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LET'S WORK FOR WILDLIFE

EDGE

EVOLUTIONARILLY DISTINCT & GLOBALLY ENDANGERED

Survival Blueprint

Green sea turtle, *Chelonia mydas*
Philippines

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1. STATUS REVIEW

1.1 Taxonomy:

The green sea turtle is the second largest extant species of marine turtle with a global tropical and subtropical distribution (Seminoff, 2004). The family Cheloniidae comprises six of the seven marine turtle species (it does not include the leatherback turtle). The majority of these sea turtles' carapace is made of hard keratin scales. The green sea turtle has the biggest maximum size amongst these hard-shelled turtles. Subpopulations of the green sea turtle occur in Hawaii, North Indian Ocean and the South Atlantic Ocean. There is an interesting study and debate for years now on whether the Black turtle found in the Pacific region is a subspecies of the *Chelonia mydas,* or if it is a full species on its own or is simply a colour morph of the species (Pritchard, 1999; Pritchard et al, 1983).

Class: Reptilia
Order: Testudines
Family: Cheloniidae
Genus: Chelonia
Species: *C. mydas*
Local name: Anono, Payukan, Pawikan

1.2 Distribution and population status:

Green sea turtles have a cosmopolitan distribution in tropical and subtropical oceans. Population size for the global population is restricted to country or regional level estimates for a specific life-stage, mostly nesting females and/or relative estimates of abundance for foraging juveniles. Notably, East Pacific green sea turtles are known/referred to as black turtles.

1.2.1 Global distribution:

Ocean	Population estimate (plus references)	Distribution	Population trend (plus references)	Notes
EASTERN PACIFIC OCEAN	In the early 1970s (Cliffton et al, 1982), ~25, 000 females were recorded but has since dropped to fewer than 500 - 1000 females (Alvarado-Díaz et al. 2001). From 2000 – 2006, annual nesting females reached 1, 395 individuals.	Michoacan, Mexico	Decreasing (Alvarado-Díaz et al. 2001). Increasing slightly in recent years (Delgado & Alvarado, 2006).	Population estimates based on the annual nesting of females at the primary rookery in Michoacan.
	Has 90 annual nests from 1999 – 2002 (Juarez-Ceron et al, 2003)	Revillagigedos Islands, Mexico	Stable (Juarez-Ceron et al, 2003)	Study on nesting stock

	Among the recorded 819 turtles, 624 were green sea turtles (Chabot et al, 2021).	Florida's Big Bend, Gulf of Mexico (GOM)	Not determined	Abundance and distribution were determined through vessel—based distance sampling and active capture methods to characterize current foraging aggregations near the St. Martins Marsh Aquatic Preserve over 10 sampling periods between 2012—2018.
	A total of 1, 233 tagged individuals over 4 nesting seasons (2012-13 to 2015-16) (Fonseca et al, 2018).	San Jose Island, Murcielago Archipelago NW Costa Rica	Unknown	Newly discovered nesting population in which mean annual number of nests and females are higher than those previously reported for Pacific Costa Rica (Fonseca et al, 2018).
	1975 – 1982: 1, 500 tagged nesting females (Hurtado, 1984). During the 2002 nesting season, a total of 2, 756 females were tagged in the four nesting beaches studied. A total of 2, 709 nesting turtles were measured during the present season (Zarate et al, 2003).	Galapagos Biological Reserve of Marine Resources (GMR) Galapagos Islands, Ecuador	Stable over time (National Marine Fisheries Services and U.S. Fish and Wildlife Service, 1998; Seminoff 2004).	Data based on nesting females on major nesting beaches within the GMR. The highest number were recorded in Las Bachas: 925 tagged individuals, Quinta Playa: 704; Bahía Barahona: 680 and Las Salinas: 447.
	A total mean density of 180.4 turtles/km^2 was found with highest densities found in bays and inlets located in the southeast (Quiñones et al, 2015).	Lobos de Tierra Island, Peru	Not determined	Sea turtle abundance determined through fixed point surveys at sea and on land on March 2014 (Quiñones et al, 2015).
WESTERN PACIFIC OCEAN	There are 3,643 green turtles captured in 2014-2017 by mark-recapture study at 3 foraging grounds (Bell et al., 2019).	Great Barrier Reef (GBR), Australia	Not determined	The three foraging populations had similar age class structure and adult sex ratios to other green turtle foraging populations in the GBR.

	A combined total of 117 nesters in 3 islands with at least 62.8 ± 35.1 nests observed per year (Summer et al, 2018).	Commonwealth of the Northern Mariana Islands (CNMI) – Saipan, Tinian and Rota	The CNMI nesting data suggest an annual increase in nesting females of 7.4% per year, which is corroborated by a 10% increase in foraging green turtles (mostly juveniles) estimated from aerial surveys in the southern portion of the archipelago (Martin et al., 2016).	Determined with 11 years of nesting data: nester abundance on 3 islands in CNMI.
CENTRAL PACIFIC OCEAN	In the study of Balazs et al (2015), 4,000 mature individuals were recorded. A related assessment in 2018 recorded 6,550 mature individuals (Chaloupka & Pilcher, 2019).	Northwestern Hawaiian islands specifically in the East Island, French Frigate Shoals (FFS), United States	Increasing (Chaloupka & Pilcher, 2019)	Assessment of this subpopulation's abundance is based on monitoring the number of female nesters at one key rookery in FFS using a 43-year data. Balazs et al (2015) annual surveys were conducted from 1973 to 2012. More recent analyses by Chaloupka and Balazs modelled the number of nesters at based on annual capture-mark-recapture histories.
SOUTHEAST ASIAN SEAS	1940: ~ 36,000 females; 200 females/night on peak season (Schulz, 1984) 1984: ~4,000 – 5,000 females; 25 females/night on peak season (Schulz, 1984)	Berau islands, NE Kalimantan Indonesia	Decreasing (Schulz, 1984).	Data on nesting females.
	Sangalaki Island: average number of nests per month during 2002–2006 was 57.5% of that recorded during 1995–2000. Derawan Island: average number of nests per month during 2002–2006 was 25.5% of that recorded during 1985–1990 (Adnyana et al, 2008)	Derawan islands, Berau, NE Kalimantan Indonesia	Decreasing (Adnyana et al, 2008)	Estimates on nesting individuals and number of nests.

	The population of nesting green turtles in the Turtle Island is estimated to be about 2,500 (Trono, 1993).	Turtle Islands, Philippines	Stable (Cruz, 2002)	Population estimates were based on nesting females and egg production.
	In 1984 - 1989, a total of 27,458 nests were recorded (Trono 1991). As of July 1993, a total of 50,898 complete nests were recorded and in 1992, total of 1,052,168 eggs were produced (Palma, 1993). In 1995 and 2011, ~2,466 and ~2,844 individual nesting females were recorded (Burton 2012).	Baguan Island, Philippines	Unknown	Population estimates were based on nesting females and egg production.
	8,000 nestings per year representing a threefold increase over levels recorded in the early 1980s (Chan, 2006).	Sabah Turtle Islands, Malaysia	Increasing (Chan, 2006)	Population status measured by the number of nests produced per year (Chan, 2006).
	Recorded 2, 000 – 3, 000 nesting per year (Chan, 2006).	Sarawak, Malaysia	Stable or in equilibrium (Chan, 2006).	Population status measured by the number of nests produced per year (Chan, 2006).
	Nesting density averages 2, 000/year (Chan, 2006).	Terrenganu, Malaysia	Not been monitored but anecdotal evidence suggests declines of over 80% (Chan, 2006).	Population status measured by the number of nests produced per year (Chan, 2006).
	In 1985, there have been 933 nests and reduced to 215 in 1995 (Charuchinda, & Chantrapornsyl, 1999). By 2001, there have been 250 annual nests. Moreover, there were 135 nesting females from 1973 – 1983. On 1992 0 2001, there have been 85 nesters (Seminoff. 2004).	Gulf of Thailand, Thailand	Decreasing (Charuchinda & Monanunsap, 1998; Charuchinda, & Chantrapornsyl, 1999).	
	Approximately 100 females nest per year on the islands within the Gulf of Tonkin. In addition, there are 500 females per year along the mainland and near-shore islands of South-Cenral Vietnam (Hamann et al, 2006).	Vietnam	Decreasing (Hamann et al, 2006)	Based on breeding populations or females nesting annually **(**Hamann et al, 2006).

	In 1992, there were about 400 nesters (Zhang, 1992). From 1985 – 2005, the number of nesting and eggs laid each year ranged from 1 to 83 and 131 to 9766, respectively, producing a total of over 75,000 eggs from 665 nests. Average: 30 nests and 3500 eggs/yr. A total of 125 nesting turtles were tagged during this period (range = 1 to 20 tagged females/year) (GSTNNR, 2005).	Gangkou Sea Turtle National Nature Reserve, China	No obvious increasing or decreasing trends are discernable (Chan et al, 2007).	Data based on nesting females, nests and eggs laid per year.
EASTERN AND NORTH INDIAN OCEAN	A total of 7,461 nests and 693,929 eggs were recorded during the study period (Lwin, 2008). A total nesting population of 1283 was recorded at Thameehla Island during the period from 2002 to 2008. In Thameehla Island 280 green turtles were tagged utilizing Inconel Tags during the study period. Among 280 tagged turtles 130 turtles laid eggs (Lwin, 2010).	Thameehla island, Myanmar	Declining (Thorbjarnarson et al. 2000)	The number of sea turtle nests and total eggs laid on the beaches of Thameehla Island were recorded during the period from 1986 to 2007 (Lwin, 2008).
	1981 – 866 nests deposited (Bhaskar, 1984); 2000 – 461 nests deposited (Sunderraj et al, 2006).	Gujarat, India	Not determined	
	Out of 827 nesters, 752 are green sea turtles with 3, 218 nests with 320, 738 eggs (Ekanayake et al, 2002).	Rekawa beach – largest rookery in Sri Lanka	Not determined	Nesting turtles were tagged and number of eggs counted while nesters are laying from September 1996 to July 2000.
	A total of 1,492 nests recorded with a mean of 298.4 annual nests (Ekanayake et al, 2010)	Koskogoda rookery, Sri Lanka – 2nd largest rookery in Sri Lanka	Not determined	Nesting behaviour studied a five-year period from August 2003 to July 2008.
	From 1994 – 1997, there have been 600 nests recorded (Asrar, 1999).	Hawkes Bay and Sandspit, Pakistan	Decreasing (Asrar, 1999)	
	Annual nesting females from 1991 – 1992 range from 408 – 559 individuals (Pilcher, 2000).	Karan island, Saudi Arabia	Stable (Pilcher, 2000)	
WESTERN INDIAN OCEAN	Annual nesting females in the late 1990s are 3, 535 –	Seychelles Island	Increasing (Mortimer, 2011).	

	4, 755 individuals (Mortimer, 2011).			
	Annual nesting females in the late 1990s are 5, 000 individuals (Ahamada, 2001)	Comoros Island	Increasing (Ahamada, 2001)	
	In Europa island, nesting females decreased from 463 to 360 individuals. Same in Tromelin island, it went down from 1, 639 to 1,445 individuals (Rene & Roos, 1996).	Isles Eparces	Decreasing (Rene & Ross, 1996)	Comparison of the nesting females from 1983 – 1987 and 1990 – 1994 data (Rene & Ross, 1996).
	200 – 300 females nesting annually between the periods of 1999 – 2004 (Okemwa and Wamukota, 2006).	Kenya	Not determined (Okemwa and Wamukota, 2006)	
SOUTH ATLANTIC OCEAN	77, 000 mature individuals (Broderick & Patricio, 2019)		Increasing (Broderick & Patricio, 2019)	
EASTERN ATLANTIC OCEAN	A total of 16,778 encounters, defined as the number of tracks. Since 2008, the estimated number from 63 to 649 females annually (Honarvar et al, 2016).	Bioko island, Equatorial Guinea	No significant trend in the number of green turtle encounter rates from the 2000–2001 to 2013–2014 seasons. The trends for other green turtle populations in this region are still largely unknown (Honarvar et al, 2016).	14-year (2000 – 2014) study on turtle species encounters, nesting females, tagging, etc.
	7,000 - 29,000 clutches annually (Catry et al. 2009)	Bijagos Archipelago, Guinea-Bissau	Unknown	Data based on annual nests and estimations to clutches.
CENTRAL ATLANTIC OCEAN	1977: 5,257 nests by about 1,500 females 1978: 10,764 nests by about 3 000 females (Mortimer and Carr, 1987). 1999 – 2004: estimated current breeding population is 11,000–15,000 females (Broderick et al, 2006).	Ascension Island, United Kingdom	Increasing (Broderick et al, 2006)	Population based on the number of nesting females from an estimate of the number of clutches laid (Broderick et al, 2006).
WESTERN ATLANTIC OCEAN	Annual female nesters in 1995 were counted to be 1, 803 individuals (Weijerman et al, 1998).	Galibi Reserve, Suriname	Increasing (Weijerman et al, 1998)	
	Annual nesting females ranges from 335 – 443 from 2005 – 2006 (Vera, 2007)	Isla de aves, Venezuela	Stable (Vera, 2007)	

	In the 1980s, there have been 875 nests/yr. By 2000, nests increased to over 1,500 nests/yr (Marquez, 2004).	Yucatan Peninsula, Mexico	Increasing over the last 2 decades (Marquez, 2004)	Daily nesting beach reconnaissance.
	Number of nests deposited varied from 1,333 to 5,261 (Almeida et al, 2011)	Trindade island, Brazil	Stable (Almeida et al, 2011)	7-year period monitoring (17 non-consecutive nesting seasons, from 1982 to 2009) of nesting by the number of nests deposited on the island (Almeida et al, 2011).
	Annual nests from 2001 – 2005 reached 5, 055 nests and annual nesters of 759 individuals (Meylan et al, 2006).	Florida, USA	Increasing (Meylan et al, 2006)	
CARIBBEAN SEA	Juvenile recruitment (<75.0 cm straight carapace length; SCL) from the north-western Caribbean increased from 12% to 38% while recruitment from the eastern Caribbean region decreased from 46% to 20% between 2006–2007 and 2015–2016 (van der Zee et al., 2019).	Lac Bay in Bonaire	Northwestern Caribbean – increasing Eastern Caribbean - decreasing	Population composition determined at a major juvenile feeding ground during the last decade.
	There are 104,411 nests yearly, corresponding to 17,402 - 37,290 nesting females per year between 1971 - 2003 (Troeng and Rankin, 2005).	Tortuguero, Costa Rica	Increasing, in recovery (Troeng and Rankin, 2005)	Rookery size was defined as the mean number of nests 1999–2003.
MEDITERRANEAN SEA *regionally, green sea turtles in the Mediterranean sea are categorized as Critically Endangered with the populations decreasing (Broderick et al, 2002)	1990 – 2001: 214 – 231 recorded annual nesting females (Broderick *et al*. 2002)	Turkey	Unknown	
	North: 96 – 102 mean number of nesting females (Godley et al., 1998). South: 25 nesting females (Demetropoulos & Hadjichristophorou, 1989).	Cyprus	Unknown	
	1993 – 1998: 1-3 nesting females (Kuller, 1999).	Israel	Unknown	
	Recorded 100 annual nests from June – August 2004 (Rees et al, 2008).	Latakia beach, Syria	Unknown	Data gathered through nesting occurrences and events Rees et al, 2008).

1.2.2 Local distribution:

Population estimates of green sea turtle in the Philippines are based on records of nesting individuals in primary nesting rookeries within established marine turtle sanctuaries in the country. The Turtle Island Group in Tawi-tawi is known to be a major green turtle nesting aggregation among the ASEAN region. Other nesting sites of the green sea turtle include other islands in the province of Palawan, Antique Zamboanga del Sur and Basilan (Marine Wildlife Watch of the Philippines, 2014; Miclat & Arceo, 2018).

Region / province	Site	Level of Protection	Population size	Reference(s)	Notes
PALAWAN PROVINCE	El Nido-Taytay Managed Resource Protected Area (ENTMRPA)	In 1984, it was first declared a Marine Turtle Sanctuary. In virtue of Republic Act 7586 - National Integrated Protected Areas System (NIPAS) Act of 1992, ENTMRPA is legislated to be a protected area.	Unknown	Miclat & Arceo (2018)	Nesting habitat for green sea turtles
	Tubbataha Reefs Natural Park (TRNP)	On 1988, was declared to be a natural park and protected area under Republic Act 7586 - National Integrated Protected Areas System (NIPAS) Act of 1992 1993 – declared as Marine UNESCO World Heritage Site	Unknown	Miclat & Arceo (2018)	Nesting habitat for green sea turtles and foraging area for juveniles
	Municipality of Balabac	NIPAS Area	Unknown	Miclat & Arceo (2018)	
TAWI-TAWI PROVINCE	The Turtle Islands Wildlife Sanctuary (TIWS) – part of the PH-Sabah Turtle Island Heritage Protected Area (TIHPA)	Protected area – for conservation; allowed and regulated turtle egg collection by the locals as part of their tradition, pursuant to DENR-AO No. 33 series of 1982: Regulations Governing the Collection of Marine Turtle Eggs in Tawi-tawi and Reiterating the Duties and Responsibilities of Deputy Conservation Officers and Game Wardens. Specifically, main	Recorded 2, 500 nesting individuals in 1993. 2010 -2012: there were 6,315 nesters; 31,578 nests and 3,189, 176 eggs. 2011: around 14,000 nesters recorded, higher than	Zulkifli et al (2004) Miclat & Nunez (2016)	Estimates are limited to nesting individuals, nests and eggs.

		provisions are focused on the establishment of arrangement wherein 30% of the turtle eggs are for conservation, 10% for a Foundation and 60% for exploitation.	the 12,000 nesters recorded in 1995, with an average of nearly 2 million turtle eggs laid annually from 2010 to 2012.		
	Baguan Island, Tawi-tawi	1982 – Marine Turtle Sanctuary; egg collection prohibited	In 1984 - 1989, a total of 27,458 nests were recorded. As of July 1993, a total of 50,898 complete nests were recorded and in 1992, total of 1,052,168 eggs were produced. In 1995 and 2011, ~2,466 and ~2,844 individual nesting females were recorded (Burton 2012).	Trono (1991) Palma (1993) Burton, 2012	Population estimates were based on nesting females and egg production.
	Four other islands in the TIWS: Bancauan, Taganak Langaan Lihiman Bakkungan	The residents of are allowed to collect 60 percent of the total eggs produced; 30 percent were conserved, and the remaining 10 percent went to the Tawi-Tawi Marine Turtle Foundation.	Unknown	Miclat & Nunez (2016)	
CEBU PROVINCE	Tan-awan, Oslob	Tourist area for whale sharks wherein green sea turtles are also observed foraging, swimming or resting in the area; during tourism hours, fishing is not permitted in the demarked areas.	There are 82 individuals identified wherein 53% of the time they are swimming, 33% feeding and 14% resting.	Araujo, et al (2019)	Estimates were bases with number of turtles encountered through photographic identification as including behaviour observation from January 2015 – October 2018.

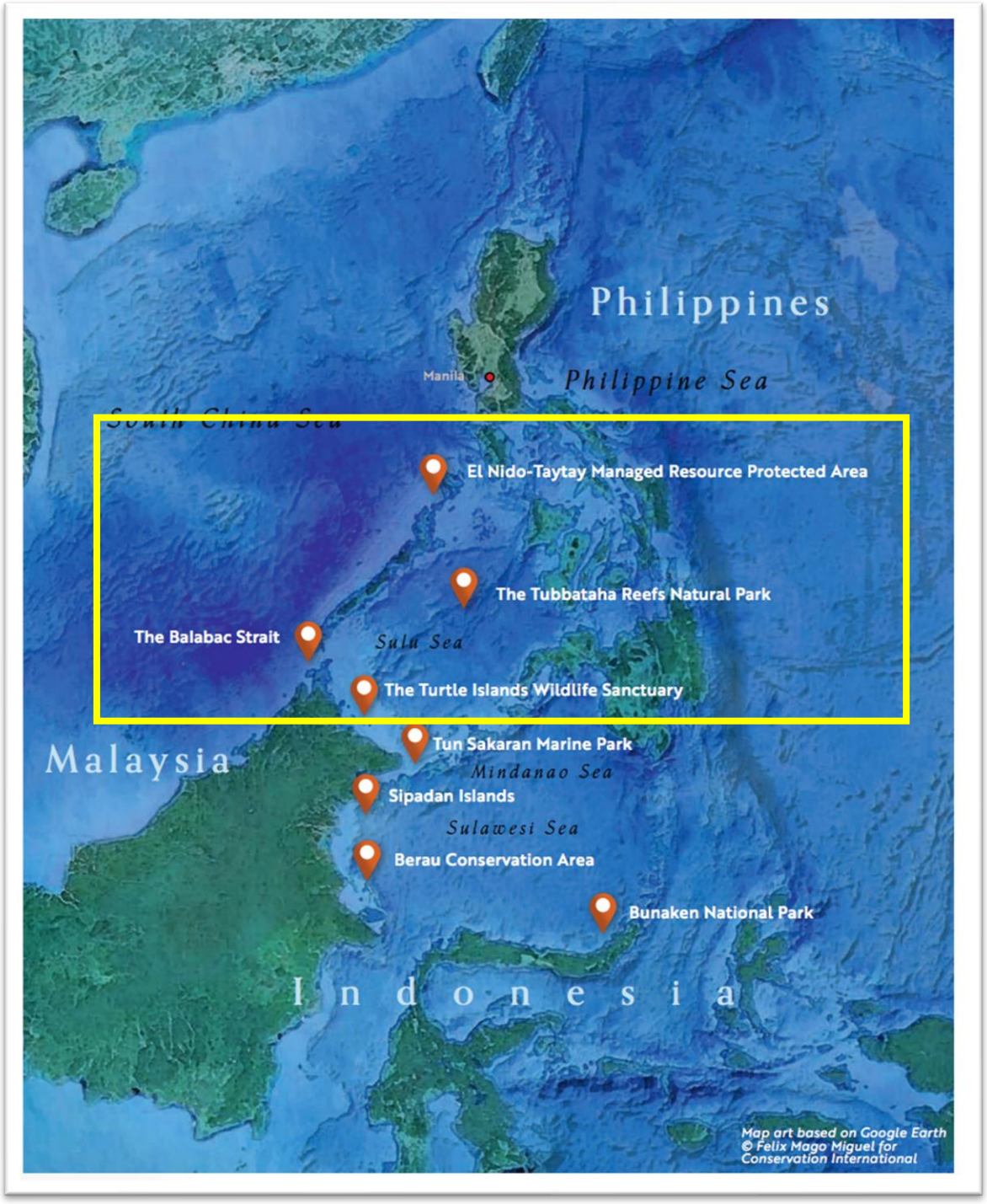

Figure 1. The Sulu-Sulawesi Protected Area Network (Miclat & Arceo, 2018). Highlighted area is the proposed Marine Turtle Protected Area Network (MTPAN) in the Philippines

1.3 Protection status:

The green sea turtle (*Chelonia mydas)* is an evolutionary distinct and globally endangered (EDGE) species. It is also categorized as Endangered on the IUCN Red List of Threatened species. Together with other marine turtle species, it is listed in Appendix I of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) that prohibits international trade of the animal and its products.

On 1948, the Philippines legislated its first policy under a Fisheries Administrative Order (FAO) that focused on the regulation of turtle egg collection. To further protect the remaining population of sea turtles in the country, a nation-wide research and conservation programme was made. In 1979, the Philippine government created the Task Force Pawikan (later renamed as Pawikan Conservation Project). This focused on the following: *(1) habitat surveys and Information, Education, and Communication (IEC) activities; (2) rescue and rehabilitation of marine turtles and dugongs; (3) capacity building; and the (4) establishment of partnerships, networking and monitoring of Memorandum of Agreement (MOA)-related activities*. At present, it is the the Department of Environment and Natural Resources (part of the executive department of the Philippine government) that is primarily responsible for the conservation, management, development, and proper use of the country's environment and natural resources. The Pawikan project at present is specifically integrated into the conservation of threatened species of the Wildlife Resources Division (WRD) of the Biodiversity Management Bureau (BMB-DENR).

Many other legislations to conserve sea turtles and its habitat have been implemented in the country. Through the National Integrated Protected Area Systems (NIPAS) Act on 1992, several protected areas were established for biodiversity conservation and sustainable development including the Turtle Islands Wildlife Sanctuary. The Turtle Island Group also named as Turtle Islands Wildlife Sanctuary (TIWS) is part of the Turtle Islands Heritage Protected Area (TIHPA) – the first trans boundary protected area on sea turtles in the world, established and managed by the Philippines and Malaysia. To further widen the area of marine protection of connected MPAs operating across territories, the Sulu-Sulawesi Seascape was established by the Philippines, Indonesia and Malaysia. This transboundary seascape connects the chain of habitats most especially of endangered and migratory species to complete its life cycle. Aside from the TIWS, three (3) more protected areas in the Philippines are part of it namely (see Figure 1): El Nido-Taytay Managed Resource Protected Area (ENTMRPA), Tubbataha Reefs Natural Park (TRNP) and the Municipality of Balabac (Miclat & Arceo, 2018).

In addition, the Integrated Coastal Resource Management Program (ICRMP) protects the coastal areas which are important habitats for sea turtles. Major laws that provide provisions of penalties against the destruction of critical habitats and prohibitions of the collection of threatened wildlife and its derivatives for non-scientific and breeding purposes are legislated under the Republic Act 8550 (Fisheries Code of the Philippines) and the Republic Act 9147 of 2001 (Wildlife Resources Conservation and Protection Act). Sea turtles are also protected by the Philippine Animal Welfare Act of 1998 protecting its welfare most especially in rehabilitation programmes.

The Philippines also participates in conservation agreements internationally. The country is a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species (CMS), Convention on Biological Diversity (CBD), and the Convention on Wetlands. It is also a member and a party of transboundary and multi-national cooperative conservation programmes such as the TIHPA, Sulu-Sulawesi Seascape and Coral Triangle Initiative.

1.4 Ecology, behaviour and habitat requirements:

Green sea turtles are mega-herbivores feeding and grazing on seagrass and algae like dugongs. As they graze, nutrients stored in the sediments are mixed, increasing the growth and productivity of the seagrass ecosystem. However, foraging habits of green sea turtles are affected by the food available in their feeding grounds. East Pacific green sea turtles (*Chelonia mydas agassizii*) have expanded their diet with non-alga food items such as sponges, tube worms, sea pens and sea hares. (Seminoff et al, 2002).

Being highly migratory animals with complex life stages, green sea turtles inhabit different habitats and geographical areas throughout their life. The species is widely found in tropical and subtropical coastal waters of over 140 countries and nests in n 80 countries worldwide (Seminoff, 2004). Identification and protection of nesting sites is very important as nesting females show high affinity to the area where they were laid, returning there to nest themselves (Miller, 1997). However, there is no data interconnecting the different life stages of adult female/nesters and males and juveniles in which different stages occupy different habitats. After emergence from the nesting beaches where they were born, hatchlings go to the open ocean and spend 5-20 years foraging in the ocean surface and take a journey on what is called the “lost years” (Lanyon et al, 1989). During this stage, migration and use of habitat of these hatchlings are not determined (Campbell, 2007). Immature to adult turtles are then seen about 30 – 50 years on their developmental migration and forage on the coastal shallow water or” benthic foraging zone” (Lanyon et al, 1989). Sexually mature males and females travel thousands of kilometers to start the breeding season. From their foraging grounds, they migrate near to the coastal waters of their nesting beaches (MWWP, 2014). For this stage, scientific efforts are focused on the use of satellite tracking and DNA analysis to further understand migration patterns and habitat use (Luschi et al, 1998; Ferraroli et al, 2004) and their breeding grounds (Bowen and Karl, 1996).

1.5 Threat analysis:

Natural and anthropogenic threats affect the sea turtle population in all its life stages from eggs to adults. Sea turtles have high vulnerability to anthropogenic activities and have long been threatened because of their economic importance. Major threats to green sea turtles include habitat destruction, fisheries by-catch, and poaching for meat and egg consumption.

Threat	Description of how this threat impacts the species	Intensity of threat *(low, medium, high, critical or unknown)*	IUCN Threat category
Egg harvest/ collection (overharvesting of eggs)	Egg removal during the 45 – 75 day incubating period reduces juvenile recruitment. Traditional use by the Tagbanwas continues to this day in certain areas where they have jurisdiction over their claimed ancestral waters under a Certificate of Ancestral Domain Title (CADT). Egg collection and hunting are still being practiced. However, these indigenous groups only consume the eggs and meat of green sea turtle as they find hawksbills inedible and awful (Poonian, et al 2016). The Tagbanwas are found in the northern region (Luzon) of the country in the Palawan province. In the southern region of the country (Mindanao) of the Tawi-tawi region - some areas within TIHPA, the residents are allowed to collect 60 percent of the totaleggs produced; 30 percent were conserved, and the remaining 10 percent went to the Tawi-Tawi Marine Turtle Foundation. Specifically, in the Turtle Islands, Tawi-tawi, the DENR stopped issuing permits to collect marine turtle eggs in 2002 due to the implementation of the Philippine Wildlife Act. In unprotected and unmanaged nesting beaches, egg collection is still prevalent. Even in areas with conservation programs, poaching still exists in the community.	Critical	5.4.2 Biological Resource Use - Intentional Use: Large-scale
Juvenile and adult poaching (both in nesting and foraging habitats)	Juvenile and adult green sea turtles are hunted for their meat while hawksbills have been hunted for their scales. The decline of nesting females impacts highly on the sea turtle population, making it more difficult to recover. With fewer females, egg production for the next generation will also be lost.	Critical	5.4.2 Biological Resource Use - Intentional Use: Large-scale
Degradation of nesting and foraging habitats	Coastal areas in the Philippines have been developed for residential, commercial and tourism-related purposes. The increased waste and contamination from coastal development, construction of ports, increased boat traffic, and harvest of near-shore marine algae resources has affected sea turtle populations and their nesting and foraging habitats. Females return to the beach/shore where they hatched – the most important life cycle habitat; and come to lay eggs. Disturbances such as lights, infrastructure, noise, domestic animals and pollution prevent females from nesting. Nesting	Critical	1.1 Residential and Commercial Development – Housing and Urban Areas

	sites have decreased abruptly in last 35-50 years. Due to tourism demands, hatchlings and even juvenile/adult turtles are being captured and caged for viewing. This phase in their lives is being disrupted as hatchlings are supposed to go out in the open water for the first years of their lives. Seagrass areas around the world are important as these provide shelter for fish, shellfish, sea turtles and even sea cows. Green sea turtle, along with sea cows (dugongs) are the only megafauna solely grazing on seagrass and algae. Coastal areas and communities, adjacent to seagrass beds, are being polluted with domestic and industrial wastes which run-off to the coastal habitats such as mangrove, seagrass and coral ecosystems thereby contributing to the degradation and destruction of these habitats. This threat contributes to disappearing feeding areas for green sea turtles.		1.3 Residential and Commercial Development – Tourism and Recreation Areas
Accidental fisheries related by-catch and illegal fishing	Green turtles forage and swim on coastal and fishing areas. Most of the time, they are caught by long lines, fish corrals and drift nets and illegal fishing methods as dynamite blasting and other gears. Bycatch mortalities lead to drowning and eventually death to the animal. Fisheries bycatch and illegal fishing methods still persist and are difficult to address. To address this issue, the local government in collaboration with the Philippine Coast Guard and the Bureau of Fisheries and Aquatic Resources established "Bantay Dagat" (Sea Guard) in many municipalities have enforcement activities. However, due to lack of logistics and manpower in some areas, the Bantay Dagat is not effective.	High to critical	5.4.3 Biological Resource Use – Unintentional effects: Subsistence/Small-scale (species being assessed is not the target)[harvest]
Ingestion of marine plastic debris	Marine plastic debris affect sea turtle health and fitness by reduced feeding and stomach capacity, increased weakness, reduced reproductive output and exposure to diseases and toxic chemicals. Upon ingestion of these plastics, marine animals have been reported to be drowning, have gastro-intestinal blockage and stomach rupture. Plastics are being ingested as they are visually similar to their natural food. A study by Abreo et al (2016), revealed the first incidence of a recorded mortality of a green sea turtle due to plastic ingestion in the Philippines. Several plastic materials caused blockage in the pyloric end of the stomach which may have caused the turtle's mortality. The most common plastics that were ingested are soft and transparent (33.3 %) and white plastics (33.3 %).	Medium	9.4 Pollution - Garbage and solid waste

Climate change	Most likely, sea-level rise has a destructive impact on sea turtles when it comes to habitat loss. It has been estimated that the Philippines anticipate having a 20-cm (8-in) rise in sea level yearly. Low lying coastal areas and beaches are being reached by the waves causing erosion and degradation. This affects the nesting activities of adult females as they might not find a suitable area to lay eggs and even so may end up laying eggs under the houses of fishers and the likes. As sea turtles depend on the temperature on the sand to determine the sex of a hatchling, increase in beach temperature may influence and affect sex ratios. This creates and imbalance for reproductive activities and genetic diversity.	Medium	11.1 Climate change and severe weather – Habitat shifting and alteration 11.3 Climate change and sever weather – Temperature extremes

1.6 Stakeholder analysis:

Stakeholder	**Stakeholder's interest in the species' conservation**	**Current activities**	**Impact** *(positive, negative or both)*	**Intensity of impact** *(low, medium, high or critical)*
Department of Environment and Natural Resources (DENR) Environmental concerns are forwarded to the government mandated agencies such as the DENR and PCSD.	DENR is an executive department of the Philippine government primarily responsible for the conservation, management, development, and proper use of the country's environment and natural resources They work on the dissemination of information for marine mammal and habitat protection under their jurisdiction including the dugong and sea turtles.	Coordination with its team members and head on the municipal and provincial level on the activities and possible animal stranding and response for rehabilitation. Invitation to participate on meetings and discussions to give more information to the community about the government's programmes on protection and conservation.	Both Positive. DENR has the authority to pass laws and policies for marine management, protection and conservation of sea turtles and its habitat. They also respond to illegal wildlife poaching and conduct enforcement operations. Negative. If the roles are not done well, enforcement of the law and regulation are not implemented and effective to protect wildlife and the environment.	Critical
Palawan Council for Sustainable Development (PCSD)	The PCSD ensures the integration of biodiversity and locally declared conservation areas in Environmentally Critical Areas Network strategy in the Palawan province, regarded as the last ecological	Coordination with its team members and head on the municipal and provincial level on the activities and possible animal stranding and response for rehabilitation. Invitation to	Both Positive. Instead of the DENR, PCSD leads on planning, policy and rulemaking, coordinating, oversight, enforcement, and is the implementing body under RA 7611- the Strategic Environmental Plan (SEP) for Palawan	Critical

	frontier in the Philippines.	participate on meetings and discussions to give more information to the community about the government's programmes on protection and conservation. Conducts information dissemination, awareness activities, community organizing and stranding response and rehabilitation.	Act. Also, PCSD is responsible for the enforcement of other existing laws, rules and regulations similar to or complementary to the Wildlife Act in Palawan. Most especially, PCSD has the authority to establish critical habitats, registration of threatened and exotic wildlife in the possession of private persons and deputation of wildlife enforcement officers. Negative. If the roles are not done well, enforcement of the law and regulation are not implemented and effective to protect wildlife and the environment.	
Mayor of Busuanga municipality	Head of the municipality and the protection of the green sea turtles and pristine waters and beaches can be a source of pride for the municipality and can generate ecotourism activities beneficial for the municipality.	Member of the PCSD Council in Busuanga and participates on the regular meetings to discuss and decide on environmental and eco-tourism related matters. Promotes Eco-tourism in Busuanga municipality.	Both Positive. Provides endorsement and support on policy-making and conservation programmes. Coordination with the office of the Mayor to conduct the activities under her jurisdiction. Gives endorsement to the barangay officials to allow the conduct of the activities. Negative. If the administration gives priority to the tourism and private sector on building establishments and balance out the importance and protection of the green sea turtles and its habitat.	High
Municipal councillor, head on the Committee of Environment and Eco-tourism of Busuanga municipality	Head of the Committee of Environment and his/her main work is to look into programmes best for the environment.	Member of the PCSD Council in Busuanga and participates on the regular meetings to discuss and decide on environmental and eco-tourism related matters.	Both Aligned with their programme for the environment and eco-tourism programme in Busuanga, coordinate plans and activities as well as budget to further the efforts on protection and conservation.	High

		Promotes Eco-tourism in Busuanga municipality.	Negative. If the administration gives priority to the tourism and private sector on building establishments and balance out the importance and protection of the green sea turtles and its habitat.	
Municipal Agriculture Office (MAO) of Busuanga municipality	The Municipal Agriculture Office is a branch of the municipal government currently handling concerns related to coastal and marine and wildlife management and conservation. C3PH is working closely with MAO for the programme's planning and development. Implementation of fishery law and programmes are also being implemented by the Municipal Fisheries and Aquatic Resources Management Council and Federation of Fisherfolk and Farmers Association in Busuanga uplifting the welfare of both basic sectors of farmers and fishers.	Implements livelihood programs for farmers and fishers. Organize associations for their welfare and guide these groups. Holds annual farmers and fishers' festival every May to showcase agricultural and fisheries products as well as spread awareness about the terrestrial and marine species found in Busuanga. These are a source of pride and lobby to protect its treasures.	Positive. Plays an important role locally on the creation of more marine protected areas and declaration of flagship species in Busuanga. Also, can easily mobilize fishers on fishery-related activities and environmental protection and conservation.	Critical
Municipal Fisherfolk Association and Management Council (MFARMC)	Implementation of fishery law and programmes are being implemented by the Municipal Fisheries and Aquatic Resources Management Council and Federation of Fisherfolk and Farmers Association in Busuanga with the MAO uplifting the welfare of both basic sectors of farmers and fishers.	Conducts regular sea-borne monthly patrolling to monitor illegal fishing activities and poaching within the municipal waters. Holds a regular meeting within they also have an educational discussion about the environment.	Both Members of the MFARMC are representatives of different barangays and barangay-wide council (BFARMC) that will assist on the implementation and monitoring of policies and report to the NGOs and government agencies of illegal activities that may harm the green sea turtles. However, from experience, some fishers rather not report of illegal activities and become doubtful as it is believed that these activities are already being	High

			backed up by politicians or higher officers in the government.	
Chieftain	Head of the Tagbanwa tribe and leads to protect the interest of the culture and tradition of the tribe.	Together with the Council of Elders and the Tagbanwa people's organization, laid plans and vision on the nesting beaches of sea turtles within their ancestral domain for protection and of course guided tourism in the future. Declared seagrass areas as a critical habitat for dugongs and sea turtles. Implementing local policies on boat speed limits within coastal areas to avoid animal boat collisions.	Positive. Leads the community and influences them to protect the environment (islands) where their ancestors have been born and lived for years and co-existed with species such as dugongs and sea turtles. Endorses programmes for the environment and the Tagbanwa community to municipal and provincial level.	Critical
Council of elders	Next decision-making body within the Tagbanwa tribe and supports conservation programmes within and around the ancestral domain.	Created a system of people to monitor that local polices are being implemented and followed on a daily basis with the members of the community and that programmes do not only benefit the environment but also the people by supporting local biodiversity friendly enterprises.	Positive. Members of the Council represent the family clans in the Calawit island Tagbanwa community. They influence and inform the families about conservation projects and encourage them to participate in the activities. Crafts local policies, laws and programmes for the environment and the Tagbanwa community. They have this drive and lead to preserve indigenous knowledge systems and practices giving directives to the youth group on how to document these for future generations to pass on.	Critical
Fishers	People involved in the fisheries daily and can benefit on	Organized in groups and association, the	Both Have been closely working with fishers to know more	Critical

	proper management of the resources and species.	Tagbanwa fishers envision the sustainability of their resources and follow policies within them on appropriate fishing grounds and look out for the animals that they consider as their ancestors. Reports to NGOs and government agencies on marine animal stranding and assists on responses and rehabilitation.	about the green sea turtles and its habitat – its range, season, distribution. Provide local information which they gather and know during fishing daily. However, from experience, some fishers rather not report of illegal activities and become doubtful as it is believed that these activities are already being backed up by politicians or higher officers in the government.	
Tagbanwa Women	Interested in conservation efforts and comprise 50% of the population in the communities.	Currently are active on the management and protection of coastal habitats to preserve these areas for their children as well as generate income with seashell collection (gleaning) of bivalves.	Positive Through their skills and interest in desire to participate on community development, Tagbanwa women group also play a big role on awareness-raising. With their limited participation to fishing (economic activity), domestic life can narrow/lessen their knowledge on sea turtle protection and conservation.	High
Tagbanwa youth	Interested in conservation efforts and comprise 50% of the population in the communities.	Currently are actively working hand-in-hand with the community leaders on projects that benefits for the youth sector and the community as a whole. An interesting task of this group is that they are to lead the documentation of the indigenous knowledge systems and practices for example in farming, fishing, cultural activities, etc.	Positive A new and fresh mind and vigorous physical state to work with as they are receptive too with conservation and social work beneficial to the community. Being the successors in the community, a strategic group to work with where we can pass on knowledge and traditions.	High

1.7 Context and background information that will affect the success of any conservation action for this species:

	Description	Barriers to conservation	Opportunities for conservation
Socio-cultural effects and cultural attitudes	- Traditionally the indigenous Tagbanwa people have consumed turtle meat and eggs. - They believe that when they see sea turtles breathing in the surface, it is a sign of bad weather and they would refrain from going out to sea. Sacrificing the turtle and offering to the sea was believed to help bring good weather. - Some generations ago, male reproductive organs were used to diagnose infidelity among partners. - Fishers transitioning into seaweed farming perceive sea turtles as negative for the farms, for they eat the seaweed and though, rarely, they get entangled on the line. - On 2018, 94.5 kilos of fresh green turtle meat and 20 kilos cooked turtle stew were confiscated in a small eatery in Cebu City, found in the Visayan region in the Philippines. Six (6) sea turtle heads were confiscated in the operation. It was allegedly selling raw sea turtle meat for PHP200 (US$3.80) per kilogram and the stew for PHP90 (US$1.71) per serving. The meat stew is believed to be an aphrodisiac. - Under Republic Act No. 9147 (Wildlife Resources Conservation and Protection Act), trading of endangered animals or their by-products is punishable with imprisonment of at least six months to one year, with accessory penalty of	Although hunting sea turtles and consuming their meat and eggs is no longer widely practiced, especially by younger generations, these practices are part of their cultural identity and could be a barrier for implementing conservation actions on-site if the local communities are not involved and engaged with these actions from their onset. Conflict over seaweed farms is and emerging threat for the species. This could imperil results from conservation actions as small-scale local seaweed farms are increasingly being adopted as an innovative financial tool for locally managed conserved areas and as a sustainable livelihood alternative.	The species is deeply linked with their identity and thus, preserving the species is also important for preserving their cultural identity. This could be leveraged to increase local participation and even leadership in conservation actions.

	10,000 to 100,000 pesos. For the slaughter of sea turtle, a violator may be imprisoned for six to 12 years and fined between 100,000 and one million pesos.		
Economic implications	- Illegal trade of carapaces and meat is still ongoing but is very rare. - Seaweed farms as alternative livelihoods are being installed close to seagrass patches, which could reduce critical habitat for the species. Individuals entangled can generate costs as lines need be cut to release them. - Sea turtles are charismatic species and volunteering and tourism-based conservation projects have been profitable and successful in some areas	These activities represent economic incentives to kill individuals of the species, especially for local communities where income alternatives are extremely reduced.	Locally led conservation programmes focused on nesting populations could be developed, leveraging international volunteering and tourism for financial sustainability. Improved management of seaweed farms can reduce entanglement of megafauna and increase engagement of local communities in conservation projects. Palawan province is a famous tourist destination in the world. Tourism can advantageous to promote conservation programmes and community-led income generating sources. It should be noted that the balance between tourism business and conservation can be tricky and we can not somehow balance or work both, it can definitely cause problems.
Existing conservation measures	- All sea turtle species are legally protected in the country. The implementation if these legal frameworks and the international agreements is done by the Department of Environment and Natural Resources.	NGOs and government programmes are not very well coordinated and thus conservation action is not necessarily complementary.	The legal framework and protected sites are already in place, facilitating conservation action on the ground and government level investment for implementation and enforcement

	- Throughout the country there are several organisations dedicated to respond and manage stranding as well as several hatcheries and nurseries		
Administrative/ political set-up	- The executive department of the Philippine's government is primarily responsible for the conservation, management, development, and proper use of the country's environment and natural resources- the Department of Environment and Natural Resources, specifically the conservation of threatened species of the Wildlife Resources Division (WRD) of the Biodiversity Management Bureau (BMB-DENR). The bureau implements through a hierarchical set-up from provincial to municipalities. - Indigenous communities are led by a chieftain and the Council of Elders in which their implementing arm are the officials of a registered indigenous group people's organization (PO). Members of the community belong to different sectors of farmers, fishers, women and youth groups. The The general membership in the community through a General Assembly decides on matters that can not be resolved by the Council of Elders which concerns the whole community itself. - Elders' Councils registered under the National Commission of Indigenous people (NCIP). - The NCIP approves and certifies informed consents from the communities for project permits.	The current administrative set-up increases bureaucracy, which in turns delays administrative processes needed to legally implement conservation actions. It also makes adoption of new practices for improvement lengthier.	Having specific departments to implement policies within all levels of government facilitates the implementation of international agreements focused on the conservation of the species.
Local expertise and interest	- There are many NGOs working with megafauna - including sea turtles- in the Philippines as well as	There is a tendency that scientific research and studies can not be communicated simply to local and	Local experts and scientists increase the knowledge of what we know about these species by studying more about

	long-term programmes that focus on monitoring nesting populations. - Several universities in the country have undergraduate and graduate programmes in marine biology and veterinary, providing good local expertise.	indigenous communities. Also, there is an impression in these communities that the results and recommendations of scientific studies are not appropriate or applicable to the community's direction and perspective on development and conservation.	them and understanding their ecology and behaviour. Also, with these number of experts, different fields and methods can be explored and done as well as locate areas where these species habituate. Going forward, solutions and programmes can therefore be crafted led by the scientists and the local leaders and community members.
Resources	- Formely the Task Force Pawikan, the Pawikan Conservation Project is presently attached to the attached to the Wildlife Division of the Protected Areas and Wildlife Bureau of the Department of Environment and Natural Resources (DENR). The project has a nationwide scope with pilot sites in the Turtle Island Group in Tawi-Tawi and El Nido (Bacuit Bay in Northwestern Palawan). In order to achieve its objectives, the project has instituted three major programs: (1) Resource Management and Protection, (2) Research and Investigation, and (3) Information and Education. - Several Universities and NGOs conducting research and working actively with marine conservation. - International funding landscape has slowly shifted, reducing available financial resources for sea turtles. Sea turtles are charismatic species and volunteering, crowdfunding and other tourism-funded schemes have been successful at gathering financial resources for conservation programmes.	The Philippines is a mega diversity country from the upland to the oceans. However, it is also a biodiversity hotspot with a lot of species and habitat to protect and conserve. There can be different priority species in every part of the country, so national government funds are being utilised in many programmes also depending on the prioritization of the funds yearly. Local funds for sea turtle programmes might be limited and insufficient most especially in areas where there are no National Parks or Protected Landscapes and Seascapes.	With an increasing number of experts and scientists in Philippines, there can be more opportunities and manpower to study on charismatic species such as the green sea turtle. Local indigenous communities are generally interested on the protection of both flora and fauna connected to their culture in which capacity building on crowdsourcing and funding is helpful to allocate for these projects.

2. ACTION PROGRAMME

Vision (30-50 years)	
Viable and healthy nesting and foraging populations of Green Sea Turtles in the Calamianes islands	
Goal(s) (5-10 years)	
Develop and implement a sustainable and collaborative conservation plan with Tagbanwa communities to increase and stabilize green sea turtle population in the Calamianes islands.	
Objectives	**Prioritisation** *(low, medium, high or critical)*
Objective 1: Perform habitat assessments of nesting and foraging grounds of green sea turtles within the ancestral waters of the indigenous Tagbanwa and marine protected areas in the Calamianes	Critical
Objective 2: Estimate population size and reproductive output of green sea turtles in the Calamianes	Critical
Objective 3: Determine movement and habitat use of green sea turtles in the Calamianes	High
Objective 4: Build capacity and provide support to create sea turtle local conservation areas	Critical
Objective 5: Establish a sustainable community- managed programme that will both benefit the species and the members of the Tagbanwa communities.	High

Activities	Country / region	Priority *(low, medium, high or critical)*	Associated costs (currency)	Time scale	Responsible stakeholders	Indicators	Risks	Activity type
Objective 1: Perform habitat assessments of nesting and foraging grounds of green sea turtles within the ancestral waters of the indigenous Tagbanwa and marine protected areas in the Calamianes								
Survey nesting and foraging grounds using standardized techniques on aerial/boat and ground surveys. Also, include new areas identified from fisher and community network sighting reports and interviews.	Indigenous People's Communities (IPC) in the Calamianes Group of Islands (CIG)	Critical	At least ~ £10, 000/year deploy and gather sighting reports and locate identified nesting and foraging grounds	1-5 years	NGOs	Number of identified and reported nesting and foraging grounds Location (coordinates) of the identified and reported nesting and foraging grounds	Identified nesting and foraging grounds are already degraded possibly due to coastal development and siltation, etc. Fishers/volunteers not interested or nor participating in sighting reports Identified and reported grounds can't be located possibly due to false information, habitat degradation, withheld information, etc.	Improving knowledge
Set up and encourage reporting of sightings of turtles by the general public, local communities, fishers, trade boatmen, aero club/helicopter pilots, tour operators, divers, etc.	CIG	Critical	At least ~ £2, 000/year for trainings, distribution and collection of forms,	5 years	IP communities, fishers NGOs, DENR, PCSD, People's organizations, Local Government Unit, private	Number of volunteers who reported Number of reports collected	Not finding interested members/volunteers in the communities and organizations Private individuals and establishments may not be	Awareness and education Improving knowledge

			communication and supplies		individuals and establishments	Data and sighting map from the reports	willing to be involved possibly of disinterest, conflict of interest, etc.	
Train citizen scientists/C3 staff/Sea Rangers/Ecowarriors/Women on the habitat assessment of nesting and foraging grounds	IPC in the CIG	Critical	At least ~ £5,000/ year for trainings and workshops At least ~ £2, 000/year for field equipment and maintenance	2 years	NGOs, DENR, PCSD, People's organizations, Local Government Unit	Number of trained people List of names of the trained people and monitoring scheme	Not finding interested members/volunteers in the communities and organizations Time allotted by the trained members/volunteers to conduct the assessments (monitoring scheme)	Awareness and Education
Create a database and map out the sighting reports and areas of nesting and foraging grounds	IPC in the CIG	High	~ £1,000/ year for research assistance and specialists	1-5 years	NGOs	Data gathered from the sighting reports, interviews and identified nesting and foraging grounds Database report and map		Improving knowledge
Train citizen scientists/C3 staff/Sea Rangers/Ecowarriors/Women on the assessment of nesting and foraging grounds	IPC in the CIG	Critical	At least ~ £5,000/ year for trainings and workshops At least ~ £2, 000/year for field equipment and maintenance	2 years	NGOs, DENR, PCSD, People's organizations, Local Government Unit	Number of trained people List of names of the trained people and monitoring scheme	Not finding interested members/volunteers in the communities and organizations Time allotted by the trained members/volunteers to conduct the assessments (monitoring scheme)	Awareness and Education

Objective 2: **Estimate population size and reproductive output of green sea turtles in the Calamianes**								
Have monitoring and patrolling teams and scheme with the local community for a long-term monitoring and assessment of nesting seasonality and reproductive outputs	IPC in the CIG	Critical	At least ~ £2, 000/year for trainings and workshops	1-5 years	IP communities, NGOs, DENR, PCSD, People's organizations, Local Government Unit	Number and list of people who will conduct the long-term monitoring and assessment Monitoring and patrolling plan and scheme	Not finding interested members/volunteers in the communities and organizations Conflict of interest/schedules/commitment from the volunteer/citizen scientists	Improving knowledge
Train citizen scientists/C3 staff/Sea Rangers/Ecowarriors/Women on the assessment of nesting seasonality and reproductive outputs	IPC in the CIG	Critical	At least ~ £5, 000/year for trainings and workshops	2 years	NGOs, DENR, PCSD	Number of trained people List of names of the trained people and monitoring scheme	Not finding interested members/volunteers in the communities and organizations Time allotted by the trained members/volunteers to conduct the assessments (monitoring scheme)	Awareness and education
Conduct monitoring surveys and patrolling on the nesting beaches to assess seasonality and reproductive outputs	IPC in the CIG	Critical	At least ~ £5, 000/year for field activities and contingency	5 years	NGOs, DENR, PCSD, People's organizations	Data gathered and analysed per site Report of results from the monitoring and patrolling	Assessment activities cancelled due to bad weather conditions Private beach owners (who bought the islands within the IP ancestral domain) may not allow research activities and other related activities	Improving knowledge
Analyse data on nesting seasonality and reproductive outputs	CIG	High	At least ~ £1, 000/year for field activities	5 years	NGOs, DENR, PCSD	Report of results from the monitoring and patrolling	Insufficient data gathered due to insufficient survey times.	Improving knowledge

			of data collation			Peer-reviewed paper on nesting seasonality and reproductive outputs	Data sufficient for quantitative statistical analyses based on nesting seasonality and nesting density.	
Train citizen scientists/C3 staff/Sea Rangers/Ecowarriors/Women on hatchery management and hatchlings release in partnership with the DENR	IPC in the CIG	High	At least ~ £5,000/year for trainings and workshops At least ~ £1,000/year for field equipment and maintenance	2 years	NGOs, DENR, PCSD, People's organizations	Number of trained people List of names of the trained people and monitoring scheme	Not finding interested members/volunteers in the communities and organizations Time allotted by the trained members/volunteers to conduct the assessments (monitoring scheme)	Awareness and education
Objective 3: **Determine movement and habitat use of green sea turtles in the Calamianes**								
Coordinate with the Department of Environment and Natural Resources (DENR) to access or receive satellite tags for post-nesting tagging and movements monitoring	CIG	High	At least ~ £1,000/year for coordination and communication from the local to the national level	1-5 years	NGOs, People's organizations	Number of tags accesses/requested Number of tags deployed Number of trainings in partnership with the DENR	Bureaucracy and long processing to possible access or receive the tags in coordination with the National Office of the DENR Limitations of the number of tags accessed or received (limited resources)	
Train citizen scientists and C3 staff on sea turtle handling, tagging and release and stranding reports and rescue in partnership with the DENR	Islands within the Calawit and San Isidro-Panlaitan IPC	High	At least ~ £5,000/year for trainings and workshops	2 years	NGOs, DENR, PCSD, People's organizations, Local Government Unit	Number of trained people List of names of the trained people and monitoring scheme	Not finding interested members/volunteers in the communities and organizations	Awareness and education Improving knowledge

			At least ~ £15, 000 for the purchase of tags and equipment and maintenance				Time allotted by the trained members/volunteers to conduct the assessments (monitoring scheme)	
Perform post-nesting tagging and movements monitoring	Islands within the Calawit and San Isidro-Panlaitan IPC	High	At least ~ £5, 000/year for field activities and contingency	1-5 years	NGOs, DENR, PCSD, People's organizations	Number of tags deployed Number of animals successfully tagged and tracked	Deployed tags got lost or removed from the animal by natural or human-related situations, etc.	Law and policies Improving knowledge
Analyse data from the receivers	Islands within the Calawit and San Isidro-Panlaitan IPC	High	At least ~ £5, 000/year for field activities of data recovery of tags and contingency	5 years	NGOs, DENR, PCSD	Report of the tagging and movement monitoring tracking Peer-reviewed paper on tagging and movements	Losing data from lost/unrecovered tags due to bad weather conditions, removal from the animal by natural or human-related situations, etc.	Law and policies
Objective 4: **Build capacity and provide support to create sea turtle local conservation areas**								
Identify areas of critical habitat such as migratory corridors, nesting beaches, inter-nesting and feeding areas through series of public consultations, stakeholders meetings and workshops	IPC in CIG	Critical	At least ~ £5, 000/year for trainings, seminars and workshops in different areas	1-5 years	IP communities, NGOs, DENR, PCSD, People's organizations, Local Government Unit	Identified areas of critical habitat Map of the identified critical habitat areas	Information might not be enough to identify critical habitat areas Critical habitat areas are privately owned and can have conflict on interests or the likes	Law and policies Improving knowledge
Increase public awareness and community	CIG	High	At least ~ £2, 000/year for educational	5 years	IP communities,	Number of people who attended	Institutions and communities are not suited for this program (unsatisfactory evaluation)	Awareness and Education

participation in sea turtle conservation			discussion, community and classroom learning and materials		NGOs, DENR, PCSD, People's organizations	List of names of the people who attended Evaluation from the attendees on how effective the discussions were Local programme on educational sea turtle conservation	Lack of interest from principals or teachers and community leaders and members Lack of resources	
Designate and manage sea turtle conservation areas, sanctuaries or temporary exclusion zones in areas of critical habitat through series of public consultations, stakeholders meetings and workshops	IPC in CIG	Critical	At least ~ £2, 000/year for trainings, seminars and workshops in different areas	1-5 years	IP communities, NGOs, DENR, PCSD, People's organizations, Local Government Unit	IP communities' local ordinances stating the declaration and designation of local conservation areas Community management plan and management committee	Local leaders and authorities might not agree and not interested in this project Policies can be either vague or localized that there can be risks of forgetting or exclusion of policies in the management plan **Local conservation areas can have conflicts with fishing grounds and small-scale aquaculture livelihood of the community members**	Law and policies
Legislate in the local/municipal/provincial and national levels the establishment of community-managed	IPC in CIG	Critical	At least ~ £2, 000/year for trainings, seminars and write shops in	1-5 years	IP communities, NGOs, DENR, PCSD, People's organizations,	Policy brief/ordinances/executive orders from the local to the national level	Bureaucracy and long processing from the local to the national level and back to the groundwork	Law and policies

conservation areas/critical habitats			different areas; processing of documents		Local Government Unit		Leaders and authorities might not agree and not interested in this project	
Formulate and implement local policies to eliminate disturbances at nesting beaches (ex. decreasing artificial lighting, building infrastructures by the beach, etc.)	IPC in CIG	Critical	At least ~ £5, 000/year for trainings, seminars and write shops in different areas; processing of documents	1-5 years	IP communities, NGOs, DENR, PCSD, People's organizations, Local Government Unit	Policy brief/local ordinances and executive orders IP communities' local ordinances and signage	Local leaders and authorities might not agree and not interested in this project Nesting beaches are privately owned and can have conflict on interests or the likes	Law and policies
Develop and implement a six-year management plan through participatory processes	Islands within the Calawit and San Isidro-Panlaitan IPC	Critical	At least ~ £20, 000/year for trainings, workshops and salary contributions	1 year	IP communities, NGOs, DENR, PCSD, People's organizations, Local Government Unit	Community management plan and management committee	Leaders and authorities might not agree and not interested in this project Nesting beaches are privately owned and can have conflict on interests or the likes	Law and policies
Objective 5: **Establish a sustainable community- managed programme that will both benefit the species and the members of the Tagbanwa communities.**								
Identify and facilitate alternative (income generating activities) that would not harm the sea turtles and its habitat through a consultation with	Islands within the Calawit and San Isidro-Panlaitan IPC	Critical	At least ~ £2, 000/year for trainings and workshops ~ £5, 000 for the consultant	2-3 years	IP communities, NGOs, People's organizations	Identified income generating activities for the Tagbanwa communities and sectoral people's organizations	Local leaders and authorities might not agree and not interested in this project Non-feasible (harmful, impactful) income generating	Capacity building

the Tagbanwa communities and other stakeholders			and conduct of feasibility studies				activities in the area; lack of information and participation	
Workshops with tour operators, tour guides, dive masters and guides and the Tagbanwa communities to identify possible eco-tourism area on sea turtles and guidelines on snorkelling and diving	CIG	Critical	At least ~ £2, 000/year for trainings and workshops ~ £5, 000 for the consultant and conduct of feasibility studies	2-3 years	IP communities, NGOs, DENR, PCSD, People's organizations, Local Government Units Tourism sector: Private individuals, tour operators, divers, tour guides, etc.	Identified areas for ecotourism activities related to sea turtles Feasibility study	Not finding interested members/volunteers in the communities and organizations Private individuals and establishments may not be willing to be involved possibly of disinterest, conflict of interest, etc. Differences on the understanding of the guidelines and protocols	Capacity building
Multi-stakeholder meetings with the tour operators, tour guides, tour operators and the Tagbanwa community to consult and formulate a Memorandum of Understanding and the Rules and Procedures of the eco-tourism activity	CIG	Critical	At least ~ £2, 000/year for meetings, trainings and workshops	2-3 years	IP communities, NGOs, DENR, PCSD, People's organizations, Local Government Units Tourism sector: Private individuals, tour operators, divers, tour guides, etc.	Memorandum of Understanding Rules and Procedures Ecotourism Guidelines and Protocols	Not finding interested members/volunteers in the communities and organizations Private individuals and establishments may not be willing to be involved possibly of disinterest, conflict of interest, etc. Differences on the understanding of the	Capacity building

							memorandum, guidelines and protocols	
Train local tour guides for safe and responsible sea turtle observation	Islands within the Calawit and San Isidro-Panlaitan IPC	High	At least ~ £2, 000/year for trainings and workshops At least ~ £1, 000/year for equipment and maintenance	2 years	NGOs, DENR, PCSD, People's organizations, Local Government Unit	Number of trained people List of names of the trained people Local sea turtle ecotourism guidelines and protocols	Not finding interested members/volunteers in the communities and organizations Time allotted by the trained or conflict of schedule of the members/volunteers to be involved in the stranding response	Awareness and Education
Ensure equitable sharing of resulting revenues and other benefits with local communities through workshops, seminars and technical support	Islands within the Calawit and San Isidro-Panlaitan IPC	Critical	At least ~ £2, 000/year for trainings and workshops ~ £5, 000 for the consultant and conduct of value chain analysis, business planning and the likes	5 years	IP communities, NGOs, People's organizations DENR, PCSD, Local Government Units	Local document on equitable sharing Value chain analysis reports Business plans	Local leaders and authorities might not agree and not interested in this project Financial conflict and disagreements/misunderstandings	Capacity building

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