SUBJECT: PROTOCOL FOR MANAGING HUMAN-CROCODILE CONFLICT (HCC) IN THE PHILIPPINES

Pursuant to Republic Act 9147 (Wildlife Resources Conservation and Protection Act), DENR Administrative Order 2019-09 (Updated National List of Threatened Fauna and their Categories), DENR Administrative Order 2016-12 (Adopting the National Biodiversity Strategy and Action Plan); in order to enhance conservation of the two Critically Endangered crocodile species of the country namely the Saltwater crocodile (*Crocodylus porosus*) and the Philippine crocodile (*Crocodylus mindorensis*); and to promote the co-existence of humans and crocodiles, this Protocol on Managing Human-Crocodile Conflict is hereby adopted for guidance of all concerned.

Section 1. RATIONALE

The modification of the natural environment or wildlife habitats into built environment such as human settlement results to increasing incidences of Human-Crocodile Conflicts (HCCs) reported annually in the Philippines. These incidences mostly involve *C. porosus* which are typically associated with brackish waters such as coastal mangrove swamp-forests of Northern Luzon, Palawan, and Mindanao.

Fear of crocodiles, whether well-founded or not, always defeat efforts to conserve crocodiles. Most often, communities resort to capturing crocodiles during incidences of attacks, mere sightings or encounters. Yet, most if not all conflicts need not be resolved by killing or removal of the crocodile in question.

In an effort to balance the protection of human life and property with that of crocodile conservation, there is a need to address HCCs in all its perspective taking into consideration the conflict's negative effects on human social, economic or cultural life, and on the conservation of the species or on the environment.

This Protocol establishes the guidelines in responding to HCCs to mitigate such conflicts so that both lives of humans and crocodiles are protected and promote co-existence.

Section 2. DEFINITION OF TERMS

For the purpose of this Protocol, the following terms and corresponding definitions shall be used:

- a. *Abnormal behavior* an atypical or out of the ordinary, undesirable crocodile behavior (i.e. frequent sighting of horizontal body with head, back and tail exposed in the water during daytime) that may result to it becoming a nuisance crocodile.
- b. Close proximity with human settlements- the area within which an individual crocodile has established its territory and exhibited its territorial behavior (i.e. defends it against human intrusion and marks it as a food source) is 1 kilometer or less from any barangay proper
- c. Crocodile- a large riparian predatory reptile species under the family Crocodilia.
- d. *Human-crocodile conflicts or HCC* any interaction which results in negative effects on human social, economic or cultural life, on conservation of the species or on the environment. Also refers to interactions between crocodiles and humans where the latter

or their livestock are threatened, injured or killed, or livelihoods are affected (e.g. damage to fishing gear, loss of catches).¹

- e. *Potentially problematic crocodile* any crocodile more than 10 feet long living in close proximity to human settlements.
- f. *Nuisance crocodile* is a crocodile that is depredating [killing livestock or pets] or a threat to human health or safety as adopted from the current legal definition of a nuisance gator laid out in the Texas Administrative Code (Title 31, Part 2, Chapter 65, Section 65.352)
- g. *Translocation* the capture, transport and release or introduction of crocodile from one location to another.

Section 3. HCC PROTOCOL

A. Creation of HCC Quick Response Team

All DENR Regional Offices shall create a Quick Response Team at the provincial level to be called the Provincial Wildlife Quick Response Team (PWQRT) through the issuance of a Special Order. The PWQRT shall be composed of representatives from the PENRO, CENRO, LGU/s concerned, Academe, NGO, PNP, Coast Guard, and other men-in-uniform. The PWQRT shall be under the direct supervision of the Provincial Environment and Natural Resources Officer (PENRO). The PWQRT shall address and handle cases of human-wildlife conflicts in their respective area of jurisdiction.

In the case of Palawan, the Palawan Council for Sustainable Development (PCSD) shall create its own Quick Response Team.

B. Establishing the Nature of the Incident

The nature of HCC incidents shall be classified into the following: 1) crocodile sighting/s; 2) crocodile attack/s; and, 3) crocodile capture.

The nature of HCC incidents shall be established following the process below:

- 1. DENR CENROffice receives report on sightings, attacks or captures from informant/reporter e.g concerned citizen, LGUs or police station;
- 2. The DENR CENROffice shall assist and guide the informant/reporter in filling-out the HCC Incident Report (Annex "A");
- 3. The accomplished HCC Incident Report shall then be forwarded to the PENR Office or the Office of the PCSD, in the case of Palawan and then endorsed to the PWQRT or the PCSD Quick Response Team to undergo the verification process;
- 4. The PENRO or the PCSD, in the case of Palawan, shall furnish the DENR Regional Office and Biodiversity Management Bureau (BMB) with a copy of incident report for information and technical advice, if necessary.

Reports on HCC received through other means (i.e. electronic mail, phone) shall likewise be documented properly using the HCC Incident Report and shall follow the same procedure described herein.

¹ http://www.iucncsg.org/pages/Human%252dCrocodile-Conflict.html

C. Validation of HCC Incidents

All incident reports forwarded to the PWQRT or the PCSD Quick Response Team shall undergo the required validation/confirmation process.

Upon receipt of the HCC Incident Report, the designated PWQRT or the PCSD Quick Response Team, as the case may be, shall initiate the conduct of a field validation as follows:

- 1. Coordination with the concerned local government unit for arrangements on onsite validation;
- 2. Deployment of the PWQRT (immediately within 6 hours from the time of report);
- 3. Information gathering and validation of the incident using the prescribed HCC Incident Verification Report (Annex "B");
- 4. Photo documentation (Geo-tagging required, among others);
- 5. The Quick Response Team submits the accomplished HCC Incident Verification Report together with its assessment and recommendation/s to the PENRO or the Office of the PCSD Executive Director, as the case maybe. Recommendation/s on removal or non-removal of the crocodile/s in question shall be based on the criteria set under Section 3. D. *Criteria for Addressing HCC*;

D. Criteria for Addressing HCC

There are two (2) basic options in handling human-crocodile conflict: 1) removal; or 2) non-removal of the crocodile/s from the habitat.

Listed below are all the criteria that must be satisfied before any decision to remove crocodile/s in conflict from its habitat shall be effected. Failure to satisfy even one criterion shall be sufficient to opt for non-removal of the crocodile/s in question.

Criterion 1: Confirmed/Verified report of human-crocodile conflict

Crocodile/s must be subject of a confirmed/validated HCC Incident Report to be considered for removal.

Criterion 2: Size of the crocodile - equal or greater than 10ft

Crocodile/s with lengths equal to or more than 10 feet and living in close proximity to human settlements are considered as potentially *problematic crocodile* and should considered for removal.²

Criterion 3: Proximity of incident to barangay proper - within 1 kilometer

Crocodile/s frequently seen within the 1 kilometer range of any barangay proper that poses a threat to human safety or made repeated attacks on livestocks are considered *nuisance* crocodiles and thus may be recommended for removal.

²In such a situation, removal of the problem crocodile might provide a temporary fix, but another crocodile will eventually dominate the creek and may again be a threat to local people and tourists (Sivaperuman and Kumar 2013). Thus, avoidance measures and community awareness should remain in place even after removal of a problematic crocodile.

Criterion 4: Attacks despite presence of quality habitat

Incidence of crocodile attack/s despite presence of quality habitat³ indicates that the crocodile is exhibiting *abnormal behavior* and should be considered for removal.

Criterion 5: Attacks outside of the egg laying to hatching period (October to February)

Crocodiles that attack <u>outside the egg laying and hatching period</u> that is from <u>October to February</u> are likely to be attracted to human activities (i.e. nuisance crocodiles) and thus should be considered for removal.

Within the duration of <u>egg laying period from March to May</u> (Sibal et al. 1993) and <u>hatching period from June to August</u> (Regoniel et al. 1992), crocodiles are more aggressive and vigorously defend their nest to deter predators and/or intruders. This normal behavior should not be taken against the crocodile when assessing HCC.

Crocodiles are highly territorial, and will defend their territory against intruders, including humans.⁴ Territoriality cannot be ruled out as the motivation of attacks particularly where the size of the victim is much greater than the size of the crocodile (Manolis and Webb, 2013). Other primary motivation could be mistaken identity. It is possible that some attacks may be directed at dogs or other animals accompanying people, with the latter being bitten by mistake.⁵

E. Management Options for Human-Crocodile Conflict

Upon thorough assessment of the HCC incident based on the set criteria, the recommended intervention to address the HCC shall be carried out as follows:

- Based on the recommendation of the Quick Response Team, the PENRO or the PCSD Executive Director issues a Memorandum Order (Annex "C") on the management options to address the HCC. The LGU concerned shall be furnished a copy of the document, for information purposes;
- 2. The PWQRT or the PCSD Quick Response Team then carries out the management intervention prescribed under the Memorandum Order to address the HCC in coordination with the LGU concerned. The removal or non-removal of the crocodile/s from its habitat shall be undertaken by the Quick Response Team under the following conditions:

2.1 Removal from the Habitat or Capture Site

- a. Removal of crocodiles in conflict shall involve translocation or temporary transport to the nearest or any capable DENR accredited/designated Wildlife Rescue Center, or the Palawan Wildlife Rescue and Conservation Center (PWRCC), in the case of Palawan:
- b. Removal of crocodiles in conflict shall be performed only by a trained and skilled staff from the Palawan Wildlife Rehabilitation and Conservation Center;
- c. The LGU concerned shall be notified prior to carrying out any and all decision/s on the removal of the crocodile/s from its habitat/capture site. Logistical arrangements

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³A habitat ranging from about 5 to 10 km river length should be able to support a viable population of crocodiles.

⁴ IUCN-SSC Crocodile Specialist Group

⁵ Ibid

including necessary coordination and compliance with pertinent requirements shall be handled by the concerned PQRT or the Quick Response Team of the PCSD, in the case of Palawan;

- d. Any turn-over of crocodile/s to a facility must be properly covered by a Turn-Over Receipt (Annex "D") and Acknowledgement Receipt (Annex "E") from the offices involved in the turn-over and acceptance proceedings;
- e. From the temporary holding facility, the captured crocodile shall be transported to the nearest DENR accredited/designated Wildlife Rescue Center, and then brought to the PWRCC to be used as parental stock for captive breeding or translocated to viable habitats at a later time;
- f. Avoidance measures (see Section 4) shall be in place to prevent recurrence of human-crocodile conflict; and
- g. There shall be continuous community education and awareness, and monitoring of compliance to the avoidance measures being implemented to determine necessary actions and adjustments to be made.

2.2 Non-Removal from the Habitat or Capture Site

- a. The LGU concerned shall be notified prior to carrying out any and all decision/s on releasing back and/or non-removal of the crocodile/s from its habitat/capture site;
- b. Non-removal of reported crocodiles from the habitat shall immediately be followed by information education campaigns (IECs) and community consultation/s to be conducted by the responsible Quick Response Team. Regular conduct of IEC shall be undertaken;
- c. Avoidance measures (see Section 4) should be implemented to prevent recurrence of HCC. Monitoring of the status of implementation of avoidance measures shall be undertaken on a regular basis as well; and
- d. In situations where the crocodile/s in question is subject to Non-Removal but has already been captured by the community, the PQRT shall deliberate whether to translocate or transfer the captured crocodile to the nearest DENR accredited/designated Wildlife Rescue Center, or release back to their natural habitat. The decision to release a captured crocodile back to their natural habitat may be considered upon consultation with the concerned LGU.
- 3. The DENR Regional Office or the PCSD, in the case of Palawan shall furnish the Biodiversity Management Bureau (BMB) with records of all HCC incidents and corresponding response, for information and technical advice, if necessary and for database purposes.

The flow chart on HCC Management Protocol is presented as Annex "F" hereof.

Section 4. IMPLEMENTATION OF OTHER MITIGATING MEASURES TO ADDRESS HCC

Addressing HCC also involves implementation of measures by affected communities to avoid or mitigate future conflicts and to promote human-crocodile co-existence. The PENRO/CENRO shall assist the LGUs concerned in the implementation of these mitigating measures and safety guidelines and shall regularly monitor the implementation of such measures, and recommend adjustments or improvements, as necessary.

Below are recommended avoidance measures and basic safety guidelines for managing HCC, adapted primarily from to CrocBITE Worldwide Crocodilian Attack Database⁶:

1. Installation of warning signs (Annex "G").

Warning signs shall be installed in strategic areas of crocodile habitats near communities, especially in locations where risks is high.

2. Avoid activities in crocodilian habitats at dusk and night

Crocodiles hunt during the dark. Avoid heading out to crocodile habitats (e.g. coastal mangroves, estuarine rivers, and marshes) during such time to not be mistaken as their prey. If possible, perform all your activities during the daytime, however, it is important to still remain cautious.

3. Be more cautious during the crocodile breeding season <u>specially the nesting period</u> (March to August)

In the Philippines, breeding season inclusive of courtship, mating, egg laying to hatching, generally occurs from November to August (but may extends up to September in the case of Southern Mindanao), that is towards the dry months until the onset of wet season..

Crocodiles build nest on land adjacent to water bodies. <u>During the nesting period i.e</u> <u>egg laying from March to May, and hatching period from June to August</u>, crocodiles are more aggressive and vigorously defend their nest and/or young to deter predators and/or intruders. (IUCN-SSC Crocodile Specialist Group). Also, at the onset of the breeding season (i.e. courtship and mating stage) on November to December, male crocodiles tend to be mobile as they look for a mate, and thus sightings are more prevalent.⁷

Communities should be aware about the start of breeding season, <u>specially nesting period</u>, and be familiar with nesting locations to reduce human-crocodile interaction.

- 4. Refrain from building houses and other structures in crocodile habitats. Building houses in crocodile habitat greatly increases the risk of crocodile attack.
- 5. **Keep the surrounding mangrove forests healthy.** Mangrove forests are the crocodile's natural habitat. Destroying the mangrove forest will disturb the crocodiles. As a result, they may find other areas to hunt which may sometimes include residential areas.

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⁶ http://www.crocodile-attack.info/about/safety-information

⁷ Queensland Department of Environment and Science

- 6. **Keep a look out for crocodilians.** It goes without saying that if you see a crocodilian, you should act appropriately by staying out of its way and away from the water. At night, the crocodile's eyes glow bright red when hit by the shine of flashlight. Keep a look out for these eye shines when navigating in the waters at night and avoid it.
- 7. Use large boats than small boats. The larger your boat, the safer it is. Crocodiles will not attack something that is bigger than it is. Using smaller boats might increase your risk of being attacked.
- 8. **Do not lean over the water from boats, overhanging banks or trees.** Leaning over the side of a boat that's close to the water is dangerous when crocodilians are around, they can strike rapidly at such low targets. Some species are known to launch up to their entire body length out of the water in an attempt to catch prey.
- 9. Take care when launching or retrieving boats. Although most crocodilians will avoid active boat ramps, some individuals may lurk or investigate activities associated with launching and retrieving boats, especially if the boat has been used for fishing. Avoid standing in the water when moving a boat on or off a trailer, and keep a careful watch for signs of crocodilians.
- 10. Avoid walking at the water's edge. The closer you get to the water's edge, the greater the risk of being attacked. Where possible try to remain at least 5 m (16 ft) from the water's edge, to give yourself enough time to react and move to safety in the unlikely event that you disturb a crocodilian.
- 11. Avoid areas of crocodilian activity. Look out for slide marks, drag marks, flattened vegetation, and other obvious signs that a crocodilian may regularly use a particular area, because there is a good chance that the individual responsible is never far away.
- 12. Avoid swimming in crocodile habitats. If you are in crocodilian habitat, you are increasing the risk of being attacked by swimming in any body of water, river, and stream or around the coast, especially at dusk and night. If you are uncertain whether it is safe to swim, either check first or assume that it is not safe.
- 13. Avoid predictable activities at the water's edge. Crocodiles hunt effectively by learning routines and patterns in their prey, and they learn quickly. If you undertake potentially dangerous activities on the water's edge or in the water in the same place every day, you greatly increase the chances of attracting the attention of a crocodilian that may be waiting for you the next time.

The provision of deep wells, water pipelines and clean water source to local communities should be significant in encouraging local people to carry-out their activities away from crocodile river habitats.

14. Contact local authorities for information. Local government departments responsible for education and safety wish to avoid crocodilian attacks at all costs, and are usually happy to provide safety information if you are unsure whether your planned activities may be risky.

Section 5. CAPABILITY BUILDING AND IEC

The following shall be adopted by concerned offices for capacity building and Information Education Campaign (IEC) purposes:

A. DENR Field Offices

- A.1 DENR regional offices shall include in its Work and Financial Plan capacity building activities related to managing HCCs for its PWQRT and other concerned staff;
- A.2 Field offices shall heighten its information campaign before the onset of nesting season (i.e. egg laying from March to May, and hatching from June to August) when crocodiles are more aggressive and tend to vigorously defend their nest to deter predators and/or intruders.

B. Biodiversity Management Bureau (BMB)

- B.1 BMB shall develop standards including training modules in HCC management for national use.
- B.2 The BMB shall likewise provide technical assistance to the regions in the conduct of trainings on HCC management.

This Technical Bulletin is issued for information and guidance of all concerned.

RICARDO L. CALDERON
Assistant Secretary for Climate Change and concurrent Director, BMB

Republic of the Philippines

Biopurment of Environment and Natural Resources
BIODIVERSITY MANAGEMENT BUREAU

BMB202000767

Republic of the Philippines Department of Environment and Natural Resources Regional Office No: PENRO/CENRO:

	Report No.:
HUMAN	-CROCODILE CONFLICT INCIDENT REPORT
Jame of Reporter:	
Address:	
Contact Information:	
ocation Of Incident:	
Date of Incident:	Time of Incident:
Nature of Incident (tick bo	x):
□ ATTACK	No. of victims Is/are victim/s injured? □ Yes □ No Describe injury sustained by victim/s:
	Is/are victim/s dead? □ Yes □ No
□ SIGHTING	Where sighted? □ Land □ Water
□ CAPTURE	Condition of crocodile? □ Alive □ Dead
s/are there a Witness?	□ Yes □ No
f Yes, please list down na	ame/s and address/es:
Name: 1	Address:
2	
3	

To be filled up by Authority Cont	acted:	
Name:		
Position/Designation:		
ACTION/S TAKEN:		
Printed name & Signature of Aut Date:		

Note: Report must be accomplished in triplicate. Original copy: PENRO-PWQRT or PCSD

QRT.
Duplicate copy: CENRO
Triplicate copy: BMB

Republic of the Philippines Department of Environment and Natural Resources Regional Office No.: _____ PENRO/CENRO: _____

Barangay: Municipality/Province:

HCC INCIDENT VERIFICATION REPORT

Date Verified:	Time Verified:	
Suspected S	pecies:	
SIGHTING	ATTACK	CAPTURED
Date of sighting:	Date of attack:	Date of capture:
Time of sighting:	Time of attack:	Time of capture:
Location of sighting: □ Midstream □ On Bank □ In vegetation □ In Mud □ Shallow water on edge Estimated size of crocodile: □< 5ft. □ 5-10 ft. □ 11-15ft. □>15ft. □ Cannot determine No. of sighting/s:	Kind of victim: Human Please provide name/s of victim/s, specify age and gender: 1	Location of capture: □ River □ Lake □ Creek □ Stream □ Coastal Mangrove Distance from the community: □< 1km □≥ 1km Size of crocodile:
□ Daily □ 2-3x/week □ Weekly □ Monthly □ Unobserved Crocodile Behavior: □ Head Only □ Head to Back □ Full Body □ Underwater □ Tracks Only Distance from the community:	Victim Status: Alive, no injury sustained Alive but injured Dead Activity/ies of victim/s prior to attack: Swimming Fishing Crossing the body of water	Reason/s for capture: □Proximity to barangay proper □ Repeated attacks □Shows aggressive behavior □ Others, please specify Capture Method: □ Netting □ Snares
□< 1km □≥ 1km	☐ Doing domestic chores☐ Others, please specify:	☐ Netting ☐ Snares ☐ Harpooning ☐ Trapping

Circumstances of attack:

Evidence/s of attack:

□ Others, please specify_

□ Remains/Carcass
□ Bite wound

□ Provoked

□ Unprovoked

Name/s of Witness/es:

3. _____

□ Others, please specify

Name and Address of

Holding Facility:____

Name of captor/s:

1.

	Estimated size of crocodile: □< 5ft. □ 5-10 ft. □ 11- 15ft. □>15ft. □ Cannot determine Distance from the community: □< 1km □≥ 1km Is/are there previous incident/s reported: □ Yes □ No Witness/es or Survivor/s account:	
RECOMMENDATION/S:		
Prepared by:		
Printed Name & Signature o Date:	f PWQRT Member	
Noted by:		
Printed Name & Signature o Date:		

Note: Report must be accomplished in triplicate. Original copy: Office of the Regional Director Duplicate copy: PWQRT or PCSD Triplicate copy: BMB

MEMORANDUM ORDER

TO: The Team Leader, Provincial Wildlife Quick Response Team

FROM : The Provincial Environment and Natural Resource Officer

SUBJECT : REPORTED HUMAN CROCODILE CONFLICT IN _____

Upon careful evaluation of the Incident Verification Report submitted by the Provincial Wildlife Quick Response Team (PWQRT) on the Human-Crocodile Conflict (HCC) incident in (Sitio/Brgy/Municipality/Province), the crocodile in question has been (established/ not established) to be a (nuisance or potentially problematic crocodile), and has (satisfied/not satisfied) all the criteria for removal of crocodiles in conflict under Section 3 (D) Criteria for Addressing HCC.

(If action is for removal):

In view of the foregoing, you are hereby ordered, in coordination with the LGU concerned, to remove the subject crocodile from its habitat (If not yet in captivity) and transfer the same to (indicate the name of the <u>facility: DENR accredited/designated Wildlife Rescue Center or to the PWRCC)</u>.

(If action is for non-removal):

In view of the foregoing, you are hereby ordered, in coordination with the LGU concerned, to maintain status quo/keep crocodile/s in the wild (if not yet in captivity) or release the crocodile/s in question back to its original habitat or capture site (if already in captivity).

To prevent future incidence/s of HCC, the PWQRT in coordination with LGU concerned shall facilitate the implementation of the following mitigating/ safety measures (e.g continuous awareness), among other applicable measures (enumerate the measures):

The PWQRT shall continuously monitor and assess the implementation of such measures as to its effectiveness, and recommend improvement of measures as necessary.

Further, you are required to submit a status report on the progress of action taken on the aforementioned response to address the HCC.

FOR COMPLIANCE.

-	PENRO	

ANNEX "D"

Region __ PWQRT
TURN-OVER FORM NUMBER: HCC-2020-01

HUMAN-CROCODILE CONFLICT TURN-OVER RECEIPT

Name of Wildlife Rescue Center / Facility:

urned-o umbe r of leads	ver anim		Anim	al Cond	tion/Information		REMARK
umbe r of	Live/		Anim	al Cond	tion/Information		REMARK
r of		A	Anim	al Condi	tion/Information		REMARK
		A					
	Deau	Age	Sex	Size	Area of origin	Date of capture	
			_	£		- +	
					_		
			SI	GNATU	RE AGENCY	Y/ADDRESS	
					Noted by:		
						Noted by:	Noted by:

NAME of FACILITY (DENR accredited/designated Wildlife Rescue Center)

ACKNOWLEDGEMENT RECEIPT

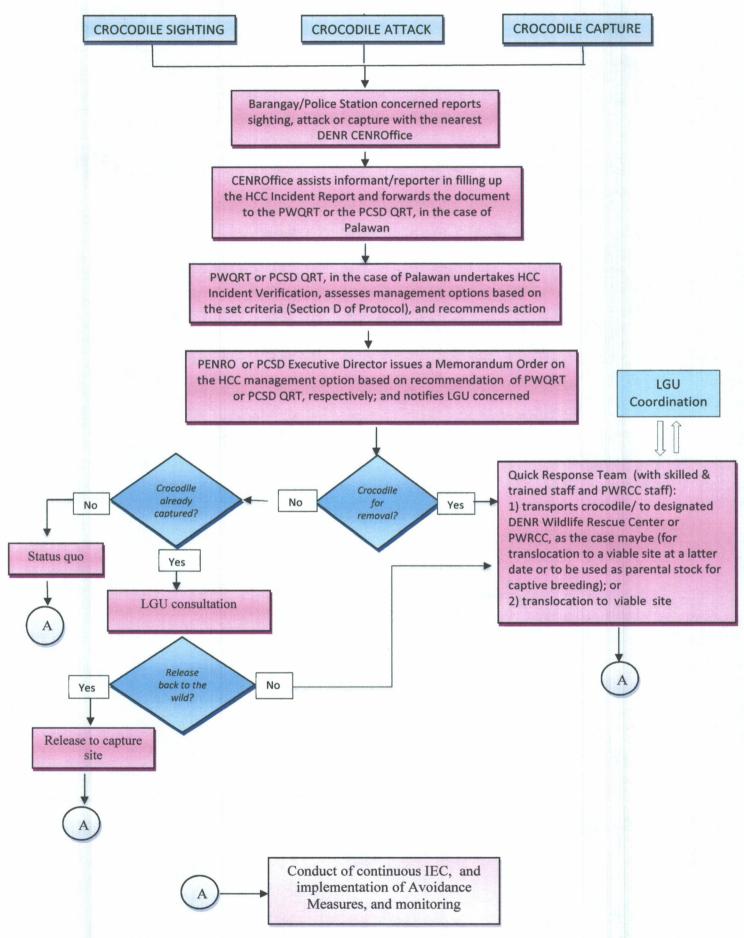
(WRC Acceptance Form Number: 2020-001)

This is to acknowledge receipt of the following animal/s:

COMMON N	AME	SCIENTIFIC	CNAME	NO. OF HE	AD
Turned over by (Nam. (date).	ne)	of <u>(<i>Affili</i></u>	ation or Address)		this
			Wild	llife Rescue Cer	nter

ANNEX "F"

HCC MANAGEMENR PROTOCOL



SAMPLE WARNING SIGNS (downloadable)





CAUTION SIGN

