







### PALAWAN PANGOLIN (*Manis culionensis*) CONSERVATION STRATEGY 2018-2043

PALAWAN COUNCIL FOR SUSTAINABLE DEVELOPMENT STAFF IUCN SSC PANGOLIN SPECIALIST GROUP KATALA FOUNDATION INCORPORATED ZOOLOGICAL SOCIETY OF LONDON









IUCN SSC PANGOLIN





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Created in 1948, IUCN is now the world's largest and most diverse environmental network, harnessing the knowledge, resources and reach of more than 1,300 Member organisations and some 13,000 experts. It is a leading provider of conservation data, assessments and analysis. Its broad membership enables IUCN to fill the role of incubator and trusted repository of best practices, tools and international standards.

IUCN provides a neutral space in which diverse stakeholders including governments, NGOs, scientists, businesses, local communities, Indigenous Peoples' Organisations and others can work together to forge and implement solutions to environmental challenges and achieve sustainable development.

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Palawan pangolin © Lucy Archer.

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The Pangolin Specialist Group (Pangolin SG) is voluntary network of experts from around the world including field biologists, social scientists, zoologists, veterinarians, ecologists and geneticists, all of whom are actively involved in pangolin research and conservation. The Pangolin SG serves as an advisory body to IUCN, assesses the conservation status of pangolins for The IUCN Red List of Threatened Species<sup>™</sup>, contributes scientific and technical input to CITES, convenes stakeholders to develop species conservation strategies, and provides technical advice on pangolin research and conservation.

#### Katala Foundation Incorporated

For the past 20 years, Katala Foundation Incorporated, a non-profit, non-stock, non-governmental organization has been active in protecting and conserving wildlife, particularly the Philippine cockatoo, the Palawan forest turtle, the Palawan pangolin and other highly threatened wildlife in Southeast Asia, but particularly in Palawan, Philippines. KFI's Palawan Pangolin Conservation Program (PPCP) has sought to understand and address the conservation needs of the Palawan pangolin since 2008.

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Founded in 1826, the Zoological Society of London is an international conservation charity, whose vision is a world where wildlife thrives. We're working every day to achieve this, through our science, our field conservation around the world and engaging millions of people through our two zoos, ZSL London Zoo and ZSL Whipsnade Zoo.

Established in 2010, ZSL Philippines supports mangrove rehabilitation, Marine Protected Area (MPA) establishment and management, and sustainable livelihoods for local communities. Its species-focused projects include seahorses, freshwater eels and, most recently, the Palawan pangolin.

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## Foreword

The Indigenous Peoples of Palawan are sincerely thankful for the National Pangolin Workshop that was held at the Legend Hotel, Palawan on April 11-13, 2018. It was an honour for all the Indigenous Peoples present to participate in the workshop, and we are grateful that there are organisations that support the protection of wildlife in Palawan, especially those that are most threatened and are endemic.

Our lives as Indigenous Peoples are dependent on the forest and the wildlife, which we use on a daily basis. For us the pangolin is sacred because we use it as a source of medicine when somebody in the tribe gets sick.

We praise the aforementioned organizations for their endeavours and continued support for the protection of the Palawan pangolin which is threatened because of overexploitation for trade. Therefore, as part of the National Pangolin Workshop, we, the Indigenous Peoples are thankful to the PCSDS, the IUCN SSC Pangolin Specialist Group, KFI, ZSL and other organisations for organizing this workshop. I hope that these organisation will contribute to saving the Palawan pangolin and other wildlife in Palawan.

On behalf of the Indigenous Peoples of Palawan I am very grateful and thankful to you all.

Mabuhay po kayo!

John Mart Salunday President, Nagkakaisang Tribo ng Palawan (NATRIPAL)

## Foreword



Nelson P. Devanadera Executive Director Palawan Council for Sustainable Development Staff



Palawan pangolin © Roger Dolorosa.

Palawan is known for its rich biodiversity and has for decades served as a good research platform for local and international researchers and scientists. While numerous research studies have already been conducted focusing on Palawan's flora and fauna, only a few tackle the Palawan pangolin.

In recent years, the Palawan pangolin has become one of the most heavily trafficked species in Palawan. There have been substantial decreases in sightings of the Palawan pangolin due mainly to two factors: illegal trading of its meat and scales at the local and international level, and habitat loss due to human activities. As such, it has been listed as Critically Endangered on The IUCN Red List of Threatened Species. The next 25 years is crucial in our advocacy for the conservation of the Palawan pangolin — we either succumb to its impending extinction or we prevail with our objective of conserving it for generations to come.

Indeed, Palawan is a unique ecological haven and a home to a plethora of diverse species, including the Palawan pangolin. This entails protection and conservation efforts on our part. This conservation strategy is but a guide to all the stakeholders for conserving the Palawan pangolin. The success of this conservation effort ultimately lies in each one of us as we fulfil our duty to the environment. Let us make good use of the little time left for us to protect Palawan's pangolin.

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## Acronyms and Abbreviations

AD	Ancestral Domains	KFI	Katala Foundation Incorporate
ADSDPP	Ancestral Domain Sustainable Development and Protection Plan	КМА	Knowledge Management Analy
AFP	Armed Forces of the Philippines	KSK	Kilusan Sagip Kalikasan
BMB	Biodiversity Management Bureau	LCA	Local Conservation Area
BIR	Bureau of Internal Revenue	LGU	Local Government Unit
CAAP	Civil Aviation Authority of the Philippines	MENRO	Municipal Environment and Na
CADT	Certificate of Ancestral Domain Title	ММТ	Multipartite Monitoring Team
CENRO	Community Environment and Natural Resources Office	MoU	Memorandum of Understandir
CG	Coast Guard	MRFC	Mine Rehabilitation Fund Com
CHED	Commission on Higher Education	NALECC-SCENR	National Law Enforcement Coo
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora		Environment and Natural Reso
CSO	Civil Society Organisation	NATRIPAL	Nagkakaisang Tribo ng Palawa
DAO	Department Administrative Order	NBI	National Bureau of Investigatio
DAP	Development Academy of the Philippines	NCIP	National Commission of Indige
DBM	Department of Budget and Management	NGA	National Government Agency
DENR	Department of Environment and Natural Resources	NGO	Non-Governmental Organisation
DENR-BMB	Department of Environment and Natural Resources - Biodiversity Management Bureau	NTFP	Non-Timber Forest Products
DFA	Department of Foreign Affairs	PAMB	Protected Area Management E
DNA	Deoxyribonucleic Acid	PBCFI	Philippine Biodiversity Conserv
DOJ	Department of Justice	PCG	Philippine Coast Guard
DOST	Department of Science and Technology	PCSD	Palawan Council for Sustainab
DTI	Department of Trade and Industry	PCSDS	Palawan Council for Sustainab
ECAN	Environmental Critical Areas Network	PCTC	Philippine Centre for Transnation
ELAC	Environment and Legal Assistance Centre	PENRO	Provincial Environment and Na
ENRC	Environment and Natural Resources Committee of PCSD	PF	Professional Fee
ENRO	Environment and Natural Resources Office	PhilJA	Philippine Judicial Academy
EO	Executive Order	PKP	Palawan Knowledge Platform
HTU	Holy Trinity University	PNNI	Palawan NGO Network, Inc.
IEC	Information and Education Campaign	PNP	Philippine National Police
IP	Indigenous Peoples	PNP-MP	Philippine National Police - Ma
IPRA	Indigenous Peoples Rights Act	PNPA	Philippine National Police Acad
IRR	Implementing Rules and Regulations	PPA	Philippine Ports Authority
IUCN	International Union for Conservation of Nature	PPNPO	Puerto Princesa National Polic
JAO	Joint Administrative Order	PPSIG	Palawan Pangolin Specialist In
KBA	Key Biodiversity Area	PRB-SCNU	Pangolin Rescue Base of Sout

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# L. Introduction

PROC	Peoples Republic of China			
PSG	IUCN SSC Pangolin Specialist Group			
<b>PSU</b> Palawan State University				
<b>SCPPCM</b> Sub-Committee on Palawan Pangolin Conservation and Ma				
SEP	Strategic Environmental Plan			
SO	Special Order			
SSC Species Survival Commission				
SUC	State Universities and Colleges			
ТСМ	Traditional Chinese Medicine			
TWG	Technical Working Group			
UP	University of the Philippines			
USAID	United States Agency for International Development			
WEN	Wildlife Enforcement Network			
WPU	Western Philippines University			
WRS	Wildlife Reserves Singapore			
ZSL	Zoological Society of London			

**ZSL-PH** Zoological Society of London – Philippines



## **1**. Introduction

The Palawan or Philippine pangolin *Manis culionensis* is one of eight species of pangolin and is endemic to the Philippines, in particular to the Palawan faunal region (Schoppe et al., 2019a). It occurs on the island of Palawan and a few surrounding islands including Culion and Balabac and has been introduced to Apulit Island. It was only described as a species distinct from the Sunda pangolin *Manis javanica* in 2005 (Feiler, 1998; Gaubert and Antunes, 2005). It occupies a variety of habitats, from primary and secondary tropical forest, lowland grassland/forest mosaics and logged lowland forest, and agricultural ecosystems and artificial landscapes including cultivated areas and monoculture plantations (e.g. palm oil, rubber) (Schoppe and Cruz, 2009; Esselstyn et al., 2004).

A detailed account of current knowledge of the biology and ecology of the Palawan pangolin was recently published (Schoppe et al., 2020). The species is solitary and principally nocturnal, and rests by day in tree hollows or other resting structures (e.g., fallen logs, burrows) and is active at night. Being myrmecophagous, it predates almost exclusively on ants and termites. It is also an adept climber, is semiarboreal and has impressive core strength, making use of its prehensile tail when climbing and foraging for prey in trees. Little is known about the social structure of the species, but it is thought to be polygynous, with the home range of a male overlapping that of several females. A single young is typically born at parturition, after a gestation period of approximately six months, and maternal care likely lasts for about 3-4 months (Lim and Ng, 2007; Zhang et al., 2015).

The Palawan pangolin is listed as Critically Endangered on The IUCN Red List of Threatened Species on the basis of past, ongoing and future population reductions based on actual or potential levels of exploitation (Red List criteria A2d+3d+4d) (Schoppe et al., 2019).

At the CITES CoP17 meeting (Johannesburg, South Africa, 2016), the Palawan pangolin was transferred from Appendix II to Appendix I along with the other seven pangolin species, thereby establishing an international ban in wild-caught pangolins and their parts being traded for commercial purposes.

The Palawan pangolin has been valued through history by human beings, principally for consumptive use and some international trade, mainly in skins. It is a protected species in the Philippines, but direct threats comprise hunting and poaching for local use and international trafficking in the animals and their meat



#### A Palawan pangolin © Roger Dolorosa.

and scales. Indirect threats include habitat loss and degradation. These threats, combined with inadequate conservation action, are negatively affecting the viability of wild populations.

Although pangolins have received little conservation attention historically, this has changed in the last decade and there have been a number of action planning activities for pangolins, especially in Asia. In 2008, TRAFFIC, the wildlife trade monitoring network, organised a workshop on the trade and conservation of pangolins in South and Southeast Asia. This resulted in a number of recommendations and priority actions for the species (see Pantel and Chin, 2009), many of which have been implemented. In 2013, the IUCN SSC Pangolin Specialist Group and Wildlife Reserves Singapore organised a conservation conference on pangolins. This resulted in the first global conservation action plan for pangolins, 'Scaling Up Pangolin Conservation', which was published in 2014. It contains a number of urgent conservation actions, some of which have been implemented (Challender et al., 2014b). In 2015, the U.S. and Vietnamese governments convened representatives from African and Asian pangolin range states in Vietnam to develop a suite of recommendations to mitigate the threats that pangolins face (Anon, 2015). Many of these actions have also been implemented. Despite actions to date, the Palawan pangolin remains under threat and there is no dedicated strategy to guide conservation of the species.

The profile of pangolins has increased substantially in the last decade, and in particular, in the last five years. This has resulted in more governments, NGOs, scientists and civil society organisations prioritising conservation action for pangolins than ever before. It has also led to an increase in funding for pangolin conservation. However, to ensure that limited conservation funding is used most wisely it is important that strategies are developed which articulate what the most urgent actions are, when and where they need to be implemented, and by which stakeholders. This conservation strategy for the Palawan pangolin was developed at a workshop held in Puerto Princesa City, Palawan, in the Philippines on 10-13th April 2018. A total of 49 participants, comprising government representatives, conservation scientists, practitioners law enforcement professionals, and zoo professionals met in order to develop this strategy, following IUCN best practice guidelines for species conservation planning (see Byers et al., 2013). Following compilation of the strategy, all workshop participants had the opportunity to review it to ensure it accurately reflects the objectives and actions agreed upon in the workshop, i.e., those which are needed to conserve the Palawan pangolin in the period 2018-2043. These objectives and actions were also cross-referenced with previous recommendations and actions to ensure complementarity with existing action plans.

This strategy does not have dedicated resources, and implementation is incumbent on funding being secured for the agreed actions. Implementation of this strategy will be monitored by the IUCN SSC Pangolin Specialist Group and the results updated on its website (www. pangolinsg.org).

# 2. Status Review



Palawan pangolin © Roger Dolorosa.

## **2.** Status Review

A review of the conservation status of the Palawan pangolin underpins this strategy. It includes a historical account of the species, and available information on present distribution, taxonomy, protection status, biology, values, conservation context and threats.

#### 2.1 Taxonomy and management units

The Palawan or Philippine pangolin *Manis culionensis* (de Elera, 1915), is one of eight species of pangolin. It resides in the Order Pholidota, Family Manidae and genus *Manis* (Gaudin et al., 2009). Pangolin populations in the Philippines were previously considered to be the Sunda pangolin *Manis javanica*. However, the Palawan pangolin was recognized as a distinct species by Feiler (1998), a distinction supported by a study of discrete morphological characters by Gaubert and Antunes (2005).

The Palawan pangolin exists as subpopulations on the islands of the Palawan faunal region, but these subpopulations do not comprise more than one subspecies.

There are no Palawan pangolins under captive management, though it is likely that a small number of animals rescued from illegal trade exist in captivity (E. Sy, unpubl. data).

The Palawan pangolin has a number of names locally: Balintong (Filipino/Tagalog), Balikon (Tagbanua Calaminanes Islands), Balintong (Tagbanua Northern mainland Palawan), Tanggiling (Tagbanua Cental Palawan), Tenggaling (Tagbanua Southern Palawan), Balinton (Cuyunon), Baruktot (Batak), and Tenggeling (Palaw'an).

#### 2.2 Historical account

The Palawan pangolin has historically only been recorded in the Palawan Faunal Region, including Palawan Island and the Calamian Islands (Bourns and Worcester, 1894; Everett, 1889; de Elera, 1915; Lawrence, 1939). However there is a paucity of historic data for the Palawan pangolin, including its presence on the islands surrounding Palawan, and consequently any potential range contractions remain unknown. The fossil record indicates its presence in northern Palawan from the Terminal Pleistocene through to the Late Holocene (Piper et al., 2011), and it was identified among hunted mammalian taxa in early to mid-Holocene deposits in this area (Lewis et al., 2008).

Early publications state that the species is rare (Heaney et al., 1998; Rabor, 1965), and more recent publications suggest that the species has declined from past population numbers (Lagrada, 2012; Schoppe and Cruz, 2009).

#### 2.3 Present distribution

The Palawan pangolin is endemic to the Philippines, where it is restricted to the Palawan Faunal Region (Everett, 1893; Bourns and Worcester, 1894; Lawrence, 1939; Heaney et al., 1998). It has been recorded from Palawan Island and the Calamian Group of Islands in the north of mainland Palawan.

More recently, there have been records from Dumaran Island (Schoppe and Alvarado, 2015b), and Batas Island, Taytay (Schoppe et al., in prep.a). According to Indigenous People and local communities, it also occurs on islands off El Nido, including Lagen Island, Tagnipa, and Nagbilisong Islands in San Vicente (Acosta and Schoppe, 2018.). Its presence on Apulit Island in El Nido is the result of an introduction. This might also be true for its presence on Lagen Island, another small island in El Nido managed by the same company (S. Schoppe, unpubl. data).

Within the Calamian group of islands, there are records from Culion Island (Corbet and Hill, 1992; de Elera, 1915; Heaney et al., 1998; Hollister, 1913); Busuanga Island (Hoogstraal, 1951), and Calauit Island (Alviola III, 1998). Interview surveys in 2006 provided evidence for the species from 25 localities on 12 islands scattered across the larger islands of Calauit, Busuanga, and Culion, and at least nine smaller islands of the Calamian Group (Rico and Oliver, 2006). Based on those surveys, M. culionensis is apparently absent from Coron Island. Surveys conducted from 2010-2012 and in March 2015 on at least the four bigger islands (Busuanga, Culion, Calauit and Maglalambay) recorded the species in only 12 localities on three islands. Interviews suggested the absence of the species from Coron Island (Paguntalal et al., 2010, 2011, 2015). Recent interviews with Indigenous People further support its absence on Coron Island, and confirm its presence in

the Municipality of Coron on the Island of Busuanga (Acosta and Schoppe, 2018).

There is some debate over its presence on Balabac Island. Steere (1888) reported the absence of pangolins on Balabac Island, and the remaining literature provides no evidence of its presence there. Likewise, Indigenous People from southern Palawan denied the presence of the species in Balabac in 2018 (Acosta and Schoppe, 2018). However, interviews with informants on illegal pangolin trade on Balabac Island in 2008 suggested it may occur there in very low numbers (Schoppe and Cruz, 2008).

There were previous suggestions that the species occurred on Luzon, although this appears unlikely (Corbet and Hill,1992).

Early research indicated that the Palawan pangolin is not evenly distributed across its range, and it is likely to be localized in distribution (Heaney et al.,1998). Interview-based research indicated that it is rare in southern Palawan and more common in northern Palawan (Schoppe and Cruz, 2009), and further research estimating population densities across a variety of sites found a higher density of pangolins in sites in northern Palawan compared to southern Palawan (Lagrada 2012; Schoppe and Alvarado, 2015a, b; Schoppe et al., in prep.a). Surveys also indicated a higher density of pangolins on islands compared to mainland Palawan (Schoppe et al., in prep.a).

#### 2.4 Species biology

Very little is known regarding the distribution, biology, and ecology of the Palawan pangolin (Schoppe and Cruz, 2009). This is because pangolins have historically been a low research priority, and because research is challenging; they are difficult to detect and monitor in the wild due to their cryptic and elusive lifestyle, and they are difficult to rear in captivity.

#### 2.4.1 Current numbers

Estimating the size and trends of wild pangolin populations is challenging (Pantel and Chin, 2009). Consequently, there are no estimates of current numbers of the Palawan pangolin (Schoppe et al., 2020).



▲ Figure 1. Palawan pangolin Manis culionensis distribution. Source: Schoppe et al., 2019.

#### 2.4.2 Population trends

Although there are limited data on population numbers, it is thought that the population of the Palawan pangolin is decreasing (Schoppe and Cruz, 2009; Schoppe et al., 2019 in prep.a). Hunters in Southern Palawan reported that pangolins were once common in the region but are now very rare (Schoppe and Cruz, 2009; Lagrada, 2012). Interviewees from the Calamian Islands suggested that pangolins were formerly quite common, but had declined severely in numbers owing to continued hunting pressure, for both local and domestic consumption and commercial trade (Rico and Oliver, 2006). Indigenous People from Tagbanua Tribes, Batak Tribes, Palawan Tribes, and local Cuyunon communities from all over the Calamian Islands and Palawan Island expressed their concern due to decreasing numbers of pangolins observed over the past 40 years (Acosta and Schoppe, 2018). Unanimously, they reported a sharp increase in exploitation in 2013. Although they had difficulties in quantifying the remaining wild populations in their respective areas, they inferred that population reduction between 1980 and 2018 was around 85% in the south and 95% in the north of the species range (Acosta and Schoppe 2018).

The Palawan pangolin is currently listed as Critically Endangered on the IUCN Red List (Schoppe et al., 2019b). It is inferred that populations will decline by >80% looking forward three generations (21 years; 2019-2040) and looking backwards one generation and forward two generations (2012-2033) based on overexploitation for domestic and international use and illegal trade, which is compounded by the species' restricted distribution. However, further research is required into the population status of this species and its threats (Schoppe et al., 2020).

#### 2.4.3 Population density estimates

There are limited estimates of current numbers of the Palawan pangolin, however there are estimates of population density across a variety of sites in Palawan. Schoppe and Alvarado (2015a, b) surveyed six sites representing north-eastern islands, Central Palawan, and Southern Palawan (Schoppe et al., in prep.a). They used actual searches of 200 ha plots, and across these sites the mean density of adult individuals was 2.5±1.4 adults/km<sup>2</sup> (Schoppe et al., in prep.a). Population density was higher on the islands in northeastern Palawan (3.5 and 4.0 adults/km<sup>2</sup>), likely due to remoteness and protection status (Schoppe and Alvarado, 2015b). The three Central Palawan (Puerto Princesa City) sites had a mean adult density of 1.8±1.6 adult/km<sup>2</sup>. This included one site without pangolins due to a recent poaching event (Schoppe and Alvarado, 2015a). A similarly low density (2 adults/km<sup>2</sup>) was found in the southern site in Rizal. The trend of decreasing density from north to south is supported by the results of Lagrada (2012) who found densities of snare-trapcaptured pangolins of 0.01 and 0.05 individuals/km<sup>2</sup> along transects in mixed residual forest and brush land, and primary forest, respectively in Brookes Point, Southern Palawan. Density computation was based on an area of 1000 m (transect length) by 10 m (Lagrada, 2012).

#### 2.5 Population dynamics

#### 2.5.1 Fecundity

Whilst the fecundity of the Palawan pangolin has not been studied, the fecundity of pangolins is generally low (Lim and Ng, 2007). The closely related Sunda pangolin (Manis javanica) typically gives birth to one offspring at a time (Zhang et al., 2015), although there have been some reports of multiple offspring (Nowak, 1991, Macdonald, 2006). Indigenous People knowledgeable on Palawan pangolins stated that the species usually only has one offspring, but that occasionally two foetuses are encountered (Acosta and Schoppe, 2018.). A gravid female, with a total length of 100 cm and body weight of 3.5 kg, that had been found in early September gave birth sometime in November of the same year (Schoppe and Alvarado, 2016). Females with young are commonly seen in August and September; however it is presumed that the Palawan pangolin breeds year around.

#### 2.5.2 Mortality rates and causes

There is a paucity of data on mortality rates and causes for the Palawan pangolin. Mortality rates from harvesting have not been quantified, but are presumably high. Little is known about age class specific survival rates, or the prevalence of stochastic environmental effects such as disease or extreme weather.





#### 2.6 Life history and ecological role

Little is known about the life history or ecological role of Palawan pangolins. Their natural habitat is believed to be primary and secondary lowland forest (Schoppe and Cruz, 2009), although they have been recorded in a variety of other habitats, including human modified landscapes (Esselstyn et al., 2004; Lagrada, 2012). This suggests that they may be moderately tolerant to human disturbance (Lagrada, 2012).

Pangolins are generally nocturnal, secretive, and solitary animals (Heath, 1987; Heath and Vanderlip, 1988; Macdonald, 2006; Nowak, 1991; Wu et al., 2004b, c). They are believed to be solitary throughout their lives, apart from when mating and rearing young (Hua et al., 2015). Evidence suggests that the Palawan pangolin is nocturnal, however it may become active during the day depending on the moon phase (Schoppe and Cruz, 2009; Schoppe and Alvarado, 2015b). One study found that when the moon was brighter, the pangolin was generally active between dusk and early morning, whilst during new moon days it became active much earlier, and emerged from its burrow as early as midday and retired again by midnight (Schoppe and Alvarado, 2015b; Schoppe et al., in prep.a).

**4** Top left: Palawan pangolin in the process of uncurling © Lucy Archer Top right: Palawan pangolin © Lucy Archer Bottom right: Palawan pangolin climbing © Lucy Archer

The Palawan pangolin is known to be both terrestrial and arboreal (Lagrada, 2012; Schoppe and Alvarado, 2015b, 2016). Individuals sleep in burows on the ground or in tree hollows during the day and come out at night to forage (Schoppe and Alvarado, 2015b). The previously mentioned study demonstrated that one individual was active for an average of 12 hours every day, and it travelled an average of 3.7 km in 24 hours (Schoppe and Alvarado, 2015b).

Pangolins have a specialist diet of ants and termites (Hua et al., 2015), and the Palawan pangolin has been recorded foraging from ant and termite nests both on the ground and in trees (Schultze, 1914; Lagrada, 2012; Schoppe and Alvarado, 2015b; Schoppe et al., 2019b.). Shi and Wang (1985) estimated that an adult pangolin can consume more than 70 million insects annually, and therefore has a significant impact on the control of forest termites. Additionally, burrowing may play a role in nutrient cycling, and abandoned pangolin burrows are known to be used as shelter by other species (Schoppe et al., 2020).

#### 2.6.1 Habitat selection

Primary and secondary lowland forests are considered the natural habitats of the Palawan pangolin (Schoppe and Cruz, 2009; Lagrada, 2012), but it is also found in lowland grassland/forest mosaics and logged-over lowland forest (Esselstyn et al., 2004), agricultural ecosystems (Lagrada, 2012; Schoppe and Cruz, 2009), and near human habitations, providing sufficient trees and logs are present (Schoppe and Cruz, 2009). Indigenous People from Palawan claimed that at times when pangolins were still common they were easily spotted near houses (Acosta and Schoppe, 2018), however it must be taken into consideration that at this time human population density was lower and forest cover was higher than present. In the late 1970s to 1980s pangolins were commonly see in coastal and lowland forest areas, particularly in Aborlan (Jovic Fabello – PCSDS pers. comm. to S. Schoppe, 19 June 2018). A recent camera trap study also detected the Palawan pangolin in habitats adjacent to mangroves, and in riverine forest (Marler, 2016).

This diverse range of habitats suggests that the Palawan pangolin may be adaptable to heterogeneous or mixed habitat (Lagrada, 2012). Although there has been no research on habitat preference or adaptability of the Palawan pangolin, the closely related Sunda pangolin is known to survive in highly degraded forests (Challender et al., 2014a). The limited research on the Palawan pangolin has indicated highest density in primary forest (Lagrada, 2012). Schoppe et al. (in prep.a) presume that the encounters of Palawan pangolins outside of preferred forest habitats is related to the foraging behaviour of the species and the continuous reduction of forest habitats.

Pangolin distribution is thought to be, in part, dependent on the distribution of its food source, ants and termites (Allen and Coolidge, 1940; Heath and Vanderlip, 1988). The Palawan pangolin is known to feed from ant and termite nests in trees and on the ground (Lagrada, 2012; Schultze, 1914; Schoppe and Alvarado, 2015b). It has been suggested that they may have a higher reliance on arboreal nests in the dry season, and terrestrial nests in the wet season (Schultze, 1914). The species is thought to have an affinity for fig trees (Ficus spp.) as the fruit of these trees attracts ants, and the trees provide resting spaces (Schoppe and Cruz, 2009). Additional trees that it has been associated with include Dysoxylum spp. ("botoyamang") and Bischofia javanica ("salamereg" or "tuai") (Lagrada, 2012).

Palawan pangolins are known to seek refuge and rest in burrows and in tree hollows (Schoppe and Alvarado, 2015b). Studies of their burrows suggest that they choose areas distant from human disturbance, at slopes of 36° to >50°, and with water accessibility at a distance of some 100-200 m (Lagrada, 2012).

Although the reproductive stages of the Palawan pangolin have not been studied, the Sunda pangolin is known to use natal dens for the birth and initial rearing of young (Lim and Ng, 2007). A study on den usage of a single Sunda pangolin found that multiple dens were used, and they were always associated with the hollows of large (>50 cm diameter at breast height [DBH]) trees (Lim and Ng, 2007). This suggests that they may require reasonably mature forest for suitable den sites during the reproductive period (Lim and Ng, 2007), and it is possible that the Palawan pangolin has the same requirements.

#### 2.6.2 Mobility

The Palawan pangolin is very sensitive to human presence, which they easily hear and smell, and they typically respond by fleeing (Schoppe et al., in prep.b). This has also been observed in the Sunda pangolin (Lim and Ng, 2007).

Research at various sites in Palawan provided information on the use of dens (Schoppe and Alvarado, 2016; Schoppe et al., in prep.b). Palawan pangolins were observed to use four different kinds of sleeping places: on trees, in dens dug into the substrate, in hollow trees or between tree roots, and in dens under/ between rocks. They preferred arboreal sleeping areas during the rainy season and terrestrial ones during the dry season, presumably to avoid flooding of dens during the rainy season (Schoppe et al., in prep.b). Individuals were observed to return to the same den for 2-3 consecutive days before moving to another and eventually returning to the previous den.

Observations during the dry season revealed that Palawan pangolins first drank then foraged, while observation during the rainy season revealed that the pangolins first foraged on termites, black ants, red ants, and weaver ants before they drank and retreated to a den (Schoppe et al., in prep.b). To drink, the pangolins walked a stream and stayed for 30 to 60 minutes before they returned to their respective sleeping areas. The authors presume that the observed differences in the sequence of drinking and foraging are related to seasonality, with a higher need to drink first during the dry season (Schoppe et al., in prep.b).

Radio tracking has provided information on movement patterns (Schoppe and Alvarado, 2016; Schoppe et al., in prep.b). Peak activity was between 23:00 and 04:00 h. It was observed that Palawan pangolins became active earlier during new moon days, when they emerge from the den as early as noon time and retire again by midnight. During full moon or bright third and first quarter days they emerged at dusk and retired in the early morning (Schoppe, et al. in prep.b). This peak in activity is similar to a female Sunda pangolin, the young of which was found to have its peak activity between 03:00 and 06:00 h (Lim and Ng, 2007).

Initial research on the home range and homing behaviour of six Palawan pangolins revealed that females and males travelled an average of 3.1 km and 4.2 km in 24 hours, respectively (Schoppe et al., 2017). These individuals covered larger areas during the dry season compared to the wet season, presumably because they have to travel longer distances to find food and water during the dry season (Schoppe et al., in prep.b). Following release at 1.1–3.7 km from the places of capture, two females stayed near the release site, one female appeared transient for two months before settling near the release site, two adult males returned straight to the presumably established home range, and a juvenile male established a home range near the release site (Schoppe and Alvarado, 2016; Schoppe et al., in prep.b). Once the individuals had established a consistent range, the assessment of home ranges as Minimum Convex Polygons (MCP) revealed female home ranges of 47 and 75 ha, with areas of concentration of 12 and 18 ha, and male MCP of 59, 96, and 120 ha and areas of concentration of 29, 45, and 68 ha, respectively (Schoppe and Alvarado, 2016; Schoppe et al., 2017). Home ranges of the females did not overlap with the home range of the juvenile male during the wet season but partly overlapped during the dry season to share the only permanent water source (Schoppe and Alvarado, 2016; Schoppe et al., in prep.b). The home ranges of the adult males never overlapped, indicating territoriality (Schoppe et al., in prep.b).

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#### 2.6.3 Dispersal

Dispersal processes have not been studied sufficiently for the Palawan pangolin. It is unknown how far they disperse, at what age they initiate this process, or if males disperse further than females. The home range of a juvenile male of 77 cm total body length and 1.5 kg body weight partly overlapped with those of females, but it was obviously no longer tolerated by adult males (Schoppe et al., in prep.b).

Studies of Temminck's pangolin *(Smutsia temminickii)* showed that juveniles accompany adults whilst foraging in the natal area, establish a home range within this natal range, and later disperse, with males dispersing further than females (Pietersen et al., 2014). This species is not closely related to the Palawan pangolin, so it is unknown if their dispersal patterns and abilities are likely to be similar.

 Top left: caption: Close-up of Palawan pangolin nose © Lucy Archer,
 Middle left: Close-up of Palawan pangolin scales
 © Lucy Archer,
 Bottom left: Palawan pangolin foraging in a tree
 © Lucy Archer,
 Top right: Three Palawan pangolins curled up together © Lucy Archer,
 Bottom right: Palawan pangolin uncurling
 © Lucy Archer.

#### 2.6.4 Diet and nutrition

Pangolins are myrmecophagous, meaning they have a highly specialized diet consisting of ants and termites (Lekagul and McNeely, 1988; Lim, 2007). Field studies by Hua et al. (2015) showed that aside from ants and termites, pangolins also ingest ant larvae, bees (pupas), flies, worms, crickets, and larvae of some other insects; sometimes sand and grass will be swallowed in the intake process. A pangolin of 3 kg can consume up to 300–400 g of termites per feeding session (Coulson, 1989 Lim 2007).

Little research on the diet of Palawan pangolins has been conducted, however they have been recorded to consume two species of ants *Odontomachus infandus* (red ant) and *Diacamma sp.* (black ant), and one species of termite *Nasutitermes sp.* (black termite) (Lagrada, 2012). Schoppe and Alvarado (2015b) also observed them feeding on weaver ants (*O. smaragdina*).

This diet is extremely hard to replicate in captivity, and often an artificial diet of varying combinations of meat, eggs, dairy products, feline diets, apples, and grains is used (Yang et al., 2007; Vijayan et al., 2008). However the survival rate of pangolins in captivity is very low and they commonly die from gastrointestinal disease (Hue et al., 2015). Chin and Yang (2008) reported that over 50 percent of captive pangolins died of haemorrhagic gastric ulcers and pneumonia. It is believed that the main causes of the gastric ulcers are the stress and unsuccessful artificial diet. Consequently, a common practice in Palawan currently is to release confiscated animals as soon as possible.

#### 2.6.5 Social behaviour

Pangolins are solitary animals (Nowak, 1991). Exceptions to this solitary lifestyle include when rearing young and mating. Little is known about social systems of pangolins in the wild. Radio tracking data from Palawan pangolins indicate that males are territorial (Schoppe et al., in prep.b). According to a tribal member from Narra, he has once observed several individuals in one den (Acosta and Schoppe, 2018).

#### 2.6.6 Reproductive behaviour

Little is known about pangolin reproduction, and there have been no studies on the reproductive behaviour or maternal care of the Palawan pangolin. Indigenous People knowledgeable on Palawan pangolins stated that the species usually only has one offspring, but occasionally two are encountered (Acosta and Schoppe, 2018). Farmers have reported that mothers with young are usually seen in August (Schoppe and Cruz, 2009).



A Palawan pangolin © Lydia Katsis

A gravid female with a total length of 100 cm and body weight of 3.5 kg, which had been found in early September, had given birth sometime in November of the same year (Schoppe and Alvarado, 2016). Studies on the closely related Sunda pangolin do not suggest a mating season and indicate year round breeding (Zhang et al., 2015). Although there is a peak in sightings of females with young in August, it is presumed that the Palawan pangolin also breeds year round (Schoppe et al., in prep.a).

It is likely that the Palawan pangolin shares similarities with the better studied Sunda pangolin, which usually gives birth to one offspring at a time, after a gestation period of around six months (Zhang et al., 2015). The sex ratio at birth for Sunda pangolins is 0.875 females : 1 male. The weaning age is around 4 months, and offspring will typically reach sexual maturity after one year, although it can be as early as 6-7 months in some individuals (Zhang et al., 2015). Maternal care occurs in natal dens (Lim and Ng, 2007). Females used numerous natal dens throughout the rearing period, and these were associated with hollows of large trees (Lim and Ng, 2007). Maternal care period has been estimated at 3-4 months (Payne and Francis, 1998; Lim and Ng, 2007).

#### 2.6.7 Captive breeding

Pangolins are very difficult to keep in captivity and captive breeding is highly challenging. Only a small number of facilities have successfully bred pangolins in captivity, including Singapore Zoo and the Pangolin Rescue Base of South China Normal University (Hua et al., 2015).

The only organization in Palawan that has facilities to keep pangolins is Katala Foundation Inc. in Narra.

#### 2.7 Disease

There is limited information on the impact of disease on wild populations of the Palawan pangolin, or other pangolin species.

Pangolins involved in trade are known to contract a number of diseases including bacterial dermatitis beneath the scales, external parasites (ticks and mites), gastrointestinal parasites, and gastric and oesophageal ulceration (Clark et al., 2009). These diseases likely result from the poor conditions involved with pangolin trade, and it is unknown if they affect wild populations. However, due to the release of confiscated individuals back into wild populations, there is a risk of transmission (IUCN, 2000).

#### 2.8 Genetics

There is limited understanding of the genetic population structure of the Palawan pangolin. However, due to the highly restricted range, small population size, and the fact that individuals are isolated on islands, it is likely to suffer loss of genetic diversity, which may have implications for long term viability.

Recent DNA barcoding studies were able to distinguish poached Sunda pangolins from Palawan pangolins (Ong, 2014; Luczon et al., 2016).

#### 2.9 Values

The Palawan pangolin is particularly valued by Indigenous Peoples' Communities (IP communities), who traditionally utilise pangolins as part of their culture for medicinal purposes, rituals and subsistence. Different tribes have different uses for pangolins, however many of these traditional uses remain undocumented. Although Indigenous People are aware that the Philippine Wildlife Act 9147 prohibits even traditional uses, they do not consider traditional use as illegal (Acosta and Schoppe, 2018). Members of various IP communities claim that traditional use would manage the resource sustainably, and would not overexploit pangolins or other wildlife.

#### 2.9.1 Medicinal

Pangolins are valued locally for traditional medicinal purposes, often for asthma treatment (Esselstyn et al., 2004). The Tagbanua tribe in Aborlan, Central Palawan use pangolin meat (raw, boiled, or cooked) to treat gastrointestinal diseases, inflammation, flatulence, asthma, and ulcers (Estrada et al., 2015). Communities in Brooke's Point reported that scales are worn as a belt by older men to prevent the occurrence of prostate-related illnesses, drinking the blood is considered rejuvenating, and boiled powdered scales are used to treat asthma (Lagrada, 2012). Furthermore, scales are burned to stop thunder and the diseases that are associated with it (Lagrada, 2012). Members of the Palawan tribe in Bataraza mentioned the use of a belt with scales to cure back pain (Acosta and Schoppe, 2018.). The smoke from burning scales is used to treat mothers who just gave birth, according to a member of the Indigenous community from Narra (Acosta and Schoppe, 2018).

Bleeding a pangolin without killing it and drinking the blood is a traditional way to treat lung problems (asthma), a representative of the Cuyunon community in Dumaran stated (Acosta and Schoppe, 2018.). This was confirmed by Tagbanua from Culion (Calamian Group of Islands), however the pangolin will be killed in the process. Bleeding and drinking the blood is also done by Tagbanua in Narra to gain strength.

#### 2.9.2 Traditional/Cultural

The Tagbanua tribe in Aborlan used pangolin scales to deter Aswang (shapeshifting monster in Filipino folklore). The scales are wrapped in a shirt and worn by the person (Estrada et al., 2015). Likewise, the Indigenous People use the scales to make into bracelets or necklaces to deter bad spirits (Acosta and Schoppe, 2018).

Bayron (2014) reports burning of pangolin skin to remove bad spirits. This was confirmed by Tagbanua from Narra (Acosta and Schoppe, 2018). This is an old tradition and the scales are taken from the tip of the tail of the pangolin without killing it.

#### 2.9.3 Subsistence

Pangolins are hunted for their meat as a food source (Lagrada, 2012, Bayron; 2014 Schoppe and Cruz, 2009; Eder, 1987; Acosta and Schoppe, 2018). The Batak tribe of Central Palawan have traditionally used pangolin meat as a food source (Eder, 1987). There is evidence that pangolins have been hunted in Palawan for at least 6000 years (Lewis et al., 2008). There are, however, some tribes that do not touch the meat, as reported by a Tagbanua from Central Palawan (Acosta and Schoppe, 2018).

#### 2.9.4 Pets

The Visayan community in a village in Central Palawan have been known to keep pangolins as pets in the late 1990s, although they are typically willing to sell them for a reasonable price if an opportunity arises (Lacuna-Richman, 2006).

#### 2.9.5 National pride

As an endemic species that is only found in the Palawan group of islands, the Palawan pangolin may be a source of national pride. In fact, the Palawan Council for Sustainable Development released PCSD Resolution No. 17-609 approving the guidelines on the selection and management of flagship species by local government units in Dec 2017.

#### 2.10 Climate change

The Palawan pangolin will likely be exposed to the effects of climate change, as the Philippines is highly vulnerable to the impacts of climate change (World Bank, 2011). The extent to which pangolins are able to respond adaptively is unknown, and there is currently no adaptation planning.



A Palawan pangolin climbing tree © Lucy Archer

#### 2.11 Conservation Context

#### 2.11.1 International legal status

The Palawan pangolin is listed in CITES Appendix I meaning that all commercial, international trade in wild caught specimens is banned. Previously, the species was listed in Appendix II and in the year 2000 a zero export quota was established for commercial trade in wild-caught Asian pangolins. Due to ongoing exploitation for illegal trade, in 2016 the Palawan pangolin, along with all seven other pangolin species, was transferred to Appendix I.

The Philippines has been a Party to CITES since 1981. The Management Authority (MA) for terrestrial animals in Palawan is the Palawan Council for Sustainable Development (PCSD), while it is the Biodiversity Management Bureau (BMB) of the Department of Environment and Natural Resources (DENR) in the rest of the country.

The Palawan pangolin is listed in Annex A of the EU Wildlife Trade Regulations (Commission Reg. (EU) No. 2017/160 of 20 January 2017).

#### 2.11.2 National legal status

The Philippine Wildlife Act 9147 (also known as the "Wildlife Resources Conservation and Protection Act") provides conservation and protection for wildlife and their habitats. This act enables the implementation of the agreements made among the Parties to CITES.

In Palawan, the PCSD has jurisdiction for all terrestrial animal species, including the Palawan pangolin, whereas in the rest of the provinces of the Philippines the DENR has jurisdiction. In Palawan, the staff of PCSD (PCSDS) is the main enforcement agency. Additional bodies that have the power to enforce the Wildlife Act include the provincial (PENRO) and community (CENRO) offices of the DENR, as well as the City and Municipal Natural Environment Resources Officers (City ENRO and MENRO), the Philippine National Police, Kilusan Sagip Kalikasan (KSK - a provincial wildlife task force), municipal and city mayors and village chairmen, deputized wildlife enforcement officers, Civilian Auxiliary Force Geographical Unit (CAFGU), and special enforcement bodies at the lower local level.

Violations of the acts prohibited under this law have corresponding fines and penalties depending on the conservation status of the species involved. The Wildlife Act does not always follow the categories used by IUCN, and the status assigned to certain species by the DENR and PCSD may differ. The Palawan pangolin is listed as 'Endangered' by the DENR, and 'Critically Endangered' by PCSD. Offences and penalties under the Wildlife Act vary with the threatened status of the species, and are listed in Table 1. The Wildlife Act does not prohibit per se the collection of any flora and fauna from the wild. It only regulates the collection through the issue of necessary permits, including Wildlife Collectors Permits and Wildlife Farm Permits. Permits are given only to scientific researchers and studies as well as for commercial breeding and/or conservation breeding. In line with this, the Palawan pangolin may be legally traded locally and in international markets, assuming specimens are bred in captivity and in line with relevant regulations, i.e. CITES and Res. Conf. 12.10. As of 2019, the PCSD has not granted any permits for farming or breeding operations involving the Palawan pangolin. Therefore, all specimens collected from the wild and being traded are considered illegal.

The Wildlife Act allows collection of wildlife by Indigenous People, like the Palaw'an and other tribes, for traditional uses (but not primarily for trade), provided that the wildlife species concerned is not listed as threatened. Therefore, as the Palawan pangolin is listed as threatened, the collection of pangolins by Indigenous People is not allowed, even for subsistence purposes.

#### Indigenous Peoples Rights Act of 1997 (IPRA)

The purpose of this Act is to recognize, protect, and promote the rights of Indigenous cultural communities. The Sustainable Traditional Resource Rights in the IPRA allows Indigenous People to sustainably use, manage, protect, and conserve animals in accordance with their Indigenous knowledge, beliefs, systems and practices. However, as collection of pangolins is banned by the Wildlife Act even for traditional use, it is prohibited.

Section 9 of the Act refers to the responsibilities of Indigenous Peoples to their Ancestral Domains, including preserving, restoring, and maintaining a balanced ecology in the Ancestral Domain by protecting the flora and fauna, watershed areas and other reserves.

#### The Republic Act 7611 ("Strategic Environmental Plan Law for Palawan", or the SEP Law)

This law is known as the comprehensive framework for the sustainable development of Palawan, which protects natural resources. The SEP identifies areas for protection and areas that may be utilised to varying degrees. The classification system is called the Environmentally Critical Areas Network (ECAN). Terrestrial land is mapped under the following zones: area of maximum protection or core zone, buffer zone, restricted use area, controlled use area, traditional use area, and multiple/manipulative use area.

#### Additional laws

The Philippines made the export of all wild-caught fauna illegal in 1994 (Schoppe and Cruz, 2009) and the entirety of Palawan province was declared a game refuge and bird sanctuary in 1969 (Proclamations 219 and 530-B).

Table 1. Offences and penalties under the Wildlife Act if dealing with the Palawan pangolin or other species that are classified as Endangered or Critically Endangered in the Act.

Offence under Republic Endangered (E) Act 9147		Critically Endangered (CR)
Killing and destroying wildlife species	Imprisonment of 4 years and 1 day to 6 years and/or a fine of P50,000-P500,000	Imprisonment of minimum of 6 years and 1 day, to 12 years and/or a fine of P100,000-P1,000,000
Inflicting injury which cripples and/or impairs the reproductive system of wildlife species	Imprisonment of 2 years and 1 day to 4 years and/or a fine of P30,000-P200,000	Imprisonment of minimum of 4 years and 1 day to 6 years and/or a fine of P50,000-P500,000
Trading wildlife	Imprisonment 1 year and 1 day to 2 years and/or a fine of P2,000-P200,000	Imprisonment of 2 years and 1 day to 4 years and/or a fine of P5,000-P300,000
Collecting, hunting or possessing wildlife, their by-products and derivatives; gathering or destroying active nests, nest trees, host plants and the like	Imprisonment of 1 year and 1 day to 2 years and a fine of P20,000-P200,000	Imprisonment of 2 years and 1 day to 4 years and a fine of P30,000-P300,000
Maltreating and/or inflicting other injuries not covered by the preceding paragraph	Imprisonment of 3 months and 1 day to 6 months and a fine of P20,000-P50,000	Imprisonment of 6 months and 1 day to 1 year and a fine of P50,000-P100,000
Transporting of wildlife	Imprisonment of 3 months and 1 day to 6 months and a fine of P20,000-P50,000	Imprisonment of 6 months and 1 day to 1 year and a fine of P50,000-P100,000

#### **Active parties**

The organizations and individuals engaged in conservation management or research on the Palawan pangolin are listed below:

- Katala Foundation Inc. (KFI)
- Palawan Council for Sustainable Development (PCSD)
- USAID Protect Wildlife
- Zoological Society of London (ZSL)

#### Itemized list of pangolin projects in Palawan:

- Palawan Pangolin Conservation Program of Katala Foundation Inc. that covers the following:
  - Ex-situ conservation
  - Home range
  - Indicative presence surveys / camera trapping
  - Abundance surveys
  - Novel detection of animal origins in the illegal wildlife trade
  - Nutrition
  - Identification and management of local conservation areas
- Indicative presence and abundance of the Palawan pangolin (*Manis culionensis* de Elera) in Southern Palawan. USAID Protect Wildlife and partners.
- Palawan State University has an undergraduate student conducting their thesis on pangolins
- University of the Philippines, Los Banos, has two students conducting their thesis on pangolins
- Safeguarding the Philippine Pangolin, Zoological Society of London

## 2.12 Threats, drivers of threats, and constraints

The principle threats to the Palawan pangolin are poaching and habitat loss (Lagrada 2012, Schoppe and Cruz 2009). Collectively these pressures pose serious threats to the species, especially considering its restricted range (Schoppe et al., 2019).

#### 2.12.1 Poaching

Pangolins are hunted at a local level for meat and traditional uses, for trade at a national level (involving blood, meat, skins, and scales) and internationally (whole animal, meat, scales and skin) (Cruz et al., 2007; Esselstyn et al., 2004; Schoppe and Cruz, 2009). In 1998, Heaney et al. stated that the species was heavily hunted and probably seriously endangered, whilst Esselstyn et al. (2004) stated that hunting pressure is moderately heavy. Hunters report that pangolins used to be very common in Palawan; they caught greater numbers in the past. Hunting for trade and subsistence seem to be the main reasons for their decline (Schoppe and Cruz, 2009). Poaching is reported to be particularly high in Northern Palawan, where there is a higher density of pangolins (Bayron, 2014). Indigenous People reported that poachers smuggle hunting dogs into forested areas in Southern Palawan to collect pangolins for trade (Acosta and Schoppe, 2018). Poachers hide the dogs from the Indigenous communities because the traditional use by Indigenous People does not tolerate commercial trade. Indigenous People have estimated that as a result of trade, the Palawan pangolin population has decreased by 85-95% over the past 40 years (Acosta and Schoppe, 2018).

#### 2.12.2 Subsistence and traditional use

IP communities have traditionally used the Palawan pangolin for subsistence, medicinal use and rituals. Different IP groups are known to have different uses for pangolin, however there is limited documentation of traditional uses and practices.

Pangolins are hunted locally for meat (Esselstyn et al., 2004). Pangolins are reported to be regularly hunted for subsistence by members of the Palaw'an tribe in Southern Palawan (van den Beukel et al., 2008). In the past, Indigenous People would hunt pangolins for traditional uses and throw the scales away, because they had no value (Acosta and Schoppe, 2018). There were reports of subsistence hunting on Dumaran Island (Schoppe and Cruz, 2009). Based on interviews with 50 hunters, the Palawan pangolin ranked number 37 among 56 wildlife species that were hunted in 2005 in Southern Palawan (van den Beukel et al., 2008).

Pangolins are also valued for a variety of medicinal and traditional uses by the IP communities, however there are no data on the frequency and how this affects population numbers. Although the IPRA law recognises the traditional way of life of IP communities, including use of wildlife, the collection of pangolins even for traditional use is clearly prohibited by the Wildlife Act. However, use of pangolins is an important part of Indigenous Peoples' culture, and the communities feel the IPRA law and the self-determination of the Indigenous Peoples has not been recognised. A study in Southern Palawan suggested that the majority (63%) of pangolin hunting was for subsistence (Schoppe and Cruz, 2009). However, a later study across three sites, including Southern Palawan, showed that only 22% of respondents hunted pangolins for subsistence, and the majority of hunting was for trade (Bayron, 2014). This suggests a shift from hunting for subsistence to hunting for trade (Bayron, 2014). This shift from subsistence to market economies was noted among members of the Tagbanua and other ethnic groups (Esselstyn et al., 2004 Lacerna and Widmann, 2008).

Indigenous People from all over Palawan claim that the Palawan pangolin is now so rare that it could hardly meet the traditional use needs (Acosta and Schoppe, 2018.).

#### 2.12.3 International and national trade

The Palawan pangolin is poached for the food and traditional medicine markets of major cities in the Philippines (Gomez and Sy, 2018; Schoppe and Alvarado, 2015). There is a high demand for meat and scales in the Philippines by foreign nationals, and the meat is often eaten to reinforce social status. For example, ethnic Taiwanese people drink its blood in wine and believe the meat has medicinal value (Schoppe and Cruz, 2009). Whilst there is consumer demand for pangolin scales for medicinal purposes in the Philippines, it is thought that Palawan pangolin scales are usually exported from the Philippines, and the scales used in TCM in the Philippines are imported after processing (Emerson Sy, pers. comm.). Pangolin trade has been documented within Palawan and from Palawan to Manila (Schoppe and Cruz, 2009; Gomez and Sy, 2018). Analysis of seizure data indicates that there is a particularly high local demand for pangolin meat and scales in Metro Manila (Gomez and Sy 2018). Between 2001-2017, Manila was implicated in at least ten seizures, including live and frozen animals, which were assumed to be for the exotic food market (Gomez and Sy, 2018). Furthermore, in 2018, there were seven incidents of pangolins found roaming the streets of Manila and an additional seizure of two live animals (Gomez and Sy 2018). Hunters reported renowned pangolin buying stations in Roxas and Taytay (Schoppe and Cruz, 2009). Hunters also reported that the villages of Dumarao, Sandoval, Mendoza, and Magara in Roxas, and Capayaz in Dumaran were involved in pangolin trade in the 1980s, and used to



Adult and juvenile Palawan pangolins © Sabine Schoppe

supply Puerto Princesa City with pangolin meat and scales (Schoppe and Cruz, 2009). A study in Southern Palawan found that only 25% of hunters were involved with national trade (Schoppe and Cruz, 2009).

The Palawan pangolin, along with all pangolin species, is in high demand for international trade of skin, scales and meat (Wu et al., 2004a, 2007; IUCN, 2014). While it has been reported in international trade historically, since 2008 there is evidence of a tangible illicit international trade involving this species, both directly to China for use in traditional medicines, and to Sabah (Kudat, Sandakan), East Malaysia and Peninsular Malaysia (Schoppe and Cruz, 2009; Pantel and Anak, 2010).

Earlier studies suggested that few hunters (13%) in Palawan were involved in international trade, and it was thought that the species was only exported in small volumes from Southern Palawan to Malaysia (Schoppe and Cruz, 2009). However, according to poachers in Southern Palawan, the demand for pangolins has increased, presumably due to higher demand from China (KFI, 2013). An increase in price and a shift from meat and live animals to scales was noticeable from 2006-2013 (Schoppe, unpubl. data).

Local communities are attracted to engage in wildlife trade due to the high financial incentive and low risk, and are known to collect pangolins to order. Poverty in IP communities may incentivise them to engage in wildlife crime. Among IP communities, poverty is related to issues in legally accessing and utilising natural resources due to the complicated process and high cost of securing a Non Timber Forest Product (NTFP) Permit. Additionally the IP way of life is changing in some circumstances, with engagements in nontraditional employment. Until recently, wildlife trafficking has been a low priority for enforcement agencies and judiciaries. Consequently, combined with lack of resources and manpower to support enforcement agencies, and high turnover of staff, enforcement concerning wildlife crime has been described as ineffective and inadequate, and this has resulted in low deterrence for poaching. As a result of weak enforcement, trafficking of pangolins has gone largely undetected, and the numbers involved with national and international trade are unknown (Schoppe and Cruz, 2009). However trade has reportedly increased over the past decade (CITES, 2016). Compiled confiscation records from government organizations in Puerto Princesa City show that 18 pangolins were confiscated in Palawan between 2000-2008; of these, two were confiscated in 2001, seven in 2003, one in 2004 and eight in 2005 (KFI, 2013). Turnover data at the local rescue centre report four individuals in 2007 and three in 2008 (Joanne Justo, PWRCC, in litt. to S. Schoppe on 30 June 2008). A recent study analysing seizure data for the period 2001-2017 found a total of 39 seizure incidents in which the Philippines was either implicated as a source country or a place of seizure (Gomez and Sy, 2018). Excluding one of these seizures, which was later found to consist of Sunda pangolins from Indonesia, the remaining 38 seizures amounted to 667 individuals. 52% of these seizures consisted of meat and scales. 27% dead whole individuals, 16% individual specimens (unknown whether dead or alive), and 5% live animals. The majority of these seizures occurred within Palawan Province. The remaining seizures occurred on Luzon, Mindoro, Negros, and Tablas.

#### 2.12.4 Habitat loss

Habitat loss has historically been cited as a threat to the Palawan pangolin. Rabor (1865) stated that despite the occurrence of poaching for their meat, at that time the clearing of forest was the main reason for their population reduction. Schoppe and Cruz (2009) also stated that habitat loss and alteration pose a significant threat to the species.

The direct impact of habitat loss and degradation on the ability of Palawan pangolin populations to survive and reproduce is unknown. There are limited data on their habitat use and ability to survive and reproduce in degraded landscapes, however based on observations of the Palawan pangolin in degraded areas and evidence of adaptability of the closely related Sunda pangolin (Challender et al., 2014a; Willcox et al., 2017), it is unknown whether this a direct threat to populations. However, habitat loss is likely to threaten populations through expansion of roads and commercial concessions opening up previously inaccessible areas to poaching.

Primary and secondary forests, the pangolin's natural habitats, are among the most threatened ecosystems in Palawan (Schoppe and Cruz, 2009), and lowland primary forest has been eliminated from many parts of Palawan (Esselstyn et al., 2004). The drivers of habitat loss include the conversion of forests to other uses including mining, settlements, plantations and infrastructure, as well as land grabbing and encroachment. ECAN zones are changed to accommodate new development projects, and consequently land grabbing often occurs. This is known to occur in the Ancestral Domains of IP communities, thus negatively affecting these communities as well as degrading Palawan pangolin habitat. Additionally, poverty in IP communities, largely as a result of issues

relating to their access to natural resources, may incentivise them to sell ancestral land. In Southern Palawan, members of the IP communities highlighted the issue of cutting forest and converting habitat into oil palm plantations (Acosta and Schoppe, 2018). Another driver of habitat loss on Palawan is inadequate management of Key Biodiversity Areas (KBAs), largely due to insufficient resources, resulting in open access and leaving these areas vulnerable to habitat degradation and poaching.

#### 2.12.5 Lack of knowledge

Underpinning many of the threats facing the Palawan pangolin is a lack of knowledge and a lack of awareness of the species. There is very limited information on the ecology and biology of the species, as pangolins are challenging to monitor in the wild and they have previously been low priority in terms of research. The limited information that is known about the species is rarely disseminated and communicated to the public, and the national education system does not include endemic and local species such as the Palawan pangolin in the curriculum. Consequently, there is low awareness and poor appreciation for the species.

A further issue related to lack of knowledge includes rescue, rehabilitation and release. There is a low success rate for rescue and rehabilitation of this species, largely due to inadequate rehabilitation facilities, lack of appropriate training for personnel, and lack of corresponding protocols.

## **3** Conservation **Strategy**





## **3.** Conservation Strategy

This section outlines the conservation strategy for the Palawan pangolin for the period 2018–2043. It brings together the results of the targeted discussions that took place in the workshop in April 2018 and the recommendations emanating from those discussions.

Over the four-day planning workshop, and following a series of scene-setting presentations, participants worked collaboratively on the following:

- A VISION for the long-term future of Palawan pangolins;
- Broad operational GOALS for conservation activity aimed at achieving the Vision;
- A detailed analysis of the ISSUES currently impacting on the viability of the species across its range or impeding effective conservation action;
- A series of OBJECTIVES aimed at addressing these issues;
- ACTIONS to be completed in pursuit of the objectives, including recommendations on where and how action should be taken and who would be ideally placed to take it.

The following pages summarize the outputs of these discussions and the Vision, Goals, Objectives and Actions agreed.

#### Audience

The Palawan pangolin exists both inside and outside protected areas, in forested areas under varying types and intensities of human use, and around agricultural and urban environments. Though a large and diverse group of stakeholders, including representatives from government, Indigenous Peoples, key law enforcement agencies, academics, practitioners, and NGOs, was present at the planning workshop, it was not possible to include everyone involved in Palawan pangolin conservation. This strategy includes both broad actions and specific recommendations.

## This document is intended as a resource to be used by:

- Workshop participants, as a record of the actions, initiatives and collaborations discussed;
- Government agencies, to help guide and inform actions and activities;
- Individuals, institutions and ex situ facilities working with Palawan pangolins, to help inform their priorities;
- Non-governmental conservation organisations and community groups, to guide and inform their priorities and work plans;
- The IUCN SSC Pangolin Specialist Group, to help in directing conservation-related research and actions, and tracking and supporting progress with the directions and priorities agreed for Palawan pangolins; and
- Donor organisations, to guide priority actions for funding support.

#### 3.1 Vision and Goals

#### 25 year vision for the Palawan pangolin

By 2044, populations of the Palawan pangolin are thriving in suitable habitats as part of fully-functioning ecosystems that benefit biodiversity and local communities. As a flagship species, its biology and ecology are well understood, its threats have been mitigated, and its conservation is prioritised through good governance and empowered stakeholders.

#### Goals

- **GOAL 1**: Habitat destruction and loss have been arrested.
- GOAL 2: Overexploitation of the Palawan pangolin has been significantly reduced.
- **GOAL 3:** The ecology, biology and conservation needs of the Palawan pangolin are understood through scientific research and using local ecological knowledge.
- **GOAL 4:** Indigenous Peoples and local communities are empowered to conserve the Palawan pangolin.

#### 3.2 Objectives and Actions

The objectives and actions developed by workshop participants are described below, grouped by the relevant goal. They centre around:

- Habitat loss;
- International and local trade;
- Lack of knowledge; and
- Local communities.

#### GOAL 1: Habitat destruction and loss have been arrested

No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners
1.1.1	Conduct a Knowledge Management Analysis (KMA)	PCSDS	2 years	Analysis completed; technical report and recommendations published	Members of the Palawan Knowledge Platform (PKP)
1.1.2	Establish and manage wildlife database in Palawan	PCSDS	2 years	Database built and operational	PSU, Forest Foundation Philippines, Protect Wildlife, PKP Members
1.1.3	Convene a stakeholder meeting to identify ways to integrate knowledge in all types of planning	NGOs, LGUs, NCIP and DENR	2 years	Stakeholder meeting held; strategy developed	
1.1.4	Integrate KMA into planning in pangolin habitat	PSCDS	25 years	Number of planning applications informed via KMA or other means identified in 1.1.3	PCSD, DENR

	accou	countability mechanisms					
	No.	Action	Responsibility	Timeline	Measurable	Collaborators /	
	1.2.1	Document best practices of private sector in conservation work	DENR	2 years	Best practices documented; report of best practices published	Partners PCSDS, PAMB, LGUs	
	1.2.2	Implement existing PCSDS guidelines on the private sector to adopt a wildlife species	PCSDS	2 years	Number of programs adopted and financed	BIR, Private Sector	
	1.2.3	Develop and present funding portfolios to potential donors	PCSDS	2 years	Number of funding portfolios presented to donors; database of funding from all sources	DENR, NGOs/CSOs, Indigenous communities	
	1.2.4	Collaboration with donors to design and implement conservation financing mechanism	Protected Area, local conservation area, critical habitat and Ancestral Domain managers	1-25 years	Number of conservation financing mechanism initiated	CSOs, NGOs, LGUs/ Academe, NCIP, DENR, PCSDS	
	1.2.5	Use funding generated to manage KBAs for pangolins	PCSDS	1-25 years	No. of KBAs effectively managed		

Objective 1.2: Effective management of Key Biodiversity Areas through conservation finance and improved

of such, to reduce conflicts in land-use and the management of pangolin habitats						
No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners	
1.3.1	Creation of Technical Working Group (TWG) to review and harmonize laws, ordinances, IRRs and other relevant policy instruments	PCSDS	1 years	Technical Working Group established	DENR, ELAC, NCIP, USAID Protect Wildllife, PCSD	
1.3.2	TWG (see 1.3.1) to revise implementing mechanisms and institutional arrangements for harmonizing laws and ordinances	PCSDS	2 years	Strategy for revision to implementing mechanisms and institutional arrangements developed	PCSD, DENR, USAID, KFI	
1.3.3	Strategy for revision to implementing mechanisms and institutional arrangements developed and implemented	PCSDS	5-25 years	Subject to strategy development		
1.3.4	Periodically review laws and policies related to the conservation of pangolin habitats, including customary laws	PCSDS	25 years	Workshops held with key stakeholders to discuss application of law		

No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners
1.4.1	Conduct research to identify existing and potential pangolin habitats	Universities, Indigenous communities, Local communities, LGUs and NGOs	5 years	Number of research projects completed; number of scientific papers published	PCSDS, NGOs Academia, DENR
1.4.2	Declare and manage Palawan pangolin habitats, existing and potential, pursuant to best practice, including the Wildlife Act and/or local government code	PCSDS, enforcement agencies, Indigenous communities, Local communities, LGUs, and NGOs	5-25 years	Number of critical habitats or Local Conservation Areas (LCAs) declared and demarcated; no. of management plans developed; no. of sites and/or LCAs managed according to best practice and in accordance with the Wildlife Act and government code	PCSDS, NGOs, Academe
1.4.3	Engage existing mining and plantation companies to adopt pangolin conservation programs	DENR	1-25 years	Number of compliant companies; no. of sites implementing programmes for pangolins	PCSDS, NCIP, LGUs, Multipartite Monitoring Team (MMT), Mine Rehabilitation Fund Committee (MRFC), Indigenous communities

uitable habitats by conducting research to identify and declare babitats for pr

#### GOAL 2: Overexploitation of the Palawan pangolin has been significantly reduced

Objective 2.1: Provide timely and punitive wildlife law enforcement to prevent and stop wildlife crimes involving					rimes involving pangolins
No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners
2.1.1	Conduct training with law enforcement agencies at the local, municipal, provincial and national level on identification of pangolins, trafficking dynamics, and law enforcement best practices	PCSDS, PCSDS Enforcement task force	10 years	No. of workshops held; no. of law enforcement staff trained	NGOs: ELAC, PNNI, NATRIPAL, KFI, Intel Group of PNP, NBI, CG, AFP, DENR, LGU, PhilJA, DAP, PNPA (academics), USAID Bantay Palawan
2.1.2	Conduct training on applicable laws and jurisprudence with the judiciary in Palawan and the Philippines	PCSDS, Dept. of Justice, PhilJA	5 years	No. of workshops held; no. of judiciary staff trained	
2.1.3	Strengthen existing Wildlife Enforcement Network (WEN) by establishing interpersonal wildlife enforcement network	PCSDS (Provincial) DENR (national)	1 year	Interpersonal WEN established; no. of active participants; no. of arrests and convictions linked to the network	
2.1.4	Conduct research on online pangolin trade involving the Palawan pangolin	PCSDS (locally) DENR (nationally)	5 years	No. of research projects completed; no. of scientific studies completed	DENR, PCSeDS, USAID, ICF, ZSL-PH

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crimes involving pangolins						
	No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners
	2.1.5	Creation and provision of permanent wildlife enforcement positions for PCSDS, DENR, and other NGAs to undertake pangolin trafficking detection and surveillance	NBI (buy-in needed) PCSDS, DENR	2 years	No. of wildlife positions created, filled and resourced	Philippine Center for Transnational Crime (PCTC), NGOs, NGAs (CAAP and PPA), legal traders (not pangolin traders), couriers, airlines, shipping company, Senator Legarda, House of Representative Committee on Environment and Natural Resources, Governor of Palawan
	2.1.6	Increase the profile of wildlife crime locally and nationally through traditional and social media outlets	PCSDS (locally) DENR (nationally)	5 years	Profile of wildlife crime raised against an established baseline	

#### Objective 2.1: Provide timely and punitive wildlife law enforcement to prevent and stop wildlife

Objective 2.2: Eliminate demand for pangolin meat and scales in the Philippines						
No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners	
2.2.1	Undertake research on consumers to inform behaviour change programmes	UP, Consultants KFI, PCSDS, DENR	5 years	Number of research projects funded; number of research projects completed; number of scientific papers published	Academics, TRAFFIC, KFI, ZSL-PH	
2.2.2	Undertake research on Palawan pangolin trade dynamics in the Philippines	UP, Consultants KFI, PCSDS, DENR	5 years	Number of research projects funded; number of research projects completed; number of scientific papers published	Academics, TRAFFIC, KFI, ZSL-PH	
2.2.3	Develop and implement behaviour change campaigns to reduce demand for pangolin products in the Philippines	UP, Consultants KFI, PCSDS, DENR	5-10 years	Number of campaigns developed, implemented and evaluated	Protect Wildlife	
2.2.4	Engage with DFA to discuss pangolin trade and consumption with Peoples Republic of China (PROC)	PCSDS	3 years	DFA-PCSDS dialogue meetings held; DFA- PROC meeting held	DFA, CSO	

Objective 2.3: Review wildlife laws periodically to ensure they are responsive to changing needs						
No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners	
2.3.1	Lobby for immediate passage of the revised wildlife act	DENR	2 years	Lobby effort exerted	CSO, industry, Palawan Congressmen, media, Wildlife Ambassadors	
2.3.2	Review agency mandates	DENR NALECC-Sub Committee on the Environment and Natural Resources (SCENR)	2 years	TWG, Review groups formed	CSO (NGOs, academics) DBM, EO, SO, DAO, JAO	

GOAL 3: The ecology, biology and conservation needs of the Palawan pangolin are understood through scientific research and using local ecological knowledge

Objec	Objective 3.1: Knowledge of the ecology and biology of the Palawan pangolin is generated					
No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners	
3.1.1	Form a Palawan Pangolin Special Interest Group to coordinate research efforts and streamline permit acquisition	PCSDS	1 year	Sub-committee on Palawan Pangolin Conservation and Mangement established	ENRC members	
3.1.2	Conduct research on pangolin populations, including comparative studies between habitat types	'SPPCM" (Sub- committee on Palawan Pangolin Conservation and Management)	1-10 years	Number of research projects funded; number of research projects completed; number of scientific papers published	PSG, PSU, WPU, HTU, KFI, ZSL, Protect Wildlife Project	
3.1.3	Conduct research on pangolin ecology including dietary preferences	SPPCM	1-10 years	Number of research projects funded; number of research projects completed; number of scientific papers published	PSG, PSU, WPU, HTU, KFI, ZSL, Protect Wildlife Project, ant and termite experts	
3.1.4	Conduct research to identify priority areas for habitat research	PCSDS	1 year	Number of research projects funded; number of research projects completed; number of scientific papers published	PPTF	
3.1.5	Identify and train researchers to study pangolins and their threats	SPPCM	1-10 years	No. of researchers identified and trained	PSG, PSU, WPU, HTU, KFI	
3.1.6	Develop citizen science protocol for pangolin monitoring	ZSL-PH	1 year	Protocol developed	PBCFI, PSU, WPU, HTU, KFI, IPs	
3.1.7	Citizen scientists trained in monitoring Palawan pangolins	ZSL-PH	Ongoing	No. of citizen scientists trained	PBCFI, PSU, WPU, HTU, KFI, IPs	

Ot	ojective 3	3.2: Resc	ue and re	habilitatio	n capacity	built for	р
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No.	Action	Responsibility	Timeline	Measurable	Collaborators /		
					Partners		
3.2.1	Establish and increase capacity of existing rescue facilities	DENR-BMB	1-10 years	No. of individuals qualified to rehabilitate pangolins	WRS, PSG		
3.2.2	Accredit KFI to receive pangolins	DENR-BMB	1 year	KFI accredited through SEP clearance	WRS		
3.2.3	Through future release of confiscated animals, determine best practice for monitoring release success	PPTF	2 years	No. of releases evaluated	WRS, Save Vietnam's Wildlife		
3.2.4	Palawan pangolin rescue, rehabilitation and release protocol developed	DENR-BMB PCSD	3 years	Protocol developed	PPTF, PSG, Singapore Pangolin Working Group, Save Vietnam's Wildlife		
3.2.5	Appropriate personnel (vets, rescue centers' personnel) trained every 3 years on rescue, rehabilitation and release of pangolins	DENR-BMB	Ongoing	No. of people trained	KFI, WRS		
3.2.6	Streamline air repatriation of pangolins to Palawan	DENR-BMB	2 years	Airlines consulted and MoU signed on repatriation	Airlines		

#### pangolins in the Philippines

No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners
3.3.1	Create an education committee as part of PPTF	PSU, WPU	1 year	Committee established and operational	CHED, Department of Education, other experts
3.3.2	Develop educational materials on the Palawan pangolin for integration into school curriculum	PSU, WPU	2 years	Education materials developed; no. of schools using curriculum	CHED, Department of Education, other experts
3.3.3	Create and implement a communications plan for the Palawan pangolin	ZSL	1-10 years	Communications plan developed; communications plan implemented	CHED, NGAs, Department of Education, SUCs, KFI, Universities and NGOs

Objective 3.3: Education materials developed and integrated into education curriculum in the Philippines

#### GOAL 4: Indigenous Peoples and local communities are empowered to conserve the Palawan pangolin.

Objective 4.1: Empower and strengthen local communities for the protection of Palawan pangolin and its habitat							
No.	Action	Responsibility	Timeline	Measurable	Collaborators / Partners		
4.1.1	Pilot the drafting of ADSDPP (Ancestral Domain Sustainable Development and Protection Plan) in 3 areas in Palawan (South, Central, and North) to include conservation of pangolins	NCIP/IP communities	3 years	No. of ADSDPP's drafted	PCSDS, ZSL, LGUs, DENR, NGOs, NATRIPAL		
4.1.2	Reduce the process length for NTFP permitting and extend permit duration	NATRIPAL/NCIP, DENR, CENRO/ PENRO	2 years	Permitting process improved through revised rules incorporating localized approval and reduced cost for application Resumption of the production of NTFPs by IPs	PCSDS, ZSL, NGOs, DENR Region		
4.1.3	Provide support to IPs for product development and marketing (e.g., rattan, honey)	IP group	2 years		DOST, DTI, NTFP Exchange Philippines, NGOs/Fair Trade Orgs		

No.	Action	Responsibility	Timeline	Measurable	Collaborators /
4.1.4	Develop and deputize more Wildlife Enforcement Volunteers coming from community, bantay- CADT group (to conduct monitoring, surveillance/ intel, first aid, rescue, paralegal) – consider IEC for barangay and municipal officials	PCSD	2 years		IP communities, NATRIPAL, DENR, KFI, ZSL, ELAC, DOJ – Fiscals, Bantay Palawan, PPNPO, PNP – MP, PCG
4.1.5	Develop and distribute IEC materials (World Pangolin Day, Radio spots, social marketing, champions, pride campaigns)	PCSD, DENR	Ongoing		KFI, ZSL, ELAC, NATRIPAL, IP communities, other NGAs, NGOs, schools, and media

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