WESTERN VISAYAS CONSERVATION WORKSHOP

West Visayas Conservation Workshop: Final Report

JUNE 24-27 2019

TALARAK FOUNDATION, INC.

IUCN SSC Species Survival Commission

CONSERVATION PLANNING SPECIALIST GROUP
Changing the Future for Wildlife

WPSG IUCN/SSC: Wild Pig Specialist Group

Deer Specialist Group IUCN

Hornbill Specialist Group

For more information about this plan and its implementation, please contact:
Matt Ward, Talarak Foundation: talarakconservationteam@gmail.com

Workshop organised by Talarak Foundation and IUCN SSC Conservation Planning Specialist Group.

Workshop supported by Chester Zoo, Bristol Zoological Society, Zoo Planckendael, Wildlife Reserves Singapore, Toledo Zoo, North Carolina Zoo, ZGAP (Zoological Society for the Conservation of Species and Populations / *Zoologische Gesellschaft für Arten- und Populationsschutz*), Synchronicity Earth, KMDA, ADRTZ corp, Department of Environment and Natural Resources Region 6 and Region 7, Province of Negros Occidental, Energy Development Cooperation, Sugarland Hotel, Don Papa Rum, Three Hens, Mailumfalls Ecopark.

Workshop facilitated by IUCN SSC Conservation Planning Specialist Group.

Cover photos courtesy of: Talarak Foundation

Recommended citation:

Rode-Margono, J., Ward, M., Sy, E.Y., Rafael, E.F., Kerhoas, D., Datta, A., Werner, N., Schwarz, C.J., Sweeney, R., Leus, K., Raghavan, R. Gibson, C. (Eds). 2021. Western Visayas Conservation Workshop: Final Report. IUCN SSC Conservation Planning Specialist Group, Apple Valley, MN.

A PDF of this document can be downloaded at
www.cpsg.org
www.talarak.org
https://bristolzoo.org.uk/save-wildlife/conservation-and-research/negros-bleeding-heart-dove-project

WESTERN VISAYAS CONSERVATION WORKSHOP

24 – 27 JUNE 2019, BACOLOD CITY, PHILIPPINES

FINAL REPORT

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Western Visayas Conservation Workshop brought together in-situ and ex-situ partners to jointly develop a multi-species conservation strategy covering five (Critically) Endangered West Visayan species: Visayan warty pig (*Sus cebifrons*), Visayan spotted deer (*Rusa alfredi*), Rufous-headed hornbill (*Rhabdotorrhinus waldeni*), Visayan hornbill (*Penelopides panini*) and Negros bleeding-heart dove (*Gallicolumba keayi*). These five flagship species show a degree of overlap in their distributions, habitats and threat processes; as well as in the likely conservation strategies and partnerships required to support their conservation in the wild. For these reasons, a multispecies workshop process was designed aiming to bring the greatest possible complementarity and added benefit, by identifying cases where species may respond positively to a similar set of conservation actions, and where conservation needs can be addressed by the same constituency of conservation actors.

The results of this strategy workshop form a conceptual bridge between the overarching governmental Philippine Biodiversity Strategy and Action Plan (PBSAP) and Negros Island Biodiversity Strategy and Action Plan (NIBSAP) and future, detailed operational action plans and actions to implement the cross-species and species-specific conservation strategies this workshop identified.

The workshop was facilitated by the Conservation Planning Specialist Group (CPSG) of the Species Survival Commission (SSC) of the International Union for the Conservation of Nature (IUCN). Following the "One Plan Approach (OPA)" to species conservation, experts from both the in-situ and ex-situ communities were brought together to form this multi-species conservation plan, thus making use of the expertise in both communities to formulate all of the goals and strategies, including – but not limited to – the evaluation of potential roles for ex-situ management and conservation translocations as integrated components of the strategy. The latter was guided by the "IUCN SSC Guidelines for Reintroductions and other Conservation Translocations" (IUCN SSC 2013) and the "IUCN SSC Guidelines on the Use of ex-situ Management for Species Conservation" (IUCN SSC 2014). In order to design the workshop process and provide the basis for discussion of the status updates, elements from CPSG's newly developed A2P (Assess to Plan) process, particularly A2P's methodology of analysing and comparing information in the IUCN Red List Assessments of these five species, was used.

The workshop participants worked in knowledge-café-style working group sessions to expand on and refine the knowledge regarding the current status (in-situ and ex-situ) of the five species and the relevant Protected areas (PA). All five species already have ex-situ populations being managed in breeding centres and zoos in the Philippines. All but the Rufous-headed hornbill are also the subject of international cooperative ex-situ programmes (EAZA Ex-situ Programmes (EEP) under the European Association of Zoos and Aquaria (EAZA) and/or Species Survival Plan (SSP) programmes under the Association of Zoos and Aquariums (AZA) in North America), founded with individuals exported under Memorandum of Agreement with the Philippine Government's Department of Environment & Natural Resources (DENR). Participants completed, refined and updated existing information on the ex-situ populations and listed particular challenges for ex-situ management of these species.

Taxon-based working groups then created causal chains for threats for the species, defining what causes these, as well as what effects these threats have on the species (e.g. increased mortality (of certain sex/life stages), reduced reproductive success, density reduction, population fragmentation etc.). Using these causal chains, the working groups produced threat descriptions and categorised the severity of each threat to the species' viability. A table comparing the threats and their severities among all five species was created and the results considered when developing species-specific goals,

and both species and cross-species strategies for conservation. The main threats were various types (in terms of causes and consequences) of habitat loss and hunting; as well as, for the Negros bleeding-heart dove, predation or disease risk from invasive alien species. Infectious disease was listed as a potential future threat for Visayan warty pigs. However, since there was no concrete threat of a particular disease at the time, conservation strategies were not developed at the workshop. Post-workshop, outbreaks of African Swine Fever (ASF) started occurring in the Philippines. While these have not yet occurred on Negros or Panay, as a precautionary approach, it should be assumed that Visayan warty pigs, like *Sus scrofa*, are very susceptible to the disease. Mitigating the risk of ASF was not discussed during this workshop but is being addressed separately post-workshop.

Continuing the work in the taxonomic groups, participants described in the goal statements the desired state of the species 20 years from now (e.g. how the population status should have changed and/or how the threat situation should have changed and/or which knowledge gaps should have been addressed in order to make sound conservation decisions). Next, they established taxon-specific conservation strategies for a period of 5-10 years. For this, they examined the threat causal flow diagrams and the threat statement(s) developed in order to identify potential strategies aimed at addressing the threat(s) (their causes and/or impact on species) and/or key knowledge gaps and thus contributing to the conservation of the taxon. The strategies from all taxa were amalgamated and sorted into four thematic groups: 1) Population viability, reintroduction, ex-situ management; 2) Habitat conservation, reforestation/rainforestation and protection; 3) Hunting and law enforcement; 4) Knowledge gaps to be addressed to inform conservation strategies. Workshop participants switched from taxon-based to theme-based working groups. Each theme-based working group divided similar taxon-specific strategies into subgroups and evaluated whether an overarching, cross-species strategy could cover these subgroups. These are strategies that can benefit more than one species in a variety of ways; by implementing teams to develop methodologies (even if they end up being implemented by different teams) or establish relationships with stakeholders; sharing knowledge and experience; creating joint databases and cross-species work teams; submitting joint grant applications to avoid competition; sharing resources (human resources, materials etc.) and communication etc. Effective and efficient cross-species collaborations can take place, even if the different species have slightly different slants on the strategy and/or have activities in slightly different locations. Furthermore, even if a specific strategy was not formulated for a taxon in the taxon-specific working group, this taxon may still benefit from this work being undertaken for other species. The following cross-taxa conservation strategies were formulated (extracted from Table 23 – consult relevant section for details):

1) Wild population viability, reintroduction, ex-situ management

a. Baseline wild population parameters established, and standardised long term monitoring strategy developed and implemented.

b. Healthy ex-situ populations established for insurance and as a potential source for reintroductions.

c. Improved management of the ex-situ populations, through improved genetic and demographic management, increased capacity for/within ex-situ centres, development of ex-situ task forces (within and across species) and strengthened collaboration.

d. Ascertained and augmented nest availability and continued and expanded nest monitoring and protection programmes for both hornbill species across their range. Assess and improve hornbill food plant diversity and density.

e. Disease surveillance and mitigation plan (most urgent for African Swine Fever). *[This item was added post-workshop related to the first outbreaks of African Swine Fever in the Philippines.]*

f. Translocation and reintroduction needs evaluated; potential reintroduction sites identified and evaluated; where appropriate (trial) releases are conducted.

g. Genetic studies to investigate if, and to what extent, there are differences between the populations on Negros and Panay, and to guide ex-situ management and possible reintroductions. [Already available studies for hornbills include Sammler et al., 2011, 2012, 2013]

2) Habitat conservation, reforestation, rainforestation and protection

a. Create additional PA in specific locations/accord legal protection to remaining habitat of the species through a variety of approaches e.g. Critical Habitat (CH), Indigenous Culturally Conserved Areas (ICCAs), Local Conservation Areas (LCAs) and PA.

b. Rainforestation and forest rehabilitation in key areas; capacity building in rainforestation practices and increasing natural forest areas.

c. Creating and protecting corridors to connect fragmented habitat patches.

d. Track primary and secondary forest cover over time.

e. Enforcement of protected area regulations and following the Expanded National Integrated Protected Areas System (ENIPAS) act in biodiversity protection in PA.

f. Awareness programme (related to habitat protection) for political leaders.

g. Community Empowerment (such as community-based management agreements, capacity building in agricultural techniques and rainforestation, alternative livelihood programmes etc.).

3) Hunting and law enforcement

a. Alternative livelihood programmes to reduce/eliminate hunting.

b. Assessed the drivers, causes, socio-economics, scale etc. of hunting for all purposes and by all parties.

c. Communication platform to facilitate reporting of hunting.

d. Develop community and wider public awareness programmes for diverse stakeholders to reduce/halt hunting.

e. Increase hunting-related law enforcement efforts.

f. Agencies have an integrated, cooperative approach to conservation.

g. Communicate scientific findings to policymakers in an appropriate format.

4) Knowledge gaps to be addressed to inform conservation strategies

a. Genetic studies (in-situ and ex-situ) on a) taxonomy/genetic structure, particularly potential differences between populations on Negros and Panay (though already available studies for hornbills include Sammler et al., 2011, 2012, 2013); b) genetic diversity, potential hybridisation, inbreeding levels, effective population size.

b. Ecological research in-situ (demography, life history, behaviour, carrying capacity/home range, diet, breeding/nesting, seed dispersal)

c. Establishing baselines (population size, density, demography, trend, distribution, etc.).

d. Health baselines for wild populations (e.g. relevant parasites, diseases, hormone levels etc).

e. Training and capacity building for local researchers/knowledge managers.

f. Raised awareness within the general public in the West Visayan area concerning the Big 5 species biology, ecology and conservation status.

The taxon-specific and cross-taxa conservation strategies provide a clear platform and starting point for post-workshop work to draw up (at least partially) communal/overlapping implementation action plans and actions. This workshop also drew up a list of additional Philippine (conservation) plans and further stakeholder groups that should be considered when designing implementation actions.

WORKSHOP AIMS AND APPROACH

The Western Visayas Conservation Workshop aimed to bring together in-situ and ex-situ partners to jointly develop a multi-species conservation strategy covering five key West Visayan species:

- Visayan warty pig (*Sus cebifrons*)
- Visayan spotted deer (*Rusa alfredi*)
- Rufous-headed hornbill (*Rhabdotorrhinus waldeni*)
- Visayan hornbill (*Penelopides panini*)
- Negros bleeding-heart dove (*Gallicolumba keayi*)

These five flagship species show a degree of overlap in their distributions, habitats, and threat processes and the likely conservation strategies and partnerships required to support their conservation in the wild. For these reasons, a multispecies workshop was designed to identify where species may respond positively to a similar set of conservation actions and where these actions can be addressed by the same constituency of conservation actors.

The results of this strategy workshop form a conceptual bridge between the overarching governmental Philippine Biodiversity Strategy and Action Plan (PBSAP) and Negros Island Biodiversity Strategy and Action Plan (NIBSAP) and future, detailed operational action plans and actions to implement the cross-species and species-specific conservation strategies this workshop identified, with the greatest possible complementarity in partners and efficiency in resource use.

The workshop was facilitated by the Conservation Planning Specialist Group (CPSG) of the Species Survival Commission (SSC) of the International Union for the Conservation of Nature (IUCN). CPSG leads the planning element of the SSC's Assess-Plan-Act conservation cycle, and provides species conservation planning expertise to governments, IUCN SSC Specialist Groups, zoos and aquariums, and other wildlife organisations. CPSG does not bring knowledge of the species, of threats to their persistence, of potential conservation solutions, or of the wider conservation frameworks within which the outcomes of this workshop will need to operate; this all comes from the workshop participants. CPSG brings to the project expertise in designing, preparing for and conducting neutral facilitation of collaborative processes that bring together people and stakeholders with diverse perspectives and knowledge to catalyse positive conservation change.

The workshop is an example of the One Plan Approach to species conservation, a process coined and promoted by CPSG: a "One Plan Approach" (OPA) to species conservation promotes the joint development of management strategies and conservation actions for all populations of a species by all responsible parties to produce one comprehensive conservation plan for the species, with the ultimate goal of supporting the species' conservation in the wild (Byers et al. 2013)." All five of these Visayan species already have ex-situ populations being managed in the Philippines, and for four species also internationally (Negros bleeding-heart doves are only bred in captivity in the Philippines). Getting consensus on the potential need and timing for reintroductions was also highlighted as a specific topic for the workshop. Hence, experts from both the in-situ and ex-situ communities were brought together to form this multi-species conservation plan, thus making use of the expertise in both communities to formulate all of the goals and strategies, including – but not limited to - the evaluation of potential roles for ex-situ management and conservation translocations as integrated

components of the strategy. The latter is guided by the “IUCN SSC Guidelines for Reintroductions and other Conservation Translocations” (IUCN SSC 2013) and the “IUCN SSC Guidelines on the Use of Ex situ Management for Species Conservation” (IUCN SSC 2014).

In order to design the workshop process and provide the basis for discussion of the status updates, elements from CPSG’s newly developed A2P (Assess to Plan) process, particularly A2P’s methodology of analysing and comparing information in the IUCN Red List Assessments of these five species, was used.

The workshop participants provided updated information on the status of the species, their habitats and relevant PA; reached consensus on taxon-specific 20-year conservation goals; and identified taxon-specific and cross-species conservation strategies. This provides a clear starting point for post-workshop work to draw up (at least partially communal/overlapping) implementation action plans and actions. This workshop also drew up a list of additional Philippine (conservation) plans and further stakeholder groups that should be taken into consideration when designing actions for implementation.

STATUS ASSESSMENTS

The workshop participants worked in consecutive, knowledge-café-style working group sessions (so each person could contribute knowledge to more than one species/protected area) in order to expand on and refine the knowledge regarding the current status (in-situ and ex-situ) of the five species as well as the relevant PA.

Purpose: Expand on the current knowledge on the in-situ status (distribution, habitat, population size/density) and ex-situ status of the species.

For the *in-situ* status of each species, participants were asked to review the information currently in the Red List Assessment for each species:

- **Geographic range**: Add to/refine/update information on the current range? For example, in which areas is the species confirmed, possibly present, possibly extinct, extinct.
- **Population:** Add to/refine/update information on population size or densities (in particular locations when possible).
- **Habitat:** Add to/refine/ update information on the information regarding the habitat types in which the species can be found.

Each of the species accounts below first presents the summarised information from the IUCN Red List or the ex-situ information sources mentioned above, followed by information produced by the workshop participants.

For the ex-situ status of each species, participants were presented with demographic and genetic population information gathered prior to the workshop from the Zoological Information Management System (ZIMS) for Husbandry (Species360), from available regional or international studbook databases or breeding and transfer plans, and from pre-workshop communication with ex-situ centres in the Philippines. They were asked to review this information and to:

- Add to/refine/update information on the ex-situ populations.
- List any particular challenges for ex-situ management of these species (i.e. to obtain reliable survival and reproduction).

With regard to PA, participants were asked to:

- Review the names of PA mentioned in each of the five species assessments, indicate their locations on the map and where possible confirm PA status.
- Record any other relevant, new information on these PA (e.g. plans for change of status; plans to increase/decrease their range etc.).
- Record any known plans for additional PA being designated in the short to mid-term future (e.g. next 5 years).

Note: Data for each working group was compiled in a non-standardized manner, hence the presentation of information below may be non-uniform.

Visayan warty pig in-situ status

Summary of IUCN Red List information

Information summarised from:

Meijaard, E., Oliver, W.R.T. & Leus, K. 2017. *Sus cebifrons*. The IUCN Red List of Threatened Species 2017: e.T21175A44139575.
http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T21175A44139575.en

LISTING: Critically Endangered

- **Criteria:** CR A2cde.
- **Details:** Population reduction of ≥ 80% in three generations where the causes may not have ceased / may not be understood /may not be reversible; BASED ON c: a decline in AOO, EOO and/or habitat quality; d: actual or potential levels of exploitation; e: effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

GEOGRAPHIC RANGE

- Previously it occurred on Panay, Guimaras, Negros, Cebu, Masbate and (probably) Ticao Islands. It is not known whether *S. cebifrons* formerly occurred on the neighbouring island of Siquijor, where wild pigs have also been extirpated.
- This species has been extirpated from most of its range, and fragmented populations survive today in remaining forest on Negros (6% land area), Panay (~8% land area), and *possibly* Masbate (last confirmed in 1993).
- **Elevation:** 0 – 1,600 m.

Figure 1: Geographic range map for the Visayan warty pig. From IUCN Red List assessment Meijaard et al. (2017)

POPULATION

- Eliminated from three of the six islands where it was known or presumed to have occurred formerly: Cebu (last reported in 1960s), Guimaras and Ticao Islands.
- It is also close to extinction, if not already "functionally extinct", on Masbate, where the species was last confirmed in 1993, at which time only a few individuals were reported to survive in one location.
- **Population trend**: Decreasing.
- **Trend justification**: Undergoing a drastic population decline, inferred to be >80% over a period of three generations (estimated to be about 21 years). This inferred rate of decline is based on the apparent disappearance of several populations due to a number of threats.

HABITAT

Originally this species occurred in primary and secondary forest from sea-level to mossy forest at 1,600 m above sea level. Now it occurs mostly above 800 m above sea level, as there are relatively few patches of suitable habitat in the lowlands. It can persist in some degraded habitats such as cogon grasslands (Kerhoas, pers. comm.) as long as there are areas of dense cover. There is some evidence to suggest that pigs surviving in largely denuded areas are predominantly composed of feral animals of mixed origin.

Table 1: Visayan warty pig habitats as recorded in IUCN Red List assessment Meijaard et al. (2017)

Habitat type classification	Suitability	Of major importance?
Forest -> Subtropical / Tropical Moist Lowland	Suitable	NO
Forest -> Subtropical / Tropical Moist Montane	Suitable	YES
Grassland -> Subtropical / Tropical Seasonally Wet / Flooded	Marginal	N/A
Grassland -> Subtropical / Tropical High Altitude	Marginal	N/A
Artificial / Terrestrial -> Subtropical / Tropical Heavily Degraded Former Forest	Marginal	N/A

Workshop updates/additions/correction

GEOGRAPHIC RANGE / OCCURRENCE

The workshop participants identified the following locations with Visayan warty pig presence and provided information on the type of evidence for occurrence and any known/suspected information on population status.

Note: Locations are listed as PA and NPA.

Table 2: Geographical locations with Visayan warty pig presence identified by the participants to the Western Visayas Conservation Workshop. PA: Protected area; NPA: Non-Protected area; DD: Data Deficient

# On Map	Location	Status	Size	Forest type	Presence	Population
Panay						
1	Northwest Panay Peninsula Natural Park	PA	12,000 ha	Primary and secondary forest	Sightings, camera trapping, field signs	Good
2	Central Panay Mountain range	NPA	61,000 ha	Mountain and lowland forest	Field signs, sightings	DD
3	Sibalom Natural Park (Mt. Tigum)	PA	5,500 ha	Mountain forest	Field signs	DD

# On Map	Location	Status	Size	Forest type	Presence	Population
Negros						
4	North Negros Natural Park	PA	16,687 ha	Primary and secondary forest	Field signs, sightings, camera trapping	Good
5	Mt Kanlaon National Park	PA	24,388 ha	Primary and secondary forest	Field signs, sightings	DD
6	Balinsasayao Twin Lakes Natural Park	PA	8,000ha	Secondary forest	Field signs, sightings	Evidence of their survival is scarce; restricted to certain areas
7	Guihulngan	NPA	3,000 ha	Secondary forest	Sighting	DD
8	Jimalalud	NPA	1,000 ha	Secondary forest	Field signs, sightings	DD
9	Tayasan	NPA	25 ha	Secondary forest	Field signs, camera trapping	20-50
10	Binalbagan	NPA	800 ha	Mountain and lowland forest	Field signs. sighting	DD
11	Ayungon	NPA	3,000 ha	Secondary forest	Field signs, sighting	DD
12	Mt. Talinis (Cuernos de Negros)	NPA	10,000 ha	Mountain forest	Field signs	Good
13	Mantiquil, Siaton	NPA	600 ha	Mountain forest and cogon grassland	Field signs, camera trapping	Good
14	Bayawan	NPA	3,000 ha	Lowland forest, grassland	No Visayan warty pig	Historical range, potentially suitable after restoration

Figure 2: Locations of occurrence of the Visayan warty pig identified by the participants to the Western Visayas Conservation Workshop. See Table 2 for legend to numbers.

Visayan spotted deer in-situ status

Summary of IUCN Red List information

Information summarised from:

Brook, S.M. 2016. *Rusa alfredi. The IUCN Red List of Threatened Species 2016*: e.T4273A22168782. http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T4273A22168782.en

LISTING: Endangered

- **Criteria:** EN C2a(i).
- **Details:** Total population size of less than 2,500 mature individuals, an observed, estimated, projected or inferred continuing decline and ≤250 mature individuals in each sub population.

GEOGRAPHIC RANGE

- **Occurs:** Panay, Negros.
- **Historic distribution included:** Guimaras, Masbate and probably Ticao Islands.
- Mount Madja-as - Mount Baloy area of west Panay and a few scattered remnants of forest on Negros.
- It was extirpated on Cebu in the mid-twentieth century. A few individuals were reported to survive on Masbate between 1991 and 1993, but the population there is almost certainly extinct or "functionally extinct".
- **Elevation:** 0 – 2000 m.

Figure 3: Geographic range map for the Visayan spotted deer. From IUCN Red List assessment Brook (2016)

POPULATION

- Rare throughout its present, limited range. Populations are fragmented and declining. Estimated to have been extirpated from 95% to 98% of its former range. There is no global estimate of the population size, but it is reasonable to suppose that it is fewer than 2,500 mature individuals.
- Recent biological surveys of southern Negros suggest that the species is far less numerous than is the Visayan Warty Pig (*Sus cebifrons*). An estimated density of <1 animal per km² seems likely. This would give a population of about 1,100 animals, and assuming that about two-thirds of the pre-breeding population are mature individuals, this would suggest a population size of approximately 700 mature individuals.
- **Population trend**: Decreasing.

- **Trend justification**: Population size estimated to number fewer than 2,500 mature individuals, estimated continuing decline in the number of mature individuals, and no subpopulation is likely to contain more than 250 mature individuals (except for the Central Panay Mountain Range population, which is considered to be contiguous).

HABITAT

Formerly occurred from sea-level to at least 2,000 m above sea level in primary and secondary growth forest. It can persist in some degraded habitats such as cogon grasslands as long as there are areas of dense cover. Its preferred habitat is not clear, since it is now restricted to steep, rugged slopes of dipterocarp forest that are inaccessible to humans. It was known to rely on dense forest for refuge, but also frequents open grassy patches and secondary communities. Main constituents of diet are reported to be young shoots of cogon grass (found in clearings) and young low-growing leaves and buds within forests. It is predominantly a browser, but also a grazer (captive animals also relish fruit). It also visits burnt forest clearings for the pioneering shoots and ash that grow there.

Table 3: Visayan spotted deer habitats as recorded in IUCN Red List assessment Meijaard et al. (2017)

Habitat type classification	Suitability	Of major importance?
Forest -> Subtropical / Tropical Moist Lowland	Suitable	YES
Forest -> Subtropical / Tropical Moist Montane	Suitable	YES
Shrubland -> Subtropical / Tropical Moist	Suitable	NO
Grassland -> Subtropical / Tropical Seasonally Wet / Flooded	Missing?	NO

Workshop updates/additions/correction

Formerly possibly also present in the Eastern Visayas? Lydekker (1915) lists the following islands: Cebu, Guimaras, Leyte, Masbate, Negros, Panay, and Samar.

NEGROS

Locations

Table 4: Geographical locations on Negros with Visayan spotted deer presence identified by the participants to the Western Visayas Conservation Workshop.

Sightings	Year	Evidence
North Negros Natural Park, Tinagong Dagat	Early 2000s	Photographic evidence. Also evidence of scat and a feeding trail. This area has the most hunting pressure.
North Negros Natural Park	2012	Camera trap (Neil D'Cruze)
Sitio Sagaban, EB Magalona, North Negros Natural Park		Spotted by Leo Canson in the community (the deer died)

Sightings	Year	Evidence
Pingot, Ilog	Early 2000s	Individuals surrendered by poachers. Now questionable
Mt. Kanlaon Margaha Valley (Upper area within the park)	2006	3 Visayan spotted deer (1 male, 1 female and 1 fawn). Seen by hunter after burning grass
Pamari Watershed. Tayawan, Bayawan	Since 2016	One male Visayan spotted deer observed entering a tree plantation
Hinobaan	2017 2019	5 Visayan spotted deer confirmed. 1 male deer interacting with livestock
Mt. Ginsayawan, Balinsasayao Twin Lakes National Park	2019	Sighting of scat by mountaineers and bird watchers, but could have been goat scat
Mt. Talinis, Cuernos de Negros		Sighting of scat

Suitable habitats

- Forests with available grassland and forest edges.
- Most suitable areas are in the North.
- North Negros Natural Park– more forested area.
- Balinsasayao Twin Lakes Natural Park– forest with grassland.
- Cuernos de Negros – forested area and adjacent to Balinsasayao Twin Lakes Natural Park.
- Mt. Kanlaon Natural Park – forest with grasslands in craters.
- Comfortable around aquatic environments. All locations have water sources.

Diet items

- Predominantly grass.
- Anecdotally reported to graze at night and retreat to the forests during the day.
- Eat fruit that falls – nothing in particular.
- Wild bananas full of seeds.
- Ficus.
- Minerals from ash (why they are easily hunted by burning grasslands).

Known survey activities

- DENR conducts yearly patrols in selected areas.
- Several local government units conduct Biodiversity Monitoring Systems.

Relevant PA

- North Negros Natural Park - 70,000 ha but only 20,000 ha of forest cover.
- Mt. Kanlaon Natural Park - 8,000-10,000 ha.
- Balinsasayao Twin Lakes National Park - 8,000 ha but <5,000 ha of forest cover.
    - Note: Mount Talinis and Cuernos de Negros are unprotected forested areas that connect to Balinsasayao Twin Lakes National Park.

Possibilities for reintroduction

- Balinsasayao Twin Lakes National Park – forested habitat, understory vegetation with patchy grassland.
- Hinobaan - massive grassland (Damutan Valley), forest could be rebuilt to create a suitable habitat.
- Cebu has no more deer, but is still a potential release site. Philippines Biodiversity Conservation Foundation (PBCFI) has ongoing project for 1,000 ha.
- No known particular disease issues.

PANAY

Locations

- 10 deer escaped from facility into the Northwest Panay Peninsula Natural Park.
- Known population in the Central Panay Mountain range (Abandoned study on faeces during the 2000s and more or less regular sightings of the deer in the CPMR reported to PhilinCon rangers).
- No estimation of numbers as terrain is too steep.
- If the Central Panay Mountain Range population is contiguous, there possibly is a subpopulation that contains more than 250 mature individuals? No supporting evidence as yet.

Suitable habitats

- Marginal lands.
- Mountains are a refuge.
- They are a forest edge species.

Protected areas

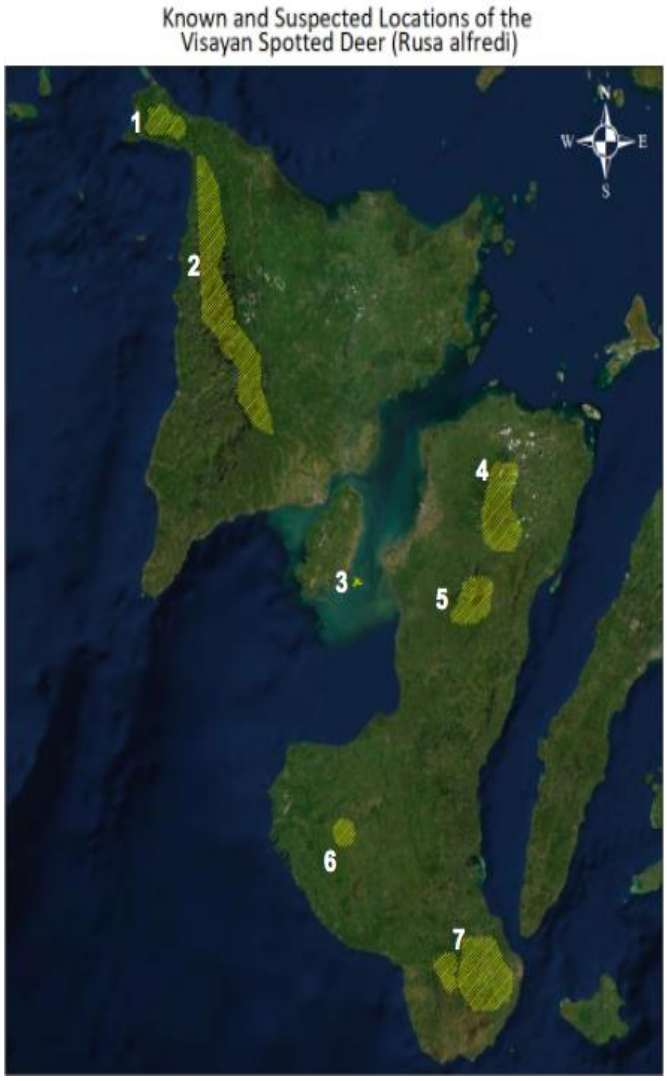
- Northwest Panay Peninsula Natural Park.
- Sibalom National Park.

MISSING INFORMATION

- Suitable group size.
- Feeding ecology.
- Home range size and territory.
- Unknown habitat preference.
- Unknown size, demographic and locations of existing populations.

Figure 4: Locations of occurrence of the Visayan spotted deer identified by the participants to the Western Visayas Conservation Workshop.

# On Map	Location	Evidence
1	Northwest Panay Peninsula Natural Park	Escaped Visayan spotted deer
2	Central Panay Mountain Range	Suitable habitat. Presence supported by abandoned study on faeces during the 2000s and more or less regular sightings of the deer in the CPMR reported to PhilinCon rangers.
3	Inampulugan island	Brown Deer Release (unknown data provider)
4	North Negros Natural Park	Spotted last in 2013
5	Mt Kanlaon National Park	Spotted last in 2006
6	Basay-Hinobaan	Anecdotally known
7	Balinsasayao Twin Lakes Natural Park and Cuernos de Negros Mountain Range	Last seen in early 2000s



Rufous-headed hornbill in-situ status

Summary of IUCN Red List information

Information summarised from:

Citation: BirdLife International. 2018. *Rhabdotorrhinus waldeni* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2018: e.T22682517A125519634. http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22682517A125519634.en

LISTING: Critically Endangered

- **Criteria:** CR A2cd.
- **Details:** Population reduction of ≥ 80% in three generations observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased OR may not be understood OR may not be reversible; Based on c: a decline in area of occupancy (AOO), extent of occurrence (EOO) and/or habitat quality; d: actual or potential levels of exploitation.

GEOGRAPHIC RANGE

- Occurs on Panay and Negros. It is now absent from Guimaras.
- **Panay**: Central Panay Mountain Range and northwest Panay Peninsula. However, no breeding records since 1997 (one pair) in the north-west Panay Peninsula although no systematic search has been conducted. Due to the small size of the remaining forest in the peninsula (c. 5,000 ha) any breeding there may have been sporadic and it has since almost certainly been extirpated.
- NEGROS: Unconfirmed records from Balinsasayao Twin Lakes Natural Park and Calinawan Forest. It has been suggested that the species may be functionally extinct on Negros. However local surveys recently found the species in three separate areas on Negros. The North Negros Natural Park probably supports the largest remaining population on Negros.
- **Elevation:** 300 – 1,200 m.

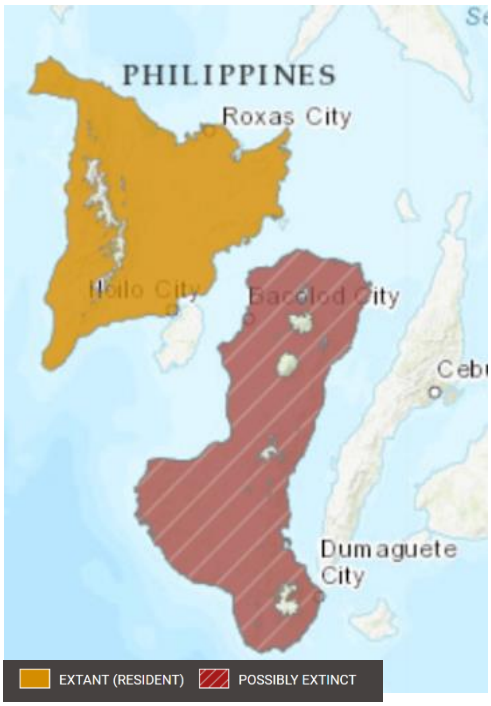


Figure 5: Geographic range map for the Rufous-headed hornbill. From IUCN Red List assessment BirdLife International (2016)

POPULATION

- Population of this species is extremely small and severely fragmented. A combination of threats have resulted in an extremely rapid population decline.

- There were 1,018 active nest holes located in the Central Panay Mountain Range in 2008. This represents 2,036 mature individuals, and may be appropriate to estimate the population size to number between 1,000-2,499 mature individuals. This equates to 1,500-3,749 individuals in total, rounded here to 1,500-4,000 individuals.
- **Population trend:** Decreasing.
- **Trend justification:** The population is presumed to have decreased extremely rapidly within its range over the last three generations. Continuing declines may continue in the future due to ongoing threats.

HABITAT

- Closed-canopy forests, also frequenting logged areas and occasionally isolated trees in clearings. It is probably adapted to lower or mid-elevation forest, with records from 400-1,200 m above sea level on Panay and 300-950 m above sea levels on Negros. It is omnivorous, taking some animal matter to its nests and feeding in the canopy on figs and other fruits. It may make local nomadic movements in response to food availability. It nests in large trees.

Table 5: Rufous-headed hornbill habitats as recorded in IUCN Red List assessment BirdLife International (2016).

Habitat type classification	Suitability	Of major importance?
Forest -> Subtropical / Tropical Moist Lowland	Suitable	YES
Forest -> Subtropical / Tropical Moist Montane	Suitable	YES

Workshop updates/additions/correction

GEOGRAPHIC RANGE / OCCURRENCE

Philippine Initiative for Environmental Conservation (PhilinCon) considers there to be a global population of 1,500 to 2,000 breeding pairs.

NEGROS

There was a discussion as to whether the species should be considered functionally extinct on Negros. There are historical Records from Sta Catalina, Mantiquil and Siaton in the 2000s (care of PBCFI). (Paguntalan 2000, 2002).

Table 6: Geographical locations on Negros with Rufous-headed hornbill presence identified by the participants to the Western Visayas Conservation Workshop.

Location *(Negros)*	**Presence**	**Comments**	**Reported by**
Northern Negros Natural Park	3 week surveys in the Cadiz area: 2013 – 4 individuals 2014 – 6 individuals 2017 – 8 individuals 2018 – 1 individual 2019 – Survey planned July-August	Very few, no nests seen.	PBCFI
Balinsasayao Twin Lakes National Park (southern)	2008 – first sighting 2011 – next sighting of 1 pair 2010 – 4 individuals recorded with pictures 2016 – 3 individuals seen by European bird watchers 2017 – 1 male recorded 30 March 2019 - one female seen during a hornbill count	Surveys: one day, two transects (2km). Tree size is problematic for rufous-headed hornbills in BTLNP. No photographic evidence provided. Local communities claim the species extirpated from the area.	PBCFI
Mount Kanlaon Natural Park		Historic records but none now (from 2015-2019).	PBCFI
Southwestern Negros	A number of locations have been surveyed without any observation of the species, despite historical records.		PBCFI

PANAY

Table 7: Geographical locations on Panay with Rufous-headed hornbill presence identified by the participants to the Western Visayas Conservation Workshop.

Location *(Panay)*	**Presence**	**Comments**	**Reported by**
Northwest Panay Peninsula	Mid 2000s few nests. No reliable signs since 2010.	Difficult terrain.	PhilinCon
Central Panay Mountain Range (Northern sector)	2019: currently in Antique 1019 nests in three municipalities (Sebastes, Culasi and Pandan). San Remejio had sightings (used to have larger forest cover than Sibalom) 10-15 birds seen on a survey in Maria Cristina, Madalag, on January 29 to February 2, 2013.	Non-protected area. Surveys have covered the northern part/nest wardens. Most of the studies were confined to Sebaste and Culasi.	PhilinCon

Location *(Panay)*	**Presence**	**Comments**	**Reported by**
Central Panay Mountain Range	Populations in Sebaste and Culasi; Malinao and Madalag: 10-15 active nests in each municipality. 2014-15: 3-4 individuals in Valderrama and Bugasong (Antique). Unconfirmed in Sibalom and Miagao; Records in San Remigio.		David Josiah Quimpo

Habitat

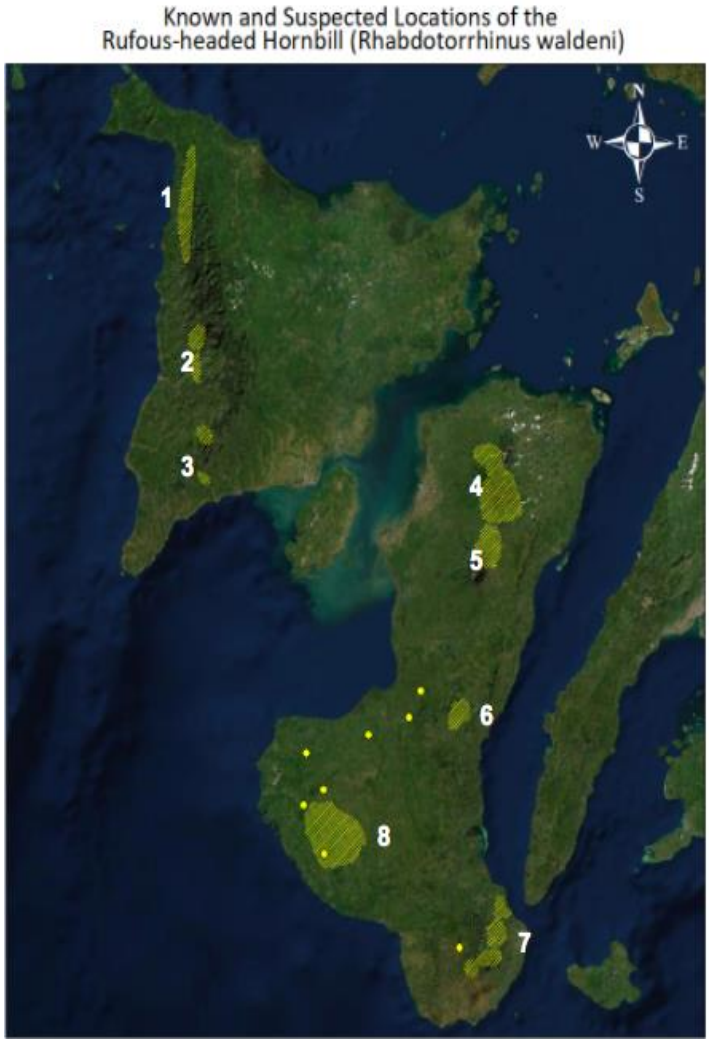
- Nests are mostly found in lowland forests. Possibly down to 100-200 m.
- A lack of primary forests tends to create problems for nesting. Tree width is a good indication for counts. Large emergent species (usually dipterocarps) are preferred for nesting. Trees taller than 15 m and with more than 60 m.
- The birds do re-use the same trees every breeding season (David Josiah Quimpo).
- Altitudinal occurrence information
    - 680-800 m (PBCFI).
    - Lowest forest elevation 379 m; no nests higher than 900 m.
    - Results of 2019 PHILINCON survey: lowest nest 89 m, highest nest 958 m.
    - Highest nest is 835 m.
    - Magsaysay and Paningayan: 460 m and 830 m.
- Red lauan and white lauan have nests. Seen in 2017. (Silay Local Government Unit (LGU))
- PhiliCon has data on nesting tree species and distribution.
- A species list of nesting trees is available from the Haribon Foundation.

Feeding preference

- Keystone species are figs, vines and palms.
- Data on fruits eaten and wood worms are available from the Haribon Foundation.
- They take skinks (PBCFI).
- They congregate at food sources.

Figure 6: Locations of occurrence of the Rufous-headed hornbill identified by the participants to the Western Visayas Conservation Workshop.

# On Map	Location	Evidence
1	Central Panay Mountain Range (North)	
2	Central Panay Mountain Range (Mid)	
3	Central Panay Mountain Range (South)	
4	North Negros Natural Park	
5	Mt Canlaon Natural Park	
6	Ayungon BanBan	Historical Records
7	Balinsasayao Twin Lakes Natural Park and Cuernos de Negros Mountain Range	
8	Southwest Negros	
	Possible sites from 2012 surveys	



Visayan hornbill in-situ status

Summary of IUCN Red List information

Information summarised from:

Citation: Citation: BirdLife International. 2016. *Penelopides panini. The IUCN Red List of Threatened Species 2016*: e.T22682494A92948577.
http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22682494A92948577.en

[Since the workshop, an updated Red List assessment has been published. Citation: BirdLife International. 2020. Penelopides panini. The IUCN Red List of Threatened Species 2020: e.T22682494A184683355. https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T22682494A184683355.en. Downloaded on 07 November 2021. The information below still refers to the 2019 Red List assessment, which was used during the workshop]

LISTING: Endangered

- **Criteria:** EN A2cd+4cd; C2a(i).
- **Details: A:** Population reduction of ≥ 50% in three generations observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased or may not be understood or may not be reversible; Based on c: a decline in area of occupancy (AOO), the extent of occurrence (EOO) and/or habitat quality; d: actual or potential levels of exploitation; + An observed, estimated, inferred, projected or suspected population reduction of ≥ 50% in three generations where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible. Based on c: a decline in area of occupancy (AOO), the extent of occurrence (EOO) and/or habitat quality; d: actual or potential levels of exploitation; c**:**Total population size of less than 2,500 mature individuals, an observed, estimated, projected or inferred continuing decline and ≤250 mature individuals in each subpopulation.

GEOGRAPHIC RANGE

- Panay: including the offshore islands of Sicogon and Pan de Azucar; Guimaras, Negros, Masbate and Ticao.
- In the 19th century, it was widespread and common on Panay, Guimaras, Negros and Masbate. The race *ticaensis* is extinct on Ticao: and the species is likely to have been extirpated from Sicogon and Guimaras.
- Panay, it is still fairly common within the proposed Central Panay Mountains range and the Northwest Panay Peninsula Natural Park but rare elsewhere.

Figure 7: Geographic range map for the Visayan hornbill. From IUCN Red List assessment BirdLife International (2016)

- Negros: increasingly rare, with recent records from Ban-ban forest in Ayungon, Mt. Talinis-Balinsasayao, the North Negros Forest Reserve and at Simpang forest, Sipalay Negros Occidental.
- Single records since 1990 from Masbate and Pan de Azucar indicate that tiny populations may remain on these islands.
- **Elevation:** 0 – 2,000 m.

POPULATION

- The population is thought to number at least 1,800 individuals, roughly equivalent to 1,200 mature individuals. This estimate is now considerably out of date (2001); if predicted rates of decline have precipitated the population may now fall below 1,000 individuals.
- **Population trend**: Decreasing.
- **Trend justification**: This species has apparently been extirpated from a number of islands and its decline is suspected to have continued very rapidly. No new information has been provided concerning the population size or rate of decline, but given that a proportion of remaining habitat is protected and the species is presumably now very rare, declines in the future are unlikely to be as rapid as in the recent past.

HABITAT

- Primary, evergreen, dipterocarp forest up to 1,100 m, perhaps pushed upslope by deforestation to 1,500 m, sometimes wandering to secondary forest or isolated fruiting trees. It nests in tall trees, frequently in fragments of just a few hectares. Nest-holes were found aggregated in remnant habitat patches, at an average height of 11 m, with a mean nearest-neighbour distance of about 190 m. Nest density was estimated at three nests per km^2 on Mt. Balabag.

Table 8: Visayan hornbill habitats as recorded in IUCN Red List assessment BirdLife International (2016).

Habitat type classification	Suitability	Of major importance?
Forest -> Subtropical / Tropical Moist Lowland	Suitable	YES
Forest -> Subtropical / Tropical Moist Montane	Suitable	NO
Grassland -> Subtropical / Tropical Dry	Marginal	N/A

Workshop updates/additions/correction

Geographic range might rather be: Panay, including offshore islands of Sicogon and Pan de Azucar;, Negros, possibly extinct on Masbate.

There is continued sightings of the species in illegal trade and poaching.

[Post workshop information: a) Mynott et al. (2021) estimated the population in the North West Panay Peninsula Natural Park at 2,231 individuals; b) a news communication (Chavez, 2020 in Mongabay) based on surveys by PBCFI estimated the population in Negros to be 3,564 individuals.]

Table 9: Geographical locations with Visayan hornbill presence in Negros Island identified by the participants to the Western Visayas Conservation Workshop.

Negros Island	**Area**
Hinobaan Wilderness	200 ha
Cauayan	300 ha
Sipalay	200 ha
Ilog Hilabangan Watershed Forest ● Mt. Kanlaon Natural Park ● Northern Negros Natural Park	10,400.06 ha 24,557.6 ha 80,450 ha
Banban ● Ayungon and Bindoy are connected	1991 – 10,000 ha 1999 – 2/10,000 ha 2015 – 3,000 ha
Balinsasayao Twin Lakes Natural Park	8,000 ha
Cuernos D Negros Mountain Range (including Mantiquil, Siaton)	4,000 ha
● St. Catlina Forest	>200 ha

Table 10: Geographical locations with Visayan hornbill presence in Panay Island identified by the participants to the Western Visayas Conservation Workshop.

Panay Island	**Area**
North West Peninsula Natural Park	1,200 ha
Sibalom Natural Park	5,511.47 ha
Balabag Natural Park	Unconfirmed Size
Iloilo National Watershed	6,150 ha
San Remigio	Unconfirmed Size
Lambunao, Iloilo	40,710 ha

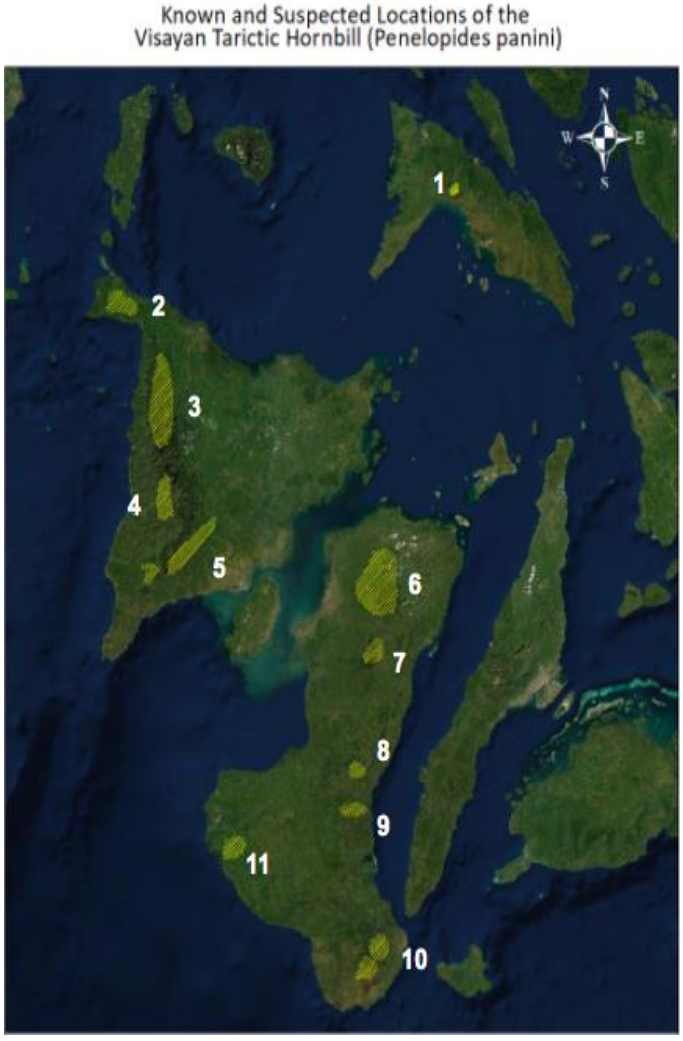
Habitat

- Forest - Subtropical/ tropical moist lowland – major importance.

- Forest - Subtropical/ tropical moist montane – not major importance.
- Grassland - Subtropical/ tropical dry (marginally suitable).
- Primary evergreen dipterocarp forests up to 1,100 m.
- Potentially pushed up to 1,500 m by deforestation.
- Sometimes wander into secondary forest or isolated fruiting trees.
- Nest in tall trees in fragments of a few hectares.
- Nest holes found aggregated in remnant habitat patches at an average height of 11 m.
- Nearest-neighbour nest distance of ~190 m.
- Nest density estimated at three nests per km^2 on Mt. Balabag.

Figure 8: Locations of occurrence of the Visayan hornbill identified by the participants to the Western Visayas Conservation Workshop.

# On Map	Location
1	Masbate
2	Northwest Panay Peninsula Natural Park
3	Central Panay Mountain Range (Balabag)
4	Central Panay Mountain Range (Lambunao)
5	Sibalom Natural Park and Iloilo Watershed
6	North Negros Natural Park
7	Mt. Kanlaon Natural Park
8	Jimalalud
9	Ayungon BanBan
10	Balinsasayao Twin Lakes Natural Park and Cuernos De Negros Mountain Range
11	Sipalay



Negros bleeding-heart dove in-situ status

Summary of IUCN Red List information

Information summarised from:
BirdLife International. 2018. *Gallicolumba keayi*. The IUCN Red List of Threatened Species 2018: e.T22690988A130328535.
http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22690988A130328535.en

LISTING: Critically Endangered

- **Criteria:** CR C2a(i).
- **Details:** total population size of less than 250 mature individuals (assessed in 2018), an observed, estimated, projected or inferred continuing decline AND ≤50 mature individuals in each subpopulation.

GEOGRAPHIC RANGE

- Occurs on Panay and Negros.
- Panay: It has been observed regularly in the Northwest Panay Peninsula Natural Park in recent years including breeding records.
- Negros: It was fairly common in the 19th century but had become extremely rare by the 1930s. Since 1980, it was recorded at just one area (above Mambucal), despite several weeks of surveys, with unconfirmed local reports from six additional localities. However, recent research suggests a few small populations in southern Negros, but it may now be extirpated in the north.
- **Elevation**: 300 – 1,000 m

Figure 9: Geographic range map for the Negros bleeding-heart dove. From IUCN Red List assessment BirdLife International (2018).

POPULATION

- The total population has been estimated in 2001 by BirdLife International to number 50-249 mature individuals, which equates to 75-374 individuals in total, rounded to 70-400 individuals. The current population is likely to be smaller and more recent population size estimations are needed.
- It seems unlikely that more than a few hundred individuals remain on each island (Panay and Negros), although as Panay retains more lowland forest cover, it is likely that this population is larger.
- **Population trend**: Decreasing.

- **Trend justification**: During the 20th century extensive forest loss occurred throughout the species range. On Negros it was fairly common in the 19th century, but had become extremely rare by the 1930s. Declines due to habitat loss are likely to have slowed, but the impact of other threats is now likely to be driving declines.

HABITAT

This predominantly terrestrial species appears to prefer dense closed-canopy forests (Mynott et al., 2020). It has been reported to range from 300-1,000 m, exceptionally to 1,200 m although it has never been captured on camera traps above 800 m (Kerhoas et al., 2019). Sightings and recent research suggest it prefers primary lowland forest (Mynott et al., 2020) but tolerates secondary habitats on Panay where it has been recorded from selectively logged forest on limestone, and from open and severely degraded forest with few large trees.

Table 11: Negros bleeding-heart dove habitats as recorded in IUCN Red List assessment BirdLife International (2018).

Habitat type classification	Suitability	Of major importance?
Forest -> Subtropical / Tropical Moist Lowland	Suitable	YES

Workshop updates/additions/correction

GEOGRAPHIC RANGE / OCCURRENCE

- An additional population was identified at Mt. Kanlaon Natural Park (NIBSAP 2019).
- The species was heard in central Panay in 2013/2016 (overlapping with habitat preference modelling).
- There are confirmed sightings in North Negros Natural Park, whereas the IUCN Red List species account states that the species may now be extinct there.

Therefore, for the purpose of this action plan, the range needs to be extended.

NEGROS

Table 12: Geographical locations on Negros with Negros bleeding-heart dove presence identified by the participants to the Western Visayas Conservation Workshop. Locations listed are areas where surveys have been performed.

LOCATION	Year	Evidence	Reported by
Mt. Kanlaon National Park	(2017-2018)	1 heard by PBCFI volunteers, KGB Kanlaon Green Brigade	PJ Panaguiton, DENR

LOCATION	Year	Evidence	Reported by
South Negros (Mantiquil, Siaton)	10 years conservation actions	Unlikely to be present - 12 camera traps deployed for 5 years in Mantiquil Forest Cuervos de Negros area (South Negros) with no camera trap recordings, no validated observations, some un-confirmed sightings.	Daphne Kerhoas, Bristol Zoological Society
Gawahon Eco Park inside North Negros Natural Park	2018 - ongoing	Past unconfirmed sightings - Bristol Zoo started a camera trapping project in collaboration with Talarak Foundation. 4 cameras deployed with no camera trap recording yet.	Daphne Kerhoas, Bristol Zoological Society
North Negros (Gawahon)	○ 2014 ○ 2016 ○ 2019	○ 4 observations (1 seen 3 heard) ○ 1 observation (1 heard) ○ BNS report by ranger (but not a confirmed observation)	Godfrey Jakosalem, PBCFI
Balinsasayao Twin Lakes Natural Park	2016, 2017, 2018, 2019	1 observation each year, outside the transect	Godfrey Jakosalem, PBCFI
Canaway	2019	1 caught	Godfrey Jakosalem,, PBCFI
Municipality of Sta. Catalina	2009	Seen	Lisa Paguntalan, PBCFI
North Negros Natural Park		Recorded (needs verification)	Rob Hutchinson
Balinsasayao Lakes (Twin Lake)		Several confirmed records	Rob Hutchinson
Balinsasayao Twin Lakes Natural Park (Valencia)	2018	1 seen and heard	Rico Mier, BTLNP
North Negros Natural Park	2019	Confirmed observation published in Negros Island Biodiversity Strategy and Action Plan 2019	PJ Panaguiton, DENR
North Negros Natural Park, Sipalay	2017	Not certain, heard	PJ Panaguiton, DENR

PANAY

Table 13: Geographical locations on Panay with Negros bleeding-heart dove presence identified by the participants to the Western Visayas Conservation Workshop.

LOCATION	Year	Evidence	Reported by
North West Panay Natural Park	2018, 2019, 2020	Healthy population - 9 seen (video & camera trap) and 22 heard in 31 field days and ~60 camera trap days.	Daphne Kerhoas, Bristol Zoological Society
North West Panay Natural Park		Field encounters here are frequent and suggest a very healthy population	Rob Hutchinson
Central Panay Mountains, Culasi, Sebaste	2016	Heard	Godfrey Jakosalem, PBCFI
Central Panay Mountain range	Jan 2013	1 (heard) BRGY Maria Cristina, Madalag, Aklan	Christian Schwarz, PhilinCon
St San Remigio, Antique	2008	Seen	Godfrey Jakosalem, PBCFI

Figure 10: Locations of occurrence of the Negros bleeding-heart dove identified by the participants to the Western Visayas Conservation Workshop.

POPULATION

- No further information on pop size or trend (more research needed).

HABITAT

- Observation in Mt. Kanlaon at 1,000 m; highest recorded is 900 m in Negros and 600 m in Panay.
- Refined/additional information on the species.
    - The habitat preference is understorey cover in a forested area (NWPPNP: Understorey cover of 1.5m positively coincides with the presence of NBH (Slade et al., 2005; Mynott et al., 2020).
    - Food tree species (palm, ficus species and *Ariasena sp*.) and eats fruits, invertebrates and berries.
        - Publication: Conservation through aviculture (ISBBC 2007): Proceedings of the IV inter Symposium on breeding birds in captivity.
        - Myles M. Lamont (Toronto).

Summary of ex-situ status

The information below reflects that ex situ status at the time of the workshop in June 2019.

Philippine ex-situ breeding centres and international cooperative breeding programmes

Philippines

In the Philippines, the majority of the ex-situ individuals of the five species under the remit of this plan are held in some or all of four different breeding centres (Lamont 2014):

- Talarak Foundation Inc. (TFI) – Negros Forest Park (Bacolod City, Negros Occidental) In 1984 a group of citizens started a movement called "Save Our Forest" which grew into the Negros Forest and Ecological Foundation Inc (NFEFI). The foundation created the Biodiversity Conservation Centre in Bacolod City, Negros. In 2016, following an agreement between Negros Forest and Ecological Foundation Inc., PBCFI, the Provincial Government and the TFI, the latter took over the BCC. TFI had since 2010 already been managing what started out as a satellite breeding centre in Kabankalan City for Negros Forest and Ecological Foundation Inc. In 2018 Negros Forest and Ecological Foundation and TFI merged under the banner of TFI. TFI relaunched the BCC as the Negros Forest Park.
- TFI - Kabankalan Breeding Centre (Kabankalan, Negros Occidental).
- Centre for Tropical Conservation (CenTrop) at the Silliman University (Damaguete City, Negros Oriental). The oldest breeding center in Negros, CenTrop is also the first captive centre to breed Negros bleeding-heart doves in captivity.
- Mari-it Conservation Park at the West Visayas State University (Lambuano, Iloilo (Panay)).

In addition, there are smaller numbers of individuals of some of the species in zoos, such as the Avilon Zoo (Rodriguez, Rizal (Luzon)) and Cebu Safari and Adventure Park (Toril, Corte, Carmen (Cebu)), both members of the Philippine Zoos and Aquariums Association (Philzoos).

International

Under a Memorandum of Agreement with the Philippine Government's Department of Environment & Natural Resources (DENR), descendants of the founding individuals for Visayan warty pigs, Visayan spotted deer and Visayan hornbills were exported from the Philippines to become the start of EAZA ex-situ Programmes (EEP) under the European Association of Zoos and Aquaria and/or Species Survival Plan (SSP) programmes under the Association of Zoos and Aquariums (AZA) in North America. Exporting descendants of founding individuals from Rufous-headed hornbills is covered in a Memorandum of Agreement but has not been carried out yet. Many of the participating international institutions continue to support ex-situ and in-situ conservation activities for these species.

Visayan warty pig

Table 14: Population sizes of known ex-situ holdings of Visayan warty pigs in the Philippines.

Location	#Males	#Females	#Unk sex	Total	#Founders	Data Source
VISAYAN WARTY PIG						
Visayan warty pig – Negros origin						
TFI-Negros FP	8	11	0	19 (32)	9	TFI pre-workshop records (update WVCW Workshop)
TFI-Kabankalan	30	24	0	54 (21)		TFI pre-workshop records (update WVCW Workshop)
CenTrop	8 (20)	16 (16)	0 (0)	24 (36)		TFI pre-workshop records (update WVCW Workshop)
EAZA (42 institutions)	83	82	2	167	5	EEP Studbook 12 June 2019
Total	**129**	**133**	**2**	**264 (256)**		Preworkshop (update WVCW workshop)
Visayan warty pig – Panay origin						
Mari-it	3	10	0	13	?	TFI pre-workshop records
AZA (19 institutions)	34	38	0	72	5	SSP Breeding & Transfer Plan - 23 April 2019
Total	**37**	**48**	**0**	**85**		Confirmed WVCW workshop
Visayan warty pig – unknown geographic origin						
Avilon Zoo	(2)	(0)	(0)	(2)		(update WVCW Workshop)
Cebu Safari	(Has Visacan warty pig; but unknown number at time of workshop)					(update WVCW Workshop)
Total	**(>2)**			**(>2)**		

TFI-Negros-FP: *Talarak Foundation Inc.- Negros Forest Park, Bacolod City, Negros;* ***TFI-Kabankalan:*** *Talarak Foundation Inc. - Kabankalan Breeding Centre, Kabankalan, Negros;* ***CenTrop:*** *Centre for Tropical Conservation, Silliman University, Damaguete City, Negros;* ***Mari-it:*** *Mari-it Conservation Park, West Visayas State University, Lambuano, Panay;* ***Avilon Zoo:*** *Avilon Zoo – Avilon Wildlife Conservation Foundation, Rodriguez, Rizal, Luzon;* ***Cebu Safari:*** *Cebu Safari & Adventure Park, Toril, Corte, Carmen, Cebu;* ***EEP:*** *EAZA ex-situ Programme;* ***EAZA:*** *European Association of Zoos and Aquaria;* ***SSP:*** *Species Survival Plan;* ***AZA:*** *Association of Zoos and Aquariums (in North America).*

The population sizes of known ex-situ holdings can be found in table 13. In addition to the holdings in the Philippines, there is an EEP for Negros origin individuals under EAZA (coordinated by Lidia Przybylska of Wrocław Zoo, Poland (Przybylska, 2016)) and an SSP for Panay origin individuals under AZA (coordinated by Craig Miller of Jacksonville Zoo, USA (Miller et al., 2019)).

The following extra information was provided by workshop participants:

- Between the two TFI institutions, there are currently seven living wild origin individuals, one without living descendants.

- Participants wondered if the individuals at Mari-it were still of reproductive age and/or were still reproductively viable. It was not clear when they last bred.
- A long-standing recommendation to investigate to what degree the in-situ populations from Negros and Panay are genetically distinct, and whether this warrants continued management as separate units (in-situ and ex-situ), still applies.
- There may be sources of unrelated individuals in private collections, but an important concern is whether these are pure (i.e. not hybridised with individuals from the other island (Negro vs Pany), or with *Sus scrofa* (wild, feral or domestic).
- Occasionally injured or confiscated animals appear which might potentially be additional sources of unrelated individuals.
- There are laboratories and markers available to carry out genetic testing to determine taxonomy/hybridisation.
- At the Centre for Tropical Conservation, breeding is said to be relatively easy, but the main constraint is the availability of space and financial and other resources.
- There is an interest from additional institutions in the Philippines, but often there is less confidence in the level of animal welfare and husbandry expertise that these can provide, and in the degree of reliability as an ex-situ conservation partner.
- For both the Philippine and the international populations, a large challenge is to control population growth in this species with high reproductive output, without losing the future reproductive potential of the individuals. Experiences with this and other wild pig species in zoos and ex-situ centres suggest that limiting breeding through contraception or separation of sexes can compromise future reproductive potential in wild pigs. This is an area that requires further study, and a precautionary approach in the meantime.
- The SSP in the AZA is struggling with finding sufficient space for the species (in light of competition with other species). The importance within the association might increase if genetic analyses were to be confirmed that the Panay origin population will need to continue to be managed separately from the Negros origin population.

Visayan spotted deer

Table 15: Population sizes of known ex-situ holdings of Visayan spotted deer.

Location	#Males	#Females	#Unk sex	Total	#Founders	Data Source
VISAYAN SPOTTED DEER						
Visayan Spotted Deer – Negros origin						
TFI-Negros FP	7	18	0	25 (29)	>10	TFI pre-workshop records (update WVCW Workshop)
TFI-Kabankalan	19	15	0	34 (23)		TFI pre-workshop records (update WVCW Workshop)
CenTrop	50 (38)	55 (49)	0 (0)	105 (87)		TFI pre-workshop records (update WVCW Workshop)
Mari-it	10 (12)	7 (7)	3 (0)	20 (19)		TFI pre-workshop records (update WVCW Workshop) Negros origin to be confirmed
Avilon Zoo	(1)	(0)	(0)	(1)		(update WVCW Workshop)
EAZA (27 institutions)	48	42	3	93	10	EEP studbook 31 Dec 2018
Total	**134**	**137**	**6**	**277 (252)**		Pre-workshop (update WVCW workshop)
Cebu Safari	(Has VSD; but unknown number at time of workshop)					(update WVCW Workshop) Negros origin to be confirmed

TFI-Negros-FP: *Talarak Foundation Inc. - Negros Forest Park, Bacolod City, Negros;* ***TFI-Kabankalan:*** *Talarak Foundation Inc.- Kabankalan Breeding Centre, Kabankalan, Negros;* ***CenTrop:*** *Centre for Tropical Conservation, Silliman University, Damaguete City, Negros;* ***Mari-it:*** *Mari-it Conservation Park, West Visayas State University, Lambuano, Panay;* ***Avilon Zoo:*** *Avilon Zoo – Avilon Wildlife Conservation Foundation, Rodriguez, Rizal, Luzon;* ***Cebu Safari:*** *Cebu Safari & Adventure Park, Toril, Corte, Carmen, Cebu;* ***EEP:*** *EAZA ex-situ Programme;* ***EAZA:*** *European Association of Zoos and Aquaria.*

The population sizes of known ex-situ holdings can be found in table 14. In addition to the holdings in the Philippines, there is an EEP under EAZA and an International (i.e. global) studbook under the World Association of Zoos and Aquariums (WAZA) (coordinated by Christina Schubert, Zoo Landau in der Pfalz, Germany).

The following extra information was provided by workshop participants:

- It is necessary to determine/confirm to what degree the in-situ populations from Negros and Panay are genetically distinct, and whether this warrants management as separate units (in-situ and ex-situ), which will also have consequences for reintroductions.
- It requires confirmation if the individuals in Mari-it and Cebu Safari Park are certainly from Negros origin.
- Are managed in smaller groups, including male groups.

- The level of management for the in-situ population on Negros has increased in the last few years.

Rufous-headed hornbill

Table 16: Population sizes of known ex-situ holdings of rufous-headed hornbills.

Location	#Males	#Females	#Unk sex	Total	#Founders	Data Source
RUFOUS-HEADED HORNBILL						
TFI-Negros FP	6	6	0	12	? (minimum 8 living wild origin birds – ZIMS 12 June 2019)	TFI pre-workshop records
TFI-Kabankalan	2	2	1	5		TFI pre-workshop records
Mari-it	9	7	0	16		TFI pre-workshop records
Total	**17**	**15**	**1**	**33**		Confirmed WVCW workshop

TFI-Negros-FP: *Talarak Foundation Inc.- Negros Forest Park, Bacolod City, Negros;* ***TFI-Kabankalan:*** *Talarak Foundation Inc.- Kabankalan Breeding Centre, Kabankalan, Negros;* ***Mari-it:*** *Mari-it Conservation Park, West Visayas State University, Lambuano, Panay.*

The population sizes of known ex-situ holdings can be found in table 16. There are no known holders of this species outside of the Philippines (according to ZIMS for Husbandry (Species360)).

The following extra information was provided by workshop participants:

- Only one chick was produced in 10 years (earlier there was more consistent breeding at Mari-it).
- There has been investment in creating larger and taller aviaries; the resources and facilities on Negros are improving.
- The species' husbandry requirements are probably reasonably known and so improvements can be made to enclosures and care (for example to house several pairs per location so that repairing is possible, if pair bonding is poor).
- In recent years in several centres, quite a few pairs have sealed nests and laid eggs, but there have been no chicks.
- *R. leucocephalus* breeds quite well under identical conditions.

Visayan hornbill

Table 17: Population sizes of known ex-situ holdings of Visayan hornbills.

Location	#Males	#Females	#Unk sex	Total	#Founders	Data Source
VISAYAN HORNBILL						
TFI-Negros FP	16	16	0	32	>32 ???	TFI pre-workshop records
TFI-Kabankalan	3	2	0	5 (7)		TFI pre-workshop records (update WVCW Workshop)
Centrop	1	2	0	3		TFI pre-workshop records
Mari-it	11 (10)	11 (10)		22 (20)		TFI pre-workshop records (update WVCW Workshop)
Avilon Zoo	(2)	(3)	(0)	(5)	Of unknown origin	WVCW Workshop
Cebu Safari	(has quite a few Visayan hornbills, but no precise number at time of workshop)					(update WVCW Workshop)
EAZA (22institutions)	21	28	0	49	10	EEP studbook 13 May 2019
Total	**52**	**59**	**0**	**111 (116)**		Pre-workshop (update WVCW workshop)

TFI-Negros-FP: *Talarak Foundation Inc. - Negros Forest Park, Bacolod City, Negros;* ***TFI-Kabankalan:*** *Talarak Foundation Inc. - Kabankalan Breeding Centre, Kabankalan, Negros;* ***CenTrop:*** *Centre for Tropical Conservation, Silliman University, Damaguete City, Negros;* ***Mari-it:*** *Mari-it Conservation Park, West Visayas State University, Lambuano, Panay; ;* ***Avilon Zoo:*** *Avilon Zoo – Avilon Wildlife Conservation Foundation, Rodriguez, Rizal, Luzon;* ***Cebu Safari:*** *Cebu Safari & Adventure Park, Toril, Corte, Carmen, Cebu;* ***EEP:*** *EAZA ex-situ Programme;* ***EAZA:*** *European Association of Zoos and Aquaria.*

The population sizes of known ex-situ holdings can be found in table 15. In addition to the holdings in the Philippines, there is an EEP for Visayan tarictic hornbills under EAZA (coordinated by Nigel Simpson, Wild Place Project, Bristol, UK).

The following extra information was provided by workshop participants:

- There are several additional specimens in zoos and private collections but these are not managed.
- The species does well under zoological management and breeds well in the Philippines and in EAZA.
- The species is commonly traded.
- How much effort will be/should be put into improving aviaries etc. may depend on the roles (if any) for ex-situ management in the conservation of this species.

Negros bleeding-heart dove

Table 18: Population sizes of known ex-situ holdings of Negros bleeding-heart dove.

Location	#Males	#Females	#Unk sex	Total	#Founders	Data Source
NEGROS BLEEDING-HEART DOVE						
TFI-Negros FP	14	11	1	26 (23)	3? (1.2 came in; possibly only 1.1 bred)	TFI pre-workshop records (update WVCW Workshop)
TFI-Kabankalan	5	16	3	24 (26)		TFI pre-workshop records (update WVCW Workshop)
CenTrop	1 (9)	0 (13)	26 (3)	27 (25)		TFI pre-workshop records (update WVCW Workshop)
Total	**20**	**27**	**30**	**77 (74)**		Preworkshop (update WVCW workshop)

TFI-Negros-FP: *Talarak Foundation Inc. - Negros Forest Park, Bacolod City, Negros;* ***TFI-Kabankalan:*** *Talarak Foundation Inc.- Kabankalan Breeding Centre, Kabankalan, Negros****; CenTrop:*** *Centre for Tropical Conservation, Silliman University, Damaguete City, Negros.*

The population sizes of known ex-situ holdings can be found in table 16. There are no known holders of this species outside of the Philippines (according to ZIMS for Husbandry (Species360)).

The following extra information was provided by workshop participants:

- The three founders were one male and two females. It is possible that only 1.1 of those bred. It is very unlikely that there are written records to fall back on, but interviewing the CenTrop head keeper (Lou Jean Cerial) might bring some clarity.
- In the last few years, the CenTrop and the TFI have been collaborating more, with the support of Bristol Zoological Society, and there has been an increased focus on breeding. In 2019,3 pairs were sent from the CenTrop to TFI-Kabankalan.
- Sexing individuals can be challenging but for this too, Talarak Foundation Inc. (TFI) and CenTrop have been collaborating and sexing has been funded by Bristol Zoological Society.
- Previously, breeding has at times been restricted due to the concerns about the small number of founders.
- The pedigree information is incomplete; recently, recording has improved but there are historical gaps so that living individuals cannot be traced back to the original founders.
- There are currently no obvious signs of inbreeding depression but further research is needed.
- CenTrop is experiencing financial and institutional governance challenges.
- There have been no recent confiscations of individuals of this species.
- Ideally the centres would have more clarity on the timing, frequency and scale of any potential reintroductions, so that the breeding of additional birds can be planned accordingly.

Protected Areas Status

Participants reviewed the names of PA mentioned in each of the five species IUCN Red List assessments, indicated their locations on the map and where possible confirmed protected area status. They then recorded any other relevant information on these PA (e.g. plans for change of status; plans to increase/decrease their range etc.). Finally, they noted areas potentially considered as additional protected in the short to mid-term future.

The National Protected Areas System Act of 1992 had assigned 13 PA. In 2018, and amendment to NIPAS was signed into law, known as the Expanded National Integrated Protected areas System (ENIPAS) Act (https://www.officialgazette.gov.ph/downloads/2018/06jun/20180622-RA-11038-RRD.pdf). This declared 94 Natural Parks as new PA, increasing the number of PA under law (and under management of the government) to 107 (Ogena 2018).

NEGROS

Areas currently protected:

1. North Negros Natural Park (88,454.5 ha)

Contains two dormant volcanoes, the largest lowland forest in the entirety of Negros and the 2nd largest watershed. There are six major rivers in the area.

The North Negros Forest Reserve (established by legislation in 1946) was declared a Natural Park by President Arroyo under proclamation 809 in the year 2005, changing its name to the present North Negros Natural Park (NNNP). After having gained increased protection under the ENIPAS Act in 2018, there are some speculations that it might revert to a National Park, but this would require an act of congress. The official size of NNNP changes when areas of forest/land are added or change to the classification of certain areas from Strict Protection Zones to Multiple Use Zones within the protected area occur.

Remaining forest: Secondary forest is 20,000 ha and there is Primary Forest remaining in the core of NNNP.

Stakeholders: 11 cities/municipalities, 41 barangays (towns), DENRE, congressmen, senators, ENIPAS Act, Indigenous Peoples, National Commission of Indigenous Peoples.

The PA consist of other small parks. The Department of Environment and Natural Resources (DENR) identified more >100 illegal structures in the park, e.g. resorts were built without permits. Two tribes of Indigenous Peoples, the ATA and BUKIDNON tribes, live in the park, a population of >5,000 people. The Indigenous People are waiting for the Certificate of Ancestral Domain Title for them to claim their land (1,003.82 ha).

2. Mount Kanlaon Natural Park (24,388 ha)

Landscape of the park is dominated by a Mt. Kanlaon, a 2,435m high stratovolcano and tallest mountain on Negros. The Bago River Watershed is nestled between North Negros Natural Park and Mount Kanlan Natural Park.

Mount Kanlaon Natural Park was legally established under the RA 9154 (Mt. Kanlaon Law).

Remaining forest: Secondary forest also provides shelter for wildlife. 15,000 ha is left and only 10,000 ha is considered as secondary forest. This 10,000 ha is shared by Negros Occidental and Oriental.

Stakeholders: Six cities/municipalities (Bago, La Carlota, San Carlos, La Castellana, Murcia and Canlaon City), mountaineers, researchers, tourists, energy development corporation, settlers (formal and informal), mountain resorts, game farms, DENR and Philippine Institute of Volcanology and Seismology, Provincial Environment Management Office, NGO's, sugarcane planters, National Irrigation Administration. An indigenous people community named Minoan of Kanlaon (population >1,000) lives within the protected area.

3. Balinsasayao Twin lakes Natural Park (8,000ha)

The Natural Park surrounds two small crater lakes, Lake Balinsasayao and Lake Danao, on the eastern slope of the Cuernos de Negros mountain range. Contains headwaters of five major river systems and is an important watershed for the municipalities of San Jose, Valencia and Sibulan. Declared a protected area in 2000 under Proclamation nr 414. Secondary forest, primary high elevation forest and degraded areas.

Stakeholders: Three municipalities (Valencia, Sibulan, San Jose) and seven barangays (towns); the Balinsasayao Twin Lakes Farmers Association Inc. (BTLFAI) peoples association and a designated Protected area Management Board who manage biodiversity and tourism; the Energy Development Corporation (the park contains a portion of the Negros Geothermal Reservation of this energy company); Silliman University (formerly active conducting research in the area and will reinitiate soon); Amlan hydroelectric power company, and the local government of Sibulan municipality that gives 50,000 Pesos or area management every year.

Potential future protected areas:

4. Binalbangan River

5. Mount Talinis (~10,000 ha)

6. Southwestern Negros Forest Fragments

PANAY

Areas currently protected:

1. Northwest Panay Peninsula Natural Park (12,000 ha)

Important watershed and highest protection level. Still contains significant stands of primary, secondary and selectively logged forest and it may be the only remaining protected lowland tropical forest in Panay and Negros islands. Part of the last contiguous lowland forest in the Western Visayas with the Central Panay Mountain Range which is not currently protected apart from two small areas in the south.

Proclaimed a natural park by President Arroyo in 2002 through Presidential Proclamation No. 186. Handled by ENIPAS RA 11038 of 2018. The Northwest Panay Biodiversity Management Council (NPBMC) was formed in 1999 and is made up of the local government units of Northwest Panay, NGOs (e.g. BioCon, PhilinCon), and national and local government agencies (e.g. Department of Environment and Natural Resources).

Stakeholders: Five municipalities (Nabas, Malay, Buruanga, Libertad and Pandan).

2. Aklan River Watershed Forest Reserve (23,185 ha)

All five species found in the area.

Proclaimed by President Arroyo in 1990 through Presidential Proclamation No. 600.

Stakeholders: Two municipalities (Madalag and Libacao) that contain 49 towns

3. Panay River Watershed Forest Reserve (~4,350 ha)

At least three species found in the area.

Stakeholders: Four towns.

Proclaimed by President Arroyo in 1990 through Presidential Proclamation No. 599.

The actual boundaries do not appear exact as compared to this Presidential Proclamation.

4. Maasin River Watershed Forest Reserve (6,738.52 ha)

The watershed provides water to over 500,000 residents of Iloilo City and adjacent municipalities, namely Maasin, Cabatuan, Sta. Barbara, Pavia, Oton and San Miguel. The watershed is also a major source of irrigation water to agricultural lands in the central portion of Iloilo province. Maasin River Watershed Forest Reserve has hornbills and Visayan warty pig.

Stakeholders: Three municipalities (Maasin, Alimodian and Janiuay) and 16 towns.

5. Bulabog Putian National Park

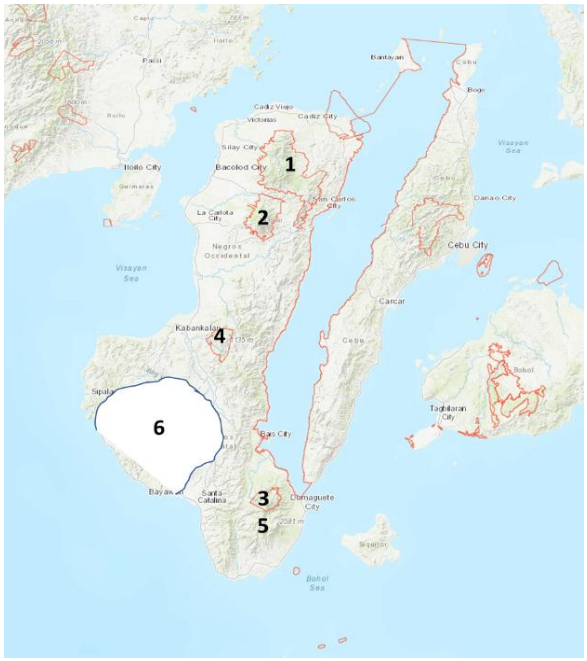
None of the five species is found in the area. Vegetation cover consists mostly of neophytes. Proclaimed 12 February 1923. Proclamation #16 as a resource reserve.

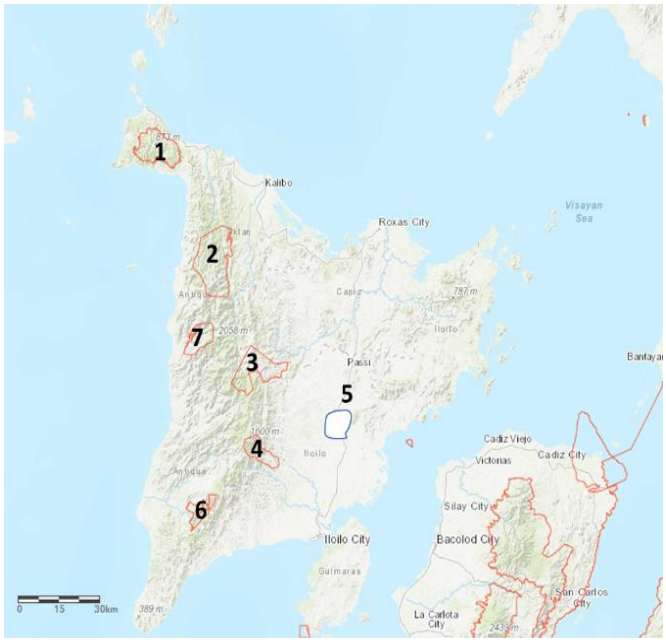
6. Sibalom Natural Park (~6,000 ha)

Also under ENIPAS (declared In Year 2018 RA 11038). Old area for the park is ~5,000 ha but changed to ~6,000 ha.

Figure 11: Currently PA's and areas of relevance to the five species.

A. Negros: 1. North Negros Natural Park, 2. Mount Kanlaon Natural Park, 3. Balinsasayao Twin lakes Natural Park, 4. Ilog-Hilabangan, 5. Mount Talinis, 6. Southwestern Negros Forest Fragments.
B. Panay: 1. Northwest Panay Peninsula Natural Park, 2. Aklan River Watershed Forest Reserve, 3. Panay River Watershed Forest Reserve, 4. Maasin River Watershed Forest Reserve, 5. Bulabog Putian National Park, 6. Sibalom Natural Park





Potential protected area:

7. Proposed Central Panay Mt. National Park

In Central Panay under 4 provinces: Iloilo, Capiz, Aklan, and Antique. There was a movement to legislate it as a protected area but until now, no action has been taken. Critical habitat for all five species. The regional development council gave instruction that all provinces found within the mountain range should see it as a critical habitat; key biodiversity area.

Areas not protected but critical for the five species:

1. Southwestern Negros; Series of fragmented forests (fragmented by developments in between areas); need immediate actions for conservation; parts of SW Negros are declared Key Biodiversity Area by the LGU. These key areas are Hinobaan (~600 ha), Cauayan (~2,000 ha including secondary forests) and Sipalay (~1,000 ha). In between the forests are also sugarcane plantations, cities, private lands and several IP groups.

2. North of the Central Panay Mountain range; lowland and mountainous primary and secondary forest patchwork that is close enough to the North-West Panay Peninsula Natural Park to allow for a corridor and expansion of range for possibly five of the species. Further survey needs to investigate the habitat quality and the threat pressure in this area.

Potential reintroduction sites that are not considered at the moment:

3. South Cebu Mountain Range (~1,200 ha); protected by the community and the DENR. Area of potential interest for reintroduction of Visayan warty pig and Visayan spotted deer. Cebu was the home of the now extinct subspecies of the Visayan warty pig (*S. cebifrons*

cebifrons) and a now extinct population of Visayan spotted deer for which it is not certain if it was taxonomically distinct from extant populations.

4. Ilog-Binalbangan not a protected area; declared as watershed, initial component of PA; there are already claimants of the area; Used to be a Natural Park but after the Martial Law (1970s to 1980s) the area was modified and downgraded to an unprotected area. Some parts are dominated by limestone; may be critical areas for hornbill and there are speculations of the presence of Negros bleeding-heart doves.

THREAT ANALYSES

The workshop participants worked in three working groups to define the key threats to the species. Species were combined in this way because it was anticipated there would be overlap in their threat processes.

1. Visayan warty pig (*Sus cebifrons*) Visayan spotted deer (*Rusa alfredi*)
2. Rufous-headed hornbill (*Rhabdotorrhinus waldeni*) and Visayan Hornbill (*Penelopides panini*)
3. Negros bleeding-heart dove (*Gallicolumba keayi*)

Purpose: Identify the THREATS to the species - including their underlying causes, the nature of their effects on the species and the degree of impact on the species' viability

Participants were asked to first conduct a brainstorm of threats affecting the species. Thereafter, the groups created causal chains for each threat, defining what causes the threat (the reasons why the threat is there), as well as what are the effects of the threats on the species (e.g. increased mortality (of certain sex/life stages), reduced reproductive success, density reduction, population fragmentation etc.). Using these causal chains, the working groups produced threat descriptions. Through group discussion and consensus, they also categorised the severity of each threat - as having a likely High, Moderate or Low impact on each species' viability. A comparison of the threats and their severities among all five species can be found in table 18. This was taken into account when developing species-specific goals and both species and cross-species strategies for conservation.

Visayan warty pig and Visayan spotted deer

1. Hunting related threats

Wildlife act 9147: Hunting of endemic wildlife, both threatened and non-threatened, is illegal, with the exception of hunting by indigenous people for non-commercia purposes (subsistence). Species listed as pest species or invasive alien species are also exempt from this, but that does not apply to either Visayan warty pigs or Visayan spotted deer.

Hunting – Religious (only affects Visayan warty pigs):

Threat: Hunting for religious ritual by indigenous peoples (illegal).

Description: Hunting for the purpose of using the animal in specific religious rites, rituals or celebrations.

Cause: Local traditions and cultures.

Impact: Population size decrease, which may lead to decreased genetic diversity.

Hunting – Sport (affects both species):

Threat: Sport hunting (illegal).

Description: Hunting with the main purpose being the enjoyment of the hunter/s. Obtaining meat for food may be a by-product, but is not the main motivation for the hunt.

Cause: Common past-time (leisure) activity.

Impact: Population size decrease or fragmentation, which may lead to decreased genetic diversity and/or local extirpation.

Hunting – Consumption (affects both species):

Threat: Subsistence hunting (legal if by indigenous people for non-commercial purposes and 'home consumption'; illegal in other cases).

Description: Hunting for the main purpose of providing meat for the hunter and the hunter's family.

Cause: Can be either opportunistic or demand-driven and species-targeted; both of which, in turn, can be driven either by the lower price of the meat, curiosity towards unusual food items, or the meat being perceived as tastier. Insufficient enforcement of existing laws means this is also insufficiently prevented.

Impact: Population size decrease or fragmentation, which may lead to decreased genetic diversity and/or local extirpation.

Hunting – Selling (affects both species):

Threat: Commercial hunting (illegal).

Description: Hunting in order to sell the meat and/or physical trophies/products (e.g. antlers, bones, teeth).

Cause: Can be either opportunistic or demand-driven and species-targeted; both of which, in turn, can be driven either by the lower price of the meat, curiosity towards unusual food items, or the meat being perceived as tastier. Insufficient enforcement of existing laws means this is also insufficiently prevented.

Impact: Population size decrease which may lead to decreased genetic diversity and/or local extirpation.

Hunting – Pet Trade (affects both species):

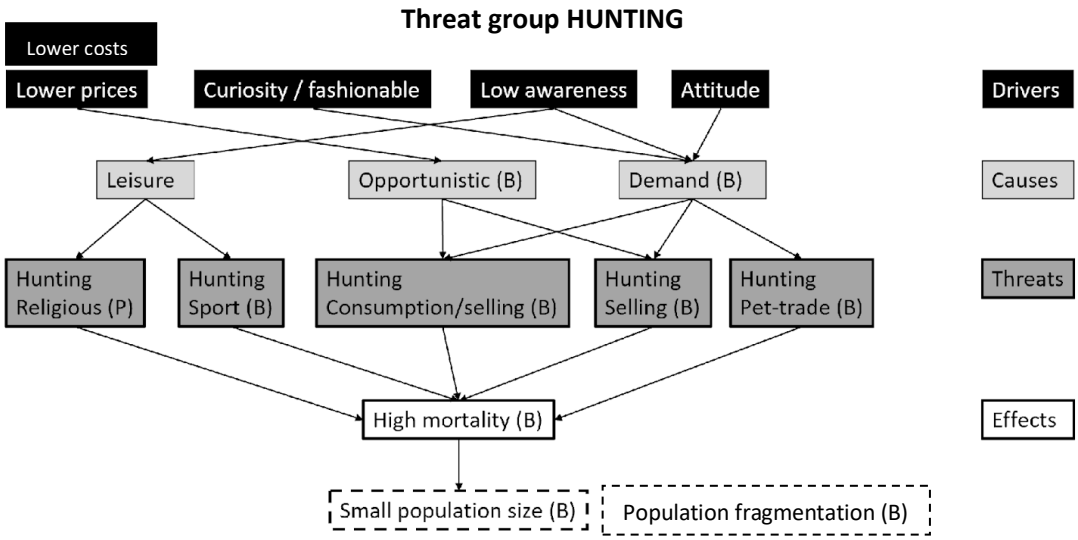
Threat: Hunting for the pet trade (illegal).

Description: Hunting for the purpose of selling live, usually young, animals to buyers who keep these animals as pets.

Cause: Demand-driven and species-targeted due to curiosity of buyers or a wish to demonstrate status. Insufficient enforcement of existing laws means this is also insufficiently prevented.

Impact: Population size decrease or fragmentation which may lead to decreased genetic diversity and/or local extirpation.

Figure 12: Causal flow diagram for the hunting related threats affecting Visayan warty pigs and Visayan spotted deer. D = only of relevance to the deer, P = only of relevance to the pig, B = of relevance to both species



2. Land conversion related threats

Conversion for human settlement (affects both species):

Threat: Land-use conversion (human settlement in NPAs).

Description: Conversion of natural habitats into houses and/or resorts inside NPAs.

Cause: Human population growth and/or the search for better opportunities for living or recreation and tourism drives people away from the settlements and into NPAs. Insufficient enforcement of existing laws means this is also insufficiently prevented.

Impact: Decreased food supply may cause decrease in population size which may lead to decreased genetic diversity. The latter could also be caused by fragmentation of the population into small, isolated populations.

Conversion for agriculture – Slash and Burn (affects both species):

Threat: Land-use conversion (seasonal crop agriculture).

Description: Conversion of natural habitats into fields for growing seasonal crops. Conversion is often achieved by the slash and burn method.

Cause: Human population growth and concurrent increased demand for use of more land and of better (nutrient-rich) land.

Impact: Decreased food supply may cause a decrease in population size which may lead to decreased genetic diversity. The latter could also be caused by fragmentation of the population into small, isolated populations.

Conversion for plantation (affects both species):

Threat: Land-use conversion (plantations).

Description: Conversion of natural habitats into plantations of various crops – often in monoculture fashion. Often for the purpose of international trade rather than local/national use. One example could be the resurgence of natural rubber production.

Cause: Commercial pressure for larger-scale agriculture and its need for better (nutrient-rich) soil.

Impact: Depending on crop and/or level of cultivation (for example deer may still use monoculture forest plantations, but struggle more with rice and sugar plantations), plantations may reduce food supply and cause decrease in population size or cause population fragmentation, and both of which may lead to decreased genetic diversity. However, tree plantations might sometimes be a suitable habitat for pigs and deer, so conversion of some natural habitat into plantations might not necessarily be a severe threat and conversion of degraded habitats into plantations might even improve the situation.

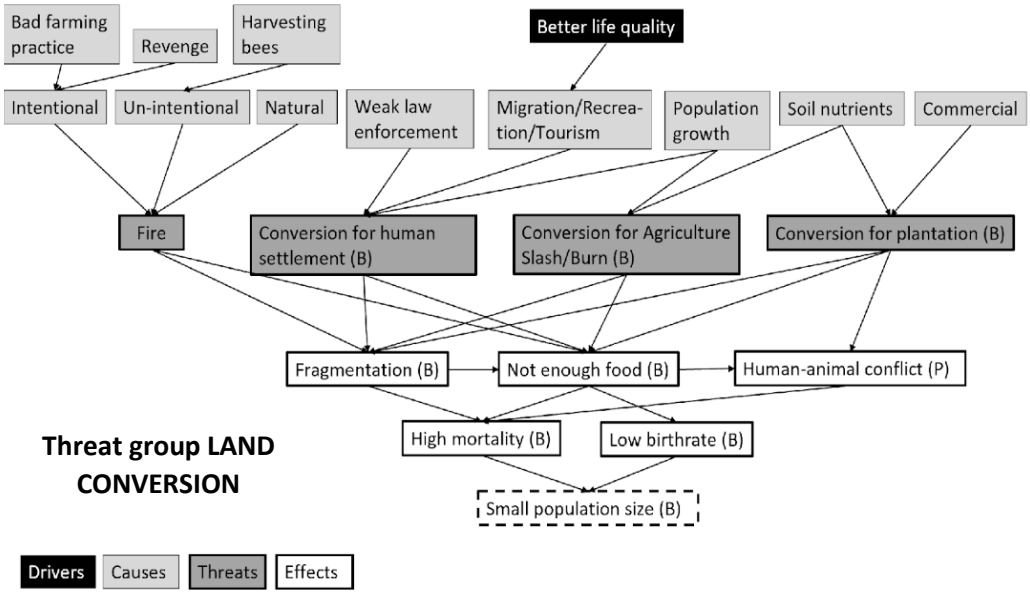
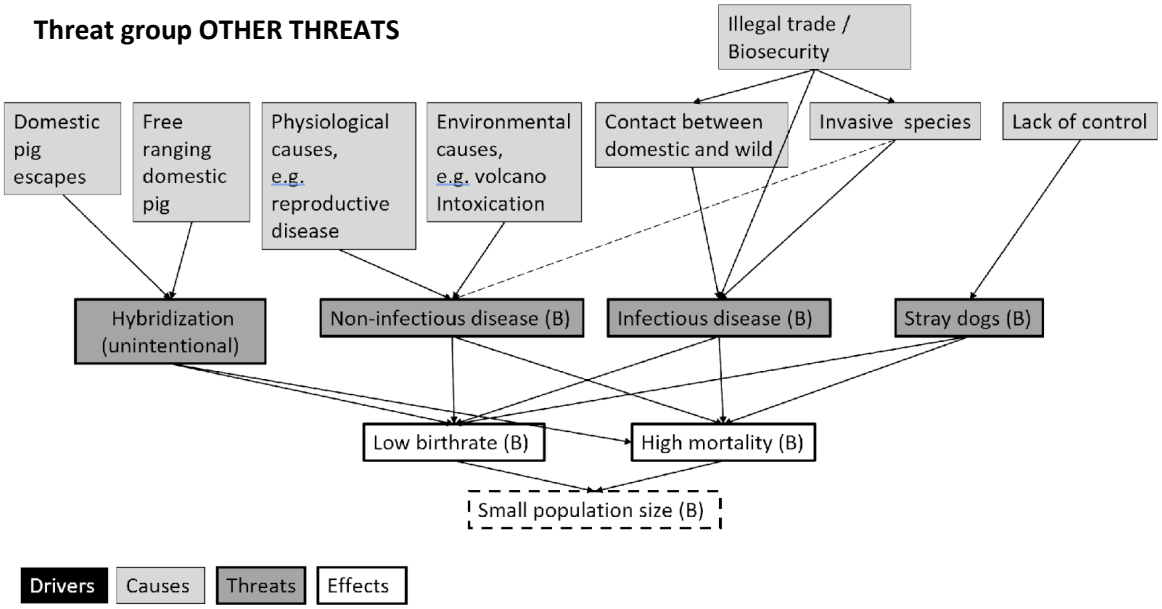


Figure 13: Causal flow diagram for the land conversion related threats affecting Visayan warty pigs and Visayan spotted deer. D = only of relevance to the deer, P = only of relevance to the pig, B = of relevance to both species

3. Remaining threats

Figure 14: Causal flow diagram for the remaining threats affecting Visayan warty pigs and Visayan spotted deer. D = only of relevance to the deer, P = only of relevance to the pig, B = of relevance to both species



ADDED POST WORKSHOP: African Swine Fever (ASF)

At the time of the workshop, the threat of disease was an assumed potential threat. However, in August 2019 the first outbreak of African swine fever (ASF) was recorded in the Philippines (Bureau of Animal Industry 2019 - https://www.bai.gov.ph/index.php/asf-portal).

ASF is a haemorrhagic viral disease of domestic and wild pigs that causes almost 100% mortality in all species so far encountered. It is a transboundary animal disease that is highly contagious and causes outbreaks that affect the economic stability, food security and ecosystem dynamics. There is neither treatment nor a vaccine for ASF on the market. For threatened Asian wild pig species, that are often island endemics and already have low population sizes, it is assumed that ASF will be a significant threat to the existence of populations or even species (Luskin et al., 2020). Several mass mortalities have already been reported, for instance for the Sunda bearded pig (*Sus barbatus*) populations in Borneo (Ewers et al., 2021). Since the first outbreak, ASF has continued to spread in the Philippines, though there are no official reports yet of cases in the Visayas. Luskin et el. (2020) consider the Visayan warty pig at "very high risk" of being affected by ASF, based on its conservation status, domestic pig farming, trade, human density and pork consumption in the area. In August 2021, a Disease Risk Assessment workshop for all Philippine pig species, led by Los Baños University, the IUCN SSC Wild Pig Specialist Group and the IUCN SSC Conservation Planning Specialist Group, used the Visayan warty pig as one of their example species to assess the disease risk for pig species in the Philippines. The group is currently producing the report from this workshop. Additionally, a statement by the Food and Agriculture Organization of the United Nations (FAO), the International Union for Conservation of Nature Species Survival Commission (IUCN SSC) and the World Organisation for Animal Health (OIE) has been published in June 2021 (Link).

Rufous-headed hornbill and Visayan hornbill

1. Habitat loss: forest conversion to agriculture

Description: Slash and burn cultivation for cash crops like sugarcane on Negros and coconut, banana and taro on Panay and for subsistence for rice and vegetable crops.

Cause: Local population needs for subsistence livelihood/income driving forest conversion for agriculture.

Impact: Lowland areas cut which are suitable for agriculture, but also important habitat for hornbills. Hornbills rely on large trees for nesting. Lack of suitable nesting trees – loss of large trees. Ageing population and no recruitment. Loss of learnt behaviours/knowledge of geography – no transfer of ecological knowledge. Dwindling food trees – search/disperse further and wider for food. Thus, lose body condition because they expend more energy. More susceptible to predation by natural predators (eagle, python, leopard cat, Malay civet) and hunting by humans as they range more widely.

Notes: Lack of field data on drivers and their extent and impacts on hornbills.

2. Small–scale illegal logging /timber poaching

Description: For subsistence: timber being cut for personal use (house construction – ebony which is termite-proof, selected species of dipterocarps), fuelwood/firewood for charcoal (small trees) and also for fencing (non-species specific). Timber is also being cut for cash income: from sale of boats (dipterocarps, molave), furniture (Narrh (protected), *Pterocarpus indicus*, ebony), handicrafts (ebony – hardwood lasts long).

Cause: There is a ban or moratorium on cutting trees in any land – even in ancestral domains. However, the community believes they own the forest, that they have free access, and they have a sense of ownership. Timber land: misconception – although it is for biodiversity, people perceive it as theirs. Public or forestland: no one is supposed to cut timber. DENR is the main authority but enforcement is weak or limited due to many constraints such as limited political support and will, weak governance, and poor co-ordination and co-operation between departments – e.g. local village (barangay), local municipality.

Impact: Direct and indirect effects on hornbills. Removal of big trees – nesting trees (see agricultural conversion thread). Loss of potential food trees (same thread as agricultural); loss of trees: increasing potential for further habitat degradation through landslides/soil erosion. Trees with nesting birds may be felled. Opportunistic hunting and poaching (see poaching for pet trade). Potential disturbances by human activities and presence. Presence of camps, people and chainsaws: noise-scaring birds, disturbance during breeding season.

Additional notes:

- Ancestral domains need to be claimed by people; they can be claimed, but people need to apply for permit/instrument – designated areas. Indigenous peoples allowed to use resources, though not for commercial purposes; plant and wildlife resources – allowed for religious and indigenous traditional uses; only allowed for species not classified as threatened (see RA9147, IRR Rule 27.2.) Legalizing community ownership has happened, but even in these areas trees cannot be cut (permits are needed); tenured migrants can apply for permits within public forestlands.

- To avoid unauthorized use, the government also has community-based forest management.
- Based on a resource management plan – cannot cut naturally grown areas but can harvest planted trees.
- Strict protection zone – scientific studies and religious practices of indigenous people are allowed.
- Multiple use zones – managed by the local government.
- Production zone – planted and harvested – owned by government, resident communities are granted instrumentation to use – but problems in governance.
- Protection zone - only plant trees, not allowed to cut and harvest; Ecotourism zone.

3. Rapid development

Description: The Visayan hornbill and Rufous-headed Hornbill are threatened, Endangered and Critically Endangered respectively, bird species endemic in the West Visayas region of the Philippines. Now they are only found in Negros and Panay Islands and has been extirpated elsewhere in their historical distributional range.

Cause: Over the past years, the drive towards economic and tourism development have become more aggressive. Mismanagement, lack of information and awareness, lack of effective coordination, convergence and conflicting mandates among NGAs and LGU, and lack of political will, have caused the invasion of forests and wildlife habitat.

Impact: Human invasion of forests and wildlife habitat have paved the way for more illegal structures, community settlements and road networks leading to a series of cascading effects which have negatively impacted the hornbill species and other wildlife species. The road network paved the way for illegal structures and people invading the areas surrounding the habitats which have caused the decrease of forest area, poaching, fragmentation of forest cover resulting in edge effect, inbreeding and crossbreeding of species, which may eventually lead to depletion and extinction.

4. Hunting/poaching

Hunting for food, recreation/sport, for the local souvenir trade and for the pet trade are affecting the Visayan hornbills and Rufous-headed hornbills**.**

Description:

- Hornbills are hunted for food and keeping up local traditions. Wild meat is considered a delicacy amongst indigenous forest people.
- Local people are coming into the forest for recreational hunting. Displaced indigenous people might be doing this. Some local people coming from outside are doing it as a recreational hobby (older men).
- There is evidence that Visayan hornbills and Rufous-headed hornbills are targeted for the live pet trade and are traded locally and on the international market. Poaching for live trade is mainly local for both species. There is documentation of four individuals of Visayan hornbill for sale via an online survey from 2018-2020 (Sy & Raymundo, unpublished data)). Rufous-

headed hornbills are more desirable for the pet trade; Visayan hornbills seem to be more opportunistically taken because they are harder to find.

- Hornbill body parts (bills) are sold as souvenirs in the local tourist area of Boracay. These may be obtained through targeted hunting, or taken opportunistically. Mostly Visayan hornbill.
- All hornbill species are protected by national and international laws.
- The CITES Trade Database gives the following trade data for exports from the Philippines from 1992 till 2020 - to all countries, from all sources, for all purposes [in case of poor legibility of tables, they can be downloaded at https://trade.cites.org/) (please see additional comments from workshop participants below the tables):

Rufous-headed hornbill

Comparative Tabulation Report

Year	App.	Taxon	Class	Order	Family	Genus	Importer	Exporter	Origin	Importer reported quantity	Exporter reported quantity	Term	Unit	Purpose	Source
1994	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	DE	PH			23	specimens		S	W
2002	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	DE	PH			7	specimens	flasks	S	W
2004	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	PT	PH		2		live		T	C
2007	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	US	PH		1		specimens		S	W
2009	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	GB	PH			2	specimens		S	W
2009	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	US	PH			0.5	specimens	g	S	W
2009	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	US	PH		1	1	specimens		S	W
2010	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	DE	PH		14	14	feathers		S	W
2010	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	GB	PH			3	feathers		S	W
2010	II	Aceros waldeni	Aves	Coraciiformes	Bucerotidae	Aceros	GB	PH			6	specimens		S	W

Visayan hornbill

Comparative Tabulation Report

Year	App.	Taxon	Class	Order	Family	Genus	Importer	Exporter	Origin	Importer reported quantity	Exporter reported quantity	Term	Unit	Purpose	Source
1992	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH		4	5	live		T	C
1992	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH			1	skins		S	W
1992	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH		1		specimens		S	U
1993	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH		2	4	specimens		S	W
2002	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	DE	PH			26	specimens	flasks	S	W
2005	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	DE	PH		16		specimens		S	W
2007	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	GB	PH		8	8	live		B	F
2007	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	GB	PH			24	specimens		S	F
2007	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH		5		specimens		S	W
2008	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	SG	PH		4		live		T	C
2008	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH		1		bodies		S	C
2009	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	DE	PH		26		specimens		S	C
2009	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	GB	PH			27	specimens		S	W
2009	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH			1.3	specimens	cm3	S	C
2010	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	BG	PH			10	live		T	F
2010	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	BG	PH		10		live		Z	F
2010	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	DE	PH		7	8	feathers		S	W
2010	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	GB	PH			32	feathers		S	W
2010	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	GB	PH			47	specimens		S	W
2010	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH			1	bodies		S	W
2010	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH		1		specimens		S	W
2011	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	BG	PH			17	live		B	F
2011	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	DE	PH		1	1	live		T	C
2011	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	US	PH		3	3	specimens		S	W
2012	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	BG	PH			17	live		B	F
2014	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	GR	PH			8	live		B	C
2014	II	Penelopides panini	Aves	Coraciiformes	Bucerotidae	Penelopides	GR	PH		8		live		Z	C

Purpose codes: T=Commercial; S= Scientific; Z=Zoo; B=Breeding in captivity
Source codes: W=Wild; C=Captive bred; U=Unknown; F=Born in captivity (F1 and subsequent)

The official trade data from the CITES Trade Database suggests that two Rufous-headed hornbills and 73 Visayan hornbills have been traded internationally (legally). The amount of 73 Visayan hornbills is based on exporter-reported quantity (officially) from 1992 – 2016. The total amount from the Philippines during the same period was 66 Visayan hornbills, remaining individuals were from other countries (Austria, UK, Netherlands) in the earlier years. (Data from Emerson Sy, Traffic, Manila). From 2007 to 2016, there was an increase in quantity – 61 exported Visayan hornbills from the Philippines to Great Britain, Singapore, Bulgaria, Germany, Israel, Turkey, Greece. Only five Visayan hornbills were exported from the Philippines in the previous period of 1992-2006.

- Some of these are legally procured for zoos through agreements. They may not all be Visayan tarictic hornbills, because of previous subspecies now having been elevated to species.
- There is the potential for, and reports of, wildlife laundering for international trade: wild birds are caught illegally and then fraudulently declared as captive bred by some breeding farms and zoos in the Philippines.

Cause: There is trade in these species for private collections. Birds are being bought in the Philippines by both foreigners and locals. People sell the birds for some cash income and may receive around 800-1,000 Pesos per bird locally. Other times one is aware this activity is illegal, but there is a lack of proper enforcement.

Hunting for souvenirs may be either targeted, or may be a by-product of hunting and killing the birds for other purposes. Hunting may be for income – sold in the tourist area of Boracay, where enforcement is poor. With regard to international trade/laundering of live wild birds, there may be corruption in issuing permits. Technically, one is supposed to give information on parentage but in practice that does not always happen.

Impact: Hunting hornbills for food, recreationally, and live bird/pet trade leads to direct loss of adults, breeding individuals, incubating females and/or juveniles/chicks. Targeted nest poaching for pet trade lead to around 90% of nests being poached (Philippine Initiative for Environmental Conservation (PhilinCon) prior to start of nest guarding program). Rufous hornbill – usually 2-3 chicks in a nest, Visayan hornbill – 3-5 chicks in a nest. Loss of females and chicks. Reducing/losing breeding capacity. Lack of data on actual extent of offtake through hunting and impact on the species; limited data on levels of trade (legal and illegal).

Negros bleeding-heart dove

1. Habitat loss and fragmentation

Pastureland

Threat/Issue: Increase in pasturelands causing habitat loss/fragmentation for Negros bleeding-heart dove.

Description: Areas used for pasture are expanding into suitable habitats for Negros bleeding-heart dove. This includes the cutting down of forests for grazing land as well as animals expanding out from villages.

Cause: Widespread industrial agriculture, which has marginalized local populations, and increased demand for food (this is impacted by increase in local population, increase in tourism, and increasing middle class).

Impact: The loss of habitat from this threat results in the lack of feeding and nesting areas for the species. An increase in contact with humans leads to the species being prone to car accidents and vulnerable to direct poaching. Contact with feral dogs and cats, and contact with domestic birds (including domestic pigeons and domestic poultry), increases Negros bleeding-heart doves susceptibility to diseases. Ultimate impacts are reduced genetic variability, reduced recruitment, displacement and mortality.

Agriculture

Threat/Issue: Conversion to Agricultural land, provoking habitat loss.

Description: Forest habitat is being cut down to make way for agricultural lands (due to both slash and burn and other practices) for non-industrial (and industrial?) agriculture.

Cause: Increase in local population (including migrants) and limited space drives forest logging and conversion to crops.

Impact: Habitat loss decreases suitable habitat (for food and nest sites), leading to displacement of species, increased mortality and reduced recruitment.

Power plants

Threat/Issue: Power plants – coal and geothermal energy.

Description: Power plants take up space, drive noise pollution and increase human movement.

Cause: An increasing human population and development led to escalating demand for energy. Government drive to produce energy through coal and geothermal might potentially be a factor.

Impact: Reduction of nesting sites, food availability and breeding success.

Charcoal

Threat/issue: The Negros bleeding-heart dove is threatened by loss of habitat attributed to the production of charcoal in their forest habitats.

Description: Charcoal production threatens Negros bleeding-heart dove habitats because forest areas are cleared. These are cut and burned to make charcoal. The charcoal producers are also setting traps and living off the land in their forests of use, increasing the chance for poaching or mortalities of Negros bleeding-heart doves.

Cause: Charcoal production is assumed to be a result of increase in consumption because of an increase in local population, including immigrants. It is assumed that charcoal is still traditionally used at home, used commercially such as in restaurants, and a traditional source of income for some communities.

Impacts: The loss of habitat from this threat leads to a lack of feeding areas and nesting areas for the species. An increase in contact with humans leads to the species being prone to vehicle accidents and vulnerable to direct poaching. Contact with feral dogs and cats, and contact with domestic birds (including domestic pigeons and domestic poultry), increases Negros bleeding-heart dove's susceptibility to diseases. Ultimate impacts are reduced genetic variability, reduced recruitment, displacement and mortality.

Encroachment

Threat: Encroachment into forest areas for both residential and commercial (resorts).

Description: Clearing of forest to make way for additional settlements and commercial developments.

Cause: Limited space and lack of alternative employment opportunities in urban centres.

Impact: Disturbance, displacement, reduced recruitment, increased risk of disease (poultry).

2. Hunting

Hunting for food

Description: Opportunistic hunting for food. Hunting using guns and snare traps in many cases.

Cause: Negros bleeding-heart dove is a source of meat, which is easy to capture and is caught for subsistence. Other causes include poverty, lack of education, and lack of awareness of rarity of the species. It is possible that Indigenous Peoples (on Panay) are specifically involved in this, but this needs further research.

Impact: The ultimate impact of this is direct mortality, reduced recruitment, and loss of genetic variability (no genetic analysis done on in-situ populations yet, not able to extrapolate to ex-situ). This is classified as a high-level threat, particularly around the buffer zones.

Hunting for recreation

Description: Recreational hunting by both local and non-local people.

Cause: One cause is urban dwellers travelling to Negros bleeding-heart dove habitat for shooting trips (there is evidence from community interviews to support this). It is also common practice in the Philippines to shoot animals, although this has decreased over the past 30-40 years as awareness has increased about wildlife threat. Other related causes are poverty, lack of education, and lack of awareness of rarity. It is possible that Indigenous Peoples (in Panay) are specifically involved in this, but this needs further research.

Impact: The ultimate impact of this is direct mortality, reduced recruitment, and loss of genetic variability.

Hunting for wildlife product (bones to use as trinkets for tourists)

Description: Community interviews have shown that in tourist destinations (e.g. Boracay), trinkets made of bones of local animals, including Negros bleeding-heart dove are sold. (Note: photographic records exist). There is no record of this in Negros. It is believed to be more common in Northwest Panay.

Cause: This could be a potential by-product of hunting for food or recreation. It is believed that trinkets are being bought primarily by foreign tourists and tourists from Manila, although the relationship between supply and demand here is unclear (i.e. tourists are likely buying whatever is available). Poverty and lack of education are linked to these as additional causes. It is possible that Indigenous Peoples (in Panay) are specifically involved in this, but this needs further research.

Impact: The ultimate impact of this is direct mortality, reduced recruitment, and loss of genetic variability. This is classified as a low-level threat generally, but a medium level threat in North West Panay.

Hunting for pet (cage bird) trade – emerging threat

Description: Trade for wildlife collectors.

Cause: Foreign demand from collectors for this species is potentially a big future risk. The biggest market for this might be in the Middle East where other dove species are being targeted by a new growing market – but currently this market does not have access to Negros bleeding-heart dove. This trend came from the collection of rare breeds of pigeons, which has led to a competition for the rarest species. These collectors act very targeted.

Another cause is targeting for Philippine traders, Philippine private collections and local individual pets. There used to be records of pets in South Negros. Apparently, it was particularly important for men in the village to have pets and this was one of them.

Impact: The ultimate impact of this is direct mortality, reduced recruitment, and loss of genetic variability.

3. Feral dogs and cats as well as domestic rats (invasive alien species)

Feral cats

Description: Feral cats are found within Negros bleeding-heart dove habitat.

Cause: Increase in human settlement around and within Negros bleeding-heart dove habitat has introduced cats to the area. The lack of population control and reduction of native predators in the area has led to increased populations of feral cats. Cats are a big problem for the birds, with Negros bleeding-heart doves being very easy to catch as they freeze.

Impact: Direct mortality from predation and reduced genetic variability, reduced recruitment caused by nest predation, reduced individual fitness caused by stress and other factors from presence of terrestrial predators.

Feral dogs

Description: Feral dogs and hunting dogs are found within Negros bleeding-heart dove habitat.

Cause: Increase in human settlement around and within Negros bleeding-heart dove habitat has introduced (hunting/feral) dogs to the area. The lack of population control and reduction of native predators in the area has led to increased populations of feral dogs. On Panay, dogs without owners are frequently killed out of fear of rabies and hunting dogs accompanying their owners into the forest, or dogs of people living near or inside the forest are a source of problems. On Negros, rabies is less prevalent and feral dogs are frequently seen on camara traps and form a problem.

Impact: Direct mortality from predation and reduced genetic variability, reduced recruitment caused by nest predation, reduced individual fitness caused by stress and other factors from presence of terrestrial predators.

Rats

Description: Four native rat species (*Rattus tanezumi*, *Rattus exulans*, *Rattus argentiventer* and *Rattus everetti*) and the introduced Rattus norvegicus are found in Negros bleeding-heart dove habitat. Most rats infesting houses near the forest are of the native species.

Cause: Increase in human settlement around and within Negros bleeding-heart dove habitat has introduced rats to the area, or increased their numbers. Presence of agriculture and livestock feed, combined with the reduction of native predators in the area, has led to increased populations of rats.

Impact: Rats predate on nests (which are very close to the ground, thus easy access) and eggs leading to direct mortality and reduced genetic variability and reduced recruitment.

Birds (pigeons, sparrows, chickens)

Description: "Birds" are found in Negros bleeding-heart dove habitat.

Cause: Increase in human settlement around and within Negros bleeding-heart dove habitat has introduced "birds" to the area. The popular activity of cock fighting is also a factor. Presence of agriculture and livestock feed, combined with the reduction of native predators in the area, has led to increased populations of "birds".

Impact: Potential risk from introduced diseases such as Trichomoniasis and Newcastle's Disease from "birds". Lack of veterinary monitoring on this matter.

KNOWLEDGE GAPS

- Note that none of the threats listed here are quantified and documented officially. Most of the information is based on anecdotes, community knowledge and general impressions.
- Snakes caught in the cities and villages are brought into nearest forest areas/ PA for release. This may pose a threat to (young) Negros bleeding-heart doves in the respective area.
- Unclear of preferred type of habitat. Only one account from Bristol Zoo shows that the bird prefers pristine habitat, 450 m, 1.5 m understory. TFI is planning to work on this.

- Role of indigenous peoples across the hunting threats.
- Lack of information surrounding wildlife products in Boracay and other popular tourist destinations.
- No genetic analysis on in-situ populations to date.
- Lack of information on natural competition and natural predation. Emerald dove (*Chalcophaps indica*) is thought to be a competitor.
- Unclear on level of threat from power plant development.
- Absence of links between alien species and disease.
- Not known what the potential impacts are of disease on the dove
    - Question raised on whether vaccinations given to fighting cocks will affect doves (knowledge gap).
    - Potential drivers for disease exposure.
    - Lack of veterinary capacity is an obstacle in addressing these issues.

Threat and severity ranking for the five species

Table 19: Threats and their severity ranking for the 5 species (NBHD: Negros bleeding-heart dove, VWP: Visayan warty pig; VSD: Visayan spotted deer; Rufous-headed hornbill; VH: Visayan hornbill). Threats were decided upon by working groups before identifying the level of threat for those species, lack of entry means the threat was not discussed by that species working group. Empty cells mean the species working group did not list this threat in their working group.

Threat Category	Threats	Impact				
		NBHD	VWP	VSD	RHH	VH
Habitat Loss	Overall		High	High		
	Increase in pasture land	Low				
	Conversion to agricultural lands	High	High⁺	High⁺	High	High
	Residential encroachment	High	Medium⁺	Medium⁺	Medium⁺	Medium⁺
	Charcoal production	Low				
	Human development/ encroachment				Uncertain (Med-High)	Uncertain (Low-High)
	Natural fire		Low	Low		
	Fire - unintentional		High	High		
	Fire - intentional		Medium	Medium		
	Fire - vandalism		Low	Low		
	Settlement inPA		High	High		
	Agriculture in PA	Low/ Medium⁺	High	High		
	Illegal small-scale logging/ timber poaching				High	Medium
Hunting	Overall		High ⁺		High	High
	Food/consumption	High	High⁺	Low	Medium	High
	Recreation/sport	Low	Low/Medium°	Low/Medium°	Low*	High
	Wildlife Product	Low	Medium⁺			
	Souvenirs		Medium⁺		Low*	Medium
	Cage Bird Trade	Low				
	Pet trade		Low	Low	High	High
	Selling of animal parts		Medium⁺	Low		
	Religious		Low			

Threat Category	Threats	Impact				
		NBHD	VWP	VSD	RHH	VH
Invasive Alien Species	Feral Cats	Low				
	Feral Dogs	Low				
	Feral Rats	Medium				
	Alien Birds	Low				
Others	Infectious Disease		Medium/ High+	?		
	Non-infectious Diseases		?	?		
	Reproductive		?	?		
	Hybridisation		?			
	Volcano		?	?		

Due to rarity; °Divided opinions/more surveys needed; ^Recently decreased;
+ Change/addition made postworkshop based on additional information/improved knowledge
? Threat thought to affect the species but severity unknown

20-YEAR SPECIES CONSERVATION GOALS

Working in taxonomic groups, participants were asked to describe in brief, clear, specific goal statements the desired state of the species 20 years from now. In defining these goal statements, they were asked to consider for example:

- How the population status of the species should have changed (e.g. desired change in number of populations, and/or population size, and/or population viability (genetic and demographic viability; safety from catastrophes etc.), and/or population trend, and/or representation on different islands or in different ecological settings, and/or habitat quality, etc.).
- How the threat situation of the species should have changed, particularly with regard to the highest impact threats (e.g. particular threat(s) eliminated, effect on population reduced by x%, changes in number of effectiveness of PA etc.).
- Which knowledge gaps should have been addressed (e.g. remaining populations clearly identified, population sizes determined, etc.).

Further details on what these goals entail can be found in the next section: 5-10 year conservation goals per species.

Visayan warty pig: 20-year conservation goals

1. Baseline information in place for the population size in its entire range and a system of continuous monitoring in place.
2. Hunting is minimized to a tolerable level relative to the population size.
3. Habitat secured and restored (existing habitat and corridors).
4. Re-establishment of at least one population on the way.
5. Health management and a research programme established (in situ and ex situ).
6. ADDED POST WORKSHOP: Effective monitoring and emergency response plan in place to prepare for a potential arrival of African Swine Fever.

Visayan spotted deer: 20-year conservation goals

1. At least two new viable wild populations of Visayan spotted deer exist across its historical range.
2. Suitable habitat of the Visayan spotted deer within and outside of PA increased.
3. Communities empowered to engage in conservation of the Visayan spotted deer; including reducing hunting and habitat destruction.
4. Local and national laws related to wildlife protection, PA, and forestry are strictly implemented, to protect the Visayan spotted deer and its habitat.

Rufous-headed hornbill and Visayan hornbill: 20-year conservation goals

1. There are viable populations of Rufous-headed hornbill and Visayan hornbill, which are increasing, and populations are restored in their natural range.

2. The viable habitat of Rufous-headed hornbill and Visayan hornbill is maintained, adequately protected, managed and is being restored.
3. The hunting and illegal collection of both hornbill species has been eliminated.
4. Reliable state of knowledge on population, trends, distribution and an improved ecological understanding has been achieved.
5. There is sound governance and harmonised mandates by all agencies.

Negros bleeding-heart dove: 20-year conservation goals

1. Multiple viable in-situ populations of Negros bleeding-heart dove established across Negros, Northwest Panay and Central Panay.
1. Lowland forest (<800 m.a.s.l.) in PA and NPA across Negros, Northwest Panay and Central Panay Mountain Range has been increased.
2. Accurate information on population size, distribution, demography, ecology, life history and habitat suitability from wild Negros bleeding-heart dove has been attained.
3. Significant reduction in hunting has been achieved across Negros and Panay.
4. Remaining natural forests have been protected and not converted across Negros and Panay.

5-10 YEAR CONSERVATION STRATEGIES PER SPECIES

The taxon-based working groups first established taxon-specific conservation strategies for a time scale of 5-10 years. For this, they examined the threat causal flow diagrams and the threat statement(s) they developed, in order to identify potential strategies aimed at addressing the threat(s) (their causes and/or impact on species) and/or key knowledge gaps, and thus contributing to the conservation of the taxon. These strategies tend to be linked to the points/relationships in the causal flow diagrams that might be influenced in some way to break the chain of events (or in the case of positive impacts, strengthen the chain).

Time allowing, the working groups were asked to identify more precise time frames and priorities among the strategies.

Visayan warty pig conservation strategies

Table 20: Visayan warty pig species-specific conservation strategies in a time frame of 5-10 years.

	VISAYAN WARTY PIG CONSERVATION STRATEGIES	Priority	Time frame
Str.Nr.	**Goal 1: Baseline information in place for the population size in its entire range and a system of continuous monitoring in place (by 2024).**		
1.1	Desktop research and interview survey.		1 Year
1.2	Field signs and camera trap survey.		3 Years
1.3	Standardised monitoring systems using field signs and camera trapping survey twice per year.		2 Years
1.4	Determine ranges and territory sizes by conducting radio-telemetry study.		1 Year
Str.Nr.	**Goal 2: Hunting is minimized to a tolerable level relative to the population size (by 2029).**		
2.1	Reduced hunting to a tolerable level through a community awareness programme.		2029
2.2	Reduce hunting through better law enforcement.		2029
2.3	Assess the drivers for wild pig hunting.		2024
2.4	Initiate livelihood programmes to reduce hunting to a tolerable level.		2025
Str.Nr.	**Goal 3: Habitat secured and restored (existing habitat and corridors) (by 2039).**		
3.1	Within the identified range, address the selling of land rights to rich people - start community engagement and leaders awareness programme.		2025
3.2	There is an awareness programme for political leaders for legislation.		2020
3.3	Bring all NPA under protection – first by local conservation areas and then national protection.		2025

	VISAYAN WARTY PIG CONSERVATION STRATEGIES	Priority	Time frame
3.4	Create corridors to link fragmented habitat.		2025 to 2039
3.5	Identify relevant communities that would benefit from social development and improved agricultural techniques, and start the respective programmes.		2025
Str.Nr.	**Goal 4: Re-establishment of at least one population on the way (by 2025).**		
4.1	Identify an area for trial release including a feasibility study.		2024
4.2	Prepare the release area and get permits.		2021 - 2030
4.3	Proper breeding management of captive populations established, including tackling low founder number.		2020
4.4	Complete genetic study on Negros and Panay animals to establish whether they are different.		2022
4.5	Conduct a trial soft release in the identified area.		2025
Str.Nr.	**Goal 5: Health management and a research programme established (by 2039).**		
5.1	Research on food requirements completed.		2024
5.2	Non-disease health programme for captivity in place, including nutrition etc.		2024
5.3	Institutionalised system for health monitoring in place, including post-mortem and sample analysis.		2022
5.4	Capacity building for captive centres, including a resource network.		2020
5.5	Regular collaboration with government and attend meetings to assure funds for health management.		
5.6	Review and update existing biosecurity programmes in each centre.		2020
5.7	Complete the development of DNA markers for population estimates.		2024

	VISAYAN WARTY PIG CONSERVATION STRATEGIES	Priority	Time frame
5.8	Complete faecal analysis from the wild for gut microbes, parasites, hormones etc.		2024
Str.Nr.	**ADDED POST WORKSHOP: Goal 6: Effective monitoring and emergency response plan in place to prepare for a potential arrival of African Swine Fever (by 2023)**		
6.1	Stakeholder meetings and disease risk analysis done		2021
6.2	Disaster preparedness plan produced		2023
6.3	Effective monitoring system in place		2023
6.4	Emergency and response plan in place with all players informed and ready		2023
6.5	Awareness of ASF for all stakeholders		2023

Visayan spotted deer conservation strategies

Table 21: Visayan spotted deer species-specific conservation strategies in a time frame of 5-10 years.

	VISAYAN SPOTTED DEER STRATEGIES	Priority	Time frame
Str.Nr.	**Goal 1: At least two new viable wild populations of Visayan spotted deer exist across its historical range.**		
1.1	Surveys of existing populations of Visayan spotted deer to establish baseline information on population numbers and distribution for long term monitoring programmes.	High	Initial
1.2	Ecological research on the Visayan Spotted Deer to understand habitat requirements, behaviour, carrying capacity, diet etc. for conservation of existing populations and reintroduction of new populations.	High	Initial
1.3	Genetic research to understand taxonomic differences between Negros and Panay populations, within existing sub-populations and to establish the source of captive populations.	Medium	Initial
1.4	Identification and evaluation of potential sites for reintroduction including ecological and socio-economic factors.	High	Initial
1.5	Use reintroduction (captive to wild) to start the two new populations of Visayan spotted deer within its historical range.	High	Initial Trial release
1.6	Develop effective management of Visayan spotted deer populations based on research results.	High	Middle
1.7	Strengthen collaborations between relevant parties and apply demographic and genetic population management to the ex-situ population management.	High	Initial
	Goal 2: Suitable habitat of the Visayan spotted deer within and outside of PA increased.		
2.1	Based on results from research and surveys (Goal 1), identify potential new sites and implement programmes to increase suitable habitat for the Visayan spotted deer.	High	Middle
2.2	Identify and proclaim additional PA for the conservation of the Visayan spotted deer.	Medium	Later

	VISAYAN SPOTTED DEER STRATEGIES	Priority	Time frame
2.3	Identify and establish corridors connecting suitable habitat for the Visayan spotted deer populations between populations.	Medium	Later
2.4	Encourage titled landowners (private and local government owned) to set aside land for conservation, promote biodiversity friendly agricultural practices and other measures for the conservation of the Visayan Spotted deer.	Medium	Initial
Str.Nr.	**Goal 3: Communities empowered to engage in conservation of the Visayan spotted deer; including reducing hunting and habitat destruction.**		
3.1	Socio-economic research to understand community needs, socio-economics, and attitudes towards the Visayan spotted deer and its conservation.	High	Initial
3.2	Develop and implement an educational and awareness programme within the communities bordering Visayan spotted deer populations.	High	Initial
3.3	Explore appropriate livelihood projects linked to conservation of the Visayan spotted deer as confidence building measures.	Medium	Middle
3.4	Review legislation and renew security of tenured migrants within the multiple-use zones of PA providing access to livelihood programmes in exchange for Visayan spotted deer conservation and habitat protection preventing land conversion and degradation.	High	Initial
3.5	Integrate Visayan spotted deer conservation into Forest management programmes and agreements.	High	Initial Continuous
Str.Nr.	**Goal 4: Local and national laws related to wildlife protection, PA, and forestry are strictly implemented, to protect the Visayan spotted deer and its habitat.**		
4.1	Expand community-based forest ranger programmes for improved protection of the Visayan spotted deer and its habitats.	High	Initial Ongoing

	VISAYAN SPOTTED DEER STRATEGIES	Priority	Time frame
4.2	Strengthen collaboration of Community Based Forest Management to improve enforcement through deputized wildlife enforcers and development of law enforcement operational plans for PA.	High	Initial Ongoing
4.3	Strengthen collaborations among relevant government agencies to implement environmental laws through improved capacity, awareness and coordination of the judiciary and other enforcement agencies.	High	Middle

Rufous-headed hornbill and Visayan hornbill conservation strategies

Table 22: Hornbill taxon-specific conservation strategies in a time frame of 5-10 years.

	RUFOUS-HEADED HORNBILL AND VISAYAN HORNBILL CONSERVATION STRATEGIES	Priority	Time frame
Str.Nr.	**Goal 1: There are viable populations of Rufous-headed hornbill and Visayan hornbill which are increasing, and populations are restored in their natural range.**		
1.1	Ascertain nest tree availability for both hornbills across their range and if necessary, augment with nest repairs and/or the provision of artificial nests as a key resource for population sustainability and growth.	High	
1.2	Assess and improve the diversity and density of hornbill food plants as a key resource for population sustainability and growth.	Medium	
1.3	Continue and expand long-term nest monitoring and protection programmes across ranges of both species.	High	
1.4	Ensure there is a secure and healthy ex-situ population of both hornbills for assurance and potential future re-introduction.	Medium	
Str.Nr.	**Goal 2: The viable habitat of Rufous-headed hornbill and Visayan hornbill is maintained, adequately protected, managed and is being restored.**		
2.1	Protect all existing natural forest, across the natural range of both species, particularly on Panay and Negros.	High	
2.2	Accord legal protection for all hornbill habitat through various approaches – i.e. Critical Habitat (CH), Indigenous Culturally Conserved Areas (ICCAs), Local Conservation Areas (LCAs) and PA.	High	
2.3	Proclamation of Central Panay Mountain Range, Mount Talinis, and South-West Negros KBA as PA.	High	

	RUFOUS-HEADED HORNBILL AND VISAYAN HORNBILL CONSERVATION STRATEGIES	Priority	Time frame
2.4	Protect the remaining natural forest and rehabilitate and reforest 20-30% in each of the open canopy forest in strict protection zones and buffer zones within PA.	High	
2.5	Visibly mark boundaries of different designated land zones within PA in accordance with existing PA guidelines.	Medium	
2.6	Reforestation programmes for degraded natural habitats, including focus on connectivity of existing forest patches.	High	
2.7	Establish community-based forest by extensive implementation of Community Based Forest Management Agreement (CBFMA) and Protected area Community Based Resource Management Agreement (PACBARMA), which are effectively evaluated by authorised agencies of the government in accordance with existing laws and regulations.	High	
2.8	Track the change of primary and secondary forest cover over time through improved GIS mapping.	Medium	
Str.Nr.	**Goal 3: The hunting and illegal collection of both hornbill species has been eliminated.**		
3.1	Implement Biodiversity Friendly Enterprises in communities near hornbill habitat (including community-based tourism, bird-watching/guiding).	Medium	
3.2	Develop communication education and public awareness programs for diverse stakeholders (e.g. local governments, local and city communities and schools).	Medium	
3.3	Increased presence and visibility of forest guards to discourage hunting and collection (links to Goal 5: Law enforcement).	High	
3.4	Adopt the hornbill as a mascot or flagship species across their range in pride campaigns/public awareness wildlife festivals (e.g. replicate the Negros Provincial Wildlife Month Festival activities with hornbills as flagship species in Panay).		

	RUFOUS-HEADED HORNBILL AND VISAYAN HORNBILL CONSERVATION STRATEGIES	Priority	Time frame
3.5	Strict enforcement of existing legislation against the illegal trade in hornbills, focusing on the local and international live pet trade and laundering in wild-caught hornbills, as well as the body parts trade for souvenirs.	High	
Str.Nr.	**Goal 4: Reliable state of knowledge on population, trends, distribution and an improved ecological understanding has been achieved.**		
4.1	Adopt standardised & collaborative long-term monitoring strategies using recognised methodologies specific to hornbills across both species' ranges.	High	
4.2	Ensure survey guidelines/training manuals are made available in an appropriate format to multiple users in common local dialects.	Medium	
4.3	Increase capacity building in field ecology, monitoring, data analysis and publication.	High	
4.4	Increase awareness in local communities so they can contribute to the scientific study of hornbills.	Medium	
4.5	Conduct ecological research on diet, demography, breeding, ranging, behaviour, functional role in seed dispersal and genetic studies on both hornbill species.	High	
Str.Nr.	**Goal 5: There is sound governance and harmonised mandates by all agencies.**		
5.1	Different National Government Agencies, Local Government Units and Civil Society Organisations have an integrated approach to conservation, including enforcement.	High	
5.2	Intensify enforcement of the environmental protection law in PAs and KBAs.	High	
5.3	Strict implementation (including preventing the misuse) of the permitting systems in terms of wildlife act and forestry code of the Philippines.	Medium	
5.4	Ensure scientific findings are communicated to policy makers in an appropriate format, so they are understood and integrated into policy.		

Negros bleeding-heart dove conservation strategies

Table 23: Negros bleeding-heart dove species-specific conservation strategies in a time frame of 5-10 years.

	NEGROS BLEEDING-HEART DOVE CONSERVATION STRATEGIES	Priority	Time frame
Str.Nr.	**GOAL 1: A viable ex-situ populations of Negros bleeding-heart dove**.		
1.1	Establish a viable insurance population ex-situ with proper population management guidelines.	1st	
1.2	Investigate translocation and reintroduction needs.	3rd	
1.3	Formation of an ex-situ working group with all stakeholders.	2nd	
Str.Nr.	**GOAL 2: Lowland forest (<800 m above sea level) in Protected areas (PA) (PA) and non-Protected areas (PA) (PA) across Negros, North West Panay and Central Panay Mountain Range has been increased.**		
2.1	Encourage rainforestation of native trees among private landowners and people with legal agreements with the government.	5th	
2.2	Encourage creation and passing of ordinance of more “watershed areas”.	4th	
2.3	Creation of an Memorandum of Agreement with DENR and relevant government agencies to declare protected status for lowland forest	tbc	
2.4	Increased enforcement effort in the strict protected zones of PA to stop deforestation.	2nd	
2.5	Increase in area of strict protected zones in PA to increase forest cover.	1st	
2.6	Identify areas suitable for reforestation with native trees (e.g. area covered with cogon grasslands) outside strict PA.	4th	
2.7	Establish a team dedicated to training and support in appropriate rainforestation or native trees practices across Negros and Panay.	3rd	

	NEGROS BLEEDING-HEART DOVE CONSERVATION STRATEGIES	Priority	Time frame
Str.Nr.	**GOAL 3: Accurate information on population size, distribution, demography, ecology, life history and habitat suitability of wild Negros bleeding-heart dove has been attained.**		
3.1	Systematic repeated surveys to estimate the population size and distribution across existing forest within the historical range of Negros bleeding-heart dove.	1st	
3.2	Determine demography, ecology, life history and habitat suitability for wild Negros bleeding-heart dove using an established research population.	2nd	
3.3	Establish a research project on other bleeding heart dove species to try to establish baseline data for wild Negros bleeding-heart dove.	4th	
3.4	Research on in-situ and ex-situ populations to gather genetic knowledge of Negros bleeding-heart dove to determine (1) correct taxonomy between Negros and Panay and (2) genetic health of the populations.	3rd	
Str.Nr.	**GOAL 4: Significant reduction in hunting has been achieved across Negros and Panay.**		
4.1	Understand causes, drivers, motivation and scale for hunting.	1st	
4.2	Increase enforcement effort.	2nd	
4.3	Create/promote a communication platform to facilitate reporting of hunting.	5th	
4.4	Create a strategy to address the drivers of hunting for subsistence (i.e. poverty, lack of education).	3rd	
4.5	Implement continued behaviour change (“pride campaign”) campaigns to stop recreational hunting at a national level.	4th	
Str.Nr.	**GOAL 5: Remaining natural forests have been protected and not converted across Negros and Panay.**		
5.1	Creation of a natural park in the North of the Central Panay Mountain Range.	1st	

	NEGROS BLEEDING-HEART DOVE CONSERVATION STRATEGIES	Priority	Time frame
5.2	Creation of a protected natural forest corridor between North West Panay Peninsula National Park to the North of Central Panay Mountain Range.	8th	
5.3	Declaring Cuernos de Negros as a Protected area.	3rd	
5.4	Creation of a protected natural forest corridor between Cuernos de Negros and Balinsasayao Twin Lakes Natural Park.	6th	
5.5	Increased enforcement effort in the strict protected zones of PA to stop deforestation.	3rd	
5.6	Establish and support the community organisation programme to ensure natural forest is not converted.	7th	
5.7	Investigate and provide effective alternative livelihood programmes to ensure forest is not converted.	3rd	
5.8	Training in appropriate sustainable agriculture techniques to avoid conversion of natural forest.	2nd	

CROSS-SPECIES CONSERVATION STRATEGIES

The strategies from all taxa were amalgamated and sorted into four thematic groups:

1. Population viability, reintroduction, ex-situ management
2. Habitat conservation, rainforestation and protection
3. Hunting and law enforcement
4. Knowledge gaps to be addressed

Workshop participants switched from taxon-based to theme-based working groups. Each theme-based working group divided similar taxon-specific strategies into subgroups and evaluated if these subgroups could be covered by an overarching, cross-species, strategy. These are strategies that can benefit more than one species in a variety of ways, e.g. by implementing teams working together to develop methodologies (even if they end up being implemented by different teams) or establish relationships with stakeholders; sharing knowledge and experience; creating joint database; creating cross-species teams; submitting joint grant applications to avoid competition; sharing resources (human resources, materials etc.); sharing communication. Effective and efficient cross-species collaborations can take place, even if the different species have slightly different slants on the strategy and/or have activities in slightly different locations etc. There are still substantial opportunities for complementarity and added benefit. Furthermore, even if a specific strategy was not formulated for a taxon in the taxon-specific working group (e.g. because other strategies were more important), this taxon may still benefit from this work being undertaken for other species. Which species can benefit from the cross-species strategies is also marked in the tables below.

Both the taxon-specific, and cross-taxa conservation strategies provide a clear platform and starting point for post-workshop work to draw up (at least partially communal/overlapping) implementation action plans and actions.

Wild population viability, reintroduction, ex-situ management

Table 24: Cross-taxa conservation strategies in the theme of population viability, reintroduction and ex-situ management (in a time frame of 5-10 years). Pig: Visayan warty pig; Deer: Visayan spotted deer; HB: Rufous-headed hornbill and Visayan hornbill; Dove: Negros bleeding-heart dove

Cross-species strategies *(population viability, reintroduction, ex-situ management)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Baseline population parameters established and standardised long-term monitoring strategy developed and implemented. Results used to inform in situ conservation actions.	X	X	X	X		**P1.3** Standardised monitoring systems using field signs and camera trapping survey twice per year. **P1.4** Determine ranges and territory sizes by conducting radio-telemetry study. **D1.1** Surveys of existing populations of Visayan spotted deer to establish baseline information on population numbers and distribution for long term monitoring programmes. **H4.1** Adopt standardised and collaborative long-term monitoring strategies using recognised methodologies specific to hornbills across both species' ranges. **Do3.1** Systematic repeated surveys to estimate the population size and distribution across existing forest within the historical range of Negros bleeding-heart dove.
Healthy ex-situ populations established for insurance and as a potential source for reintroductions.	X	X	X	X		**P4.3** Proper breeding management of captive populations established, including tackling low founder number. **D1.5** Use reintroduction (captive to wild) to start the two new populations of Visayan spotted deer within its historical range. **H1.4** To ensure there is a secure and healthy ex-situ population of both hornbills for assurance and potential future re-introduction **Do1.1** Establish a viable insurance population ex-situ with proper population management guidelines. **Do1.2** Investigate translocation and reintroduction needs.

Cross-species strategies *(population viability, reintroduction, ex-situ management)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Improved management of the ex-situ populations, through improved genetic and demographic management, increased capacity for/within ex-situ centres, development of ex-situ task forces (within and across species) and strengthened collaboration.	X	X	X	X		**P4.3** By 2020, proper breeding management or captive population established, including tackling of low founders. **P5.4** Capacity building for captive centres, including a resource network. **D1.7** Strengthen collaborations and apply demographic and genetic population management to the ex-situ population management. **Do1.1** Establish a viable insurance population ex-situ with proper population management guidelines. **Do1.3** Create an ex-situ task force for the Negros bleeding-heart dove.
Any outstanding issues with permits of breeding centres resolved.	X	X	X	X		By 2020, resolve any outstanding permit issues of the captive breeding centres.
Ascertain and augment nest availability and continue and expand nest monitoring and protection programmes for both hornbill species across their range. Assess and improve hornbill food plant diversity and density.			X			**H1.1** Ascertain the number of suitable nesting trees for both hornbills across their range and if necessary, augment with nest repairs and/or the provision of artificial nests as a key resource for population sustainability and growth. **H1.3** Continue and expand long-term nest monitoring and protection programmes across ranges of both species. **H1.2** Assess and improve the diversity and density of hornbill food plants as a key resource for population sustainability and growth.

Cross-species strategies *(population viability, reintroduction, ex-situ management)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Disease surveillance and mitigation plan (African Swine Fever). ***[This item was added post-workshop related to the outbreaks of African Swine Fever in the Philippines]***	X					**P5.3** Institutionalised system for health monitoring in place, including post-mortem and sample analysis. **P5.5** Regular collaboration with government and attend meetings to assure funds for health management**.** **P5.6** Review and update existing biosecurity programmes in each centre. **P6.1** Stakeholder meetings and disease risk analysis done **P6.2** Disaster preparedness plan prepared **P6.3** Effective monitoring system in place **P6.4** Emergency and response plan in place with all players informed and ready **P6.5** Awareness of ASF for all stakeholders
Translocation and reintroduction needs evaluated; potential reintroduction sites identified and evaluated; where appropriate (trial) releases are conducted.	X	X	X	X		**P4.1** By 2021, Identify an area for trial release including a feasibility study. **P4.2** By 2021 to 2025, Prepare the release area and get permits. **P4.5** By 2025, conduct a trial soft release in the identified area **D1.4** Identification and evaluation of potential sites for reintroduction including ecological and socioeconomic factors. **D1.5** Use reintroduction (captive to wild) to start the two new populations of Visayan spotted deer within its historical range. **Do1.2**: Investigate translocation and reintroduction needs.

Cross-species strategies *(population viability, reintroduction, ex-situ management)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Genetic studies to investigate if, and to what extent, there are differences between the populations on Negros and Panay; and to guide ex-situ management and possible reintroductions.	X	X	X	X		**P4.4** By 2022, complete genetic study on Negros and Panay animals to understand if they are different. **D1.3** Genetic research to understand taxonomic differences between Negros and Panay populations, within existing sub-populations and to establish the source of captive populations. **Do3.4** Research on in-situ and ex-situ populations to gather genetic knowledge of Negros bleeding-heart dove to determine (1) correct taxonomy between Negros and Panay and (2) genetic health of the populations. Already available studies for hornbills include Sammler et al., 2011, 2012, 2013)

Habitat conservation, rainforestation and habitat protection

Table 25: Cross-taxa conservation strategies in the theme of habitat conservation, rainforestation and habitat protection (in a time frame of 5-10 years). Pig: Visayan warty pig; Deer: Visayan spotted deer; HB: Rufous-headed hornbill and Visayan hornbill; Dove: Negros bleeding-heart dove

Cross-species strategies *(habitat conservation, rainforestation, habitat protection)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Create additional PA in specific locations/accord legal protection to remaining habitat of the species through a variety of approaches e.g. critical habitat, indigenous culturally conserved areas, local conservation areas and PA.	X	X	X	X		**Area specific:** **H2.3** Proclamation of Central Panay Mountain Range, Mount Talinis, and South-West Negros key biodiversity areas as PA. **Do5.1** Creation of a natural park in the North of the Central Panay Mountain Range. **Do5.2** Creation of a protected natural forest corridor between Northwest Panay Peninsula National Park to the North of Central Panay Mountain Range. **Do5.3** Declaring Cuernos de Negros as a protected area. **Do5.4** Creation of a protected natural forest corridor between Cuernos de Negros and Twin Lake National Park. **General:** **P3.3** By 2025, bring all NPA under protection – first by local conservation area then national protection. **D2.2** Identify and proclaim additional PA for the conservation of the Visayan spotted deer. **H2.1** Protect all existing natural forest, across the natural range of both species, particularly on Panay and Negros. **H2.2** Accord legal protection for all hornbill habitat through various approaches – i.e. critical habitat, indigenous culturally conserved areas, local conservation areas and PA. **Do2.2** Encourage creation of PA in lowland forest in Panay and Negros. **Do2.4** Increase in area of strict protected zones in PA to increase forest cover.

Cross-species strategies *(habitat conservation, rainforestation, habitat protection)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Rainforestation and forest rehabilitation in key areas; capacity building in rainforestation practices.	X	X	X	X		**H2.4** Protect the remaining natural forest and rehabilitate and reforest 20-30% in each of the open canopy forest in strict protection zones and buffer zones within PA. **H2.6** Reforestation programmes for degraded natural habitats, including focus on connectivity of existing forest patches **Do2.5** Identify areas suitable for reforestation with native trees outside strict PA. **Do2.6** Establish a team dedicated to training in appropriate rainforestation practices
Creating and protecting corridors to connect fragmented habitat patches.	X	X	X	X		**P3.4** From 2025 to 2039, create corridors to link fragmented habitat **Do5.2** Creation of a protected natural forest corridor between North-West Panay Peninsula National Park to the North of Central Panay Mountain Range. **Do5.4** Creation of a protected natural forest corridor between Cuernos de Negros and Balinsasayao Twin Lakes Natural Park. **H2.6** Reforestation programmes for degraded natural habitats, including focus on connectivity of existing forest patches.
Track primary and secondary forest cover over time.	X	X	X	X		**H2.8** To track the change of primary and secondary forest cover over time through improved GIS mapping.

Cross-species strategies *(habitat conservation, rainforestation, habitat protection)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Enforcement of protected area regulations and following the Expanded National Integrated Protected Areas System (ENIPAS) act in biodiversity protection in protected areas.	X	X	X	X		**P3.1** Within the identified range, address the selling of land rights to rich people - start community engagement and leaders awareness programme (by 2025). **H2.5** Visibly mark boundaries of different designated land zones within PA in accordance with existing PA guidelines. **H5.2** Intensify enforcement of the environmental protection law in PAs and KBAs**.** **Do2.3 &5.5** Increased enforcement effort in the strictly protected zones of PA to stop deforestation.
Awareness programme (related to habitat protection) for political leaders.	X	X	X	X		**P3.2** By 2020, there is an awareness programme for political leaders for legislation (related to habitat protection).

Cross-species strategies *(habitat conservation, rainforestation, habitat protection)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
Community Empowerment (such as community-based management agreements, capacity building in agricultural techniques and rainforestion, alternative livelihood programmes etc).	X	X	X	X		**P3.5** By 2025, identify communities that would benefit from social development and improved agriculture techniques and start conducting the respective programmes. **D3.4** Review legislation and renew security of tenured migrants within the multiple-use zones of PA providing access to livelihood programmes in exchange for Visayan spotted deer conservation and habitat protection preventing land conversion and degradation. **D4.2** Strengthen collaboration of Community Based Forest Management to improve enforcement through deputized wildlife enforcers and development of law enforcement operational plans for PA. **D4.1** Create community-based forest ranger programmes for improved protection of the Visayan spotted deer and its habitats. **H2.7** Establish community-based forest by the extensive implementation of Community Based Forest Management Agreement and Protected area Community Based Resource Management Agreement, which are effectively evaluated by authorised agencies of the government in accordance with existing laws and regulations. **Do2.6** Establish a team dedicated to training and support in appropriate rainforestation or native trees practices across Negros and Panay. **Do5.6** Support and continue the community organisation programme to ensure the natural forest is not converted. **Do5.7** Investigate and provide alternative livelihood programmes to ensure the forest is not converted. **Do5.8** Training in appropriate sustainable agriculture techniques to avoid conversion of natural forest.

Hunting and law enforcement

Table 26: Cross-taxa conservation strategies in the theme of hunting and law enforcement (in a time frame of 5-10 years). Pig: Visayan warty pig; Deer: Visayan spotted deer; HB: Rufous-headed hornbill and Visayan hornbill; Dove: Negros bleeding-heart dove

Cross-species strategies *(hunting, law enforcement)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
HUNTING RELATED						
Alternative livelihood programmes to reduce/eliminate hunting.	X	X	X	X	Caveat: There is not considered to be a tolerable level for hunting D, HB & Do	**P2.4** Initiate livelihood programmes to reduce hunting to a tolerable level. **D3.3** Explore appropriate livelihood projects linked to the conservation of the Visayan spotted deer as confidence-building measures. **H3.1** Implement BDFE's in communities near hornbill habitat (including community-based tourism, bird-watching/guiding). **Do4.4** Create a strategy to address the drivers of hunting for subsistence (i.e. poverty, lack of education).
Assess the drivers, causes, socio-economics, scale etc. of hunting for all purposes and by all parties.	X	X	X	X		**Do4.1** Understand causes, drivers, motivation and scale for hunting. **P2.3** By 2024, assess the drivers for wild pig hunting. **D3.1** Socio-economic research to understand community needs, socio-economics, and attitudes towards the Visayan spotted deer and its conservation.
Communication platform to facilitate reporting of hunting.	X	X	X	X		**Do4.3** Create/promote a communication platform to facilitate reporting of hunting.

Cross-species strategies *(hunting, law enforcement)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
HUNTING RELATED						
Develop community and wider public awareness programmes for diverse stakeholders to reduce/halt hunting.	X	X	X	X	Caveat: There is not considered to be a tolerable level for hunting D, HB & Do Note: Awareness campaigns may also have other goals/benefits in addition to reducing/ stopping hunting	**D3.2** Develop and implement an educational and awareness programme within the communities bordering Visayan spotted deer populations. **P2.1** By 2029, reduce hunting to a tolerable level by community awareness programme. **H3.2** Develop communication education and public awareness programs for diverse stakeholders (eg. local governments, local and city communities and schools). **H3.4** Adopt the hornbill as a mascot or flagship species across their range in pride campaigns/public awareness wildlife festivals (e.g. replicate the Negros Provincial Wildlife Month Festival activities with hornbills as flagship species in Panay). **Do4.5** Implement continued behaviour change ("pride campaign") campaigns to stop recreational hunting at a national level.
Increase hunting related law enforcement efforts.	X	X	X	X	Caveat: There is not considered to be a tolerable level for hunting D, HB & Do	**P2.2** By 2029, reduce hunting to tolerable level by better law enforcement. **H3.3** Increased presence and visibility of forest guards to discourage hunting. **H3.5** Strict enforcement of existing legislation against the illegal trade in hornbills, focusing on the local and international live pet trade and laundering in wild-caught hornbills, as well as the body parts trade for souvenirs. **H5.2** Intensify enforcement of the environmental protection law in protected area and key biodiversity areas. **Do4.2** Increase enforcement effort (related to hunting).

Cross-species strategies *(hunting, law enforcement)*	**Pig**	**Deer**	**HB**	**Dove**	**Comments**	**Original species-specific strategies leading to this cross-species objective.**
GENERAL LAW ENFORCEMENT/POLICY MAKERS						
Agencies have an integrated, cooperative approach to conservation.	X	X	X	X		**D3.5** Integrate Visayan spotted deer conservation into Forest management programmes and agreements. **D4.3** Strengthen collaborations among relevant government agencies to implement environmental laws through improved capacity, awareness and coordination of the judiciary and other enforcement agencies. **H5.1** Different NGAs, LGUs and CSOs have an integrated approach to conservation, including enforcement.
Communicate scientific findings to policy makers in an appropriate format.	X	X	X	X		**H5.4** Ensure scientific findings are communicated to policymakers in an appropriate format, so they are understood and integrated into policy.

Knowledge gaps to be addressed

Table 27: Cross-taxa overview of knowledge gaps that need to be addressed to inform conservation strategies. Pig: Visayan warty pig; Deer: Visayan spotted deer; HB: Rufous-headed hornbill and Visayan hornbill; Dove: Negros bleeding-heart dove

	Pig	Deer	HB	Dove
Genetic Studies (ex-situ and in-situ)				
• Potential taxonomic/population structure differences between Negros and Panay populations. • Genetic diversity, potential hybridisation, inbreeding, effective population size etc.	X	X	X	X
Ecological Research (in-situ)				
1. Demography	X	X	X	X
2. Life History	X	X	X	X
3. Behaviour	X	X	X	X
4. Carrying capacity/Home range	X	X	X	X
5. Diet	X	X	X	X
6. Breeding, nesting	X	X	X	X
7. Seed dispersal (functional role)			X	
Establish baselines (population size, density, demography, trend, distribution, etc.)	X	X	X	X
Health baselines for wild populations (e.g. relevant parasites, diseases, hormone levels etc.)	X	X		X
Training and capacity building (for local researchers/knowledge managers)	X	X	X	X
Species knowledge/awareness among general public				
Raised awareness within the general public in the West Visayan area concerning the Big 5 species biology, ecology and conservation status.	X	X	X	X

EXISTING (CONSERVATION) ACTION PLANS AND FURTHER STAKEHOLDERS

During a plenary session of the workshop, the following lists were drawn up, of additional Philippine (conservation) plans and further stakeholder groups that should be taken into consideration when *designing actions for implementation of the strategies (taxon-specific and or cross-taxa strategies).*

Table 28: Additional Philippine (conservation) plans to be taken into consideration when designing the implementation of the conservation strategies proposed.

Existing (conservation) strategies/plans	Habitat / land use / enforcement	in-situ and ex-situ populations	Knowledge Gaps
Philippine Biodiversity Strategy and Action Plan	X	X	X
Negros Island Biodiversity Strategy and Action Plan	X	X	X
Protected area Management Plan	X	X	X
Comprehensive Land Use Plan			
Forest Land Use Plan		X	
Regional Development Framework and Investment Plan			
Panay and Guimaras Biodiversity Strategy Action Plan	X	X	X
National Greening Program			
Ecotourism Master Plan			
Prov Development Frameworks and Investment			
Philippines Agriculture 2020			
Regional Zoo Associations (EAZA and AZA) Regional Collection Plans and Long-Term Management Plans/Breeding and Transfer Plans (e.g. AZA, 2021; Holst et al 2021)		X	X

Table 29: Further (conservation) stakeholder groups to be taken into consideration when designing implementation of the conservation strategies proposed.

Agencies/Institutions/Groups/ Initiatives	**Habitat / land use / enforcement**	**in-situ and ex-situ populations**	**Knowledge Gaps**
Department of Environment and Natural Resources (DENR)	X		X
Local Governments	X		X
NGOs, among which: ● Talarak Foundation Inc. (TFI) ● The Haribon Foundation ● Philippines Biodiversity Conservation Foundation (PBCFI) ● Philippine Initiative for Environmental Conservation (PhilinCon) ● Bristol Zoological Society (BZS) ● Balinsasayao Twin Lakes Farmers Association Inc. (BTLFAI) ● Center for Conservation Innovation (CCI) ● TRAFFIC	X X X X X X X		X X X X X X X X
Academic Institutions Silliman University	X		X
Private Corporations Energy Development Corporation (EDC)			X X
People's Organisations CMG	X X		 X
National Commission of Indigenous Peoples (NCIP)	X		X
Community enforcers	X		
Rangers and Livelihood Programs	X		
Armed Forces of the Philippines (AFP) and Philippine National Police (PNP)	X		
National Bureau of Investigation-Environmental Crimes Division (NBI-EnCD)	X		
Department of Tourism (DOT)			
Protected Area Management Board (PAMB)			
Breeding Centers Talarak Foundatin Inc.-Negros Forest Park Talarak Foundation Inc.-Kabankalan Silliman University-CenTrop Mari-it		X X X X X	

Agencies/Institutions/Groups/ Initiatives	Habitat / land use / enforcement	in-situ and ex-situ populations	Knowledge Gaps
Zoo Associations Philippine Zoos and Aquariums Association (PhilZoos) South East Asia Zoos and Aquariums Association (SEAZA) European Association of Zoos and Aquaria (EAZA) Association of Zoos and Aquariums (AZA)		X X X X X	
Species360		X	

REFERENCES

AZA 2021. Asian hornbill SAFE program plan 2021-2023. Association of Zoos and Aquariums Saving Animals from Extinction Program.

Biodiversity Management Bureau & Philippines Biodiversity Conservation Foundation (PBCFI) Inc. 2018. *Negros Island Biodiversity Strategy and Action Plan.* Bacolod City. Biodiversity Management Bureau & Philippines Biodiversity Conservation Foundation (PBCFI) Inc.

Biodiversity Management Bureau (BMB) Department of Environment and Natural Resources (DENR)(DENR). 2016. Philippine Biodiversity Strategy and Action Plan (2015-2028): Bringing Resilience to Filipino Communities. C. Cabrido (Ed.). Quezon City, Philippines: BMB-DENR, United Nations Development Programme – Global Environment Facility, Foundation for the Philippine Environment. https://www.cbd.int/doc/world/ph/ph-nbsap-v3-en.pdf

BirdLife International. 2018. *Gallicolumba keayi*. The IUCN Red List of Threatened Species 2018: e.T22690988A130328535. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22690988A130328535.en

BirdLife International. 2018. *Rhabdotorrhinus waldeni* (amended version of 2016 assessment). The IUCN Red List of Threatened Species 2018: e.T22682517A125519634. http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22682517A125519634.en

BirdLife International. 2016. *Penelopides panini. The IUCN Red List of Threatened Species 2016*: e.T22682494A92948577. http://dx.doi.org/10.2305/IUCN.UK.2016-3.RLTS.T22682494A92948577.en

Brook, S.M. 2016. *Rusa alfredi. The IUCN Red List of Threatened Species 2016*: e.T4273A22168782. http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T4273A22168782.en

Byers, O., C. Lees, J. Wilcken, and C. Schwitzer. 2013. The "One Plan Approach": The philosophy and implementation of CBSG's approach to integrated species conservation planning. *WAZA Magazine* 14: 2-5. https://www.waza.org/publications/

Ewers, R.M., Nathan, S.K.S.S. and Lee, P.A.K. 2021. African swine fever ravaging Borneo's wild pigs. Nature, 2021, 593 (7857): 37-37.

Holst, B., Beckmann, J., M., Zimmermann, K. Leus, Voorham, M. (eds.) 2021. Regional Collection Plan for the EAZA Tapir and Suiform Taxon Advisory Group – First edition. EAZA Executive Office: Amsterdam.

IUCN SSC 2013. Guidelines for Reintroductions and Other Conservation Translocations. Version 1.0. Gland, Switzerland: IUCN Species Survival Commission (https://www.iucn.org/theme/species/publications/guidelines)

IUCN SSC. 2014. Guidelines on the Use of ex-situ Management for Species Conservation. Version 2.0. Gland, Switzerland: IUCN Species Survival Commission. (https://www.iucn.org/theme/species/publications/guidelines)

Kerhoas, D., Poole, J., and Abrahams M. 2019. A systematic survey for the Critically Endangered Negros Bleeding-heart Gallicolumba keayi in the Northwest Panay Peninsula Natural Park, Philippines. BirdingAsia, 32, p50-56.

Lamont, Myles. 2014. Conservation Through Aviculture ISBBC 2007: proceedings of the IV International Symposium on Breeding Birds in Captivity.

Luskin, M.S., Meijaard, E., Surya, S., Sheherazade, Walzer, C. and Linkie M. 2020. African swine fever threatens Southeast Asia's 11 endemic wild pig species. Conservation Letters 2020 https://doi.org/10.1111/conl.12784

Meijaard, E., Oliver, W.R.T. & Leus, K. 2017. *Sus cebifrons*. The IUCN Red List of Threatened Species 2017: e.T21175A44139575. http://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T21175A44139575.en

Miller, C., DeYoung, S. and Groome Bryan, C. 2019. Population analysis and breeding and transfer plan Visayan warty pig (*Sus cebifrons*) AZA Species Survival Plan Yellow Program. Population Management Centre, Lincoln Park Zoo: Chicago.

Chavez, L. 2020. Ornithologists discover more rare hornbills than thought on Philippine island. Mongabay. 31 July 2020. https://news.mongabay.com/2020/07/ornithologists-discover-more-rare-hornbills-than-thought-on-philippine-island/

Mynott, H., Abrahams, M. and Kerhoas, D., 2019. Negros Bleeding-heart *Gallicolumba keayi* prefers dense understorey vegetation and dense canopy cover, and species distribution modelling shows little remaining suitable habitat. Bird Conservation International, pp.1-16.

Mynott, H.I., Lee, D.C., Santillan, R.A., Schwarz, C.J., Tacud, B., Fernandez, A.D. and Kerhoas, D. 2021. Population assessment and habitat associations of the Visayan Hornbill *Penelopides panini* in Northwest Panay, Philippines. Biorvix preprint online: https://www.biorxiv.org/content/10.1101/2021.08.31.458333v1.full

Ogena, A. 2018. Philippines signs 94 new Protected areas (PA) (PA) in law – ensuring regular budget for each. (http://www.biodiversityfinance.org/news-and-media/philippines-signs-94-new-protected-areas-law-ensuring-regular-budget-each) Accessed 3 March 2021.

Paguntalan; .LM.J. 2000. Negros threatened avifauna. Final Report. BP Conservation Programme.

Paguntalan, L.M.J. 2002. Bird Abundance and Diversity in Forest Fragments in Southern Negros, Philippines. MSc. Thesis. Silliman University, Dumaguete City.

Przybylska, L. 2016. European studbook for Visayan warty pig *Sus cebifrons negrinus* – data current as of 31st December 2016. Wroclaw Zoo: Wroclaw.

Sammler, S., Bleidorn, . and Tiedemann, R. 2011. Full mitochondrial genome sequences of two endemic Philippine hornbill species (Aves: Bucerotidae) provide evidence for pervasive mitochondrial DNA recombination. BMC Genomics 2011, 12:35.

Sammler, S., Ketmaier, V., Havenstein, K., Krause, U., Curio, E. and Tiederman, R. 2012. Mitochondrial control region I and microsatellite analyses of endangered Philippine hornbill species (Aves;

Bucerotidae) detect gene flow between island populations and genetic diversity loss. BMC Evol Biol 2012, 12: 203.

Sammler, S., Ketmaier, V., Havenstein, K., and Tiederman, R. 2013. Intraspecific rearrangement of duplicated mitochondrial control regions in the Luzon Tarictic Hornbill *Penelopides manillae* (Aves: Bucerotidae). Journal of molecular evolution 77: 199-205.

Schubert, C, Heckel, J-O. 2019. Visayan spotted deer (Negros) studbook iSB/EEP. Zoo Landau in der Pfalz: Landau.

Simpson, N. 2018. EEP for Visayan Tarictic Hornbills – EEP Studbook number 4, 2018. Wild place Project: Bristol.

APPENDIX 1: Agenda

Schedule DAY 1

TASK 1: Status assessment (in-situ and ex-situ)

- 13.45 – 14.15 Task instructions
- 14.15 – 16.00 Status assessment: working group sessions
- 16:00 – 16:15 Tea Break

TASK 2: Threat analysis

- 16.15 – 16.45 Task instructions
- 16:45 – 18:00 Threat analysis: working group sessions

Schedule DAY 2

- 09.00 – 10.00 Complete TASK 2: threat chains and statement
- 10.30 – 10.45 BREAK
- 10.45 – 11.45 PLENARY: Results TASK 1 (5min presentations)
- 11.45 – 12.15 PLENARY: Results TASK 2 (table)
- 12.15 – 12.30 Intro to TASK 3
- 12.30 – 15.00 TASK 3: 20-year goals for the species
- 15.00 – 16.00 PLENARY: Results TASK 3 Goals
- 15.00 – 16.00 TASK 4: Conservation strategies to address threats and achieve goals

Schedule DAY 3

- 09.00 – 09.15 PHOTO
- 09.15 – 12.30 COMPLETE TASK 4: CONSERVATION STRATEGIES TO ADDRESS THREATS AND ACHIEVE GOALS
- 12.30 – 13.30 LUNCH (BRAINSTORM NEXT STEPS)
- 13.30 – 15.30 PLENARY: RESULTS TASK 4 STRATEGIES
- 15.30 – 15.45 BREAK
- 15.45 – 18.00 TASK 5: DEVELOP CROSS-SPECIES STRATEGIES

Schedule DAY 4

- 08.30 – 09.30 STRATEGIES REVIEW IN SPECIES GROUPS
- 09.30 – 10.30 PRIORITISATION OF STRATEGIES IN SPECIES GROUPS

- 10.30 – 12.30 PLENARY SESSION: ORGANISATIONS CURRENTLY ACTIVE ON THE GROUND
- 12.30 – 13.15 LUNCH (WORKSHOP SURVEY)
- 13.15 – 14.00 NEXT STEPS FOR IMPLEMENTATION, REPORT
    - CLOSING
- 14.30 VISIT TO NEGROS FOREST
- 16.45 PRESS CONFERENCE
- 17.30 SOCIALS

APPENDIX 2: Workshop participants

NAME	AFFILIATION
Rea JM Alano	
Michael Alcala	Representing Dr A. Alcala
Razel Joy Almendrelejo	CENRO Barotac-Nuevo
Leovelyn Acepcion	
Celerino Baja Jr.	DENR Region 7 (Dumaguete) PASu BTLNP
Sarah Jane Bell	Talarak Foundation Inc.
Ninfa Bentua	PO President DSB
Felix Boladula	Liptong Woodland
Reginaldo Bueno	DENR Region 7 (Cebu) Conservation Development Dept.
JB Bullo	West Visayas State University - Mari It
Leo Canson	
Kimberly Casipe	Philippine Reef and Rainforest Conservation Foundation
Lou-Jean Cerial	Silliman CENTROP
Nerissa Chao	Wildlife Reserves Singapore/ IUCN SSC ASAP
John Ciabugvason	
Gary Consing	Hiyang Hiyang IP Chieftan
Aparajita Datta	Nature Conservation Foundation/IUCN SSC Hornbill Specialist Group
Parag Jyoti Deka	Durrell Wildlife Conservation Trust and Aaranyak
Roi Fabi	
Richard Fabre	DENR Region 7 (Ayungon) Conservation Development Dept.
Julius Galan	
Claudine Gibson	IUCN SSC Conservation Planning Specialist Group
Israel Gonzalez	
Carolyn Grijaldo	CENRO Cadiz
Dino Gutierrez	Talarak Foundation Inc.
Anna Heath	Synchronicity Earth
Jocelyn Elise Inocencio	CENTROP
Richard “Boy” Empil	Don Salvador IP Community Head
Sheila Jaggi	LGU Sibulan MENRO
Ma’am Joanne	BTLNP Peoples Organisation Secretary
Godfrey Jakosalem	Philippines Biodiversity Conservation Foundation
Daphne Kerhoas	Bristol Zoological Society
Stephanie Larapan	
Kaila Ledesma-Trebol	Philippine Reef & Rainforest Conservation Foundation
Kristin Leus	IUCN SSC Conservation Planning Specialist Group/Copenhagen Zoo

Sonja Luz	Wildlife Reserves Singapore/IUCN SSC Conservation Planning Specialist Group
Johanna Margono	Chester Zoo/IUCN SSC Wild Pig Specialist Group
Grainne McCabe	Bristol Zoological Society
Rico Mier	BTLNP Peoples Organisation President
Rex Molavin	CENRO Kabankalan
Nonilon Molina	PENRO Capiz
Ysabella Montano-Ward	Talarak Foundation Inc.
Andrew Owen	Chester Zoo
Lisa Paguntalan	Philippines Biodiversity Conservation Foundation
Peace John Panaguiton	Department of Environment and Natural Resources
Derek Palanka	
Christine Dessa V. Palic	
Peter Ernie Paris	West Visayas State University - Mari It
Joan A Peras	
Josiah David Quimpo	Haribon
Emmanuel Francisco Rafael	PhilZoos
Roopali Raghavan	Wildlife Reserves Singapore/ IUCN SSC Conservation Planning Specialist Group
Ellen Sabid	
Dennis Salvador	Philippine Eagle Foundation
Loreto Sanchez	San Carlos
Arsenio Sansing	
Endrico Sarong	DENR Region 7 (Ayungon) Ecosystems Management Dept.
Arne Schulze	ZGAP - Zoological Society for the Conservation of Species and Population
Christian Schwarz	PhilinCon
Pritpal Soorae	Environment Agency-ABU DHABI/ IUCN SSC Conservation Translocation Specialist Group
Roger Sweeney	North Carolina Zoo / Asian Hornbill SAFE Program
Emerson Sy	Philippine Center for Terrestrial and Aquatic Research
Mark Anthony Talorete	DENR Region 7 (Dumaguete) GIS Specialist
Anson Tagtag	BMB
Corazon Teodosio	PENRO Aklan
Mario Tolentino	Kumaliskis Upland Farmers Association
Hanna Torres	DENR Region 7 (Dumaguete) Biologist
Jimmy Torrino	Binitinan Tree Growers Association
Rene Vendiola	Liptong Woodland
Christina Villar	
Electo Villaster	
Matt Ward	Talarak Foundation Inc.

Noam Werner	EAZA Deer Taxon Advisory Group/IUCN SSC Deer Specialist Group
Indira Dayang Widmann	Katala Foundation
Peter Widmann	Katala Foundation
Joe Wood	Toledo Zoo and Aquarium
Corey Wyckoff	Toledo Zoo and Aquarium
Pavel Zoubek	Zoological Garden Liberec

APPENDIX 3: Assess to Plan Matrix for the 5 species – prepared by CPSG

HABITAT, THREATS & CONSERVATION MATRIX: NEGROS - PANAY FAUNA										
	1. Forest	1.6 Subtropical / tropical moist lowland	Suitable		X	X	X	X	X
		1.9 Subtropical / tropical moist montane	Suitable		X	X	X	X	
	3. Shrubland	3.6 Subtropical / tropical Moist	Suitable			X			
	4. Grassland	4.5. Subtropical / tropical dry	Marginal				X		
		4.6 Subtropical / tropical seasonally wet / flooded	Marginal		X	X			
		4.7 Subtropical / tropical high altitude	Marginal		X				
	14. Artificial / Terrestrial	14.6. Subtropical / tropical heavily degraded former forest	Marginal		X				
	1. Residential & commercial development	1.1 Housing and urban areas		Conversion and degradation	X				
	2. Agriculture & aquaculture	2.1 Annual and perennial non-timber crops	2.1.1 Shifting agriculture	Conversion and degradation	X		X		
			2.1.2 Small-holder farming	Conversion and degradation	X	X	X	X	
			2.1.3 Agro-industry farming	Conversion and degradation				X	X
		2.2 Wood & pulp plantations	2.2.1 Small-holder plantations	Conversion and degradation	X				
	5. Biological resource use	5.1 Hunting & trapping terrestrial animals	5.1.1 Intentioanl use (target species)	Mortality	X	X	X	X	X
			5.1.3 Persecution / control	Mortality	X				
		5.3 Logging & wood harvesting	5.3.3 Uninentional effects: (subsistence/small scale) [harvest]	Degradation			X	X	X
			5.3.4 Uninentional effects: (large scale) [harvest]	Conversion and degradation				X	X
			5.3.5 Motivation unknown / unrecorded	Degradation	X	X			
	8. Invasive and other problematic species, genes and diseases	8.1 Invasive non-native / alien species / diseases	8.1.2 Named species	Indirect - hybridisation	X				
		8.2 Problematic native species / diseases		Mortality					X
	11. Climate change and severe weather	11.4 Storms & flooding		E- degradation; S - Mortality				X	
	1. Land / water protection:	1.1 Site/Area Protection			X	X	X	X	X
		1.2 Resource & Habitat Protection			X	X			
	2. Land / water management	2.1 Site/Area Management			X	X	X		X
		2.3 Habitat & natural process restoration							X
	3. Species Management	3.1 Species Management	3.1.1 Harvest management		X	X			
			3.1.2 Trade management			X	X	X	
		3.2 Species recovery						X	
		3.3 Species re-introduction	3.3.1 Re-introduction			X	X		
		3.4 *Ex situ* Conservation	3.4.1 Captive breeding/artificial propagation		X	X	X	X	X
	4. Education & Awareness	4.1 Formal Education			X				
		4.2 Training			X				
		4.3 Awareness & Communications			X	X		X	X
	5. Law & policy	5.1 Legislation	5.1.2 National level					X	
		5.4 Compliance and enforcement	5.4.2 National level		X				
			5.4.3 Sub-national level		X				
Red List Criteria					A	C	A, C	A	C
SPECIES					Visayan warty pig (Sus cebifrons)	Visayan spotted deer (Rusa alfredi)	Visayan hornbill (Penelopides panini)	Rufous headed hornbill (Rhabdotorrhinus waldeni)	Negros bleeding-heart pigeon (Gallicolumba keayi)

APPENDIX 4: List of abbreviations

African Swine Fever (ASF)

Association of Zoos and Aquariums (AZA)

Balinsasayao Twin Lakes Farmers Association Inc. (BTLFAI)

Centre for Tropical Conservation (CenTrop)

Central Panay Mountain Range (CPMR)

Critical Habitat (CH)

Center for Conservation Innovation (CCI)

Conservation Planning Specialist Group (CPSG)

European Association of Zoos and Aquaria (EAZA)

EAZA Ex-situ Programmes (EEP)

Energy Development Corporation (EDC)

Indigenous Culturally Conserved Areas (ICCA)

International Union for the Conservation of Nature (IUCN)

Key Biodiversity Areas (KBA)

Local Conservation Areas (LCA)

Local Government Unit (LGU)

National Bureau of Investigation- Environmental Crimes Division (NBI-EnCD)

Negros Island Biodiversity Strategy and Action Plan (NIBSAP)

Non-Protected areas (NPA)

Philippines Biodiversity Conservation Foundation (PBCFI)

Philippine Initiative for Environmental Conservation (PhilinCon)

Philippine Zoos and Aquariums Association (Philzoos)

Philippine Biodiversity Strategy and Action Plan (PBSAP)

Protected areas (PA)

Species Survival Commission (SSC)

Species Survival Plan (SSP)

Talarak Foundation Inc. (TFI)

Zoological Information Management System (ZIMS)