKM) appointed a project group to draft the opinion. The project group consisted of four VKM members and two VKM staff. Two referees commented on and reviewed the draft opinion. The Committee, by the Panel on CITES with supplementation from two members of the Panel on Biodiversity assessed and approved the final opinion.

Authors of the opinion

The authors have contributed to the opinion in a way that fulfils the authorship principles of VKM (VKM, 2023). The principles reflect the collaborative nature of the work, and the authors have contributed as members of the project group or the VKM Panel on CITES with supplementation from the VKM Panel on biodiversity, appointed specifically for the assignment.

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Competence of VKM experts

Persons working for VKM, either as appointed members of the Committee or as external experts, do this by virtue of their scientific expertise, not as representatives for their employers or third-party interests. The Civil Services Act instructions on legal competence apply for all work prepared by VKM.

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Summary

This report presents a scientific risk assessment based on the criteria given under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). For each of the twelve species of crocodilians traded internationally and imported/exported to/from Norway since 2011, VKM has assessed whether trade poses a threat to the survival of the species (cf. Resolution Conf. 16.7 (Rev. CoP17)), in the form of a "non-detriment finding" (NDF). An NDF is a determination of impact from legal international trade on survival of a species in the wild and considers knowledge on various aspects of its biology, environment, usage, and management. In this report, the outcome of an NDF may be positive (no detriment), negative (detriment) or inconclusive (more documentation needed and NDFs should be made case-by-case). Based on the species-specific assessments VKM concludes no detriment (positive) for all twelve species. The confidence level of the conclusion of individual assessments (low to high) depends on the quantity and quality of data on biology, traded volumes, and management. As much data exists on these crocodilians, trade is seemingly well-regulated and detailed conservation plans have been developed for each species, all conclusions except one were made with high confidence. Uncertainties and data gaps in the species assessments were pertaining to the current statuses and trends of wild populations in parts of the ranges of some species, the extent of illegal trade and the management of the species in parts of their range states. VKM proposes that the NDFs could be applied for a period of ten years unless the IUCN assessments of the species are updated and changed to a level of raised concern.

Key words: *Alligator*, *Caiman*, CITES, crocodilians, Crocodylia, *Crocodylus*, NDF, Non-detriment finding, Norwegian Environment Agency, Norwegian Scientific Committee for Food and Environment, *Paleosuchus*, risk assessment, trade, VKM.

Sammendrag på norsk

Denne rapporten presenterer en risikovurdering som bygger på kriterier gitt i Konvensjonen om internasjonal handel med truede arter av vill flora og fauna (CITES). For hver av tolv krokodillearter som omsettes internasjonalt og som har blitt innført/utført til/fra Norge siden 2011, har VKM vurdert om handel utgjør en trussel for artenes overlevelse (cf. Resolution Conf. 16.7 (Rev. CoP17)), i form av en såkalt "non-detriment finding" (NDF). En NDF er en vurdering av risikoen for at lovlig internasjonal handel med en bestemt art vil være skadelig for artens videre overlevelse i naturen. En NDF består av gjennomgang av ulike aspekter av artens biologi, miljø, bruksområder og forvaltning. I denne rapporten kan utfallet av en NDF være positiv (ikke-skadelig eller "non-detrimental"), negativ (skadelig eller "detrimental") eller ingen konklusjon (behov for mer informasjon og NDF må lages for hvert enkelt tilfelle). På bakgrunn av de enkelte artenes risikovurderinger, konkluderer VKM med at lovlig handel er ikke-skadelig (positiv) for samtlige tolv arter. For hver artsspesifikk vurdering og konklusjon er det oppgitt et konfidensnivå (lavt-høyt) som avhenger av mengden av, og kvaliteten på, data om artens biologi, omfanget av handel og forvaltning. Fordi det finnes mye data, handelen virker å være velregulert og detaljerte bevaringsplaner finnes for hver art, er alle unntatt én konklusjon gjort med høy konfidens. Usikkerhet og kunnskapshull er knyttet til bestandsstørrelse og utviklingstrender for ville bestander, nivået av ulovlig handel og forvaltning i deler av utbredelsesområdene til noen arter. VKM foreslår at NDF for artene gis en gyldighet på ti år, med mindre Verdens naturvernunion (IUCN) kommer med nye vurderinger og artens bevaringsstatus endres.

Abbreviations

CITES – Convention on International Trade in Endangered Species of Wild Fauna and Flora

IUCN – International Union for Conservation of Nature

IUCN SSC – IUCN Species Survival Commission

NDF – Non-detriment finding

VKM – Vitenskapskomiteen for mat og miljø / Norwegian Scientific Committee for Food and Environment

Background as provided by the Norwegian Environment Agency

CITES regulates international trade in endangered species. This includes many species of crocodilians. Imports to Norway generally require both export permits from foreign CITES authorities and import permits from the Norwegian Environment Agency. Export or re-export of these species also require permits issued by the Norwegian Environment Agency.

The Norwegian Environment Agency receives applications regarding permits for crocodilians and specimens or products containing the species. Consequently, a scientific risk assessment (Non-Detriment Finding - NDF) is needed.

The risk assessment shall be used by the Norwegian Environment Agency in the evaluation of applications in accordance with the Norwegian Regulation on importation, exportation, possession, etc. of endangered species of wild fauna and flora (CITES-regulation).

Terms of reference as provided by the Norwegian Environment Agency

1. The Norwegian Environment Agency asks VKM for a scientific risk assessment of trade in crocodilians (Crocodylia spp.) listed in the CITES appendices and specimens thereof, based on the criteria given under the Convention on International Trade in Endangered Species (CITES). The Norwegian Environment Agency also asks VKM to give an estimate as to when the risk assessment should be updated.

2. The assessment shall be based on the Norwegian CITES Regulation, relevant articles in the convention text and resolutions. The assessment shall contain available knowledge on the following:

    a. Name, distribution, life history, habitat, role in ecosystem

    b. Populations and trends

    c. Legal / illegal harvesting, captive breeding and trade

    d. Assessment of the threat(s) posed by trade

    e. Brief summary of other threats and conservation status

    f. Population monitoring programs in the range area

    g. National regulations / legislation and in the range countries

    h. Current management in the range countries, including harvest quotas

    i. Overall assessment of data quality

3. Limitation: The risk assessment primarily concerns the species imported/exported to/from Norway since 2011.

Background documents:

- Norwegian CITES Regulation FOR - 2018-06-15-889

- Convention text, especially CITES Articles II, III, IV, VII, IX, og XIV.

- Resolution Conf. 7.12 (Rev. CoP15) Marking requirements for trade in specimens of taxa with populations in both Appendix I and Appendix II

- Resolution Conf. 8.3 (Rev. CoP13) Recognition of the benefits of trade in wildlife

- Resolution Conf. 8.13 (Rev. CoP17) Use of coded-microchip implants for marking live animals in trade

- Resolution Conf. 9.21 (Rev. CoP18) Interpretation and application of quotas for species included in Appendix I

- Resolution Conf. 9.24 (Rev. CoP17) Criteria for amendment of Appendices I and II

- Resolution Conf. 10.3 Designation and role of the Scientific Authorities

- Resolution Conf. 10.16 Specimens of animal species bred in captivity

- Resolution Conf. 10.17 (Rev. CoP14) Animal hybrids

- Resolution Conf. 10.21 (Rev. CoP16) Transport of live specimens

- Resolution Conf. 11.12 (Rev. CoP15) Universal tagging system for the identification of crocodilian skins

- Resolution Conf. 11.16 (Rev. CoP15) Ranching and trade in ranched specimens of species transferred from Appendix I to Appendix II

- Resolution Conf. 12.10 (Rev. CoP15) Registration of operations that breed Appendix-I animal species in captivity for commercial purposes

- Resolution Conf. 13.2 (Rev. CoP14) Sustainable use of biodiversity: Addis Ababa Principles and Guidelines

- Resolution Conf. 14.7 (Rev. CoP15) Management of nationally established export quotas

- Resolution Conf. 16.6 (Rev. CoP18) CITES and livelihoods

- Resolution Conf. 16.7 (Rev. CoP17) Non-detriment findings

- Resolution Conf. 18.6 Designation and role of Management Authorities - CITES 'Non-detriment findings' background - http://cites.org/eng/prog/ndf/index.php

- Interpretation and application of quotas for species included in Appendix I: http://www.cites.org/eng/res/09/09-21R13C15.php

Assessment

1 Introduction

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a multilateral treaty, ratified by and implemented in Norway (since 25 October 1976). The aim of the convention is to ensure that international trade in wild animals and plants does not threaten the continued survival of the species being traded. A scientific risk assessment of trade in crocodilians has been requested from VKM by the Norwegian Environment Agency (NEA) to support the work of the Norwegian CITES Management Authority in the evaluation of applications for these species in accordance with the Norwegian CITES Regulation (Lovdata, 2018).

The assessment is based on the Norwegian CITES Regulation as well as relevant articles in the CITES convention text and resolutions. The species lists in the Norwegian CITES Regulation (FOR-2023-02-23-249) correspond with the CITES appendices in the following way: CITES Appendix I is equal to CITES legislation Annex 1, List A; Appendix II to Annex 1, List B; Appendix III to Annex 1, List C.

Assessments to determine potential species-specific detriment pertaining to international trade (cf. Resolution Conf. 16.7 (Rev. CoP17), non-detriment findings, are made for 12 species (see Table 2.1-1) listed in Appendices I and II. These species have been registered as imported to Norway since 2011. Some of the species are listed in both appendices (so-called split-listings defined in Resolution Conf. 9.24 (Rev. CoP17), Annex 3) with some regional populations having been transferred between Appendix I and Appendix II over time (see section 3.1-3.12 for information on the individual species).

1.1 Crocodylia[1]

The order Crocodylia includes the families Alligatoridae (8 species; alligators and caimans), Crocodylidae (16 species; "true" crocodiles) and Gavialidae (2 species; gharial and tomistoma). Altogether 26 species are presently formally recognised by the International Union for Conservation of Nature (IUCN) and the Species Survival Commission (SSC) Crocodile Specialist Group (CSG) (Vliet et al., 2024). Noteworthy, only members of the family Crocodylidae are referred to as crocodiles.

Crocodilians inhabit wetlands all around the world. Most of their activities takes place in water, but nesting, and sometimes movement between water bodies, occur on land.

[1] Unless otherwise stated, sections 1.1 through 1.5 are based on information from the IUCN SSC Crocodile Specialist Group website, https://www.iucncsg.org, which in turn cites Webb & Manolis (1989) and Richardson, Webb & Manolis (2000).

Crocodilians nest in holes or mounds. Nesting may be triggered by changes in temperature or humidity. The nest is defended by the female while the eggs are incubating. The sex of all living crocodilians is determined by the incubation conditions, particularly temperature. Most crocodilians carry their newly hatched young to the water in their mouths.

Crocodilians are opportunistic feeders that take a wide array of prey, including hard-shelled molluscs, other invertebrates, fish, amphibians, reptiles, birds, and mammals. When ambient temperatures are low, the appetite is usually depressed.

All crocodilians have a similar body shape, ranging in length from Cuvier's dwarf caiman (*Paleosuchus palpebrosus,* about 1.5 meters) to the saltwater crocodile (*Crocodylus porosus,* 7 meters). The elongated snout is the most distinctive trait of crocodilians. Members of the three families can be distinguished by the broadness of their snouts. Crocodilians are also characterized by long, laterally compressed tails and short limbs that are straddled sideways from the body.

While submerged in water only the eyes, the top of the head, the ears and the nostrils will be above the surface. Potential prey will thus have little indication of the full size of the predator. In this "minimum exposure" posture all senses are retained. Crocodilians have well developed senses of smell, sight, and hearing.

Crocodilians have multiple adaptations to a semi-aquatic lifestyle. The nostrils are at the tip of the snout and can be closed by valves. Their eyes are oriented forward, resulting in binocular vision. The eyes are protected by a transparent eyelid that covers the eye under water and when attacking prey. Conventional eyelids can cover the eye completely. The eyeballs can be drawn into the eye sockets, to prevent injury during attacks on prey or when fighting other crocodilians. The ears are located on the edge of the cranial platform (that protects the brain) and are specialized for locating prey.

The scales along the sides of the jaws contain bundles of nerve endings that help detecting movement or vibrations in the water. The replaceable teeth of crocodilians are adapted to penetration and holding of prey. The muscles that close the jaws are much stronger than those that open them.

Crocodilian skin is covered with non-overlapping keratin scales. The scales contain bone deposits called osteoderms, which creates structure, particularly on the back.

1.2 Crocodilians in Norway

No crocodilians are native to Norway or Europe. It is forbidden by law in Norway to keep crocodilians as pets (Lovdata, 1976; Lovdata, 2017). Some live animals are kept in zoological exhibitions. Since 2013, import of 42 live crocodilians to Norway has been reported to the CITES Trade Database (2024) while 56 individuals have been reported

by exporting countries for the same period. Seizures of live individuals imported illegally to Norway have been made. The Council for Animal Ethics have advised against breeding of crocodilians in Norway (Rådet for dyreetikk, 2019). The import for commercial purposes (purpose code =T) to Norway since 2013 was mainly of small leather products, the importer and exporter reported quantity was 18,306 and 38,496 items respectively.

1.3 Threats to crocodilians

Of the 26 species of crocodilians, 23 have been assessed by the IUCN. Of these, 11 are Red Listed (seven as Critically Endangered (CR), one as Endangered (EN) and three as Vulnerable (VU)) and 12 are assessed to be of Least Concern (LC).

Widely distributed species, like salt-water crocodile (*Crocodylus porosus*), Nile crocodile (*Crocodylus niloticus*) and American crocodile (*C. acutus*), may be threatened in some parts of their range and not in others. The main threats to most crocodilian species are illegal hunting, habitat loss and degradation, and pollution (see more specific information in the species assessments, section 3.1-3.12).

The mortality of juveniles may be very high as they are predated upon by crabs, birds, crocodilians, mammals, and other animals. Attacks by crocodilians on humans, livestock or pets are main causes for human-crocodilian conflict but it may also involve fish resources and entanglement of crocodilians in fishing gear.

1.4 Conservation of crocodilians

The IUCN SSC Crocodile Specialist Group (CSG) has since the early 1970s worked with governments, non-governmental organisations (NGOs) and companies involved in trade of crocodilian skins in order to conserve, manage, and ensure sustainable use of crocodilians worldwide. Action plans for each species have been developed (Manolis & Stevenson (Eds.), 2018-19). For the seven critically endangered species the plans involve reintroduction. The conservation goals for 2025 are described in the 2023 report (Larriera & Manolis, 2024).

1.5 Crocodilians in trade

Crocodilian skins are traded in industrial quantities for the fashion industry. The value of crocodilian skins varies with the extent of osteoderms (see section 1.1). Saltwater crocodiles lack osteoderms in the belly scales and have the most highly prized skins.

An analysis of CITES trade data for the period 2004-2019 showed that *Alligator*, *Caiman,* and *Crocodylus* are among the top five traded reptile genera (Marshall et al., 2020). The International Alligator and Crocodile Trade Study (IACTS) by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) showed

that in the period 2013-2022, the average annual export was 1.47 million skins (Caldwell, 2024). The purpose-of-transaction codes commercial (T) or personal (P) were used for 20 of the 22 species of crocodilians registered in the CITES database (Marshall et al., 2020).

Minor trade in live crocodilians occurs between zoos and as pets. On a larger commercial scale, live crocodilians are exported for farming. The Siamese crocodile (*Crocodylus siamensis*) is bred in captivity in Cambodia, Thailand, and Viet Nam and also exported to China for consumption as food. In the period 2013-2022, over 337,500 live *C. siamensis* were reported as traded internationally. No exports to China occurred in 2020, 2021, or 2022, likely due to restrictions to avoid the spread of COVID-19 (Caldwell et al., 2024).

Trade in crocodilian skins allegedly originated in the USA in the early 1800s and increased in volume after the American Civil War (1861-65) with a high demand for boots and bags. American alligator (*Alligator mississippiensis*) was the first species used in trade, which then expanded to include other American species further south. After World War II, trade expanded to markets in Europe involving crocodilians in Africa, Asia, Australia, and Pacific Islands. The high worldwide exploitation during the 1950s, 1960s, and 1970s resulted in greatly reduced populations, and some species were driven to extinction in parts of their ranges (Hutton & Webb, 2003).

When CITES was enacted to regulate trade in wild species in 1975, all crocodilian species were listed on either Appendix I or Appendix II. Programs to ensure sustainable use of crocodilians were developed in the late 1970s and 1980s through collaboration between CITES parties and the IUCN SSC Crocodile Specialist Group. However, some of the main parties trading crocodilians kept reservations until the early 1990s (Hutton & Webb, 2003). From 1981, some populations were transferred to Appendix II if precautionary measures (ranching, strict quotas) were adopted, see CITES Resolution Conf. 11.16 (Rev. CoP15) (e.g., Jelden, 2004).

Following CITES Article VII, paragraph 4, specimens of Appendix I-listed animal species bred in CITES-registered operations can be traded legally as Appendix-II species for commercial purposes.

To mitigate against illegally taken wild skins being laundered through captive breeding facilities, a universal system for tagging crocodile skins was introduced by CITES in 1992 (see Resolution Conf. 11.12 (Rev. CoP15)). Since then, all crocodilian skins in international trade (originating from ranching, captive breeding, or wild harvest) must have a uniquely numbered, non-reusable tag attached.

Morton et al. (2024) analysed records of captive trade from 2000 to 2020 to identify probable instances of laundering and misuse of source-code D in international trade. They found sporadic high volumes of potential misuse of saltwater crocodiles (*Crocodylus porosus*) from Malaysia and Viet Nam, Siamese crocodiles (*C. siamensis*)

from the Republic of Korea and Malaysia, and Nile crocodiles (*C. niloticus*) from Namibia.

1.6 Captive, wild, and ranched

Within CITES, offtake from wild populations is covered by the source codes W and R (see Box 1.6-1 for descriptions). As the mortality of eggs and hatchlings in nature is very high, their removal for ranching will be more sustainable than collection of adults from the wild. Trade of specimens from captive facilities are recorded under the source codes C, D, and F (see Box 1.6-1 for definitions).

The term "crocodile farm" is used to describe any facility that breeds and/or grows crocodilians for commercial purposes. The contribution to the conservation of the species is mainly to limit illegal trade of wild-harvested specimens by meeting the international demand (Hutton and Webb, 2003).

According to CITES Resolution Conf. 12.10 ((Rev. CoP15), paragraph 5j), the Management Authority shall satisfy itself that operations breeding Appendix-I animal species in captivity for commercial purposes will make a continuing meaningful contribution according to the conservation needs of the species concerned.

To determine the current situation regarding the conservation strategies of operations, the CITES Secretariat analysed responses from 406 registered breeding operations and the results were presented at the 33rd meeting of the Animals Committee in 2024 (AC33 Doc. 26). The families Alligatoridae (alligators, caimans) and Crocodylidae (crocodiles) were among the families included in the study. Of all the registered breeding operations, 12% are for breeding crocodilians. All of these reported that they contributed to conservation through "Reduction of the pressure on wild populations" and by "Potential reintroduction into the wild", 74% reported to contribute to "Public awareness" and 46% to "Contribution to research on the species". None reported "Contribution to the genetic diversity of the captive-bred population".

There are challenges concerned with commercial captive breeding, such as animal welfare and that the demand could threaten wild populations of rare species. Moreover, ranching involves taking eggs/juveniles from wild populations (Delene et al., 2020). The IUCN SSC Crocodile Specialist Group has developed guidelines for best management practices for crocodilian farming (Manolis & Webb, 2016). To consider the ethical aspects of captive animal breeding falls outside the mandate of the current assignment.

BOX 1.6-1. CITES source codes. The source code definitions presented here are taken from the CITES website, where they are adapted from Resolution Conf. 12.3 (Rev. CoP19).

Source code	Description	Definition
W	Wild	Specimens taken from the wild.
R	Ranched specimens	Ranched specimens: specimens of animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood.
C	Bred in captivity	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev. CoP19), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5.
D	Captive-bred animal or artificially propagated plant	Appendix-I animals bred in captivity for commercial purposes in operations included in the Secretariat's Register, in accordance with Resolution Conf. 12.10 (Rev. CoP15), and Appendix-I plants artificially propagated for commercial purposes, as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 4, of the Convention.
F	Born in captivity	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev. CoP19), as well as parts and derivatives thereof.

1.7 Sustainability and legality

The sustainability of wildlife trade depends on the viability of harvested populations rather than the trade itself. Thus, both legal and illegal trade in species can be sustainable or unsustainable. The mandate of CITES is to "ensure that international wildlife trade does not threaten the survival of the species". However, unless the species' basic biology and the environmental conditions affecting its viability are understood, and the knowledge is applied when managing wildlife, negative impacts of trade (overexploitation) might not be detected in time (see e.g., Hughes et al., 2023 for examples). Hence, in lack of data, precaution will be particularly important when assessing the risk of detriment.

1.8 Non-detriment findings

Non-detriment findings (NDFs) should be undertaken in accordance with Resolution Conf. 16.7 (Rev. CoP17) and are an integral part of the management of international trade in specimens of species listed in CITES Appendix I or II, as well as specimens

from some captive production facilities and other sources. The NDF is a determination of impact from international trade on the survival of a given species in the wild. To assess the potential impact of legal international trade (risk) on species survival, other factors influencing its populations (e.g., local trade, illegal trade, environmental issues) must also be considered. In this assessment, the outcome of an NDF may be positive (no detriment), negative (detriment) or inconclusive (more documentation is needed and NDFs should be made case-by-case). The confidence with which each NDF is made depends on the amount of reliable information available (see Table 2.5-1).

2 Methodology and data

2.1 Data and information gathering

The primary sources for an overview of available data are assessments and reports published by the IUCN Red List of Threatened Species, the Species+ website, the IUCN SSC Crocodile Specialist Group, as well as the CITES Trade Database. In addition, a literature search was employed for each species assessment as described below (section 2.2). Distribution maps for each species were created using the shape files available at the website of The IUCN Red List of Threatened Species, Version 2024-1 (see figure legends for each individual species assessment for further details on data compilation). The 12 species assessed are listed in Table 2.1-1.

2.2 Literature search

We undertook a forward and backward citation-search (as opposed to a structured search) to identify relevant literature with high specificity reducing the number of irrelevant studies. We used the Status Survey and Conservation Action Plan (Manolis & Stevenson (Eds.), 2018-19) to account for each species assessed as a seed-article. Forward and backward searches (looking for literature that cites- or is cited by- the seed article) were carried out in the Web of Science Core collection, OpenAlex database and Google Scholar. In total, 71 references were identified using this approach. Of these references, 18 were included in the assessment. Additional ad-hoc searches were conducted resulting in 93 additional references. In total, 111 references were included in the assessment (see Supplementary information).

2.3 Taxonomy

The nomenclature applied in this report follows the CITES taxonomy (see Table 2.1-1). The CITES taxonomy sometimes lags scientific nomenclature as nomenclatural changes are processed by the CITES nomenclature specialists and submitted to the Conference of the Parties (CoP) for approval. For species names, English common names, and synonyms, the Species+ website was used as source (UNEP, 2024). For Norwegian common names, Store norske leksikon (2005-2007) was used as source.

Table 2.1-1. Information on the 12 species included in the assessment. The scientific nomenclature follows the names adopted by CITES and is taken from Species+ (UNEP, 2024). Size estimates are taken from Status Survey and Conservation Action Plan (Manolis & Stevenson (Eds.), 2019) and references therein.

Applied scientific nomenclature	English common names	Norwegian common name	Size (maximum length)		Native distribution
			Male	Female	
Alligator mississippiensis (Daudin, 1801)	American alligator, gator	Amerikaalligator	4.5 m	3.0 m	Southeastern USA
Caiman crocodilus (Linnaeus, 1758)	Lagarto blanco, spectacled caiman, common caiman, brown baiman	Brillekaiman	2.7 m	-	Central and South America
Caiman latirostris (Daudin, 1802)	Broad-snouted caiman, broad-nosed caiman, Brazilian caiman	Bredsnutekaiman	2.8 m	-	Southern South America
Crocodylus acutus (Cuvier, 1807)	American crocodile	Spisskrokodille	7.0 m	4.4 m	Central America
Crocodylus mindorensis (Schmidt, 1935)	Mindoro crocodile, Philippine crocodile	Filippinerkrokodille	2.7 m (wild); 3.0 m (captive)	-	Philippines
Crocodylus moreletii Duméril, (Bibron & Duméril, 1851)	Belize crocodile, Morelet's crocodile	Moreletskrokodille	4.5 m	-	Mexico, Belize, Guatemala
Crocodylus niloticus (Laurenti, 1768)	Nile crocodile, African crocodile	Nilkrokodille	~5.5 m	-	Eastern and southern Africa
Crocodylus novaeguineae (K.P. Schmidt, 1928)	New Guinea crocodile	Ny-guineakrokodille	3.5 m	3.0 m	Papua New Guinea (mainland only), Indonesia (Papua and West Papua Provinces)

Crocodylus porosus (Schneider, 1801)	Estuarine crocodile, Indo-Pacific crocodile, salt-water crocodile	Saltvannskrokodille	7.0 m (considered the largest living crocodilian)	-	East and southeast Asia, and Australia
Crocodylus rhombifer (Cuvier, 1807)	Cuban crocodile	Rutekrokodille	-	-	Cuba
Crocodylus siamensis (Schneider, 1801)	Siamese Crocodile	Siamkrokodille	3.5 - 4.0 m	-	Southeast Asia
Paleosuchus palpebrosus (Cuvier, 1807)	Cuvier's Smooth-fronted caiman, Dwarf caiman	Dvergkaiman	2.5 m	1.4 m	Northern and central South America

2.4 Data from CITES Trade Database

Trade data for the 12 species of crocodilians included in the assignment were downloaded from the CITES Trade Database on 13 August 2024 in the format of comparative tabulation reports. The downloaded data included all export countries, all import countries, all sources, all purposes, and all terms and spanned the entire time range from 1975 to 2022.

In the case of crocodilians, one skin may be processed into multiple leather products (or other items) in the importing country prior to re-exports that may take place over many years and with different destinations. To avoid double counting of trade quantities, re-exports were excluded from the dataset. Following the guidelines for using the CITES Trade Database (CITES Secretariat and UNEP-WCMC, 2022), direct trade which involves trade exported directly from the country of origin (i.e., is not a re-export) was identified by blank "origin" fields in the data file.

Entries with the trade terms "baleen", "ivory carvings", "ivory scraps", "tusks" were deleted from the dataset. This amounted to 14 out of 49,599 trade transactions, i.e. 0.03% of all reported trade. The remaining trade terms were then re-categorized into the groups presented below:

- Live animals: "live", "eggs (live)"
- Trophies and souvenirs: "trophies", "skulls", "teeth", "heads", "carvings", "jewellery", "claws", "bone carvings", "bone products"
- Edible products: "meat", "tails", "soup"
- Leather: "leather products (small)", "skins", "skin pieces", "leather products (large)", "leather items", "shoes", "garments", "sides", "skin scraps", "rug", "leather", "cloth"
- Other: "bodies", "specimens", "oil", "feet", "unspecified", "derivatives", "eggs", "bones", "cosmetics", "medicine", "skeletons", "scales", "genitalia", "powder", "plates", "shells", "bone pieces", "extract", "gall bladders", "gall", "chips", "wax"

Furthermore, because different units of measure cannot be meaningfully combined, we here present the subset of trade reported as "Number of specimens" as defined in CITES Wildlife TradeView (2024). Thus, in addition to trade reported with unit "Number of specimens", trade reported without a unit, or without an equivalent unit of measure (e.g., bags, bottles, boxes, cans, cartons, cases, flasks, items, pieces, sets, shipments) were also considered to be measured in "Number of specimens". Trade was also considered to be in "Number of specimens" when reported in pairs (quantity

was multiplied by 2 to give the correct number of specimens in trade), and when "bellyskin", "hornback" or "backskin" were reported as the unit of measure. This approach focusing on "Number of specimens" covered 98.1% of all trade transactions reported in the CITES Trade Database (2024).

Finally, following Hierink et al. (2020), with the modification of including ranched crocodilians as a separate category, we compared trade in wild-sourced, ranched, and captive-bred crocodilians based on recategorization of the source variable. Wild-sourced crocodilians included the sources "wild specimens" (W category in the CITES Trade Database) and "specimens taken from the marine environment" (X), ranched crocodilians included "ranched specimens" (R), whereas captive-bred crocodilians included the sources "captive bred" (C and D), and "animals born in captivity" (F). Confiscated or seized specimens (I), pre-convention specimens (O), "unknown source" (U), and unreported source (NA) were included in the category "Unknown".

2.5 Data assessment and recommendation

VKM applied the *Guidance for CITES Scientific Authorities in making non-detriment findings for Appendix II exports* (Rosser & Haywood, 2002) when selecting information to include in the species assessments. These guidelines are aimed at the exporting country and have a larger emphasis on annual harvest and management than what is obtainable when considering import from all range states, as the assignment to VKM requires. The species assessments in this report contain data on scientific and vernacular nomenclature, distribution, life history, habitat, role in ecosystem, populations and trends, legal and illegal harvesting, captive breeding and trade, assessments of the threat posed by trade, other threats, conservation status, population monitoring programs in the range area, national regulations and legislation in the range countries, current management in the range countries, including harvest quotas, as well as an overall assessment of data quality.

The IUCN Red List assessments compile data covering the fields relevant for the species assessments, but a few assessments are outdated. In addition, species descriptions and conservation action plans for all 12 species have been developed and published by the Crocodile Specialist Group (Manolis & Stevenson (Eds.), 2018-19).

The conclusion of each species assessment (NDF) was given a confidence score of low, medium, or high based on the amount of, and quality of information available (see Table 2.5-1 for description of the criteria used). Note that in cases where conflicting information is found, the level of confidence will be lowered.

Table 2.5-1. Description of confidence levels used in the report.

Rating	Descriptors
Low	The information on the species is limited and its status, management and the role of trade not recently assessed. Little peer-reviewed literature is available and empirical and quantitative data to support the assessment is limited.
Medium	Relevant information on the species exists, but the data on its status, management and the role of trade may be limited and/or not up to date. Both grey and peer-reviewed literature may have been used, and the assessment is supported by some empirical and quantitative data.
High	Extensive information on the species, its status, management, and the role of trade is available. Primarily peer-reviewed literature is used, and the assessment is supported by empirical and quantitative data.

3 Species assessments

The individual species assessments are presented in the sections below (3.1-3.12). The species assessments follow a standard structure compiling data on a) Name, distribution, life history, habitat, and role in the ecosystem; b) Populations and trends; c) Legal / illegal harvesting, captive breeding, and trade; d) Assessment of the threat(s) posed by trade; e) Brief summary of other threats and conservation status; f) Population monitoring programs in the range area; g) National regulations / legislation and in the range countries; h) Current management in the range countries, including harvest quotas; i) Overall assessment of data quality.

The data extracted from the CITES Trade Database (2024), as "Number of specimens" (see section 2.4), covers the period 1975-2022. The traded volumes differ substantially between species, from a few hundred (*Crocodylus rhombifer)* to millions (*Caiman crocodilus*) of annual transactions globally (Figure 3-1). The annual reported imports and exports increased over time until 2014 and have since then decreased. The reported exported and imported volumes follow a similar pattern over the years.

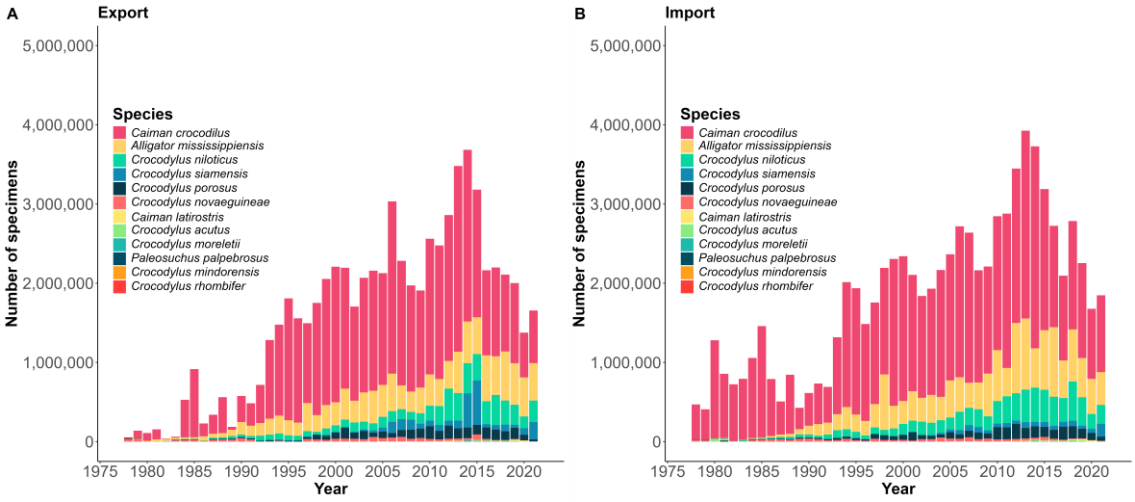

Figure 3-1. Global reported quantities of exported (A) and imported (B) specimens of crocodilians disaggregated by year and species. Data from CITES Trade Database, downloaded 13 August 2024.

Discrepancies apparent in some of the figures in sections 3.1-3.12 used to visualize annual volumes of exports and imports may be caused by differences in reporting by the trading partners. They could also rely on numerous other reasons, including differences in CITES compliance, typographical errors, smuggling, taxonomic miscategorization, unitless data, and other recording and data management inaccuracies (Blundell & Mascia, 2005; Berec et al., 2018; Robinson & Sinovas, 2018). If years with zero (or very much lower trade volumes compared to adjacent years) occur, it is reason to suspect that this is caused by errors in the recording system.

The discrepancy between total annual reported exports and imports is visualized in Figure 3-2, showing that with a few exceptions, the imported quantities reported exceed the exported quantities reported.

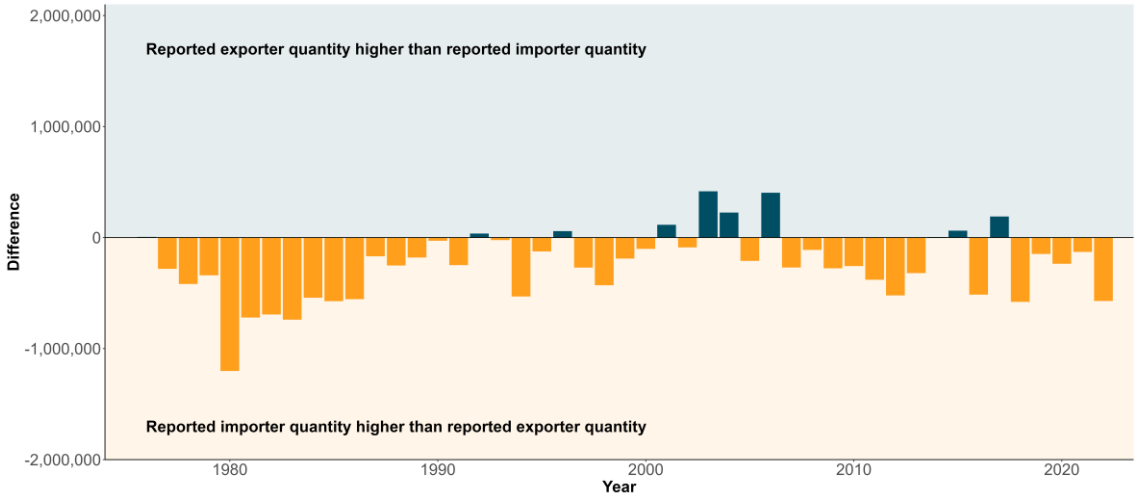

Figure 3-2. Global reported trade discrepancies over time. Reported exporter quantity versus reported importer quantity of crocodilians belonging to the 12 species included in the assessment. Data from CITES Trade Database, downloaded 13 August 2024.

As can be seen in Figure 3-3 A and B, the source of traded crocodilians was unreported/unknown until 1990. Since then, most trade have been in captive bred individuals for the 12 species combined. In the assessments for the individual species (section 3.1 to 3.12) it is apparent that for some species ranched or wild sourced animals dominate the trade. The trade term "Leather products" was used for 67.7% of all transactions and 85.4% of the total trade volume (Figure 3-3 C and D).

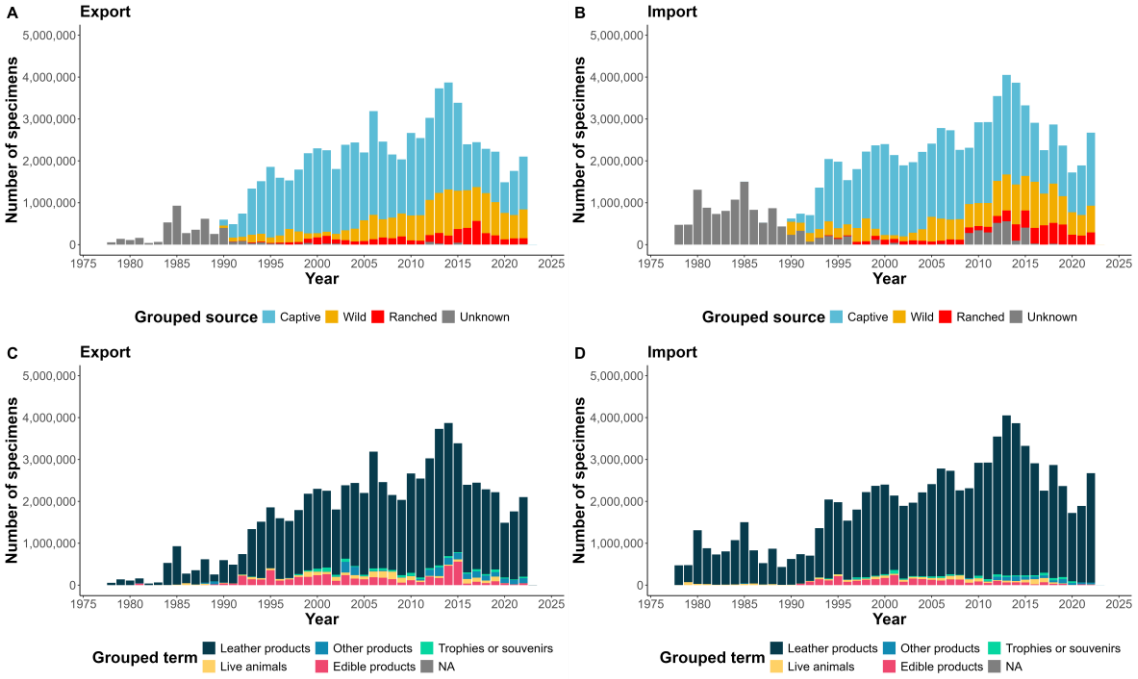

Figure 3-3. Global reported quantities of exported (A and C) and imported (B and D) crocodilians belonging to the 12 species. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

3.1 *Alligator mississippiensis*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Alligator mississippiensis* in the wild.

Justification: *Alligator mississippiensis* exhibits a stable or increasing population across its range, numbering approximately 1,000,000 mature individuals. The species is very abundant throughout its range in the USA. The harvest for the skin trade is effectively regulated and controlled within its range state. Programs in Louisiana and Florida in particular have had a strong research component over decades, and egg ranching and wild harvests are well managed and within sustainable levels.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Alligator mississippiensis* (Daudin, 1801) (UNEP, 2024).

Common name: American alligator, gator (UNEP, 2024).

Scientific synonyms: *Alligator helois* Cope, 1865; *Alligator mississipiensis* (Daudin, 1802); *Crocodilus cuvieri* Leach, 1815; *Crocodilus lucius* Cuvier, 1807; *Crocodilus mississippiensis* Daudin, 1802 (UNEP, 2024).

Taxonomic note: NA

CITES listing and IUCN assessment:
CITES Appendix II (29/07/1983; included in order listing of Crocodylia spp.) (UNEP, 2024).

IUCN Red List of Threatened Species (Elsey et al., 2019; assessed in 2018): Least Concern (LC).

Distribution: *Alligator mississippiensis* is found in the southeastern United States of America (in the States of Arkansas, North Carolina, South Carolina, Georgia, Florida, Louisiana, Alabama, Mississippi, Oklahoma, and Texas) (Woodward & Elsey, 2019; Figure 3.1-1).

Life history: Females are sexually mature at 10-16 years of age (depending on climate and habitat factors). Females construct a nest mound from vegetation and lay 30-50 eggs in June-July. Young hatch in August-September and the female cares for them for up to 9 months. Generation time is estimated to be 25 years (Woodward & Elsey, 2019).

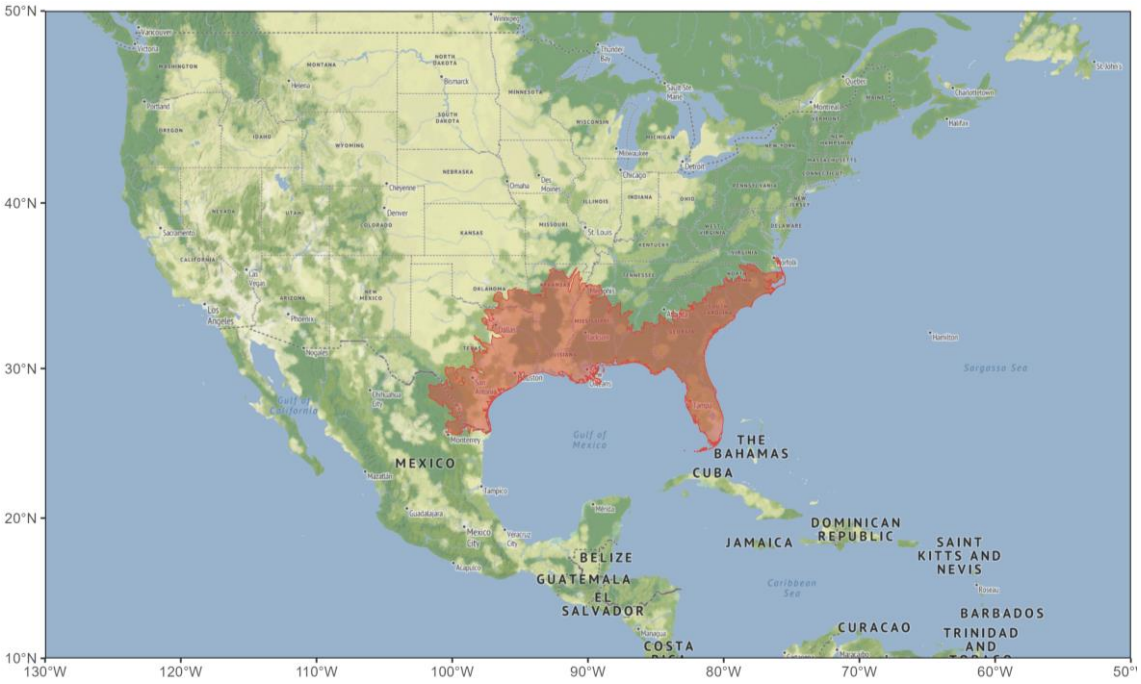

Figure 3.1-1 Distribution of *Alligator mississippiensis*. Data compiled by Elsey, R. & Woodward, A. (2018) The IUCN Red List of Threatened Species. Version 2024-1.

Habitat: *Alligator mississippiensis* inhabits freshwater lakes, swamps, marshes, and streams. Despite low tolerance for salt water, they can make use of the Gulf of Mexico for feeding and may inhabit brackish water (Rosenblatt & Heithaus, 2011).

Role in the ecosystem: American alligators consume fish, birds, and other aquatic fauna, are opportunistic predators and may also consume livestock. They play a role as top-predator, keystone species, and ecosystem engineer by digging scrapes (Barr, 1997).

b) Populations and trends

After heavy exploitation during the 1800s, the species has responded well to Federal and State conservation laws (listed as endangered in 1967 under the Endangered Species Preservation Act of 1966) and is now considered secure in its historical range (Woodward & Elsey, 2019). The current population is estimated to include 750,000-1,060,000 mature individuals and in many localities is thought to be increasing (Elsey et al., 2019).

c) Legal / illegal harvesting, captive breeding, and trade

Trade is dominated by leather products sourced from wild animals (Figure 3.1-2) exported from the United States of America to France and China. The increase in the "Other" category in recent years is mainly accounted for by "Specimens". In 2005, the US CITES Management Authority decided to use "W" for both ranched and wild

specimens, which means that assessment of trade data does not reflect the management regimes that are in place. For example, most skins (>95%) are produced from egg ranching, which is considered a "safe" form of use for crocodilians (see Jenkins et al., 2006).

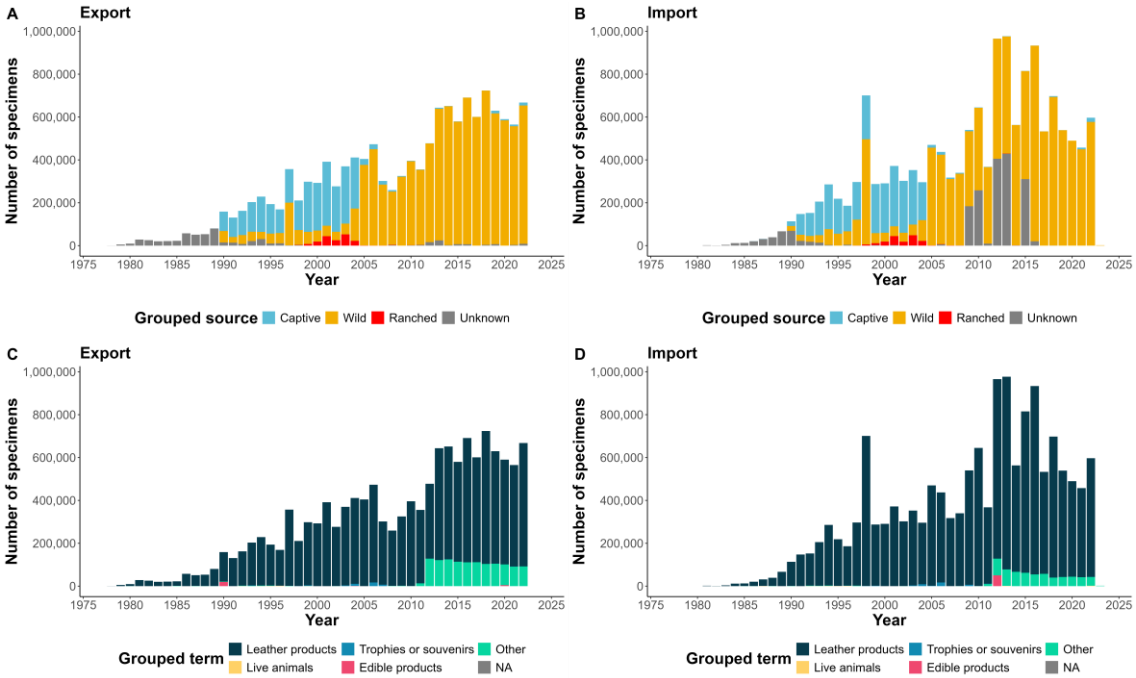

Figure 3.1-2 Reported quantities of exported (A and C) and imported (B and D) *Alligator mississippiensis* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

International trade appears to be well regulated and sustainable (Elsey et al., 2019) and is hence assessed not to pose a current threat to the survival of the species in the wild.

e) Brief summary of other threats and conservation status

The main threats to the survival of the species are habitat loss and degradation due to agriculture, urbanization, and pollution (Elsey et al., 2019).

f) Population monitoring programs in the range area

There are several long-term monitoring programs in the range area. For example, in Florida crocodiles were captured and marked annually at the Turkey Point power station between 1978 and 2014 (Briggs-Gonzalez et al., 2017), and the project appears to be continued (https://crocdoc.ifas.ufl.edu/projects/alligatorscrocodiles/) by the University of Florida to assess Everglades restoration. In Mississippi the Department of

Wildlife and Fisheries carries out annual spotlight surveys to assess American alligator populations in the Mississippi River (e.g., Strickland et al., 2018). Louisiana's population monitoring program is based mainly on nests count indices, as well as some spotlight count surveys (Louisiana Department of Wildlife and Fisheries, 2023).

g) National regulations / legislation and in the range countries

Alligators are listed on the US Endangered Species Act 1973 (https://www.federalregister.gov/d/2021-01012), as threatened due to similarity of appearance to protect the American crocodile (*Crocodylus acutus*).

h) Current management in the range countries, including harvest quotas

Many states in the range area permit legal hunting controlled by quotas. Harvest is mainly driven by commercial markets but regulated at the State level (Eversole et al., 2018). Sustainable harvest management programs are found in Louisiana, Florida, Texas, South Carolina, Georgia, Alabama, Mississippi, and Arkansas. Louisiana, Florida, and Texas allow collection of wild eggs for ranching. Captive breeding produces 45,000 hatchlings per year and ranching of eggs about ten times more. Harvest quotas are based on maintaining a sustainable population (Eversole et al., 2018). In Louisiana the quota is around 3% of the total population which equates to an average of 27,340 individuals per year (1985-2015; Joanen et al., 2021). There are no current CITES quotas applied to the species (UNEP, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is assessed as high.

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3.2 *Caiman crocodilus*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Caiman crocodilus* in the wild.

Justification: *Caiman crocodilus* has a wide distribution and a stable population of approximately 1,000,000 mature individuals. The species is very abundant throughout its range and its life history characteristics make it resilient to harvesting. Although the species experiences the highest trade volume of all crocodilians, trade primarily involves captive individuals of the subspecies *C. c. fuscus* in Columbia and is hence not a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Caiman crocodilus* (Linnaeus, 1758) (UNEP, 2024).

Common name: Lagarto blanco, spectacled caiman, common caiman, brown caiman (UNEP, 2024).

Scientific synonyms: *Caiman sclerops* Schneider, 1801, *Crocodilus caiman* Daudin, 1802 ; *Crocodilus sclerops* Schneider, 1801 ; *Jacare hirticollis* Gray, 1867 ; *Jacaretinga crocodilus* (Linnaeus, 1758) ; *Lacerta crocodilus* Linnaeus, 1758 (UNEP, 2024).

Taxonomic note: *Caiman crocodilus* has four subspecies recognized by the CSG, namely *Caiman crocodilus apaporiensis* Medem, 1955; *Caiman crocodilus crocodilus* (Linnaeus, 1758); *Caiman crocodilus fuscus* (Cope, 1868); *Caiman crocodilus chiapasius* (Bocourt, 1876). *Caiman crocodilus yacare* Daudin, 1802 is listed as a subspecies in Species+ and hence listed as *Caiman crocodilus* by CITES (UNEP, 2024), but is now widely recognized as a distinct species (Vliet et al., 2024).

CITES listing and IUCN assessment:
CITES split-listing: CITES Appendix II (29/07/1983; included in order listing of Crocodylia spp.) except for subspecies *Caiman crocodilus apaporiensis* which is listed in CITES Appendix I (01/07/1975) (UNEP, 2024).

IUCN Red List of Threatened Species (Balaguera-Reina & Velasco, 2019 assessed in 2016): Least Concern (LC).

Distribution: *Caiman crocodilus* is found in Argentina (only *C. yacare*) Brazil; Colombia; Costa Rica; Ecuador; El Salvador; French Guiana; Guatemala; Guyana; Honduras; Mexico; Nicaragua; Panama; Peru; Suriname; Trinidad and Tobago; and Venezuela. The presence of the species is uncertain in Belize and the Plurinational States of

Bolivia. Feral populations of the species are established in Cuba, Puerto Rico, and the United States (Balaguera-Reina & Velasco, 2019; Velasco & Balaguera-Reina, 2019; Figure 3.2-1).

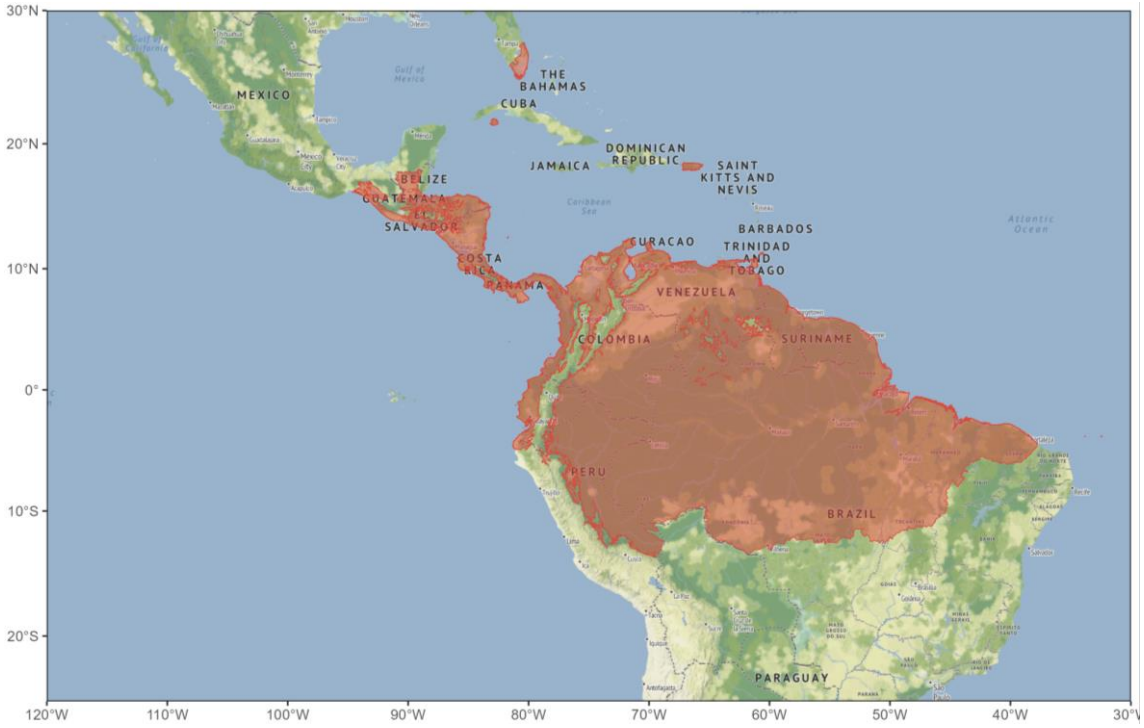

Figure 3.2-1 Distribution of *Caiman crocodilus*. Data compiled by Balaguera-Reina S.A. and Velasco A. - CSG/IUCN (2018). The IUCN Red List of Threatened Species. Version 2024-1.

Life history: Females reach sexual maturity at about 1.2 m total length and lay an average of 28-32 eggs in a mound nest, usually during the annual wet season (Thorbjarnarson, 1994). Female productivity is thought to relate to seasonal precipitation (Ayarzagüena & Castroviejo, 2008). Eggs are laid in a wide variety of substrates which means the species is competitively advantaged compared to more selective sympatric species. Generation length is estimated to be 15 years (Balaguera-Reina & Velasco, 2019).

Habitat: *Caiman crocodilus* is extremely adaptable, occupying rivers, creeks, lagoons, lakes, ditches, swamps, wetlands, dams, and marshes (Medem, 1981, cited in Balaguera-Reina & Velasco, 2019; Velasco & Balaguera-Reina, 2019).

Role in the ecosystem: *Caiman crocodilus* feeds on fish, amphibians, crustaceans, snails, birds, and mammals (Thorbjarnarson, 1991). It is an opportunistic hunter and has been known to attack livestock (Pooley et al., 2021).

b) Populations and trends

The population is thought to be stable with an estimate of 1,000,000 mature individuals (Balaguera-Reina & Velasco, 2019).

c) Legal / illegal harvesting, captive breeding, and trade

Exploitation for meat and skins has been the major threat to the species, with large trade volumes in the 1970s and 1980s leading to conservation concerns (Balaguera-Reina & Velasco, 2019). The establishment of Protected Areas and stronger regulation of harvest in the 1980s reduced the negative effects of trade, although illegal harvesting continued until the 1990s until the commercial market became less economically viable (Marioni et al., 2021). Trade volumes are the highest of any crocodilian, with leather products being the dominant trade term. The vast majority of trade is sourced from captive-bred animals with a small increase in ranched animals in the 2020s (Figure 3.2-2).

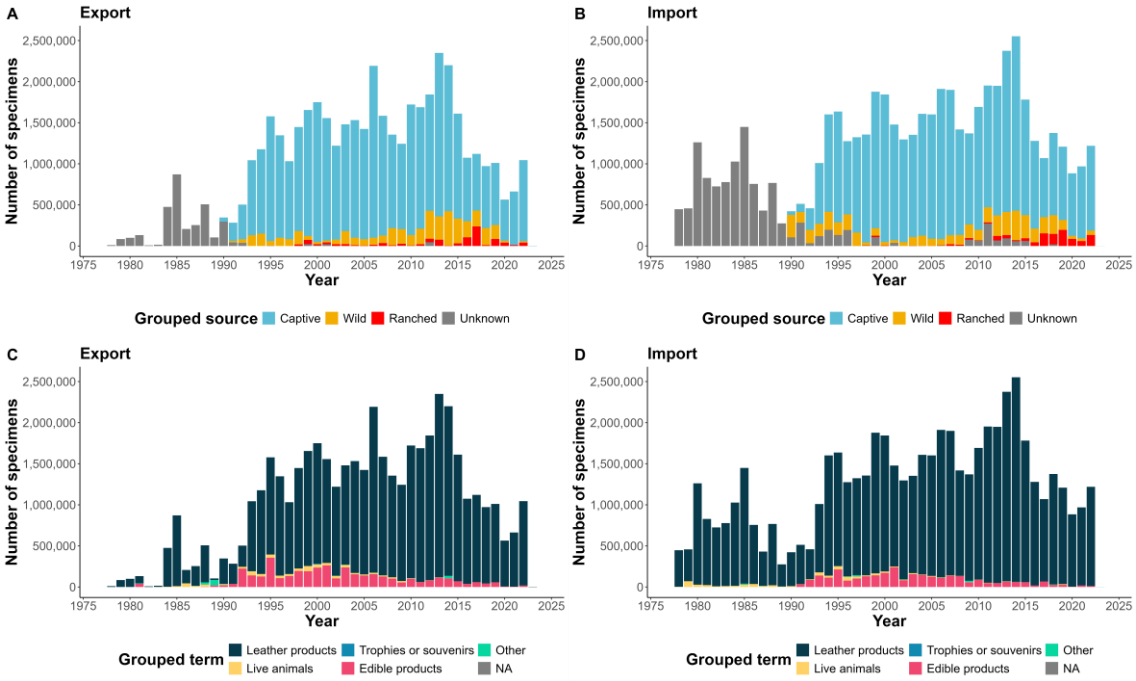

Figure 3.2-2 Reported quantities of exported (A and C) and imported (B and D) *Caiman crocodilus* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

Rapid population recovery after harvest controls were put in place indicates that the species is resilient to sustainable harvest. The widespread and general habitat requirements of the species as well as its robust reproductive ecology all contribute to this resilience (Balaguera-Reina & Velasco, 2019; Velasco & Balaguera-Reina, 2019). Reduced pressure on the wild population due to captive breeding has lowered the

threat posed by trade to the species (Balaguera-Reina & Densmore, 2014). International trade is thus assessed not to pose a current threat to the survival of this species in the wild.

e) Brief summary of other threats and conservation status

Other potential threats to the species include deforestation, wetland draining and water pollution although the species appears to be very tolerant with only local impacts on populations expected from these threat types (Balaguera-Reina & Velasco, 2019).

f) Population monitoring programs in the range area

Data across the range area is only adequate to assess local conservation status in Brazil, Costa Rica, Mexico, and Venezuela, although the population has been assessed in other countries across the range (e.g., Colombia; Balaguera-Reina & Velasco, 2019).

In Brazil, the species is thought to be increasing or stable in the Amazon region, although the data this is based on appears to be quite old now (Marioni et al., 2008). Colombia appears to have the most up-to-date survey in the Apaporis River middle basin (Balaguera-Reina et al., 2021).

g) National regulations / legislation and in the range countries

Amazonian countries (Brazil, Ecuador, Peru and Venezula in 1977, Bolivia in 1979 and Colombia in 1981) have ratified CITES and put legislation in place to regulate harvest (Marioni et al., 2021).

h) Current management in the range countries, including harvest quotas

CITES quotas exist in Guyana for craft items (500), live specimens (9,500) and skins (20,000) (UNEP, 2024). Suspensions for the issuance of export permits for wild-harvested specimens are in place in Panama and Argentina (the range of *C. yacare*) (UNEP, 2024). Venezuela currently has a small wild harvest operating, and a previous assessment of a much larger harvest indicated its sustainability (Velasco et al., 2003).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is hence assessed as high, although the population assessments for some countries are out of date.

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3.3 *Caiman latirostris*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Caiman latirostris* in the wild.

Justification: *Caiman latirostris* has a wide distribution and a stable population of approximately 500,000 mature individuals. The species is abundant throughout its range. Most international trade involves animals ranged in Argentina, and this is not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Caiman latirostris* (Daudin, 1802) (UNEP, 2024).

Common names: Broad-snouted caiman, broad-nosed caiman, Brazilian caiman (UNEP, 2024).

Scientific synonyms: *Alligator cynocephalus* Duméril & Bibron, 1836; *Caiman fissipes* Spix, 1825; *Crocodilus latirostris* Daudin, 1802 (UNEP, 2024).

Taxonomic note: NA

CITES listing and IUCN assessment:
CITES split-listing: CITES Appendix I except the population of Argentina that was transferred from Appendix I to Appendix II at Cop 10, 1997 under the Res Conf 3.15. and Brazil that was transferred under Res Conf 9.24 in Cop 17, in 2023 with zero quota (23/02/2023) (UNEP, 2024).

IUCN Red List of Threatened Species (Siroski et al., 2020, assessed in 2019): Least Concern (LC).

Distribution: *Caiman latirostris* is found in southern parts of South America in Argentina, Bolivia, Brazil, Paraguay, and Uruguay. In some range states, *C. latirostris* is sympatric with *C. yacare* (Siroski et al., 2019; Siroski et al., 2020; Figure 3.3-1).

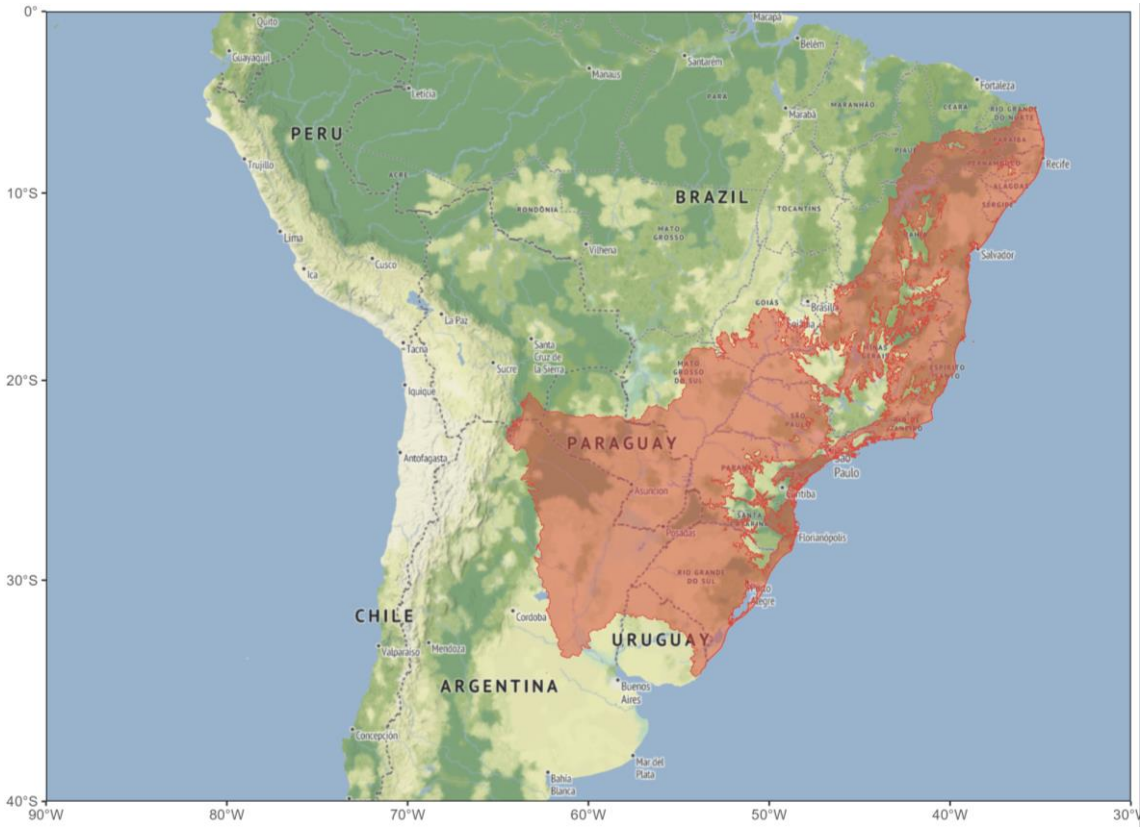

Figure 3.3-1 Distribution of *Caiman latirostris*. Data compiled by Siroski, P., Bassetti, L., Pina, C. & Larriera, A. (2020). The IUCN Red List of Threatened Species. Version 2024-1

Life history: Annually an average of 40 eggs is laid in a mound nest (Siroski et al., 2019), sometimes eggs are laid in communal nests (Larriera, 2002). Generation length is estimated to be 15 years, with females known to become reproductive at five years of age in captivity (Siroski et al., 2020 and references therein).

Habitat: The broad-snouted caiman is widely distributed and inhabits a diversity of habitats such as drainages, including small coastal drainages, wetlands, marshes, and artificial reservoirs. It prefers densely vegetated areas and basks on floating vegetation (Siroski et al., 2019).

Role in the ecosystem: *C. latirostris* is a generalist predator, with its most important food items being snails, shrimps, fish, and birds (Siroski et al., 2020 and references therein).

b) Populations and trends

The population trend is considered to be stable, and the species is widely distributed and abundant through much of its range (Siroski et al., 2020).

c) Legal / illegal harvesting, captive breeding, and trade

The skin of *C. latirostris* is attractive for leather products. Most trade involves ranched animals originating in Argentina. Some discrepancy exists between annual trade volumes reported by the exporting and importing parties (Figure 3.3-2). For the years 2014 and 2018 no direct export was recorded, but re-export of e.g., leather products particularly from Italy occurred (CITES Trade Database, 2024)). The peak registered in import around 1981 (Figure 3.3-2), was recorded in the CITES Trade Database with Italy as importing country and Colombia and Paraguay as countries of origin.

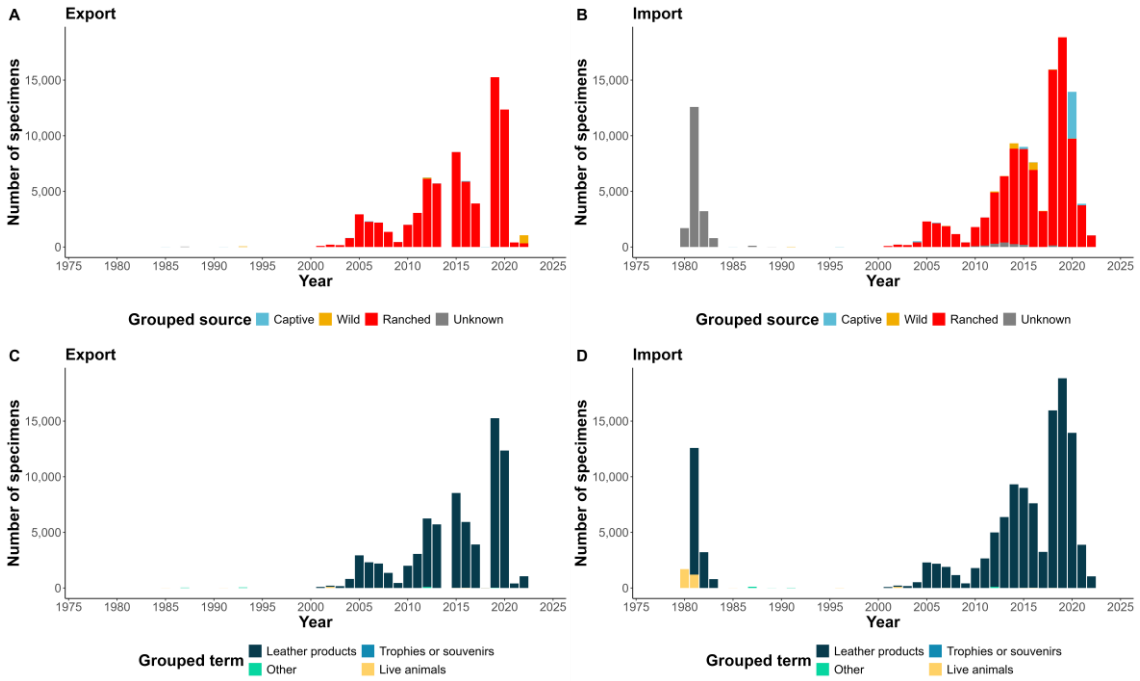

Figure 3.3-2 Reported quantities of exported (A and C) and imported (B and D) *Caiman latirostris* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

International trade in *C. latirostris* almost exclusively involves ranched animals and is assessed not to pose a current threat to the survival of this species in the wild (Siroski et al., 2020).

e) Brief summary of other threats and conservation status

Habitat destruction has increased significantly in recent years due to human activities, e.g., construction of hydroelectric dams (Siroski et al., 2020). Pollution from agriculture and illegal hunting are also major threats (Siroski et al., 2020).

f) Population monitoring programs in the range area

A successful population management program has been active in Argentina for more than 25 years (Siroski et al., 2020). In the other range states, population monitoring is under development (Siroski et al., 2020).

g) National regulations / legislation and in the range countries

Argentina put legislation in place to regulate a ranching program that has contributed to reintroduction into the wild of harvested animals since 2000 (Larriera, 2011).

h) Current management in the range countries, including harvest quotas

In Argentina, 10 to 12-month-old juveniles are returned to the wild from ranches, to counteract any negative impact from egg harvesting (Siroski et al., 2019). There are five farms in Brazil (CITES, 2022), one of which is still registered as a captive breeding operation with CITES even though the Brazilian population is now listed on Appendix II (CITES, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources. Wild populations are monitored and managed, and the assessment is supported by quantitative data. Detailed plans for future conservation exist. Overall data quality is hence assessed as high.

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3.4 *Crocodylus acutus*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus acutus* in the wild.

Justification: *Crocodylus acutus* has a wide distribution and a population of approximately 5,000 mature individuals. The overall population is currently increasing after past declines due to overexploitation and habitat loss. International trade primarily involves captive-bred animals from CITES-registered breeding operations in Colombia and is not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus acutus* (Cuvier, 1807) (UNEP, 2024).

Common name: American crocodile (UNEP, 2024).

Scientific synonyms: *Alligator lacordairei* Preudhomme de Borre, 1869*; Crocodilus biscutatus* Cuvier, 1807; *Crocodilus floridanus* Hornaday, 1875; *Crocodilus lewyanus* Duméril & Bocourt, 1870; *Crocodilus mexicanus* Duméril & Bocourt, 1870; *Crocodilus pacificus* Duméril & Bocourt, 1870 (UNEP, 2024).

Taxonomic note: *Crocodylus acutus* hybridizes with *C. moreletii* and *C. rhombifer* in areas where the species are sympatric (Rainwater et al., 2019; Wilkie et al., 2024).

CITES listing and IUCN assessment:
CITES split-listing: CITES Appendix I except for the populations of Cuba and Mexico, and the Bahía de Cispata population in Colombia, which are included in Appendix II (26/11/2019) (UNEP, 2024).

IUCN Red List of Threatened Species (Rainwater et al., 2022; assessed in 2020): Vulnerable (VU).

Distribution: *Crocodylus acutus* is the most widely distributed of the New World crocodiles and is found in Belize, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico (on both the Pacific slope and the Yucatan Peninsula), Nicaragua, Panama, Peru, the United States of America (Florida) and the Bolivarian Republic of Venezuela (UNEP, 2024; Figure 3.4-1).

Figure 3.4-1 Distribution of *Crocodylus acutus*. Data compiled by Rainwater et al. (2021). The IUCN Red List of Threatened Species. Version 2024-1.

Life history: Females are primarily hole-nesters, returning to the same nesting sites every year. Clutch size is typically 30-60 eggs (Rainwater et al., 2019 and references therein). Generation length is estimated to be 25 years (Rainwater et al., 2022).

Habitat: The species occupies coastal brackish-, salt- and freshwater habitats such as mangrove swamps, lakes, and rivers. They can move considerable distances (Rainwater et al., 2019 and references therein).

Role in the ecosystem: *Crocodylus acutus* is a generalist predator that feeds on invertebrates, amphibians, reptiles, birds, and mammals (Rainwater et al., 2019 and references therein).

b) Populations and trends

The population trend was recently estimated to be increasing with a total of 5,000 mature individuals (Rainwater et al., 2022). Historically, numbers have been greatly reduced throughout much of the species' range (Rainwater et al., 2019).

c) Legal / illegal harvesting, captive breeding, and trade

Since 2010, most trade has been in captive bred animals with "Leather products" being the major traded items (Figure 3.4-2). A peak in import numbers registered in 1980 did not appear in the data for export, examining the CITES Trade Database the majority stems from import to Italy from Paraguay. Illegal trade occurs, but is not considered a threat (Rainwater et al., 2022).

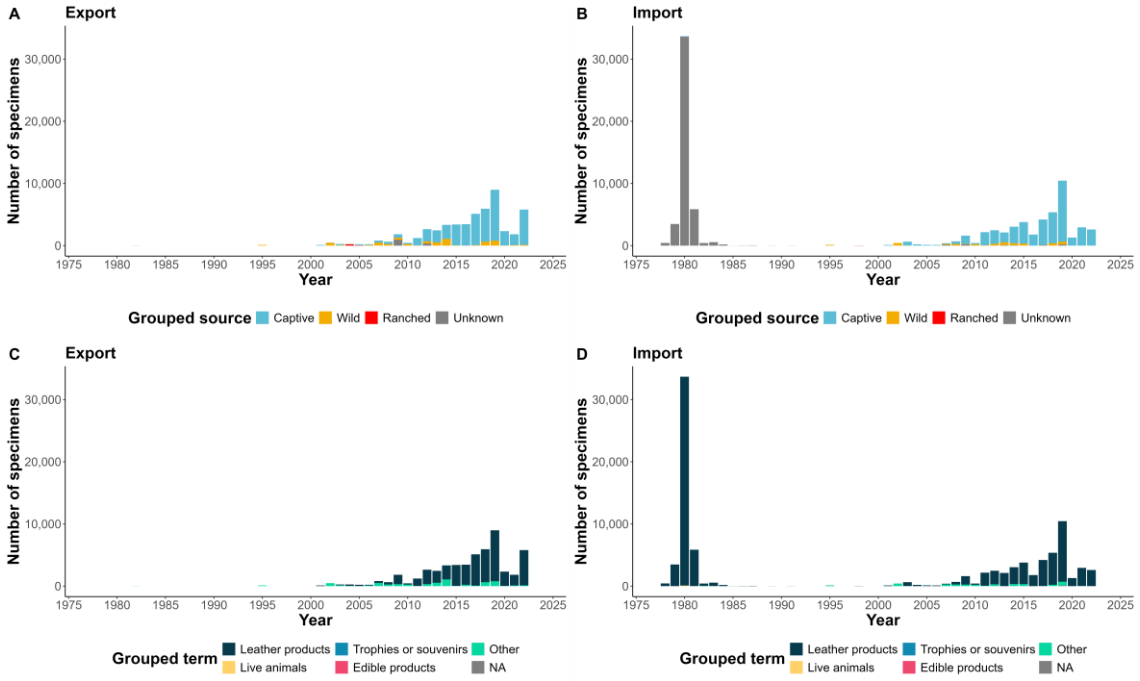

Figure 3.4-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus acutus* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

Crocodylus acutus was overexploited for its skin from around 1870, but protection measures were initiated in the 1970s and the population has recovered substantially (Thorbjarnarson et al., 2006). Presently, international trade involves almost exclusively captive bred animals and is assessed not to pose a current threat to the survival of the species in the wild (Rainwater et al., 2022).

e) Brief summary of other threats and conservation status

Threats vary between areas and include predation on eggs and hatchlings by raccoons, habitat loss, fishing nets, road mortality and illegal hunting (Rainwater et al., 2019; Rainwater et al., 2022).

f) Population monitoring programs in the range area

There are management measures in place in all range states where *C. acutus* occurs, except El Salvador and Haiti that is not a party to CITES (Rainwater et al., 2022). The

species is found in protected areas, sanctuaries and captive breeding programs exist. Thorbjarnarson et al. (2006) suggested conservation efforts to be prioritized in 69 areas in eight bioregions (defined as Crocodile Conservation Units) within the *C. acutus* distribution range.

g) National regulations / legislation and in the range countries

In the USA *C. acutus* was listed as Endangered under the US Endangered Species Act in the 1970s and recovered to be listed as Threatened in 2007 (Rainwater et al., 2019).

h) Current management in the range countries, including harvest quotas

CITES registered breeding operations are found in Colombia (6) and Honduras (1) (CITES, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources. Wild populations are monitored and managed, and the assessment is supported by quantitative data. Detailed plans for future conservation exist. Overall data quality is hence assessed as high.

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3.5 *Crocodylus mindorensis*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus mindorensis* in the wild.

Justification: Despite having a critically depleted population of approximately 100 mature individuals, that is in continuing decline, international trade is not considered a threat to the survival of the species. The species is highly dependent on conservation and international trade is restricted to live specimens exchanged as part of conservation programs.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus mindorensis* Schmidt, 1935 (UNEP, 2024).

Common name: Mindoro crocodile, Philippine crocodile (UNEP, 2024).

Scientific synonyms: *Crocodylus novaeguineae mindorensis* K.P.Schmidt, 1928 (UNEP, 2024).

Taxonomic note: The taxon was initially described by Schmidt as a subspecies of *C. novaeguineae*, but later elevated to species level. Subsequent studies have either followed this treatment or rejected it, but since Hall (1989) the taxon has been treated as a separate species. The latest phylogenetic study (Pan et al., 2021) confirms the supported sister relationship with *C. novaeguineae*.

CITES listing and IUCN assessment:
CITES Appendix I (01/07/1975) (UNEP, 2024).

IUCN Red List of Threatened Species (van Weerd et al., 2016; assessed in 2012): Critically Endangered (CR).

IUCN Green List assessment (van Weerd & Gatan-Balbas, 2021): Critically Depleted (CL).

Distribution: *Crocodylus mindorensis* is endemic to the Philippines. Restricted to the islands of Mindanao, Mindoro, Negros, and Luzon (van Weerd & Manalo, 2019; Figure 3.5-1).

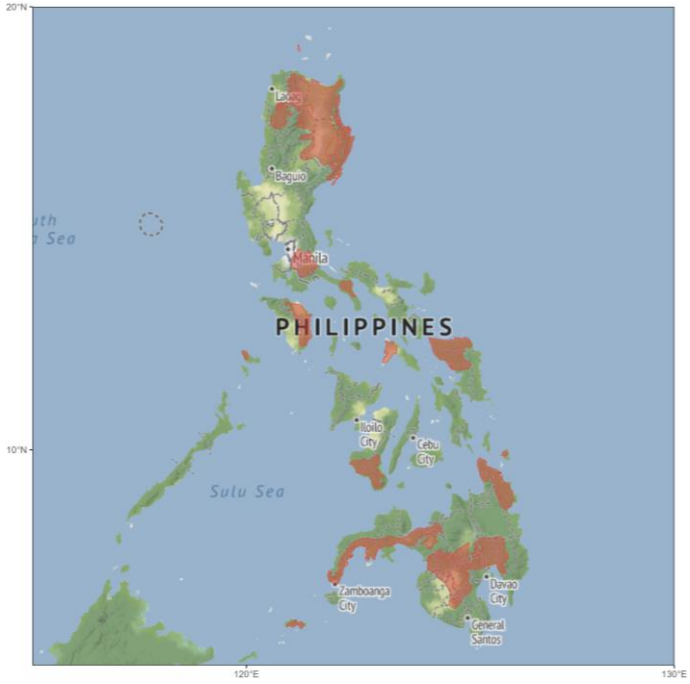

Figure 3.5-1 Distribution of *Crocodylus mindorensis*. Data compiled by Perran Ross, Merlijn van Weerd & Rainer Manalo (2016). The IUCN Red List of Threatened Species. Version 2024-1.

Life history: *Crocodylus mindorensis* is a relatively small freshwater crocodile, with males growing up to 3 meters in length (Hall, 1989). Both females and males become reproductively active at about 1.5 m long and bodyweights of about 15 kg in captivity (van Weerd & Manolo, 2019). It is a mound-nesting crocodilian, with an average clutch size of 15-20 eggs, depending on the geographic distribution (Akmad & Pomares, 2008). Generation length is estimated to be 25 years (van Weerd et al., 2016).

Habitat: The Philippine crocodile lives in rivers, creeks, ponds, and marshes from sea level up to at least 850 meters above sea level in the Cordillera Mountains of Luzon (Manalo, 2008).

Role in the ecosystem: *Crocodylus mindorensis* is a generalist predator. Juvenile crocodiles prey on species such as shrimps, dragonflies, small fish, and snails, while larger crocodiles hunt larger fish, wild and domestic pigs, dogs, civet cats, snakes, and water birds (van Weerd et al., 2016).

b) Populations and trends

The species has an estimated 92-137 mature individuals, with a continuing decreasing population. The population is severely fragmented (van Weerd et al., 2016), and is considered critically depleted with high conservation dependence (van Weerd & Gatan-Balbas, 2021).

c) Legal / illegal harvesting, captive breeding, and trade

Legal trade is mostly limited to the exchange of individuals as part of scientific captive breeding programs. Most live specimens are either source code O (Pre-Convention specimens), C (Animals bred in captivity, Resolution Conf. 10.16 Rev.) or F (Animals born in captivity, not Resolution Conf. 10.16 Rev.) with purpose-of-transaction codes B (Breeding in captivity), N (Reintroduction or introduction into the wild) or Z (Zoo). The outlier in Figure 3.5-2 concerns export of 636 milliliters with source code W (Specimens taken from the wild) for purpose S (Scientific), whereas the import was reported as 636 specimens. Illegal harvesting and trade do not seem to pose significant threats.

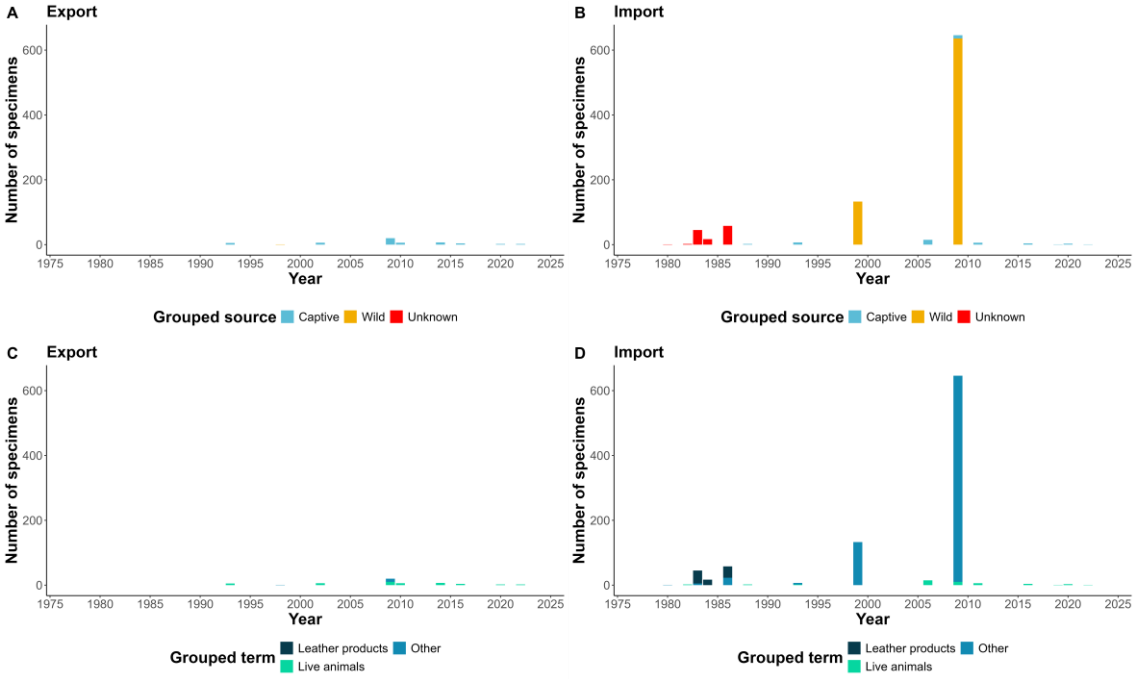

Figure 3.5-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus mindorensis* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

International trade is assessed not to pose a current threat to the survival of *C. mindorensis* in the wild (van Weerd et al., 2016). On the contrary, the species' future depends on conservation efforts (van Weerd & Gatan-Balbas, 2021) and international trade is restricted to live specimens exchanged within conservation programs.

e) Brief summary of other threats and conservation status

Habitat use by rural people, persecution, and entanglement in fishing nets are the main threats to this species (van Weerd & Manalo, 2019).

f) Population monitoring programs in the range area

Population monitoring programs exist and conduct regular surveys of known populations (van Weerd & Manalo, 2019). Less regular efforts are made to detect individuals in areas where sighting and recordings have not been made in a long time (van Weerd & Manalo, 2019).

g) National regulations / legislation and in the range countries

The species is nationally protected by law since 2001 (Philippine Republic Act 9147: the Wildlife Act). The protection of crocodiles and conservation of their habitat is the responsibility of the Protected Areas and Wildlife Bureau (PAWB) of the Department of Environment and Natural Resources (DENR) (van Weerd & Manalo, 2019).

h) Current management in the range countries, including harvest quotas

Captive breeding in the Philippines is coordinated by the Palawan Wildlife Rescue and Conservation Centre (PWRCC). The species is being reintroduced to the wild from captive-bred populations (van Weerd & Manalo, 2019). There are no harvest quotas. A trade suspension tabled by the Philippines is in place that allows exemptions for limited quantities if collection has been authorized by the prior issuance of a special permit and the export is for scientific purposes (UNEP, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is hence assessed as high.

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3.6 *Crocodylus moreletii*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus moreletii* in the wild.

Justification: *Crocodylus moreletii* has a stable population across its range states, numbering approximately 80,000-100,000 mature individuals. International trade is primarily composed of captive-bred specimens and is not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus moreletii* Duméril, Bibron & Duméril, 1851 (UNEP, 2024).

Common name: Belize crocodile, Morelet's crocodile (UNEP, 2024).

Scientific synonyms: *Crocodilus americanus moreletii* (Laurenti, 1768) (UNEP, 2024).

Taxonomic note: Natural hybridization between *Crocodyls moreletii* and *C. acutus* in the wild has been reported (Rodriguez et al., 2008; Pacheco-Sierra et al., 2016).

CITES listing and IUCN assessment:
CITES split-listing: CITES Appendix I except for the population of Belize and the population of Mexico which are included in CITES Appendix II (23/06/2010) (UNEP, 2024).

IUCN Red List of Threatened Species (Platt et al., 2023; assessed in 2020): Least Concern (LC).

Distribution: Mexico, Belize, Guatemala (Platt et al., 2019; UNEP, 2024; Figure 3.6-1).

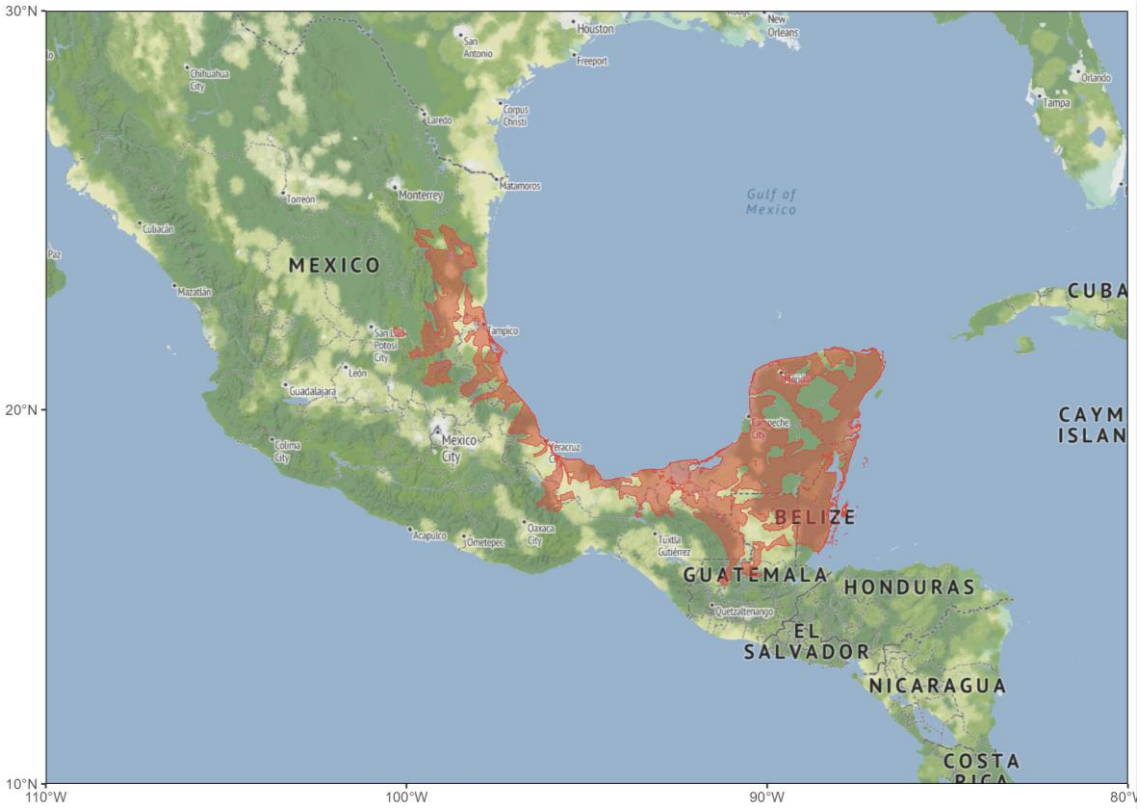

Figure 3.6-1 Distribution of *Crocodylus moreletii*. Data compiled by IUCN SSC Crocodile Specialist Group 2022. The IUCN Red List of Threatened Species. Version 2024-1.

Life history: Females reach sexual maturity at around 7-8 years of age (total length = 1.5 m). Females construct a mound nest, in which 20-50 eggs are deposited at the end of the dry season (May-July). Hatching occurs in August-September (Álvarez del Toro, 1974). Generation length is estimated to be 25 years (Platt et al., 2023).

Habitat: The species inhabits mainly freshwater areas such as marshes, swamps, ponds, rivers, lagoons, and man-made waterbodies, including large reservoirs, and occasionally occurs in brackish or saline mangrove habitats (Platt et al., 2019).

Role in the ecosystem: *Crocodylus moreletii* feeds on aquatic and terrestrial insects, arachnids, gastropods, crustaceans, fish, amphibians, reptiles, birds, and terrestrial mammals (Platt et al., 2006).

b) Populations and trends

Populations reached a minimum in the middle of the last century as a result of unregulated skin hunting (Platt & Thorbjarnarson, 2000; Sigler & Navarro, 2022). Following prohibitions and stricter enforcement, illegal hunting is now thought to be minimal. The overall population has increased to 79,000-100,000 mature individuals and assessed as stable (Platt et al., 2019).

c) Legal / illegal harvesting, captive breeding, and trade

International trade reported in the CITES Trade Database – following the most recent changes in its split listing in 2017 – is dominated by source code C (Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.)) and purpose code T (Commercial) from Mexico with roughly 50,000 specimens in the form of leather products traded in the last ten years (Figure 3.6-2). Illegal harvesting is thought to be minimal, although still considered a threat to population recovery in some localized areas (Platt et al., 2019). Harvesting eggs for ranching occurs in Mexico, and captive breeding occurred on 14 farms in 2018. In 2017, total annual production of these farms was approximately 3,000 skins for export and an additional 1,000 skins for domestic markets within Mexico (Platt et al., 2023).

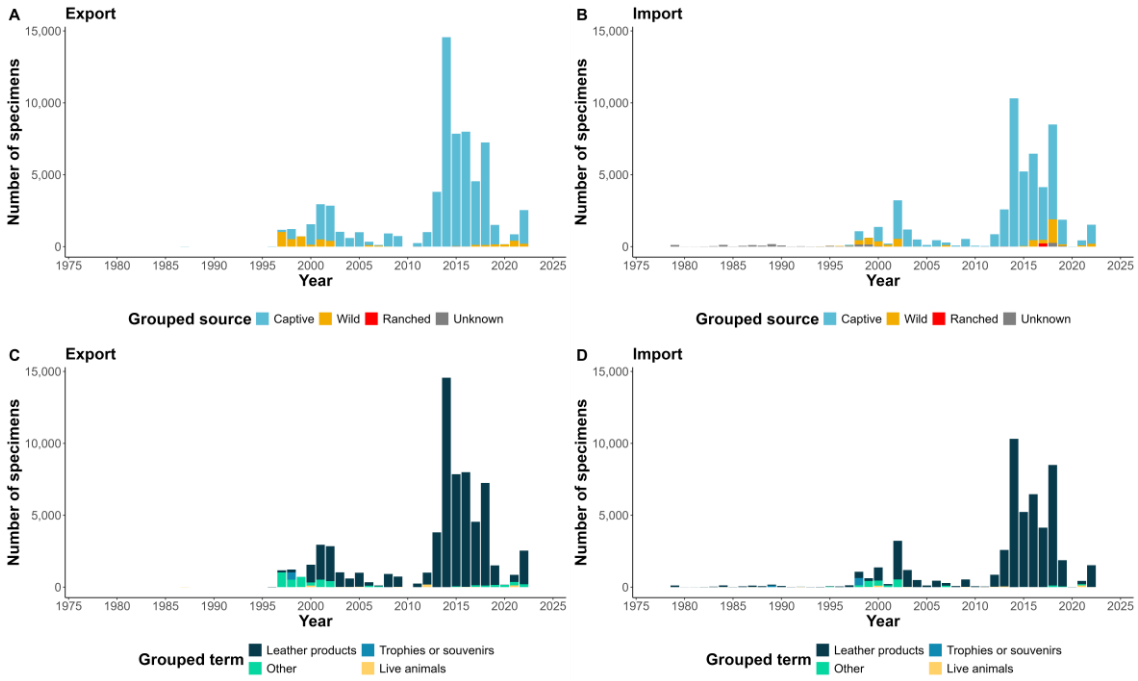

Figure 3.6-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus moreletii* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

International trade from Mexico reflects the split-listing with populations from Mexico being on Appendix II. Most traded specimens are from captive breeding with a small minority coming from the wild (CITES Trade Database, 2024). Natural hybridization occurs between *C. moreletii* and *C. acutus*, but this is not reported from farms and does thus not pose a threat of genetic hybrid contamination and introgression in wild populations as a result of trade (Platt et al., 2019; Platt et al., 2023). International trade is assessed not to pose a current threat to the survival of the species in the wild.

e) Brief summary of other threats and conservation status

The species is legally protected in the three range states, and the overall population is assessed as stable (Platt et al., 2023). Traditional use of the species persists in rural communities (Merediz-Alonso, 1999; Zamudio-Acedo, 2004). Exposure to chemical pollutants in aquatic ecosystems may be a significant threat to the long-term survival of some populations (Thirion et al., 2022).

f) Population monitoring programs in the range area

Survey data for the three range states Guatemala (Castañeda-Moya, 2000), Mexico (CONABIO 2006; Rivera-Téllez et al., 2017) and Belize (Meerman, pers. comm. in CONABIO 2006) suggest that the relative abundance of the species is similar to other crocodilians that are not endangered (References in (f) cited in Platt et al., 2023). The IUCN SSC Crocodile Specialist Group Status Survey and Conservation Action Plan (Platt et al., 2019) identifies the following conservation priorities: Status surveys are needed to establish the distribution in Guatemala; A tri-national strategy for all three range states for conservation and sustainable use is necessary.

g) National regulations / legislation and in the range countries

The species is legally protected in the three range states (Platt et al., 2023).

h) Current management in the range countries, including harvest quotas

Mexico has a pilot project for harvesting and artificial incubation of *C. moreletii* eggs collected from the wild with the objective of supporting sustainable ranching and captive breeding (see Jenkins et al., 2006). The harvest quota for wild eggs is based on technical studies (Platt et al., 2019). From 2010 to 2017, the split listing of the species in CITES had the populations of Belize and Mexico on Appendix II, with a zero quota for wild specimens traded for commercial purposes. Since 2017, only the zero quota for wild specimens traded for commercial purposes from Belize remains in place (UNEP, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is hence assessed as high.

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3.7 *Crocodylus niloticus*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus niloticus* in the wild.

Justification: Nile crocodiles are widespread and abundant across large parts of Eastern and Southern Africa, occupying a diverse range of habitats. Populations are reported to be stable throughout much of the distribution range, numbering approximately 50,000-70,000 mature individuals in total. The species' reproductive capacity is high. International trade primarily involves leather products from ranched and captive-bred individuals and is not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus niloticus* Laurenti, 1768 (UNEP, 2024).

Common name: Nile crocodile, African crocodile (UNEP, 2024).

Scientific synonyms: *Alligator cowieii* A. Smith, 1937; *Crocodilus binuensis* Baikie, 1857; *Crocodilus chamses* Bory, 1824; *Crocodilus complanatus* Geoffroy, 1827; *Crocodilus lacunosus* Geoffroy, 1827; *Crocodilus madagascariensis* Grandidier, 1872; *Crocodilus marginatus* Geoffroy, 1827; *Crocodilus multiscutatus* Rüppell, 1826; *Crocodilus octophractus* Rüppell, 1831; *Crocodilus robustus* Vaillant & Grandidier, 1872; *Crocodilus suchus* Geoffroy, 1807; *Crocodilus vulgaris* Cuvier, 1807 (UNEP, 2024).

Taxonomic note: The West African crocodile (*C. suchus)* is recognized as a separate species (Vliet et al., 2024), but the change has not yet been implemented by CITES.

CITES listing and IUCN assessment:
CITES split-listing.
CITES Appendix I (23/06/2010): Populations of Angola, Benin (*C. suchus*), Burkina Faso (*C. suchus*), Burundi, Cameroon (*C. suchus*), Central African Republic (*C.* s*uchus*), Chad (*C. suchus*), Congo, The Democratic Republic of the Congo, Côte d'Ivoire (*C.* s*uchus*), Equatorial Guinea, Eritrea, Eswatini, Gabon, Gambia (*C.* s*uchus*), Ghana (*C.* s*uchus*), Guinea (*C.* s*uchus*), Guinea Bissau (*C.* s*uchus*), Liberia (*C.* s*uchus*), Mali (*C.* s*uchus*), Mauritania (*C.* s*uchus*), Niger (*C.* s*uchus*), Nigeria (*C.* s*uchus*), Rwanda, Senegal (*C.* s*uchus*), Sierra Leone (*C.* s*uchus*), Somalia, South Sudan, Sudan, Togo (*C.* s*uchus*) (UNEP, 2024).

CITES Appendix II (23/06/2010): Populations of Botswana, Egypt (subject to a zero quota for wild specimens traded for commercial purposes), Ethiopia, Kenya,

Madagascar, Malawi, Mozambique, Namibia, South Africa, Uganda, the United Republic of Tanzania (subject to an annual export quota of no more than 1,600 wild specimens including hunting trophies, in addition to ranched specimens), Zambia and Zimbabwe (UNEP, 2024).

IUCN Red List of Threatened Species (Isberg et al., 2019; assessed in 2017): Least Concern (LC).

Distribution: Algeria (extinct), Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros (extinct), Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti (extinct), Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Israel (extinct), Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Uganda, United Republic of Tanzania, Zambia (UNEP, 2024; Figure 3.7-1).

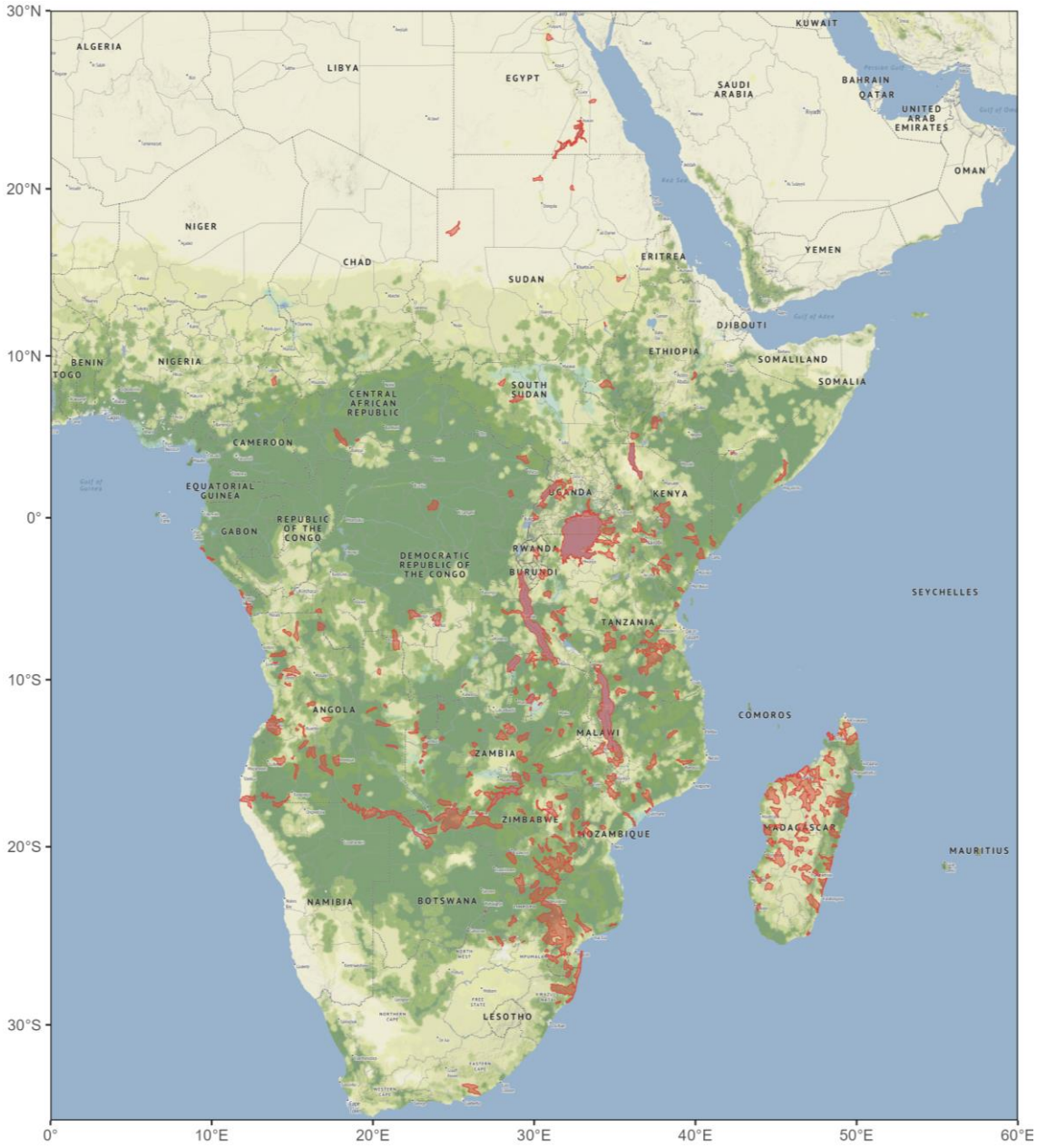

Figure 3.7-1 Distribution of *Crocodylus niloticus*. Data compiled by Isberg, S.R., Combrink, X., Lippai, C., Balaguera-Reina, S. & Ross, J.P. (2018). The IUCN Red List of Threatened Species. Version 2024-1.

Life history: *Crocodylus niloticus* is sexually dimorphic with larger males reaching up to 6 meters in length (Fergusson, 2010). Females usually become sexually mature at 2 meters (Cott, 1961; Isberg et al., 2019). Clutch sizes vary but will typically consist of 35-50 eggs. The nesting season varies among geographic areas. Female *C. niloticus* excavate hole nests a few meters from the water's edge in sandy banks, and actively guard the nest during incubation. A high percentage of eggs are lost to predation from monitor lizards, marsh mongoose, hyenas, and humans when the females leave to cool or feed in the water (Calverley & Downs, 2017; Combrink et al., 2016; Combrink et al.,

2017; Isberg et al., 2019). Generation length is estimated to be 25 years (Isberg et al., 2019).

Habitat: The Nile crocodile is found in a wide diversity of aquatic habitats such as rivers, lakes, swamps, and coastal estuaries. Populations are also reported from desert oasis pools, subterranean streams in caves, and brackish or saline water. Juveniles, sub-adults and adults differ in habitat preferences (Isberg et al., 2019).

Role in the ecosystem:
Nile crocodiles consume insects and small aquatic invertebrates when young and move to predominantly vertebrate prey as they become larger (Cott, 1961; Isberg et al., 2019). Juvenile crocodiles are an important food source for herons, egrets, and eagles as well as mammalian carnivores (Isberg et al., 2019).

b) Populations and trends

The population of *C. niloticus* is considered to be stable (Isberg et al., 2019). Hunting, particularly between 1940 and 1960, resulted in dramatic declines throughout most the range area, and extirpation from at least two countries (Israel and Comoros). National legislation and sustainable use programs have resulted in recovery in many parts of the species' range. However, since the 1990s, some populations have declined mostly due to anthropogenic factors (Combrink et al., 2019).

c) Legal / illegal harvesting, captive breeding, and trade

The Nile crocodile is one of the most commercially utilized crocodilians (Fergusson, 2010). International trade reported in the CITES Trade Database has the last 10 years been dominated by ranched and captive animals (Figure 3.7-2 A and B). Most transactions involve "Leather products", (Figure 3.7-2 C and D). For the years 2004-2010, some of the trade reported was in "Live animals" but has since then been replaced by the term categories "Edible products" and "Other" (Figure 3.7-2 C and D). Crocodile oil is used in traditional medicine as remedies for respiratory diseases and skin issues (Buthelezi et al., 2012).

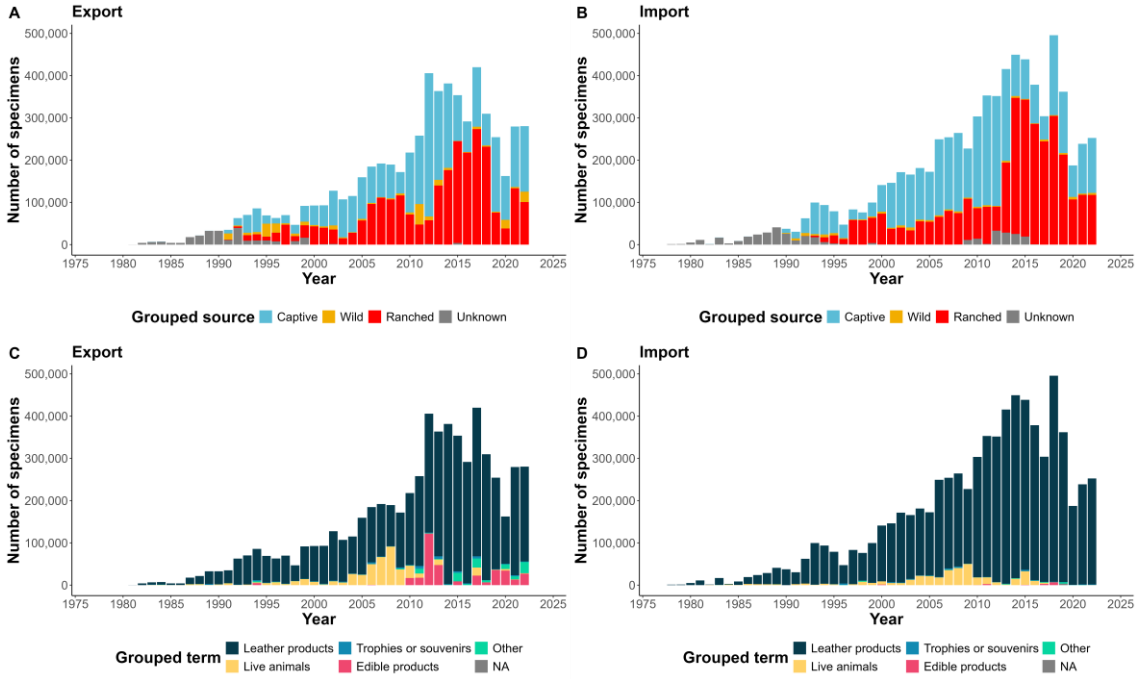

Figure 3.7-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus niloticus* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

It is considered unlikely that trade currently poses a threat in Southern and Eastern Africa (Lippai, 2018). Little trade is reported from other parts of the range (CITES Trada Database, 2024). In total, international trade is assessed not to pose a current threat to the survival of the species in the wild.

e) Brief summary of other threats and conservation status

Habitat destruction is considered a major threat to the species *C. niloticus* (Combrink et al., 2019; Isberg et al., 2019). Human-crocodile conflicts are reported to be intense throughout the distribution range, and in some local communities, crocodile eggs are eaten (Isberg et al., 2019).

f) Population monitoring programs in the range area

In the 1980s, the CITES Nile Crocodile Project (Hutton & Games, 1992) played an important role in ensuring sustainable trade (MacGregor, 2002). Most African countries do not report on crocodile monitoring programs, but a large body of studies on individual populations exists (Isberg et al., 2019 and references therein). No recent population data exists for the range states of Burundi, Congo, Democratic Republic of Congo, Equatorial Guinea, Eritrea, Eswatini, Somalia, South Sudan, and Sudan.

g) National regulations / legislation and in the range countries

Most African countries with wild populations of Nile crocodiles have implemented CITES regulations. Especially South Africa enforces national and state wise regulations (Combrink, 2014).

h) Current management in the range countries, including harvest quotas

In 2024, quotas exist for Egypt (subject to a zero quota for wild specimens traded for commercial purposes), Ethiopia (3,000 ranch skins), Namibia (25 hunting trophies/skins), the United Republic of Tanzania (subject to an annual export quota of no more than 1,600 wild specimens including hunting trophies, in addition to ranched specimens), Zambia (300 animals/trophies) and Zimbabwe (200 all/wild) (UNEP 2024). In South Africa active measures exist for the protection of wild Nile crocodile populations as well as attempts to improve farmed population monitoring (Viljoen et al., 2023). CITES registered breeding operations exists in Mali (1), Senegal (1) and Tunisia (1) (CITES, 2024).

i) Overall assessment of data quality

Although data on population trend and status, management, and the role of trade is not comprehensive across the entire geographic range of the species, there is a substantial amount of peer-reviewed and quantitative data available for Eastern and Southern Africa, where the main exporters to international trade are located. In these regions, populations are monitored, and international trade is well-regulated. Consequently, the overall data quality for the purpose of this assessment is high.

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3.8 *Crocodylus novaeguineae*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus novaeguineae* in the wild.

Justification: *Crocodylus novaeguineae* is abundant in its two range states, with a stable population of approximately 100,000 mature individuals. Over the last decade, international trade has decreased and primarily involves wild-sourced material for leather products. Current trade does not threaten the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus novaeguineae* K.P. Schmidt, 1928 (UNEP, 2024).

Common name: New Guinea crocodile (UNEP, 2024).

Scientific synonyms: NA

Taxonomic note: There are two disjunct populations, one along the northern shores and the other occupying the southern part of New Guinea. Hall (1989) suggested that the latter might be a distinct taxon, and Murray et al. (2019) described it as a distinct new species (*C. halli*) on the basis of geometric morphometric techniques assessing cranial shape variation. This new species is not currently recognized by CITES, nor by the Crocodile Specialist Group, pending additional genetic analysis (Vliet et al., 2024).

CITES listing and IUCN assessment:
CITES Appendix II (29/07/1983; included in the order listing of Crocodylia spp.) (UNEP, 2024).

IUCN Red List of Threatened Species (Solmu & Manolis, 2019; assessed in 2018): Least Concern (LC).

Distribution: Papua New Guinea (mainland only), Indonesia (Papua and West Papua Provinces) (Manolis & Solmu, 2019; Figure 3.8-1).

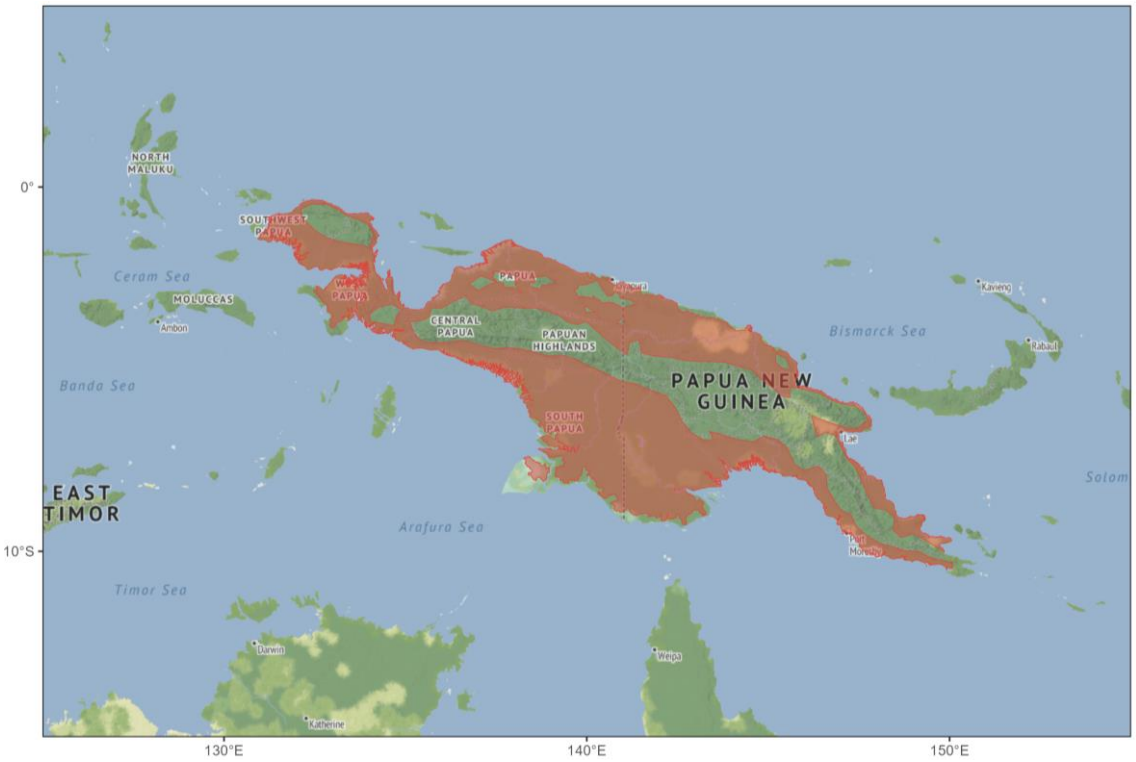

Figure 3.8-1 Distribution of *Crocodylus novaeguineae*. Data compiled by Solmu, G. & Manolis, C. 2019. The IUCN Red List of Threatened Species. Version 2024-1.

Life history: *Crocodylus novaeguineae* is a mound-nesting crocodilian. Maturity is reached between 8 and 12 years (Manolis & Solmu, 2019). Maximum size is around 3 meters for females and 3.5 meters for males (Hall, 1991). Northern populations nest in the dry season and have an average clutch size of 35 eggs, whereas southern populations nest mainly in the wet season, with an average clutch size of 22 eggs (Hall & Johnson, 1987).

Habitat: *Crocodylus novaeguineae* prefers freshwater habitats and is found throughout most of New Guinea's vast system of freshwater rivers, swamps, overgrown channels, and marshes (Manolis & Solmu, 2019).

Role in the ecosystem: *Crocodylus novaeguineae* is a top predator with an opportunistic diet. Hatchlings feed on aquatic invertebrates and juveniles feed on schools of small fish. Adults feed on insects, fish, frogs, turtles, water snakes and lizards, and aquatic birds (Tran, 2013 and references therein).

b) Populations and trends

The population is considered to be stable (Solmu & Manolis, 2019). The species appears to be abundant throughout much of its extensive habitat. Populations benefit from the vast areas of wetland habitats and low human population density on New Guinea.

c) Legal / illegal harvesting, captive breeding, and trade

Legal trade has been decreasing in the last decade and consists mostly of wild sourced skins for commercial trade in the form of leather products (Figure 3.8-2). Both range states have management programs that allow harvesting of large individuals up to specific sizes for the skin trade and harvesting of eggs and juveniles up to specific sizes for ranching. Captive breeding is less economically feasible than wild harvesting, and the lowered international demand has had a negative effect on ranching (Solmu & Manolis, 2019). The species is locally hunted for food, with the eggs constituting an important protein source for local people.

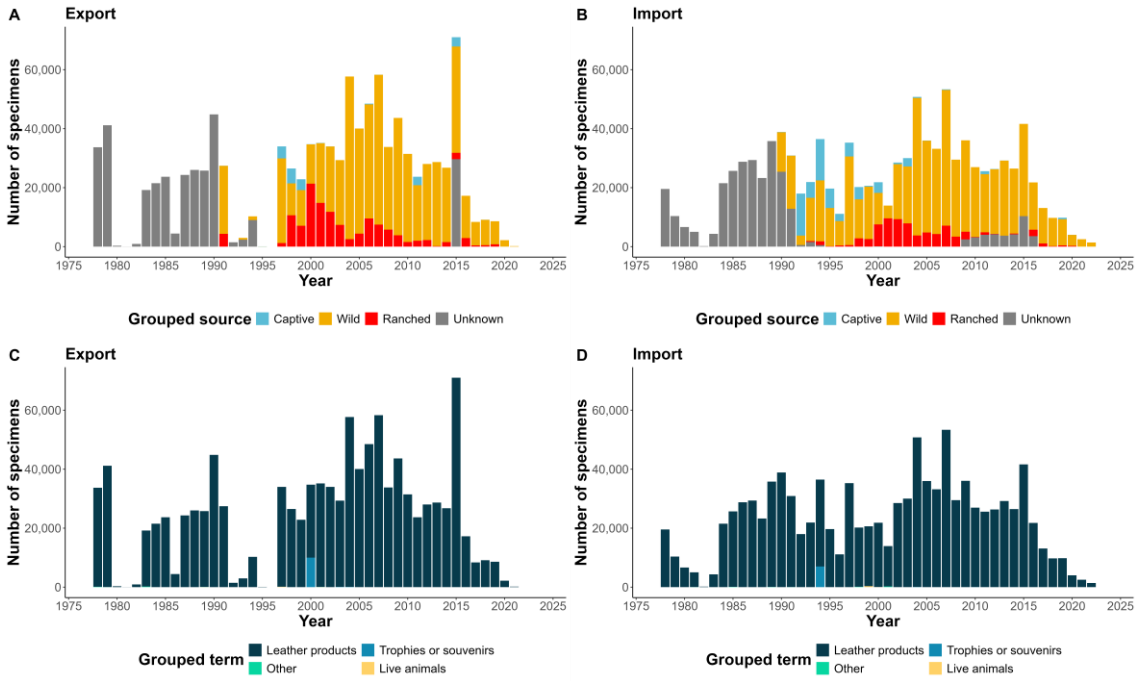

Figure 3.8-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus novaeguineae* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

Current levels of exploitation do not appear to be detrimental, and abundant habitat remains (Solmu & Manolis, 2019). International trade is assessed not to pose a current threat to the survival of the species in the wild.

e) Brief summary of other threats and conservation status

Mining and non-native fish species have minor negative impacts (Solmu & Manolis, 2019).

f) Population monitoring programs in the range area

Irregular population monitoring data from skin harvest indicate the presence of an abundant population in Papua New Guinea, which has sustained an extensive harvest

over a long period of time. Furthermore, a nest monitoring program has existed since 1981 (Hollands, 1987; Manolis, 1995; Manolis & Solmu, 2019).

In Indonesia, direct monitoring of populations has been carried out irregularly, in the Mid-Zone Mamberamo River, with spotlight surveys carried out 1987-2002 and 2014-15 (Solmu & Manolis, 2019).

g) National regulations / legislation and in the range countries

In Papua New Guinea the Crocodile Trade (Protection) Act (1974) and Crocodile Trade (Protection) Regulation (1980) provide the legal framework for the protection of the species. Crocodiles are managed at sustainable levels and can be legally harvested by indigenous landowners for personal use (food and ritual), but commercial sale and export of skins is restricted by size (Manolis & Solmu, 2019). A Crocodile Management Program for Indonesia has been in place since 1997 (PHKA, 1997). The management regime in Indonesia is similar to that in Papua New Guinea, with ranching of eggs/juveniles and wild harvest of skins permitted (Manolis & Solmu, 2019). However, in Indonesia an internal quota system operates (Solmu & Manolis, 2019). Hunting of the species within protected areas in Indonesia (e.g., Lorenz and Wasur National Parks) is prohibited (Republic of Indonesia, 2017).

h) Current management in the range countries, including harvest quotas

Indonesia has set CITES export quotas since 1998 for skins, both ranched, captive-bred, and wild harvested. The quota for 2024 is 11,875 skins (UNEP, 2024). Harvest quotas are 10% higher than CITES export quotas as 10% is allowed for domestic use (Manolis & Solmu, 2019).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is hence assessed as high.

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3.9 *Crocodylus porosus*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus porosus* in the wild.

Justification: *Crocodylus porosus* has a wide distribution and a stable population of approximately 100,000 mature individuals. A high proportion of the global population is secure in Australia, Papua New Guinea and Indonesia and use is well-managed. Most international trade involves captive or ranched animals and is not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus porosus* Schneider, 1801 (UNEP, 2024).

Common name: Estuarine crocodile, Indo-Pacific crocodile, salt-water crocodile (UNEP, 2024).

Scientific synonyms: *Crocodilus biporcatus* Cuvier, 1807; *Crocodilus oopholis* Schneider, 1801; *Crocodylus raninus* S. Müller & Schlegel, 1844; *Oopholis pondicherianus* Gray, 1862 (UNEP, 2024).

Taxonomic note: NA

CITES listing and IUCN assessment:
CITES split-listing: CITES Appendix I except the populations of Australia, Papua New Guinea, Indonesia, Malaysia, and Palawan Island in the Philippines which are included in CITES Appendix II (23/02/2023) (UNEP, 2024).

IUCN Red List of Threatened Species (Webb et al., 2021; assessed in 2019): Least Concern (LC).

Distribution:
Crocodylus porosus is one of the most widely distributed of all crocodilians. It is found in Australia, Bangladesh, Brunei Darussalam, India, Indonesia, Malaysia, Myanmar, Palau, Papua New Guinea, Philippines, Singapore, Solomon Islands, Sri Lanka, Timor-Leste, and Vanuatu. Probably extinct in Cambodia, Thailand, and Viet Nam. In the Philippines, populations are scattered through remaining wetland habitats including in Palawan Province (Webb et al., 2021; UNEP, 2024; Figure 3.9-1).

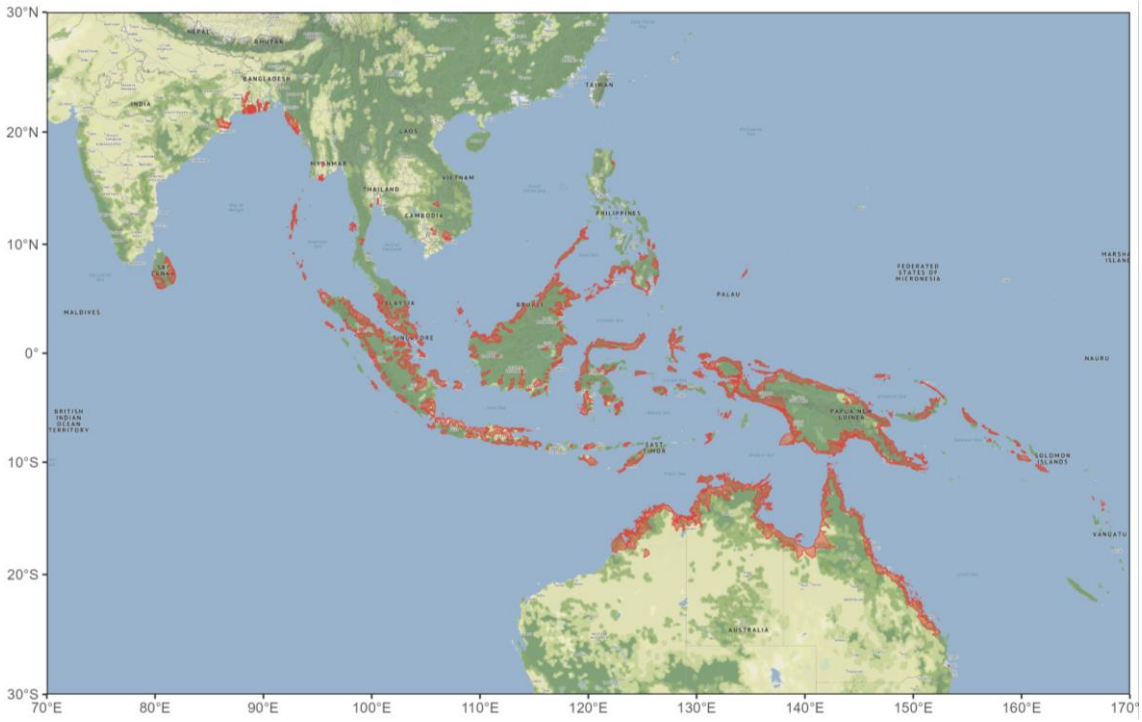

Figure 3.9-1 Distribution of *Crocodylus porosus*. Data compiled by Webb, G.J.W., Manolis, C., Brien, M.L., Balaguera-Reina, S.A. & Isberg, S. (2021). The IUCN Red List of Threatened Species. Version 2024-1.

Life history:

Females lay 50-60 eggs during the annual wet season (Webb et al., 2010; Webb et al., 2018). The percentage of eggs lost to flooding is very high (Webb et al., 1983). Egg loss to non-human predators is very low (Webb et al., 2021). Generation time is estimated to be 25 years (Webb et al., 2021).

Habitat:

The species inhabits wetland areas from the sea to hundreds of kilometers inland and is found on numerous islands. Despite its name it mainly lives in freshwater habitats like rivers, lakes, and swamps. It can, however, move around coasts between breeding and non-breeding sites (Webb et al., 2021).

Role in the ecosystem:

Crocodylus porosus is the largest of living crocodiles with male size at 5-7 meters and is an opportunistic predator which preys on small and large aquatic and terrestrial animals according to availability (Ross & Garnett, 1989).

b) Populations and trends

The population is considered to be stable, and the population is estimated to include 100,000 mature individuals (Webb et al., 2021).

c) Legal / illegal harvesting, captive breeding, and trade

Skins from *C. porosus* are the most commercially valuable of all crocodile species (Webb et al., 2021) and are traded internationally in high volumes (Figure 3.9-2). The discrepancy between exported and imported volumes in the years 2003 and 2004 (Figure 3.9-2 A and B) seems to be explained by higher number of "Derivatives" reported by Australia (exporter) and China (importer) these years (CITES Trade Database, 2024). The trade term "Derivatives" is categorized as "Others" in the analysis (Figure 3.9-2 C and D, see section 2.4).

Harvesting by indigenous peoples occurs but is not considered a threat (Webb et al., 2021).

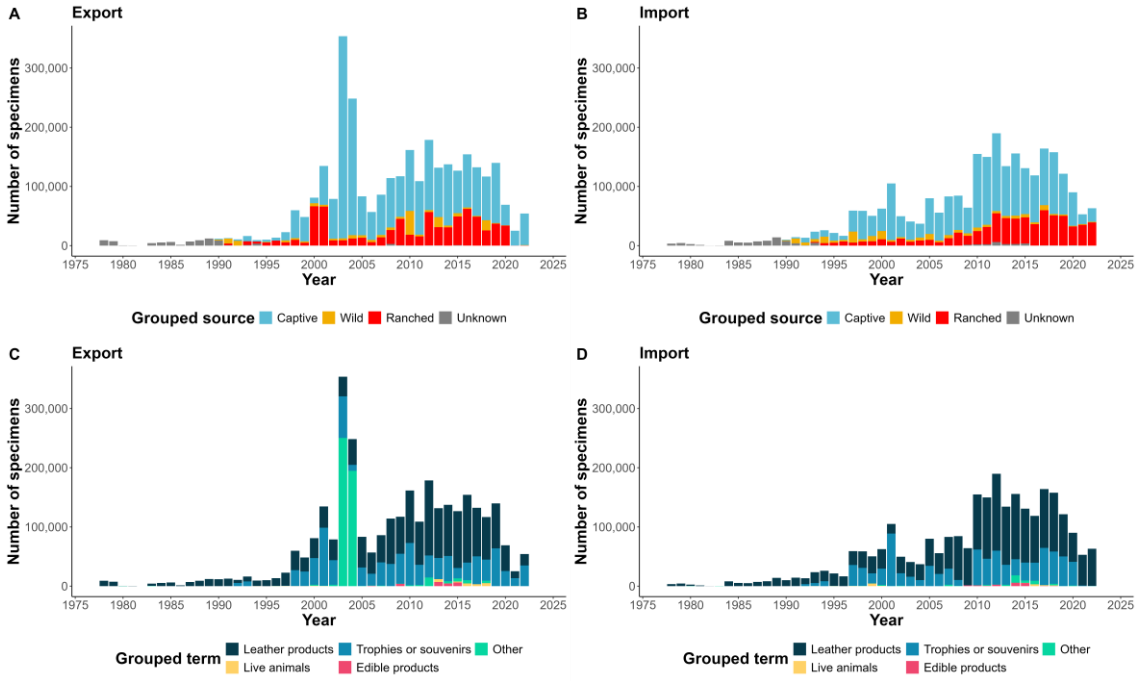

Figure 3.9-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus porosus* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

International trade in *C. porosus* involves mainly captive bred and ranched animals and is assessed not to pose a current threat to the survival of the species in the wild (Webb et al., 2021).

e) Brief summary of other threats and conservation status

In some range states, human-crocodile conflict is the main cause of mortality for *C. porosus* in the wild, intensified by growing and expanding human population. Habitat loss and environmental pollution constitute further threats (Webb et al., 2021). Natural mortality of non-hatchling *C. porosus* in recovering populations is mainly due to large crocodiles killing smaller ones (Webb & Manolis, 1992).

f) Population monitoring programs in the range area

Management programs based on sustainable use (ranching, wild harvest, captive breeding) have been successfully implemented in Papua New Guinea, Australia, and Indonesia, the three countries that contain the majority of the global population of the species (Webb et al., 2021). Farming of *C. porosus*, based on captive breeding, is undertaken in Bangladesh, China, Thailand, Singapore, Malaysia, Myanmar, Philippines, Indonesia, Papua New Guinea, and Australia (Webb et al., 2021).

CITES-registered breeding operations are found in Bangladesh (1), Philippines (3), Singapore (1) and Thailand (18) (CITES, 2024).

g) National regulations / legislation and in the range countries

Crocodylus porosus is legally protected in most range states (Webb et al., 2021).

h) Current management in the range countries, including harvest quotas

Philippines (population of the Palawan Islands only) is subject to a zero export quota for wild specimens traded for commercial purposes, as are the Malaysian states of Peninsular Malaysia and Sabah. The Malaysian state of Sarawak has a quota of 875 individuals taken from the wild for 2024 (UNEP, 2024). Trade in wild sourced skins from Papua New Guinea is subject to size limits.

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources. Wild populations are monitored and managed, and the assessment is supported by quantitative data. Detailed plans for future conservation exist. Overall data quality is hence assessed as high.

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3.10 *Crocodylus rhombifer*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus rhombifer* in the wild.

Justification: *Crocodylus rhombifer*'s distribution is limited to one small location and its population of approximately 2,400 mature individuals is in continuing decline. The volume of international trade is very low and not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus rhombifer* Cuvier, 1807 (UNEP, 2024).

Common name: Cuban crocodile (UNEP, 2024).

Scientific synonyms: NA

Taxonomic note: *Crocodylus rhombifer* interbreeds with *C. acutus* and hybrids outnumber purebred offspring (Milian-Garcia et al., 2015).

CITES listing and IUCN assessment:
CITES Appendix I (01/07/1975) (UNEP, 2024).

IUCN Red List of Threatened Species (McMahan et al., 2022; assessed in 2022): Critically Endangered (CR).

Distribution: The species is endemic to Cuba where its distribution is restricted to one swamp on the mainland (Figure 3.10-1). The species was also introduced to Isle of Youth in 1995, but this population is now believed to be extinct (C. Manolis & A. Larriera, pers. comm., October 2024).

Figure 3.10-1 Distribution of *Crocodylus rhombifer*. Data compiled by McMahan, W., Targarona, R., Soberon, R. and Alonso Tabet, M. (2022). The IUCN Red List of Threatened Species. Version 2024-1.

Life history: The average clutch size has been estimated as 25.4 eggs in captivity and 14.5 eggs in the wild (Targarona, 2013 in McMahan et al., 2022). Generation length is estimated to be 25 years (McMahan et al., 2022).

Habitat: The species inhabits densely vegetated shallow water areas (McMahan et al., 2022).

Role in the ecosystem: The species is a hole nester and feeds on fish, turtles, and small mammals (McMahan et al., 2022). Data on its ecology are limited (McMahan et al., 2022).

b) Populations and trends

The population is decreasing. The population size has been estimated to 2,400 mature individuals (McMahan et al., 2022).

c) Legal / illegal harvesting, captive breeding, and trade

The skin of *C. rhombifer* is considered less attractive than that of other crocodiles (McMahan et al., 2022) and commercial trade of wild specimens is prohibited. The volumes traded internationally are very low (Figure 3.10-2). In 2011, Cuba reported to have exported 550 "Specimens" to Canada, hence the peak in export volume this year (Figure 3.10-2 A, B). The trade term "Specimens" is categorized as "Other" in the current assessment (Figure 3.10-2 C, D; see also section 2.4). Illegal hunting for meat occurs (McMahan et al., 2022).

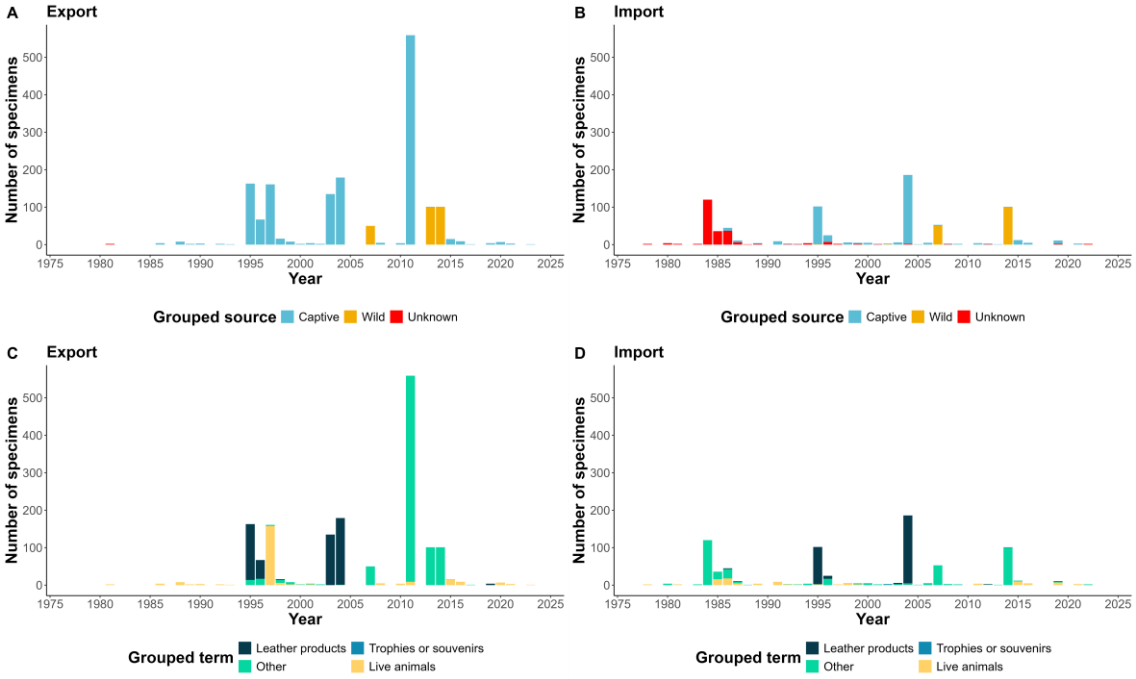

Figure 3.10-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus rhombifer* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

International trade volume is very low and assessed not to pose a current threat to the survival of the species in the wild (McMahan et al., 2022).

e) Brief summary of other threats and conservation status

The main threat is the limited distribution in a small, isolated population in the wild. Hybridization with *C. acutus* is common and few pure individuals of *C. rhombifer* are left in the wild (McMahan et al., 2019; McMahan et al., 2022; Milian-Garcia et al., 2015).

f) Population monitoring programs in the range area

A restocking program was initiated in 1985 (Ramos Targarona et al., 2010), but reintroduction to protected areas has however not led to increased numbers as illegal hunting continues to occur (McMahan et al., 2022). Captive breeding programs are considered important for future conservation (McMahan et al., 2019; McMahan et al., 2022; Milian-Garcia et al., 2015).

g) National regulations / legislation and in the range countries

The species is found within The National Park Ciénaga de Zapata, a protected wetland area that is classified as a Category II IUCN Protected Area (National Park) and a Ramsar Site (UNESCO World Heritage Centre, 2024).

h) Current management in the range countries, including harvest quotas

There are no current quotas in place for this species (UNEP, 2024). There is one CITES-registered breeding operation in Cuba (CITES, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is assessed as high.

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3.11 *Crocodylus siamensis*

Conclusion: Positive with medium confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Crocodylus siamensis* in the wild.

Justification: *Crocodylus siamensis*, considered one of the most threatened crocodilians, has a severely fragmented distribution and a population of 500-1,000 mature individuals in continuing decline. Commercial trade is prohibited except for animals bred in captivity in Cambodia, Thailand, and Viet Nam, in operations included in the CITES Secretariat's Register. Therefore, international trade is not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Crocodylus siamensis* Schneider, 1801 (UNEP, 2024).

Common name: Siamese Crocodile (UNEP, 2024).

Scientific synonyms: *Crocodilus galeatus* Cuvier, 1807 (UNEP, 2024).

Taxonomic note: Pan et al. (2021) note that the relationship between *Crocodylus porosus*, *C. siamensis* and *C. palustris* needs further study as their molecular phylogenetic inference shows low bootstrap support for the clade.

CITES listing and IUCN assessment:
CITES Appendix I (01/07/1975) (UNEP, 2024).

IUCN Red List of Threatened Species (Bezuijen et al., 2012): Critically Endangered (CR).

Distribution: Brunei Darussalam, Cambodia, Indonesia (Kalimantan), Lao People's Democratic Republic, Malaysia, Myanmar (uncertain), Thailand, and Viet Nam (UNEP, 2024; Figure 3.11-1).

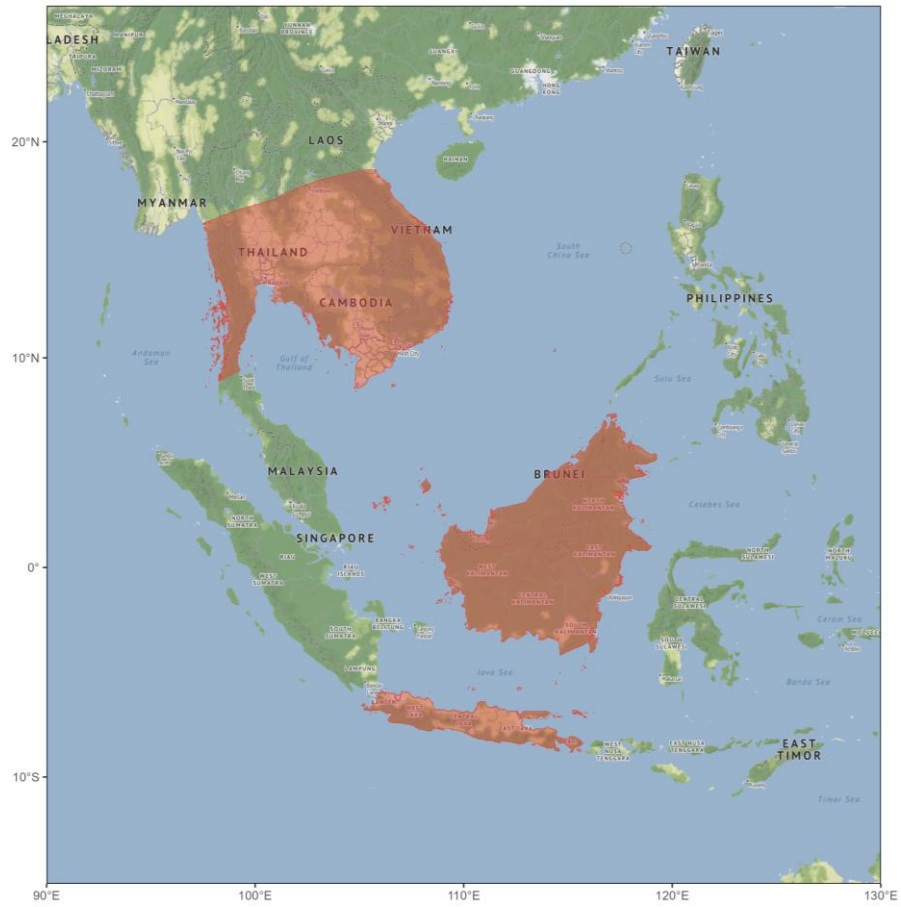

Figure 3.11-1 Distribution of *Crocodylus siamensis*. Data compiled by IUCN 2014. The IUCN Red List of Threatened Species. Version 2024-1.

Life history: A medium-sized species with males reaching lengths of 3-4 meters, and females mostly not exceeding 2.5 meters. In captivity, sexual maturity is reached after 10-12 years, and generation length is estimated to be 25 years. The species is a mound nester, with clutch size of 50-60 eggs (Platt et al., 2019).

Habitat: The species occurs in a wide range of freshwater habitats, including slow-moving rivers and streams, lakes, marshes, and swamplands (Sam et al., 2015; Platt et al., 2019).

Role in the ecosystem: *C. siamensis* is a generalist predator that feeds on a wide variety of prey, including invertebrates, frogs, reptiles, birds, and mammals, as well as carrion (Bezuijen et al., 2012 and references therein).

b) Populations and trends

The population is considered to be decreasing, and the size estimated to 500-1,000 mature individuals, but no overall survey data exists. Populations are fragmented and

disjunct, with the largest population estimated to have 55-60 individuals (Bezuijen et al., 2012).

c) Legal / illegal harvesting, captive breeding, and trade

The CITES Trade Database (2024) records 4,637 transactions in this species in the period 2010-2023 with 93% of transaction being from CITES-registered breeding operations (source code D). Trade averages below 200,000 reported specimens, with outliers exceeding 400,000 in 2014, 2015 and 2022 (Figure 3.11-2). 2014 and 2015 concern outliers of exported meat and medicine without quantifiers, and 2022 an outlier of skin imported by China from Viet Nam (Figure 3.11-2).

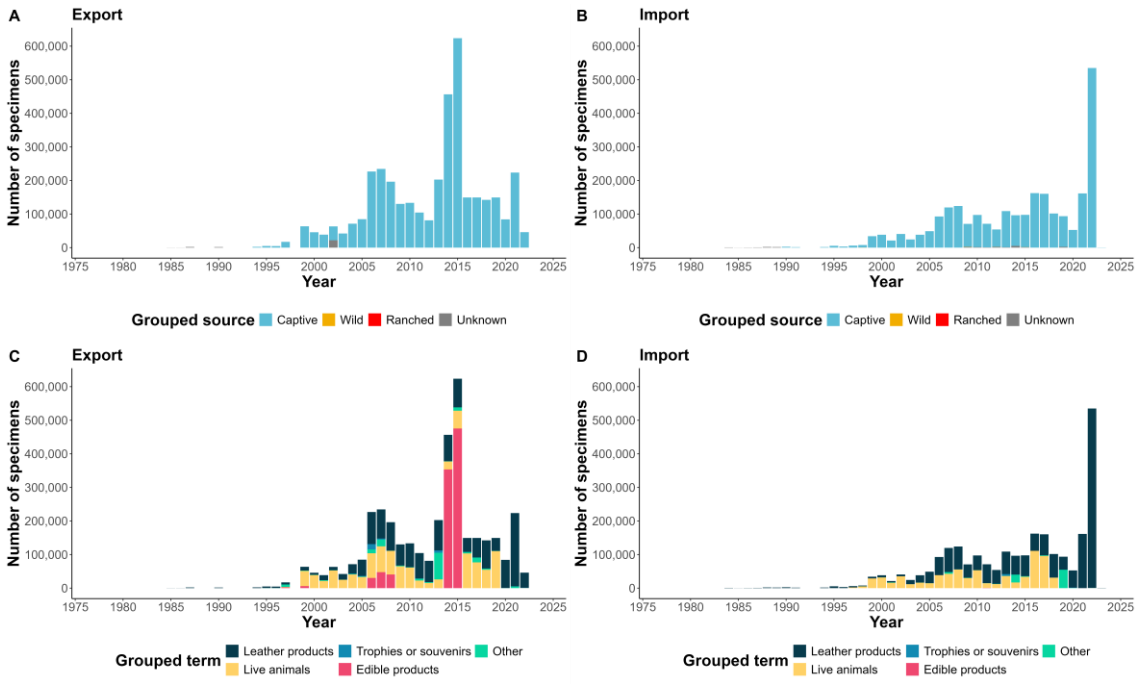

Figure 3.11-2 Reported quantities of exported (A and C) and imported (B and D) *Crocodylus siamensis* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

Trade concerns mostly captive-bred specimens, but captive breeding poses two direct threats to species survival in the wild: (i) illegal harvesting to stock farms for captive breeding; and (ii) hybridization with *C. porosus* and *C. rhombifer* is known to occur on farms and threatens the genetic integrity of some captive stocks. The escape and establishment of these hybrids further threatens wild populations. The former is suspected in Cambodia. The latter has been recorded in the Tonle Sap Biosphere Reserve, Cambodia (Platt et al., 2019). The threat posed by sourcing wild stock is assessed to be limited as obtaining wild stock is both complicated and costly and has not been documented for a long time (Platt et al., 2019). The threat posed by escaped

hybrids and introgression with remaining wild populations is present but as the species distributions is disjunct and fragmented and populations are very small, it does not outweigh the potential benefits of working with captive-breeding facilities to re-introduce the species in suitable conservation areas. Overall, international trade is assessed not to pose a current threat to the survival of the species in the wild.

e) Brief summary of other threats and conservation status

Other threats include the illegal collection of eggs and crocodiles for consumption locally, habitat loss and degradation (including conversion to palm oil plantations and construction of hydroelectric dams), and incidental capture/drowning in fishing gear (Bezuijen et al., 2012).

f) Population monitoring programs in the range area

The IUCN-SSC Crocodile Specialist Group has issued Conservation Action Plans for the species in 2010 and 2019 and have identified targeted conservation actions (Simpson & Bezuijen, 2010; Platt et al., 2019). Population monitoring programs and activities exist in Cambodia, Indonesia, Lao PDR, Thailand and Viet Nam. Reintroduction initiatives have successfully reintroduced individuals in Thailand and Viet Nam, but long-term evaluation of its success is lacking (Platt et al., 2019; CSG SC27, 2024). Reintroduction programs are also ongoing in Cambodia and Lao PDR.

g) National regulations / legislation and in the range countries

Siamese crocodiles are protected under Cambodia's 2006 Law on Fisheries, and sub-decree (No. 123) lists Siamese crocodiles as one of the protected aquatic species (Delgado, 2022). Siamese crocodiles in Indonesia are protected under Act No. 5/1990 (Biodiversity Conservation and its Ecosystems) and Government Regulation No. 7/1999 (Presentation on the wild fauna and flora) (Brien et al., 2015). In Thailand, crocodiles are protected through (i) the Wildlife Reservation and Protection Act, B.E. 2562 (2019), (ii) the National Park Act, B.E. 2562 (2019) and (iii) the Royal Ordinance on Fisheries, B.E. 2558 (2015) (CITES, 2022). Viet Nam: Penal Code 1999, Chapter VII, Article 190, regulates the protection of precious and rare wild animals (Jelden et al., 2008).

h) Current management in the range countries, including harvest quotas

No legal harvesting occurs. Illegal harvesting to stock farms for captive breeding has been a major threat in the past in Cambodia, Thailand, and Viet Nam (Siamese Crocodile Working Group, 2004). As of today, in Lao PDR, the Lao Conservation Trust for Wildlife (LCTW) works with captive breeding planned for potential re-introduction in 2026. In Cambodia, WCS Cambodia and Fauna & Flora's Cambodian Crocodile Conservation Project (CCCP) are active with captive breeding and re-introduction at several sites. In Thailand, the Thai Crocodile Farm Association (TCFA), formerly the Crocodile Management Association of Thailand (CMAT), works with the Department of National Parks (DNP), Wildlife and Plant Conservation, Ministry of Natural Resources

and Environment on reintroduction of the species in six protected areas (CSG SC27, 2024).

At CoP19 (CITES, 2022), Thailand's proposed transfer of the population of Thailand from Appendix I to Appendix II with a zero quota for wild specimens to facilitate trade in derivatives from farmed specimens was unsuccessful. Captive breeding is most widespread in Thailand, Cambodia, and Viet Nam, with populations on commercial farms exceeding 1,000,000 individuals (Platt et al., 2019). CITES registered breeding operations are found in Cambodia (21), Thailand (41) and Viet Nam (10) (CITES, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is hence assessed as high. Additional recent data on population monitoring, reintroduction programs and illegal harvesting for stocking captive breeding would have augmented the assessment.

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3.12 *Paleosuchus palpebrosus*

Conclusion: Positive with high confidence.

VKM concludes that international trade does not currently pose a threat to the continued survival of *Paleosuchus palpebrosus* in the wild.

Justification: *Paleosuchus palpebrosus* is widespread and abundant in Northern and Central South America, occupying a diverse range of aquatic habitats. The population is reported to be stable throughout much of its distribution range. Despite lack of an estimate of population size, the species is thought to be one of the most abundant crocodilians in the world. International trade is almost entirely limited to low numbers of wild-sourced animals for the pet trade and hence not considered a threat to the survival of the species.

a) Name, distribution, life history, habitat, role in ecosystem

Species name: *Paleosuchus palpebrosus* Cuvier, 1807 (UNEP, 2024).

Common name: Cuvier's smooth-fronted caiman, dwarf caiman (UNEP, 2024).

Scientific synonyms: *Caiman palpebrosus* (Cuvier, 1807), *Champsa gibbiceps* Natterer, 1840, *Crocodilus palpebrosus* Cuvier, 1807, *Jacaretinga moschifer* Spix, 1825 (UNEP, 2024).

Taxonomic note: The two species of *Paleosuchus (P. palpebrosus* and *P. trigonatus*) are similar and often confused (Campos et al., 2018).

CITES listing and IUCN assessment:
CITES Appendix II (29/07/1983; included in order listing of Crocodylia spp.) (UNEP, 2024).

IUCN Red List of Threatened Species (Magnusson et al., 2019; assessed in 2018): Least Concern (LC).

Distribution: Bolivia (Plurinational State of), Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname, Venezuela (Bolivarian Republic of) (UNEP, 2024; Figure 3.12-1).

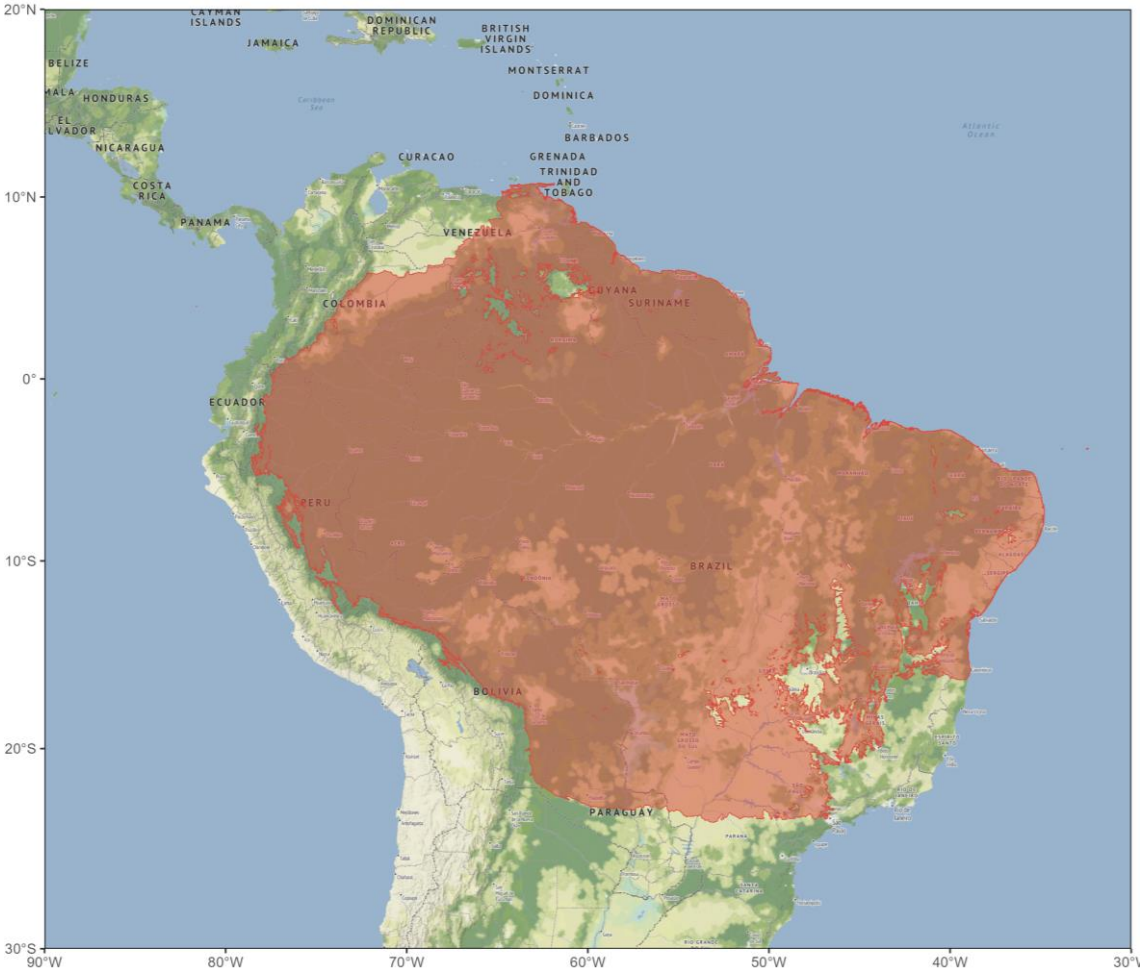

Figure 3.12-1 Distribution of *Paleosuchus palpebrosus*. Data compiled by Magnusson, W.E., Campos, Z. & Muniz, F. (2018). The IUCN Red List of Threatened Species. Version 2024-1.

Life history: The Dwarf caiman is the smallest extant crocodilian, with the maximum size 2 meters for males and 1.4 meters for females (Campos et al., 2010). In the wild, females first reproduce at about 8 years (Campos et al., 2012). Females lay 6-21 eggs in mound nests at the end of the dry season in the Amazon and in the wet season in the Pantanal (Campos et al., 2015). Females provide parental care for groups of hatchlings for up to nearly 2 years (Campos et al., 2012). The species longevity is 20-40 years (Magnusson et al., 2019).

Habitat: Dwarf caimans primarily inhabit areas with running waters (Magnusson, 1982; Magnusson et al., 2019).

Role in the ecosystem: Dwarf caimans are generalist predators that feed on a variety of vertebrate (mainly fish) and invertebrate prey (Magnusson et al., 2019). It is believed to have fewer predators than related crocodilian species because of its armored skin (Halliday & Adler, 2002).

b) Populations and trends

The population is considered to be stable (Magnusson et al., 2019). Surveys have been conducted in the majority (80%) of range states and *P. palpebrosus* is thought to be one of the world's most abundant crocodilians (Magnusson et al., 2019).

c) Legal / illegal harvesting, captive breeding, and trade

International trade mainly involves wild caught, live animals (Figure 3.12-2 A and B). There is a single exception in 1981 when Italy reported import of more than 15,000 skins from Colombia (Figure 3.12-2 B and D). This outlier may be caused by a reporting error, possibly involving skins from *C. c. fuscus*.

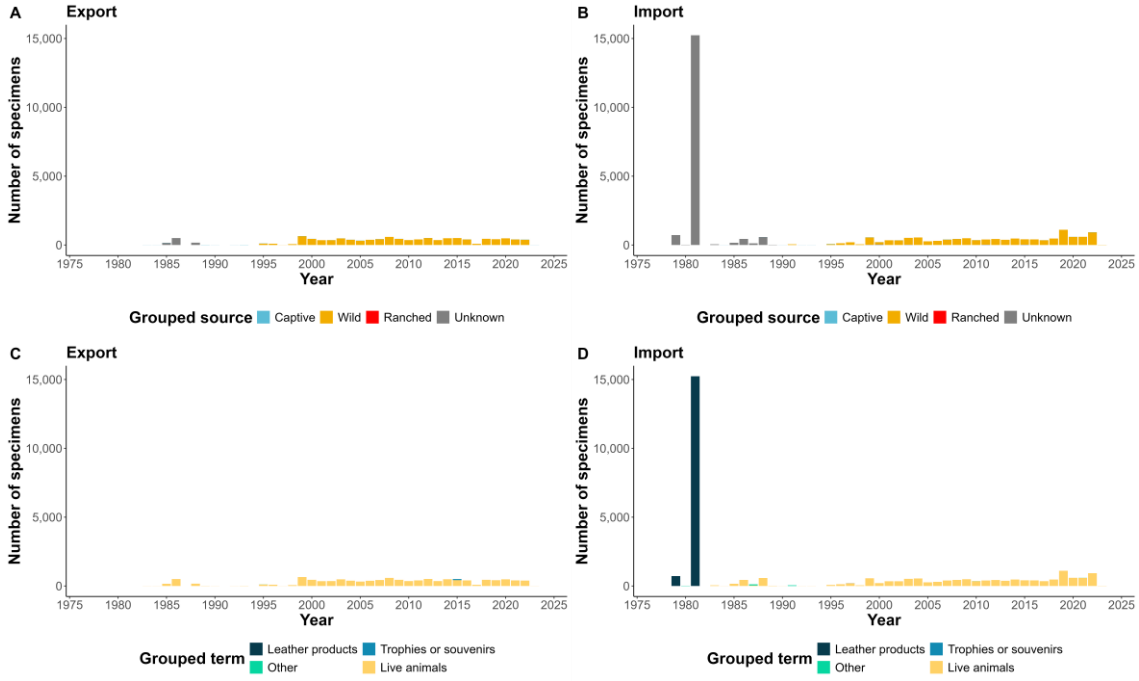

Figure 3.12-2 Reported quantities of exported (A and C) and imported (B and D) *Paleosuchus palpebrosus* specimens. In panel A and B reported quantities are disaggregated by year and grouped source and in panel C and D by year and grouped trade term. Data from CITES Trade Database, downloaded 13 August 2024.

d) Assessment of threat(s) posed by trade

The skin has little commercial value, resulting in low trade levels. Consequently, international trade is assessed not to pose a current threat to the survival of the species in the wild (Magnusson et al., 2019).

e) Brief summary of other threats and conservation status

Habitat loss and local subsistence hunting are considered the biggest threats to dwarf caimans (Magnusson et al., 2019; de Lima Muniz et al., 2021).

f) Population monitoring programs in the range area

Due to the low price of skins, there is little potential for commercially oriented management programs, as have been successful for other crocodilians (Campos et al., 2018).

g) National regulations / legislation and in the range countries

Amazonian countries ratified CITES (Brazil, Ecuador, Peru, and Venezuela in 1977, Bolivia in 1979 and Colombia in 1981) and put legislation in place to regulate harvest (Marioni et al., 2021).

h) Current management in the range countries, including harvest quotas

In Guyana, capture and sale of dwarf caiman for the pet trade, is conducted subject to a CITES annual export quota of 500 live animals (UNEP, 2024).

i) Overall assessment of data quality

Extensive information on the species, its population trend and status, management, and the role of trade is available from peer-reviewed sources, and the assessment is supported by quantitative data. Overall data quality is assessed as high.

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4 Uncertainties

Generally, the available information on the 12 crocodilian species included in the assignment is updated and comprehensive. For two of the species, *Crocodylus mindorensis* and *Crocodylus siamensis*, the current population statuses and trends of their wild populations were latest assessed by IUCN in 2012. For the rest of the species, the conservation status evaluations were done during the period 2017-2022. For all species, detailed status survey and conservation action plans have recently been developed and published by the IUCN SSC Crocodile Specialist Group (Manolis & Stevenson (Eds.), 2018-19).

For a few species with vast distribution ranges, covering multiple countries (e.g., *Crocodylus actus*, *Crocodylus niloticus,* and *Crocodylus porosus*), detailed knowledge about populations may exist from parts of the range while lacking from other areas. Moreover, for widespread species the protection status, management efforts, and law enforcement will often differ among range states. This is particularly the case for *Crocodylus niloticus.*

The IUCN SSC Crocodile Specialist Group has since the early 1970s worked with governments, non-governmental organisations (NGOs) and companies involved in trade of crocodilian skin to conserve, manage and ensure sustainable use of crocodilians worldwide. Since 1992, all crocodilian skins in international trade (originating from ranching, captive breeding, or wild harvest) have had a uniquely numbered, non-reusable tag attached to them. Detailed conservation action plans developed for each of the species are published. All in all, international trade in crocodilians seems to be well regulated.

As data on illegal trade mainly stem from seizures, the extent will largely be unknown.

Overall assessment of data quality was included for each species. To reflect the influence of uncertainty on the conclusions, confidence levels were provided with the outcomes of the NDF for each species.

5 Conclusions (with answers to the terms of reference)

The Norwegian Environment Agency requested VKM to conduct a scientific risk assessment of trade in crocodilians (Crocodylia spp.) listed in the CITES appendices and specimens thereof, based on the criteria given under the Convention on International Trade in Endangered Species (CITES). The Terms of Reference specified that the assessment shall be based on CITES, the Norwegian Cites Regulation, relevant articles in the convention text and resolutions. Additionally, paragraph 3 of the Terms of Reference specified that the risk assessment should be limited to species traded with Norway since 2011. Assessments to determine species-specific detriment pertaining to international trade (cf. Resolution Conf. 16.7 (Rev. CoP17)), non-detriment findings are made for twelve species listed on Appendix I and Appendix II. The outcome of an NDF may be positive (no detriment), negative (detrimental) or inconclusive (more documentation is needed, but assessments might be able on a case-by-case basis with sufficient information to determine risk). Based on the species-specific assessments, VKM concludes that the outcomes of the NDFs are positive for all 12 crocodilian species (Table 4-1), i.e. that the impact from legal international trade is not detrimental to the survival of the species in the wild. The confidence with which each NDF is made depends on the amount of reliable information available.

VKM proposes that the NDFs for the 12 species could be applied for a period of ten years unless the IUCN assessments are updated and changed to a level of raised concern.

Table 4-1. Overview of risk assessments for the 12 species of crocodilians included in the assignment.

Species	CITES Appendix	IUCN Red List	Non-detriment finding (NDF)[1]	Confidence
Alligator mississippiensis	II	LC-2018	positive	high
Caiman crocodilus	I/II	LC-2016	positive	high
Caiman latirostris	I/II	LC-2019	positive	high
Crocodylus acutus	I/II	VU-2020	positive	high
Crocodylus mindorensis	I	CR-2012	positive	high
Crocodylus moreletii	I/II	LC-2020	positive	high
Crocodylus niloticus	I/II	LC-2017	positive	high
Crocodylus novaeguineae	II	LC-2018	positive	high
Crocodylus porosus	I/II	LC-2019	positive	high
Crocodylus rhombifer	I	CR-2022	positive	high
Crocodylus siamensis	I	CR-2012	positive	medium
Paleosuchus palpebrosus	II	LC-2018	positive	high

[1]An NDF is an assessment of the risk of negative impact of international trade. In this report the outcome may be positive (low risk), negative (high risk) or inconclusive (more documentation on e.g., breeding facilities and management of wild populations is needed on a case-by-case basis to determine risk).

6 Data gaps

For each individual species assessment (sections 3.1-3.12)**,** the most prominent data gaps are summarised in subsection i) "Overall assessment of data quality". Overall, the amount of peer reviewed and quantitative information for the crocodilian species was very good. Detailed conservation action plans exist for all 12 species assessed. The most common data gaps encountered when performing the species assessments were:

- Lack of reliable estimate of population size for parts of the ranges.
- Lack of knowledge about population trends for parts of the ranges.
- Lack of complete data on ecology.
- Lack of knowledge about legal protective status, harvest levels and management in some range states.
- Lack of knowledge about law enforcement in some range states.
- Lack of knowledge about levels of illegal trade.

7 References

Note that the references for the individual species assessments are given at the end of each individual species assessment (section 3.1-3.12).

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8 Supplementary information

Table S1. References identified in the forward and backward (FB) citation-search and the additional ad-hoc literature included in the assessment, with information on inclusion of the reference in the assessment. Ch. = chapter in the assessment.

Reference	Search source	Included in assessment
Ahmad, N., Naquiah, N., Hossain, M., Sultana, S., Ahamad, M. N., Johan, M. R., & Ali, M. E. (2019). Quantitative duplex real-time polymerase chain reaction assay with TaqMan probe detects and quantifies *Crocodylus porosus* in food chain and traditional medicines. *Food Additives & Contaminants: Part A, 36*(6), 825-835. https://doi.org/10.1080/19440049.2019.1584407	FB	No
Akmad, M. G., & Pomares, C. C. (2008). Wild *Crocodylus mindorensis* at Tambad, Carmen, North Cotabato. Unpublished BSc (Agriculture), Department of Animal Science, College of Agriculture, University of Southern Mindanao, Kabacan, North Cotabato, Philippines.	Additional	Yes (Ch. 3.5)
Álvarez del Toro, M. (1974). *Los Crocodylia de México (Estudio comparativo)*. Instituto Mexicano de Recursos Naturales Renovables, México, D.F.	Additional	Yes (Ch. 3.6)
Amarasinghe, A. A. T., Madawala, M. B., Karunarathna, D. M. S. S., Manolis, C., Silva, A. de, & Sommerlad, R. (2015). Human-crocodile conflict and conservation implications of Saltwater Crocodiles *Crocodylus porosus* (Reptilia: Crocodylia: Crocodylidae) in Sri Lanka. *Journal of Threatened Taxa, 7*(5), 7111-7130. https://doi.org/10.11609/jott.o4159.7111-30	FB	No
Amavet, P. S., Vilardi, J. C., Rueda, E. C., Larriera, A., & Saidman, B. O. (2012). Mating system and population analysis of the broad-snouted caiman (*Caiman latirostris*) using microsatellite markers. *Amphibia-Reptilia, 33*(1), 83-93. https://doi.org/10.1163/156853812x624423	FB	No

Antelo, R. Biología del cocodrilo o caimán del Orinoco (*Crocodylus intermedius*) en la Estación Biológica El Frío, Estado Apure (Venezuela).	FB	No
Ayarzagüena, J. (1983). Ecología del caimán de anteojos o baba (*Caiman crocodilus L.*) en los Llanos de Apure (Venezuela). *Doñana Acta Vertebrata, 10*(3).	FB	No
Ayarzagüena, J., & Castroviejo, J. (2008). La baba (*Caiman crocodilus*) en la Estación Biológica El Frío (Estado Apure). Llanos del Orinoco, Venezuela. In J. Castroviejo, J. Ayarzagüena, & A. Velasco (Eds.), *Contribución al Conocimiento del Género Caimán de Suramérica* (pp. 181-294). Asoc. Amigos de Doñana, Seville, Spain.	Additional	Yes (Ch. 3.2)
Balaguera-Reina, S. A., & Densmore, L. D. (2015). The Biology and Conservation Status of the American Crocodile in Colombia. *Journal of Herpetology, 49*(2), 200-206. https://doi.org/10.1670/13-065	FB	No
Balaguera-Reina, S. A., & Velasco, A. (2019). *Caiman crocodilus*. The IUCN Red List of Threatened Species 2019: e.T46584A3009688. https://doi.org/10.2305/IUCN.UK.2019-1.RLTS.T46584A3009688.en	Additional	Yes (Ch. 3.2)
Balaguera-Reina, S. A., Vargas-Castillo, A., & Densmore, L. D. (2021). Population ecology of the spectacled caiman (*Caiman crocodilus*) in the Apaporis River middle basin. *Ecosphere, 12*(5), e03532. https://doi.org/10.1002/ecs2.3532	FB	Yes (Ch. 3.2)
Balaguera-Reina, S., & Densmore, L. (2014). Legislation and conservation efforts concerning crocodiles in Colombia: A historical review. *Herpetological Review, 45(4), 638-642.*	FB	Yes (Ch. 3.2)

Barr, B. R. (1997). *Food habits of the American alligator,* Alligator mississippiensis*, in the southern Everglades* (Ph.D thesis). University of Miami, Coral Gables, FL. Retrieved from https://www.proquest.com/openview/12e4c32810901cf6419675f805857519/1?pq-origsite=gscholar&cbl=18750&diss=y	FB	Yes (Ch. 3.1)
Benítez-Moreno, J. A., Cedeño-Vazquez, J. R., & Castelblanco-Martínez, D. N. (2024). Community engagement and human perception in crocodile conservation: preliminary steps in Sian Ka'an Biosphere Reserve. *Frontiers in Conservation Science*, *5,* 1297960. https://doi.org/10.3389/fcosc.2024.1297960	FB	No
Bertone, S., Godahewa, A., Balaguera-Reina, S. A., Briggs-Gonzalez, V., & Mazzotti, F. J. (2023). First successful nest for the Vulnerable American crocodile *Crocodylus acutus* population on the west coast of Florida, USA. *Oryx, 57*(3), 389-391. https://doi.org/10.1017/S0030605322001119	FB	No
Bezuijen, M., Simpson, B., Behler, N., Daltry, J., & Tempsiripong, Y. (2012). *Crocodylus siamensis*. The IUCN Red List of Threatened Species 2012: e.T5671A3048087. https://doi.org/10.2305/IUCN.UK.2012.RLTS.T5671A3048087.en	Additional	Yes (Ch. 3.11)
Bishop, J. M., Leslie, A. J., Bourquin, S. L., & O'Ryan, C. (2009). Reduced effective population size in an overexploited population of the Nile crocodile (*Crocodylus niloticus*). *Biological Conservation, 142*(10), 2335-2341. https://doi.org/10.1016/j.biocon.2009.05.016	FB	No
Borges, V. S., Santiago, P. C., Lima, N. G. S., Coutinho, M. E., Eterovick, P. C., & Carvalho, D. C. (2018). Evolutionary Significant Units within Populations of Neotropical Broad-Snouted Caimans (*Caiman latirostris*, Daudin, 1802). *Journal of Herpetology, 52*(3), 282-288. https://doi.org/10.1670/17-074	FB	No

Brien, M., Shwedick, B., McCaskill, L., Ramono, W. & Webb, G. (2015). *Crocodile Conservation, Management and Farming in Indonesia: A Preliminary Review with Recommendations.* Summary Report of the IUCN-SSC Crocodile Specialist Group Review Mission to Indonesia (23 August-17 September 2014). Crocodile Specialist Group: Darwin.	Additional	Yes (Ch. 3.11)
Briggs-Gonzalez, V., Bonenfant, C., Basille, M., Cherkiss, M., Beauchamp, J., & Mazzotti, F. (2017). Life histories and conservation of long-lived reptiles, an illustration with the American crocodile (*Crocodylus acutus*). *Journal of Animal Ecology, 86*(5), 1102-1113. https://doi.org/10.1111/1365-2656.12723	FB	Yes (Ch. 3.1)
Butfiloski, J. (2011). Public Alligator Hunting Season Report 2011. South Carolina Department of Natural Resources.	FB	No
Butfiloski, J. (2013). Public Alligator Hunting Season Report 2015. South Carolina Department of Natural Resources.	FB	No
Butfiloski, J. (2016). Public Alligator Hunting Season Report 2016. South Carolina Department of Natural Resources.	FB	No
Buthelezi, S., Southway, C., Govinden, U., Bodenstein, J., & du Toit, K. (2012). An investigation of the antimicrobial and anti-inflammatory activities of crocodile oil. *Journal of Ethnopharmacology*, *143*(1), 325-330. https://doi.org/10.1016/j.jep.2012.06.040	Additional	Yes (Ch. 3.7)
Caldwell, J. (2007). World trade in crocodilian skins 2003-2005. Prepared as part of the International Alligator and Crocodile Trade Study. UNEP-WCMC, Cambridge. https://doi.org/10.5962/bhl.title.45426	FB	No
Caldwell, J. (2021). World Trade in Crocodilian Skins 2017 - 2019. UNEP-WCMC, Cambridge.	FB	No

Caldwell, J. (2024). World trade in crocodilian skins 2020-2022. UNEP-WCMC, Cambridge.	Additional	Yes (Ch. 1.5)
Campos, Z., Magnusson, W. E., & Muniz, F. (2018). Cuvier's Smooth-fronted Caiman *Paleosuchus palpebrosus*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles*. Status Survey and Conservation Action Plan (4th ed.). Crocodile Specialist Group, Darwin.	Additional	Yes (Ch. 3.12)
Campos, Z., Muniz, F. L., Farias, I. P., & Hrbek, T. (2015). Conservation status of the dwarf caiman *Paleosuchus palpebrosus* in the region of the Araguaia-Tocantins basin, Brazil. *Crocodile Specialist Group Newsletter*, *34*(3), 6-8.	Additional	Yes (Ch. 3.12)
Campos, Z., Sanaiotti, T., & Magnusson, W. (2010). Maximum size of dwarf caiman, *Paleosuchus palpebrosus* (Cuvier, 1807), in the Amazon and habitats surrounding the Pantanal, Brazil. *Amphibia-Reptilia*, *31*(3), 439-442.	Additional	Yes (Ch. 3.12)
Campos, Z., Sanaiotti, T., Muniz, F., Farias, I., & Magnusson, W. E. (2012). Parental care in the dwarf caiman, *Paleosuchus palpebrosus* Cuvier, 1807 (Reptilia: Crocodilia: Alligatoridae). *Journal of Natural History*, *46*(47-48), 2979-2984.	Additional	Yes (Ch. 3.12)
Castañeda-Moya, F. J. (2000). Estatus de *Crocodylus moreletii* en el parque nacional Laguna del Tigre, Petén, Guatemala. In *Crocodiles*. *Proceedings of the 15th Working Meeting of the IUCN-SSC Crocodile Specialist Group* (p. 521). IUCN, Gland, Switzerland.	Additional	Yes (Ch. 3.6)
Charruau, P., & Niño-Torres, C. A. (2014). A third case of amelia in Morelet's crocodile from the Yucatan Peninsula. *Diseases of Aquatic Organisms, 109*(3), 263-267. https://doi.org/10.3354/dao02743	FB	No

CITES (2022). Transfer of the population of broad-snouted caiman *Caiman latirostris* of Brazil from Appendix I to Appendix II of CITES. CoP19, Prop. 11. https://cites.org/sites/default/files/documents/E-CoP19-Prop-11.pdf	Additional	Yes (Ch. 3.3)
CITES (2022). Transfer of the Thai population of *Crocodylus siamensis* from Appendix I to Appendix II with a zero quota for wild specimens. CoP19 Prop. 13. CoP19, Panama.	Additional	Yes (Ch. 3.11)
CITES Trade Database (2024). Compiled by UNEP-WCMC for the CITES Secretariat. Retrieved August 13, 2024, from https://trade.cites.org/	Additional	Yes (Ch. 1.2., 2.1, 2.4, 3, 3.1-3.12)
CITES Wildlife TradeView (2024). https://tradeview.cites.org/en/taxon	Additional	Yes (Ch. 2.4)
CITES (2024). List of species. CITES registers. Retrieved September 27, 2024, from https://cites.org/eng/common/reg/cb/species.html	Additional	Yes (Ch. 3.3, 3.4, 3.7, 3.10)
Clancy, T., & Fukuda, Y. (2021). NT Saltwater Crocodile (*Crocodylus porosus*) Wildlife Trade Management Plan: 2020 Monitoring Report.	FB	No
Combrink, A. S. (2014). *Spatial and reproductive ecology and population status of the Nile crocodile (*Crocodylus niloticus*) in the Lake St Lucia estuarine system, South Africa* (Ph.D thesis). University of KwaZulu-Natal, Pietermaritzburg, South Africa.	Additional	Yes (Ch. 3.7)
Combrink, X., Korrûbel, J. L., Kyle, R., Taylor, R., & Ross, P. (2011). Evidence of a Declining Nile Crocodile (*Crocodylus niloticus*) Population at Lake Sibaya, South Africa. *South African Journal of Wildlife Research, 41*(2), 145-157. https://doi.org/10.3957/056.041.0201	FB	No

Combrink, X., Lippai, C., & Fergusson, R. A. (2019). Nile Crocodile *Crocodylus niloticus*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (4th ed., 28 pp.). Crocodile Specialist Group, Darwin. Retrieved August 20, 2024, from http://www.iucncsg.org/365_docs/attachments/protarea/7386996acf2d72b2379d0f905b2c3200.pdf	Additional	Yes (Ch. 3.7)
Combrink, X., Warner, J. K., & Downs, C. T. (2016). Nest predation and maternal care in the Nile crocodile (*Crocodylus niloticus*) at Lake St. Lucia, South Africa. *Behavioural Processes*, *133*, 31-36.	Additional	Yes (Ch. 3.7)
Combrink, X., Warner, J. K., & Downs, C. T. (2017). Nest-site selection, nesting behaviour and spatial ecology of female Nile crocodiles (*Crocodylus niloticus*) in South Africa. *Behavioural Processes*, *135*, 101-112.	Additional	Yes (Ch. 3.7)
CONABIO (2006). Estrategia Tri-nacional Belice-Guatemala-México para la Conservación y el Manejo Sostenible del Cocodrilo de Morelet (*Crocodylus moreletii*). CONABIO, México, D.F.	Additional	Yes (Ch. 3.6)
Cott, H. B. (1961). Scientific results of an enquiry into the ecology and economic status of the Nile crocodile (*Crocodylus niloticus*) in Uganda and Northern Rhodesia. *Transactions of the Zoological Society of London*, 29, 211-356.	Additional	Yes (Ch. 3.7)
CSG SC27 (2024). Southeast Asia Report SC27 2.3. *Minutes of the Crocodile Specialist Group Steering Committee Meeting*, Double Tree Hilton, Darwin, Australia.	Additional	Yes (Ch. 3.11)

Daltry, J., Han, S., Leng, H., Ratanapich, N., Piseth, S., Sovannara, H., Simpson, B., Starr, A., Brook, S., & Frechette, J. (2015). Status, distribution and ecology of the Siamese crocodile *Crocodylus siamensis* in Cambodia. *Cambodian Journal of Natural History, 2015*, 153-164.	FB	No
de Lima Muniz, F., Campos, Z., Bittencourt, P. S., Hrbek, T., & Farias, I. P. (2021). Report of poaching of dwarf caimans *Paleosuchus spp*. (Alligatoridae: Caimaninae) for meat consumption in northern Brazilian Amazon. *Herpetology Notes*, *14*, 661-665.	Additional	Yes (Ch. 3.12)
Delene, K., Lemma, A., & Fesseha, H. (2020). Major diseases of nile crocodile (*Crocodylus niloticus*) with focus on current status in Arba Minch crocodile ranch, Ethiopia. *Online Journal of Animal and Feed Research, 10*(3), 98-110.	Additional	Yes (Ch. 1.6)
Delgado, A. L. (2022). Cambodia's crocodile farmers and conservationists forge unlikely alliance. *Dialogue Earth*. Retrieved July 12, 2024, from https://dialogue.earth/en/nature/cambodias-crocodile-farmers-and-conservationists-forge-unlikely-alliance/	Additional	Yes (Ch. 3.11)
Durán-Apuy, A., Mora, J. M., Chavarría-Trejos, R., & Madrigal-Vargas, A. (2023). An index to assess the level of vulnerability to crocodiles in coastal communities. *Phyllomedusa: Journal of Herpetology, 22*(2), 99-119. https://doi.org/10.11606/issn.231-9079.v22i2p99-119	FB	No
Elsey, R., Woodward, A., & Balaguera-Reina, S. A. (2019). *Alligator mississippiensis*. The IUCN Red List of Threatened Species. https://doi.org/10.2305/IUCN.UK.2019-2.RLTS.T46583A3009637.en	Additional	Yes (Ch. 3.1)
Eversole, C. B., & Henke, S. E. (2018). *American Alligators: Habitats, Behaviors, and Threats.* Nova Science Publishers.	FB	No

Eversole, C. B., Henke, S. E., Turner, B. L., Glasscock, S. N., Powell, R. L., Wester, D. B., & Ballard, B. M. (2018). A Theoretical Population and Harvest Model for American Alligators (*Alligator mississippiensis*). *Herpetological Monographs, 32*(1), 22-33. https://doi.org/10.1655/HERPMONOGRAPHS-D-17-00005	FB	Yes (Ch. 3.1)
Fergusson, R. A. (2010). Nile Crocodile *Crocodylus niloticus*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (pp. 84-89). Crocodile Specialist Group, Darwin.	Additional	Yes (Ch. 3.7)
Flores-Escalona, C. I., Charruau, P., López-Luna, M. A., Zenteno-Ruiz, C. E., Rangel-Mendoza, J. A., & Peralta-Carreta, C. (2021). Population status and habitat preference of *Crocodylus moreletii* Duméril & Bibron, 1851 (Crocodilia: Crocodylidae) within the limits of two protected natural areas in southeastern Mexico. *Herpetology Notes*, *14*, 55-62.	FB	No
Fujisaki, I., Hart, K. M., Mazzotti, F. J., Cherkiss, M. S., Sartain, A. R., Jeffery, B. M., Beauchamp, J. S., & Denton, M. (2014). Home range and movements of American alligators (*Alligator mississippiensis*) in an estuary habitat. *Animal Biotelemetry, 2,* 1-10. https://doi.org/10.1186/2050-3385-2-8	FB	No
Fukuda, Y., Webb, G., Edwards, G., Saalfeld, K., & Whitehead, P. (2021). Harvesting predators: simulation of population recovery and controlled harvest of saltwater crocodiles *Crocodylus porosus*. *Wildlife Research, 48*(3), 252-263. https://doi.org/10.1071/WR20033	FB	No
Funes Monzote, R., & Pérez Fleitas, E. A. (2022). In Grave Danger: A Brief Environmental History of the Cuban Crocodile (*Crocodylus rhombifer*). *Environmental History, 27*(2), 320-327. https://doi.org/10.1086/719613	FB	No

Gelabert, C., Rositano, F., & González, O. (2017). Sustainable use of caiman in Argentina: An analysis from the perspective of the stakeholders involved. *Biological Conservation, 212, 357-365. https://doi.org/10.1016/j.biocon.2017.06.012*	FB	No
González-Desales, G. A., Sigler, L., García-Grajales, J., Charruau, P., Zarco-González, M. M., Balbuena-Serrano, Á., & Monroy-Vilchis, O. (2021). Factors influencing the occurrence of negative interactions between people and crocodilians in Mexico. *Oryx, 55*(5), 791-799. https://doi.org/10.1017/S0030605319000668	FB	No
Goose, A. (2017). *Public Alligator Hunting Season Report 2017*. South Carolina Department of Natural Resources. https://www.dnr.sc.gov/wildlife/alligator/pdf/huntingreport2017.pdf	FB	No
Grant, P. B. C., & Lewis, T. R. High speed boat traffic: A risk to crocodilian populations. *Herpetological Conservation and Biology, 5*(3), 456-460.	FB	No
Hall, P. M. (1989). Variation in geographic isolates of the New-Guinea Crocodile (*Crocodylus novaeguineae* Schmidt) compared with the similar, allopatric, Philippine Crocodile (*Crocodylus mindorensis* Schmidt). *Copeia*, *1989*(1), 71-80.	Additional	Yes (Ch. 3.5)
Hall, P. M. (1991). Estimation *of* nesting female crocodilian size from clutch characteristics: correlates of reproductive mode, and harvest implications. *Journal of Herpetology*, *25*, 133-141.	Additional	Yes (Ch. 3.8)
Hall, P., & Johnson, D. R. (1987). Nesting biology of *Crocodylus novaeguineae* in Lake Murray District, Papua New Guinea. *Herpetologica, 43*, 249-258.	Additional	Yes (Ch. 3.8)
Halliday, T., & Adler, K. (2002). *The New Encyclopedia of Reptiles and Amphibians.* Oxford: Oxford University Press.	Additional	Yes (Ch. 3.12)

Harrer, S., Ginal, P., Tan, W. C., Binaday, J. W., Diesmos, A. C., Manalo, R., Ziegler, T., & Rödder, D. (2024). Disappearing archosaurs – an assessment of established protected areas in the Philippines to save the critically endangered, endemic Philippine Crocodile (*Crocodylus mindorensis*). *Salamandra*, *60*(1), 29-41.	FB	No
Hollands, M. (1987). The management of crocodiles in Papua New Guinea. In G. J. W. Webb, S. C. Manolis, & P. J. Whitehead (Eds.), *Wildlife Management: Crocodiles and Alligators* (pp. 73-89). Surrey Beatty & Sons, Sydney.	Additional	Yes (Ch. 3.8)
Hutton, J. M., & Games, I. (1992). *The CITES Nile Crocodile Project*. CITES Secretariat, Lausanne, Switzerland.	Additional	Yes (Ch. 3.7)
Isberg, S., Combrink, X., Lippai, C., & Balaguera-Reina, S. A. (2019). *Crocodylus niloticus*. The IUCN Red List of Threatened Species 2019: e.T45433088A3010181. https://doi.org/10.2305/IUCN.UK.2019-1.RLTS.T45433088A3010181.en	Additional	Yes (Ch. 3.7)
Jelden, D. C., Manolis, C., Tsubouchi, T., & Nguyen Dao, N. V. (2008). *Crocodile Conservation and Farming in the Socialist Republic of Viet Nam: A Review with Recommendations.* Crocodile Specialist Group: Darwin.	Additional	Yes (Ch. 3.11)
Jenkins, R. W. G., Jelden, D., Webb, G. J. W., & Manolis, S. C. (Eds.). (2006). *Review of Crocodile Ranching Programs*. Conducted for CITES by IUCN-SSC Crocodile Specialist Group. AC22 Inf. 2. https://cites.org/sites/default/files/common/com/ac/22/EFS-AC22-Inf02.pdf	Additional	Yes (Ch. 3.1, 3.6)
Joanen, T., Merchant, M., Griffith, R., Linscombe, J., & Guidry, A. (2021). Evaluation of Effects of Harvest on Alligator Populations in Louisiana. *Wildlife Management, 85*(4), 696-705. https://doi.org/10.1002/jwmg.22028	FB	Yes (Ch. 3.1)

Kumar, A., Kumar, S., Zaidi, Y. F., & Kanaujia, A. (2012). A Review on Status and Conservation of Saltwater Crocodile (*Crocodylus porosus*) in India. *International Day for Biological Diversity: Marine biodiversity Report, 22,* 141-148.	FB	No
Larriera, A. (2002). *Caiman latirostris* (broad-snouted caiman). Communal nesting. *Herpetological Review, 33*(3), 202.	Additional	Yes (Ch. 3.3)
Larriera, A. (2011). Ranching the broad-snouted cayman (*Caiman latirostris*) in Argentina: An economic incentive for wetland conservation by local inhabitants. In M. Abensperg-Traun, D. Roe, & C. O'Criodain (Eds.), *CITES and CBNRM. Proceedings of an international symposium on "The relevance of CBNRM to the conservation and sustainable use of CITES-listed species in exporting countries"* (pp. 86-92). Vienna, Austria, 18-20 May 2011. IUCN, Gland, Switzerland and IIED, London, UK, 172pp.	Additional	Yes (Ch. 3.3)
Lippai, C. L. (2018). East and Southern Africa. Report to the Crocodile Specialist Group Steering Committee. 25th Working Meeting of the IUCN-SSC Crocodile Specialist Group. Universidad Nacional del Litoral, Santa Fe, Argentina.	Additional	Yes (Ch. 3.7)
Louisiana Department of Wildlife and Fisheries. (2023). *Louisiana's Alligator Management Program. 2021-2022 Annual Report.* https://www.louisianaalligators.com/uploads/1/0/4/8/104800207/2021-2022_alligator_program_annual_report.pdf	Additional	Yes (Ch. 3.1)
Lourenço-de-Moraes, R., Campos, F. S., Cabral, P., Silva-Soares, T., Nobrega, Y. C., Covre, A. C., & França, F. G. R. (2023). Global conservation prioritization areas in three dimensions of crocodilian diversity. *Scientific Reports, 13*(1), 2568. https://doi.org/10.1038/s41598-023-28413-6	FB	No

Macgregor, J. (2002). International Trade in Crocodilian Skins: Review and Analysis of the Trade and Industry Dynamics for Market-based Conservation. In *Crocodiles. Proceedings of the 16th Working Meeting of the IUCN-SSC Crocodile Specialist Group* (pp. 12-18). IUCN, Gland, Switzerland.	FB	Yes (Ch. 3.7)
Magnusson, W. E. (1982). Biological aspects of the conservation of Amazonian crocodilians. In *Crocodiles. Proceedings of the 5th Working Meeting of the IUCN-SSC Crocodile Specialist Group*. IUCN, Gland, Switzerland.	Additional	Yes (Ch. 3.12)
Magnusson, W. E., Campos, Z., & Muniz, F. (2019). *Paleosuchus palpebrosus*. The IUCN Red List of Threatened Species 2019: e.T46587A3009946. Retrieved August 20, 2024, from https://doi.org/10.2305/IUCN.UK.2019-1.RLTS.T46587A3009946.en	Additional	Yes (Ch. 3.12)
Manalo, R. (2008). Occurrence of *Crocodylus mindorensis* in the Cordillera Central. Abra Province, Luzon Island. *National Museum Papers, 14*, 109-115.	Additional	Yes (Ch. 3.5)
Manolis, S. C. (1995). *Monitoring* Crocodylus novaeguineae *nests in Papua New Guinea: A Review with Recommendations.* Unpublished CSG report.	Additional	Yes (Ch. 3.8)
Manolis, S. C., & Solmu, G. (2019). New Guinea Freshwater Crocodile *Crocodylus novaeguineae*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (4th ed., 5 pp.). Crocodile Specialist Group: Darwin.	Additional	Yes (Ch. 3.8)
Manolis, S. C., & Webb, G. J. (compilers) (2016). *Best management practices for crocodilian farming.* IUCN-SSC Crocodile Specialist Group, Darwin, Australia.	FB	Yes (Ch. 1.6)

Marín-Enríquez, E., Charruau, P., & Félix-Salazar, L. A. (2023). Discovery of a suburban wetland refuge for a depleted American crocodile (*Crocodylus acutus*) population in northwestern Mexico, using a commercial Unmanned Aerial Vehicle. *Tropical Conservation Science, 16,* 19400829231209848. https://doi.org/10.1177/19400829231209848	FB	No
Marioni, B., Barão-Nóbrega, J. A. L., Botero-Arias, R., Muniz, F., Campos, Z., Da Silveira, R., Magnusson, W. E., & Villamarín, F. (2021). Science and conservation of Amazonian crocodilians: a historical review. *Aquatic Conservation: Marine and Freshwater Ecosystems, 31*(5), 1056-1067. https://doi.org/10.1002/aqc.3541	FB	Yes (Ch. 3.2, 3.12)
Marioni, B., Da Silvera, R., Magnusson, W. E., & Thornbjarnarson. (2008). Feeding Behavior of Two Sympatric Caiman Species, *Melanosuchus niger* and *Caiman crocodilus*, in the Brazilian Amazon. *Journal of Herpetology, 42*(4), 768-772. https://doi.org/10.1670/07-306R1.1	FB	Yes (Ch. 3.2)
Mascarenhas-Junior, P. B., Strickland, B. A., Heithaus, M. R., Santos, R. L., Barboza, R. S., Simões, P. I., & Correia, J. M. (2024). Artisanal fishing affects the local distribution of broad-snouted caiman (*Caiman latirostris*) within the Atlantic Forest of Brazil. *Aquatic Conservation: Marine and Freshwater Ecosystems, 34*(6), e4214. https://doi.org/10.1002/aqc.4214	FB	No
Mascarenhas-Junior, P., Maffei, F., Muniz, F., Freitas-Filho, R. F., Portelinha, T. C. G., Campos, Z., & Bassetti, L. A. B. (2021). Conflicts between humans and crocodilians in urban areas across Brazil: a new approach to support management and conservation. *Ethnobiology and Conservation, 10*. https://doi.org/10.15451/ec2021-12-10.37-1-19	FB	No

McMahan, W., Targarona, R., Soberon, R., & Alonso Tabet, M. (2022). *Crocodylus rhombifer*. The IUCN Red List of Threatened Species 2022: e.T5670A130856048. Retrieved July 14, 2024, from https://doi.org/10.2305/IUCN.UK.2022-2.RLTS.T5670A130856048.en	Additional	Yes (Ch. 3.10)
McMahan, W., Targarona, T. R., Soberon, R. R., & Tabet, M. A. (2019). Cubancrocodile *Crocodylus rhombifer*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status survey and conservation action plan* (4th ed., pp. 8). Crocodile Specialist Group, Darwin.	Additional	Yes (Ch. 3.10)
Medem, F. (1981). *Los Crocodylia de Sur América. Vol. I. Los Crocodilia de Colômbia.* Colciencias, Universidad Nacional de Colombia, Bogotá.	Additional	Yes (Ch. 3.2)
Merediz-Alonso, G. (1999). Ecology, sustainable use by local people, and conservation of Morelet's crocodile *Crocodylus moreletii* in Sian Ka'an Biosphere Reserve, Quintana Roo, Mexico. Unpublished MSc thesis, State University of New York, New York, USA.	Additional	Yes (Ch. 3.6)
Milian-Garcia, Y., Ramos-Targarona, R., Perez-Fleitas, E., Sosa-Rodriguez, G., Guerra-Manchena, L., Alonso-Tabet, M., Espinosa-Lopez, G., & Russello, M. A. (2015). Genetic evidence of hybridization between the critically endangered Cuban crocodile and the American crocodile: Implications for population history and in-situ/ex-situ conservation. *Heredity*, *114*(3), 272-280.	Additional	Yes (Ch. 3.10)
Murray, C. M., Russo, P., Zorrilla, A., & McMahan, C. D. (2019). Divergent morphology among populations of the New Guinea crocodile, *Crocodylus novaeguineae* (Schmidt, 1928): Diagnosis of an independent lineage and description of a new species. *Copeia, 107*(3), 517-523. https://doi.org/10.1643/CG-19-240.	Additional	Yes (Ch. 3.8)

Ocampo-González, P., Rodas-Trejo, J., & González-Ramón, M. del C. (2021). Conocimiento, percepciones y usos del *Crocodylus moreletti* en la Reserva de la Biosfera Pantanos de Centla. *Ecosistemas y Recursos Agropecuarios, 8*(I). https://doi.org/10.19136/era.a8nI.2664	FB	No
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Petursson, J. (2016). Management Program for the Saltwater Crocodile (*Crocodylus porosus*) in the Northern Territory of Australia, 2016-2020. https://www.scribd.com/document/607908573/crocodile-management-program	FB	No
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Platt, S. G., Rainwater, T. R., Finger, A. G., Thorbjarnarson, J. B., Anderson, T. A., & McMurry, S. T. (2006). Food habits, ontogenic dietary partitioning and observations on foraging behavior of Morelet's crocodile *Crocodylus moreletii* in northern Belize. *Herpetological Journal, 16,* 281-290.	Additional	Yes (Ch. 3.6)
Platt, S. G., Sigler, L., Rainwater, T. R., Cedeño-Vázquez, J. R., & Villegas, A. (2019). Morelet's Crocodile *Crocodylus moreletii*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (4th ed., 7 pp.). Crocodile Specialist Group, Darwin.	Additional	Yes (Ch. 3.6)
Platt, S. G., Sigler, L., Rainwater, T. R., Cedeño-Vázquez, J. R., & Villegas, A. (2023). *Crocodylus moreletii*. The IUCN Red List of Threatened Species 2023: e.T5663A193672551. Retrieved July 12, 2024, from https://doi.org/10.2305/IUCN.UK.2023-1.RLTS.T5663A193672551.en	Additional	Yes (Ch. 3.6)
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Rainwater, T. R., Platt, S. G., Charruau, P., Balaguera-Reina, S. A., Sigler, L., Cedeño-Vázquez, J. R., & Thorbjarnarson, J. B. (2022). *Crocodylus acutus* (amended version of 2021 assessment). The IUCN Red List of Threatened Species 2022: e.T5659A212805700. Retrieved July 10, 2024, from https://doi.org/10.2305/IUCN.UK.2022-1.RLTS.T5659A212805700.en	Additional	Yes (Ch. 3.4)
Rainwater, T. R., Singh, R., Tuten, C. A., Given, A. M., Gibbons, P. W., Song, B., Platt, S. G., Wilkinson, P. M., & Bodinof Jachowski, C. M. (2024). Fauna Associated with American Alligator (*Alligator mississippiensis*) Nests in Coastal South Carolina, USA. *Animals, 14*(4), 620. https://doi.org/10.3390/ani14040620	FB	No
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Ross, C. A., & Garnett, S. (1989). *Crocodiles and Alligators*. Golden Press, Silverwater.	Additional	Yes (Ch. 3.9)

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Savini, C., Pliosungnoen, M., Pattanavibool, A., Thorbjarnarson, J., Limlikhitaksorn, C., & Platt, S. (2012). A survey to determine the conservation status of Siamese Crocodiles in Kaeng Krachan National Park, Thailand. *Herpetological Conservation and Biology, 7*(2), 157-168.	FB	No
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Simpson, B. K., & Bezuijen, M. R. (2010). Siamese Crocodile *Crocodylus siamensis*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (pp. 120-126). Crocodile Specialist Group, Darwin.	Additional	Yes (Ch. 3.11)
Siroski, P. A., Bassetti, L., Piña, C. I., & Larriera, A. (2019). Broad-snouted Caiman *Caiman latirostris*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (4th ed., 7 pp.). Crocodile Specialist Group: Darwin.	Additional	Yes (Ch. 3.3)
Siroski, P., Bassetti, L. A. B., Piña, C., & Larriera, A. (2020). *Caiman latirostris*. The IUCN Red List of Threatened Species 2020: e.T46585A3009813. Retrieved July 25, 2024, from https://doi.org/10.2305/IUCN.UK.2020-3.RLTS.T46585A3009813.en	Additional	Yes (Ch. 3.3)
So, W. L., Chong, T. K., Lee, I. H. T., So, M. T. W., Liu, A. M. Y., Leung, S. T. C., Ching, W., Yip, H. Y., Shaw, P. C., & Hui, J. H. L. (2024). Cytochrome oxidase I DNA barcodes of crocodilians meat selling in Hong Kong. *Scientific Data, 11*(1), 46. https://doi.org/10.1038/s41597-023-02889-3	FB	No
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Strickland, B. A., & Vilella, F. J., & Flynt, R. D. (2018). Long-term Spotlight Surveys of American Alligators in Mississippi, USA. *Herpetological Conservation and Biology, 13*(2), 331-340.	FB	Yes (Ch. 3.1)

Targarona, R. R. (2013). *Ecologia y conservación del cocodrilo cubano (Crocodylus rhombifer) en la" Ciénaga de Zapata", Cuba* (Doctoral dissertation, Universitat d'Alacant/Universidad de Alicante).	Additional	Yes (Ch. 3.10)
Tellez, M., Boucher, M., & Kohlman, K. (2016). Population status of the American Crocodile (*Crocodylus acutus*) in Caye Caulker, Belize. *Mesoamerican Herpetology, 3*(2), 449-460.	FB	No
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Thorbjarnarson, J. B. (1994). Reproductive ecology of the spectacled Caiman (*Caiman crocodilus*) in the Venezuelan Llanos. *Copeia*, 907-919. https://doi.org/10.2307/1446713	FB	Yes (Ch. 3.2)
Thorbjarnarson, J., Mazzotti, F., Sanderson, E., Buitrago, F., Lazcano, M., Minkowski, K., Muñiz, M., Ponce, P., Sigler, L., Soberon, R., Trelancia, A. M., & Velasco, A. (2006). Regional habitat conservation priorities for the American crocodile. *Biological Conservation*, *128*(1), 25-36.	Additional	Yes (Ch. 3.4)
Thornbjarnarson, J. B. (1991). *Ecology and behavior of the spectacled caiman (*Caiman crocodilus*) in the central Venezuelan llanos*. (Doctoral dissertation). University of Florida.	FB	Yes (Ch. 3.2)
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van Weerd, M., & van der Ploeg, J. (2003). A new future for the Philippine crocodile, *Crocodylus mindorensis*. *Sylvatrop, 13*(1&2), 31-50.	FB	No
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Viljoen, D., Webb, E., Myburgh, J., Truter, C., & Myburgh, A. (2023). Remote body condition scoring of Nile crocodiles (*Crocodylus niloticus*) using uncrewed aerial vehicle derived morphometrics. *Frontiers in Animal Science, 4,* 1225396. https://doi.org/10.3389/fanim.2023.1225396	Additional	Yes (Ch. 3.7)
Villegas, A., Flores-Martínez, J. J., de Mayo Mejenes-López, S., & Babb-Stanley, K. A. (2023). Population dynamics of Morelet's crocodile (*Crocodylus moreletii*) using data of national monitoring in Mexico. *Studies on Neotropical Fauna and Environment*, 1-9.	FB	No
Vliet, K., Shirley, M., Ross, P., & Roberto, I. (2024). Living crocodylians of the world. *Crocodile Specialist Group Newsletter*, *43*(2), 15-22.	Additional	Yes (Ch. 1.1, 3.2, 3.7, 3.8)
Webb, G. J. W., & Manolis, S. C. (1992). Monitoring saltwater crocodiles (*Crocodylus porosus*) in the Northern Territory of Australia. In D. R. McCullough & R. H. Barrett (Eds.), *Wildlife 2001: Populations* (pp. 404-418). Elsevier Applied Science, New York.	Additional	Yes (Ch. 1.1-1.5)
Webb, G. J. W., Manolis, C., Brien, M. L., Balaguera-Reina, S. A., & Isberg, S. (2021). *Crocodylus porosus*. The IUCN Red List of Threatened Species 2021: e.T5668A3047556. Retrieved July 13, 2024, from https://doi.org/10.2305/IUCN.UK.2021-2.RLTS.T5668A3047556.en	Additional	Yes (Ch. 3.9)

Webb, G. J. W., Manolis, S. C., & Brien, M. L. (2010). Saltwater Crocodile *Crocodylus porosus*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (3rd ed., pp. 99-113). Crocodile Specialist Group: Darwin.	Additional	Yes (Ch. 3.9)
Webb, G. J. W., Manolis, S. C., & Brien, M. L. (2018). Saltwater Crocodile *Crocodylus porosus*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (4th ed., 20 pp.). Crocodile Specialist Group: Darwin.	Additional	Yes (Ch. 3.9)
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Woodward, A. R., & Elsey, R. M. (2019). American Alligator *Alligator mississippiensis*. In S. C. Manolis & C. Stevenson (Eds.), *Crocodiles. Status Survey and Conservation Action Plan* (4th ed., pp. 1-4). Crocodile Specialist Group.	Additional	Yes (Ch. 3.1)
Yves, A., Lima, L., Bassetti, L., & Barbosa de Andrade, M. B., & Sousa, B., & Marques, T. (2023). Distribution of broad-snouted caiman (*Caiman latirostris*) in the Rio Doce State Park, Minas Gerais, Brasil. *North-Western Journal of Zoology, 19*(2).	FB	No
Zamudio-Acedo, F. (2024). Conocimiento ecológico y sistema de manejo maya del lagarto *Crocodylus moreletii* en Quintana Roo, México. Unpublished MSc thesis, El Colegio de la Frontera Sur, Chiapas, México.	Additional	Yes (Ch. 3.6)