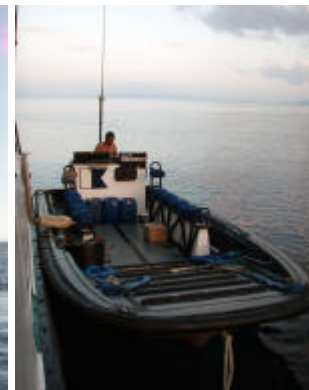




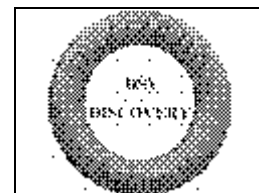
**Whale Shark
Photo-Identification
Project,
Sogod Bay, Philippines
March 29 - April 5, 2007**



Coral Cay Conservation
Elizabeth House,
39 York Road,
London SE1 7NJ,
United Kingdom.
www.coralcay.org



Philippine Reef and Rainforest
Conservation Foundation Inc.,
South Capitol Rd.
Bacolod City 6100
Philippines
www.prrcf.org



DSV Discovery
Ouano Wharf
E.C.Ouano Bldg.,
Looc, Mandaue City,
Cebu, Philippines.
www.dsvdiscovery.demon.co.uk

Acknowledgements

Coral Cay Conservation would like to thank the following, without whose support, guidance and endeavour, this project would not have been possible:

The Provincial Government of Southern Leyte

The Philippine Reef & Rainforest Conservation Foundation Inc.

The Municipality of Pintuyan and Tourism Officer Moncher Bardos

The Municipality of San Ricardo and Tourism Officer Lauro Elijorde Jr.

The fisherfolk and communities of the Barangays of Sonok and Pintuyan

The spotter association of Barangay Pintuyan

Ernesto Felicio and Muriel Felicio

CCC Society Patrons: Jake and Diane Turner

CCC Expedition Staff: Rob King

CCC Volunteers: Sue Gibbins, James Kelly, Julianna Mullen, Helen Kelly, Dominic Davies, Danielle Watt, Brendan Watt, Sam Crawford and Angela Quiros

And last, but by no means least, CCC would like to thank Martin Woodward, Paul Couch, Tony Watt, and the marvellous crew of the Diving Support and Survey Vessel, DSV Discovery, whose hospitality, professionalism and humour was unparalleled.



Report produced by Angela Quiros, Luisa Fernanda Campo, Jan-Willem van Bochove, Simon Harding and Peter Raines.

1 Background and Objectives

The Whale Shark Photo-Identification Project, Sogod Bay in Leyte, Philippines 2007 is the second year that Coral Cay Conservation has teamed up with the diving support and survey vessel DSV Discovery. The purpose of this project is to continue the whale shark survey started in 2006 to photo-identify individual whale sharks in Southern Leyte, Philippines. During an 8-day survey in late March and early April 2007, a team visited Sonok Point to gather photographs for submission to the Shark Trust (UK) and the Ecocean Project (Australia). The survey was repeated to ascertain whether individuals sighted in 2006 have returned to the same area. (For more detailed information about CCC, the province of Southern Leyte in the Philippines, and more background on whale sharks, see Whale Shark Photo-Identification Project, Sogod Bay, Philippines, March 24-30, 2006).

1.1 Coral Cay Conservation

Effective coastal zone management, including conservation of coral reefs, requires a holistic and multi-sectoral approach, which is often a highly technical and costly process and one that many tropical countries cannot adequately afford. With appropriate training, non-specialist, self-financing volunteer divers have been shown to be able to provide valuable data for coastal zone management at little or no cost to the host country (Mumby *et al.*, 1995). This technique has been pioneered and successfully applied by Coral Cay Conservation (CCC), a British not-for-profit organisation.

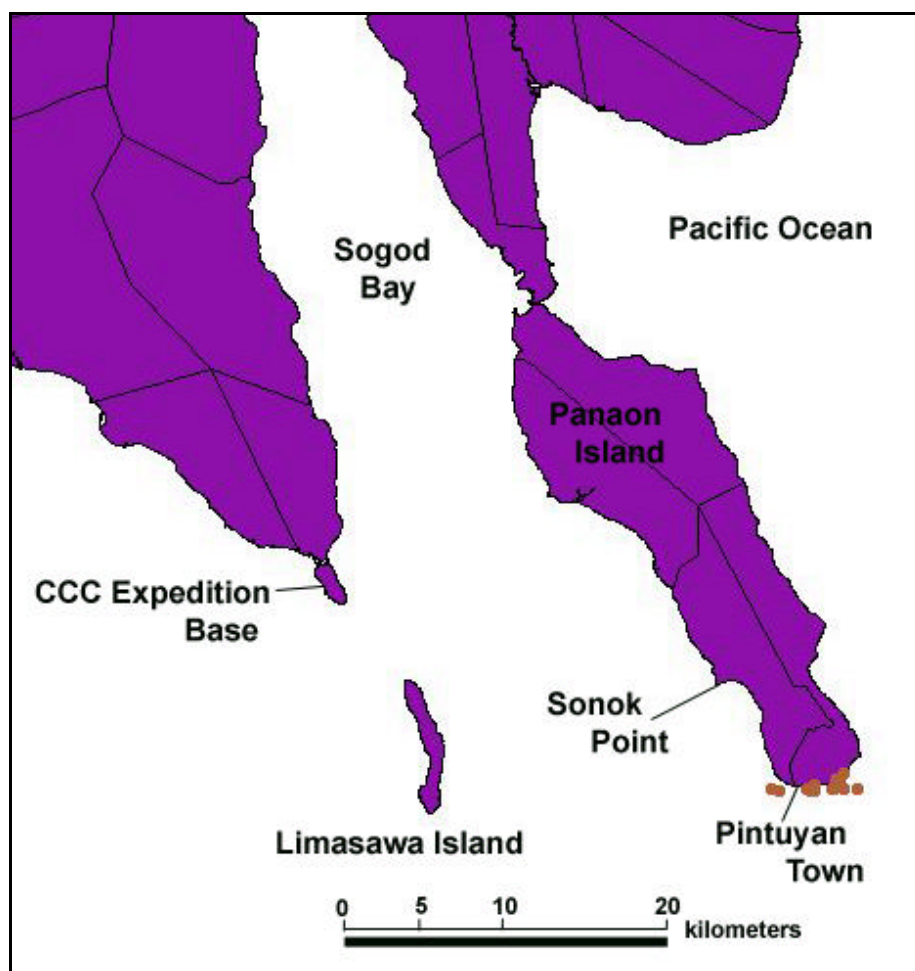
Founded in 1986, CCC is dedicated to '*providing resources to protect livelihoods and alleviate poverty through the protection, restoration and sustainable use of coral reefs and tropical forests*' in collaboration with governmental and non-governmental organisations within a host country. CCC does not charge the host country for the services it provides and is primarily self-financed through a pioneering volunteer participatory scheme whereby international volunteers are given the opportunity to join a phase of each project in return for a financial contribution towards the project costs. Under the guidance of qualified and experienced project scientists, the volunteers undergo an intensive training programme in marine life identification and underwater survey techniques, prior to assisting in the acquisition of data. Finances generated from the volunteer programme allow CCC to provide a range of services, including data acquisition, assimilation and synthesis, conservation education, technical skills training and other capacity building programmes. CCC is associated with the Coral Cay Conservation Trust, the only British-based charity dedicated to protecting coral reefs.

Coral Cay Conservation also runs mini-expeditions, where society members who cannot spare the time to join a full 1 month CCC expedition can join specifically tailored "mini-expeditions". One of CCC's marine scientists accompanies each of these trips, giving lectures on marine science, species identification and/or surveying techniques, as appropriate to the needs of the society members.

1.2 Southern Leyte, Philippines

The Philippine archipelago of approximately 7100 islands forms part of the Wallacea Triangle, an area renowned for its high terrestrial and marine biodiversity. Some 499 hard coral species (Chou, 1998) and more than 2500 fish species (Leiske and Myers, 2001) have been recorded to date. The coastline is fringed with approximately 25,000 km² of coral reefs, about 10% of the land area of the whole archipelago (Spalding *et al.*, 2001).

Southern Leyte, one of the six provinces of Eastern Visayas, is bounded in the north by the Province of Leyte, in the south by Mindanao Sea, in the east by the Pacific Ocean and in the west by the Canigao Channel. Sogod Bay (10° 12' N, 125° 12' E) is surrounded by 131.67 km of coastline and encompasses the islands of Panaon and Limasawa (Map 1).



Map 1: Sogod Bay, Southern Leyte showing locations of whale shark sightings

The coral reefs of Southern Leyte remain some of the least disturbed and least researched habitats in the Philippines. Sogod Bay is an important fishing ground and the area is rich in tuna, flying fish, herrings, anchovies, shellfish, and mackerel. The

Bay has been targeted by the Fisheries Sector Program of the Department of Agriculture as one of the country's ten largest bays in need of assessment and management (Calumpong *et al.*, 1994). Sogod Bay is also a feeding ground for charismatic mega-fauna such as pilot whales, melon-headed whales, dolphins, and whale sharks.

The topography of the coast surrounding Sogod Bay is characterised by steeply sloping hills. The western side of the bay has a flatter topography than the eastern coast, where steep hills often slope straight into the sea. The seabed is steeply sloping, providing the bay with a minimal coastal shelf and a deep, narrow central channel. There are two major rivers entering the north of Sogod Bay: the Divisoria River in Bontoc and the Subang Daku River in Sogod.

1.3 Whale Sharks

Despite the fact that the sharks and the 'true fishes' (bony fishes, jawless fishes, coelacanths etc) do not share a discreet common ancestor, they are often grouped together in common parlance as 'fish', a grouping referred to as a 'grade' by taxonomists. The whale shark, *Rhincodon typus* (Smith, 1828), is the largest member of this grade; its extraordinary maximum size of over 12m frequently earns it the moniker "the largest fish in the world". In fact, some researchers suspect that they may even reach sizes of 20m¹. Along with the rays, skates and chimaeras, sharks belong to the class Chondrichthyes, distinguished by the fact that they all have a skeleton made of cartilage rather than bone. In total, there are nearly 1000 species within this class. Sharks, skates and rays are grouped together in the sub-class Elasmobranchii, with the whale sharks being further segregated into the order Orectolobiformes, the carpet sharks. It is the only member of its family, Rhincodontidae, and thus its genus, *Rhincodon*. Its scientific name, *Rhincodon typus*, translates as 'rasp-tooth' 'type'.

Inhabiting most of the world's tropical oceans, whale sharks are cosmopolitan animals, and are known to undertake long migrations². Tagging and DNA sampling have indicated that males tend to migrate further than females, the latter habitually returning to their place of birth (Froese and Pauly, 2006). However, very little else is known about their movements, mating or lifestyles. They can often be found near river estuaries or upwelling areas, where increased levels of nutrients in the water encourage the proliferation of phytoplankton, which in turn increases the abundance of zooplankton. Whale sharks feed mainly on these zooplankton, filtering seawater through their modified gills. Their feeding appendage has evolved to allow them to actively 'suck' water into their mouths, permitting them to remain motionless in the water whilst feeding, should they so choose. They can often be seen to move their heads from side to side as they feed, and even to lift their heads partially out of the water (Clark and Nelson, 1997).

Although solitary animals are often encountered, large aggregations of over 100 individuals are also not unusual (Compagno, L.J.V., D.A. Ebert and M.J. Smale, 1989),

¹ Florida Museum of Natural History

² IUCN Red List of Threatened Species

and despite their enormous body size, they are not aggressive towards humans. In a number of areas of the world, tourism initiatives have begun to capitalise on these characteristics, offering visitors the chance to see these remarkable creatures in the wild. Their gentle nature even makes it possible to swim with them when they approach the surface of the sea.

However, these very same characteristics also make them vulnerable to human exploitation from hunting. The flesh can be eaten and the fins are sold for high prices to supply the Asian restaurant market. Whale shark cartilage is used in spurious anti-cancer 'medicines', the oil from their liver is used in the waterproofing of wood and their offal is ground up to make fish meal. Although it is hard to estimate the populations of these animals, the threat posed by such exploitation was considered sufficient to have them listed under Appendix II of the Convention on the International Trade in Endangered Species (CITES) in November 2002. Pre-empting this move, the Maldives protected whale sharks in 1995, and the Philippines followed suit in 1998³.

The legal protection of whale sharks within the Philippines has raised the profile of the animals, and has facilitated the development of tourism initiatives based around the sustainable exploitation of the animals. On the island of Donsol, for example, the arrival of the sharks in the late 1990s created the opportunity for such an industry. The Local Government Units and community members teamed up with WWF Philippines to define and install management initiatives, with outstanding success. Since 1998, over 8000 visitors have snorkelled with the whale sharks in Donsol, and the 4.2 million pesos that have been generated through the payment of user fees have created numerous jobs within the town. Time magazine have gone as far as to describe Donsol as the best place in Asia for an animal encounter⁴.

In recent years, however, the popularity of Donsol as a whale shark tourism site has changed from what was originally a conservation-development strategy into what is more akin to mass tourism. Visitor arrivals and the resulting increases in boat trips and rule breaking by operators and tourists have caused visitor discomfort, conflicts among industry members, and whale shark avoidance behaviour (Quiros, 2007). Interaction guidelines are not site-specific, tourism management is slow to respond and adjust to changes, and monitoring is not properly financed, all to the detriment of the whale sharks. The Donsol case has shown that ecotourism plays a variable role as a conservation development strategy. By managing impacts to whale sharks, addressing conflicts among stakeholders, spreading benefits equitably, and with active NGO and government support, Donsol can move back to its original vision of community-based ecotourism principles (Quiros, 2005).

Despite the issues in Donsol, whale sharks come year after year to feed in Donsol waters and tourist arrivals continue to increase. The popularity of Donsol has paved the way for other fishing communities within the Philippines to see the whale shark as a resource that can generate a sustainable income, rather than one that should be fished for a one-off bounty. Within the Province of Southern Leyte, whale sharks have

³ The Shark Trust

⁴ Worldwide Fund for Nature (WWF)

visited Sogod Bay for longer than living memory (Neil Pretencio, pers. comm.). Whale sharks were never traditionally hunted in Southern Leyte, although there are reported mortalities due to individuals becoming entangled in fisher's nets (Ernesto Felicio, pers. comm.).

Southern Leyte currently has no formal structure for the development and management of a tourism industry based on these animals. The majority of sightings of the sharks are on the eastern side of Sogod Bay, possibly as a result of the peculiar current patterns created by the channel at the town of Liloan, with most of the sightings taking place between February and April (Neil Pretencio, pers. comm.). In early 2007, the animals were mostly sighted further south than usual, near the town of Sonok (Tony Exall, pers. comm.). This is thought to be the first year that they have consistently visited Sonok Point (Mayor of Pintuyan, pers. comm.) although the reasons for this remain unclear. A lack of long-term information on the number of individuals sighted and the movements of the animals within the bay makes it impossible to make robust scientific observations regarding their population dynamics.

In order to begin to address this issue, Coral Cay Conservation teamed up with the diving support and survey vessel, DSV Discovery, to undertake a preliminary whale shark survey in order to identify as many of the individual animals as possible. For seven days in March 2006, teams of surveyors visited Sonok Point, taking digital images for submission to the Shark Trust (UK) and the Ecocean Project (Australia), as detailed below. The survey was repeated at the same time of year in 2007 in order to record new individuals and determine whether any individuals seen in 2006 had returned to the area.

2 Methods

The team of surveyors followed the Whale Shark Code of Conduct endorsed by The Shark Trust. Surveyors mostly maintained a distance of 3 metres from the shark, and 4 metres from the tail, never touched the shark, and did not use flash photography. The team actively surveyed for whale sharks in a small survey vessel for approximately 2 hours in the morning, between 7:30-10 am and for 2 hours in the afternoon between 3-6 pm. Divers also positioned themselves under the DSV Discovery twice a day, waiting for whale sharks to approach the boat. Observations of whale sharks during the noon hours were incidental.

The team searched for whale sharks up and down the coast, and for half of the time they were accompanied by 2 local spotter boats that aided in the search. Surveyors and spotters searched for whale sharks both above and below the water. From above the water, spotters looked for a shadow in the water, indicating a whale shark near the surface or a dorsal or caudal fin sticking out of the water. From below the water, whale sharks were sighted when surveyors placed their masks into the water from the boat or were pulled on a manta tow.

Once a whale shark was sighted, surveyors entered the water with snorkelling gear and underwater cameras. They took photos of the left hand side of the whale shark, dove under the shark to check for gender, measured the length of each shark by

comparing length of nearby swimmers to the shark, took GPS coordinates, the time each interaction started and ended, feeding behaviour, rule breaking by snorkelers, avoidance and other behaviours of the whale shark, movement of the shark, depth at which the shark was encountered, temperature of the water, and any markings on the shark.

3 Results

3.1 Interactions

The majority of the sightings were before 10:00 (27%) or after 15:00 (50%). The average length of time for each interaction was 5 minutes, with a minimum of 30 seconds and a maximum interaction of 21 minutes. Figure 1 depicts the distribution of sightings throughout the day.

Out of the total 62 interactions, whale sharks were sighted using snorkelling techniques 36 times (58%), SCUBA diving 24 times (39%), and from the boat twice (3%).

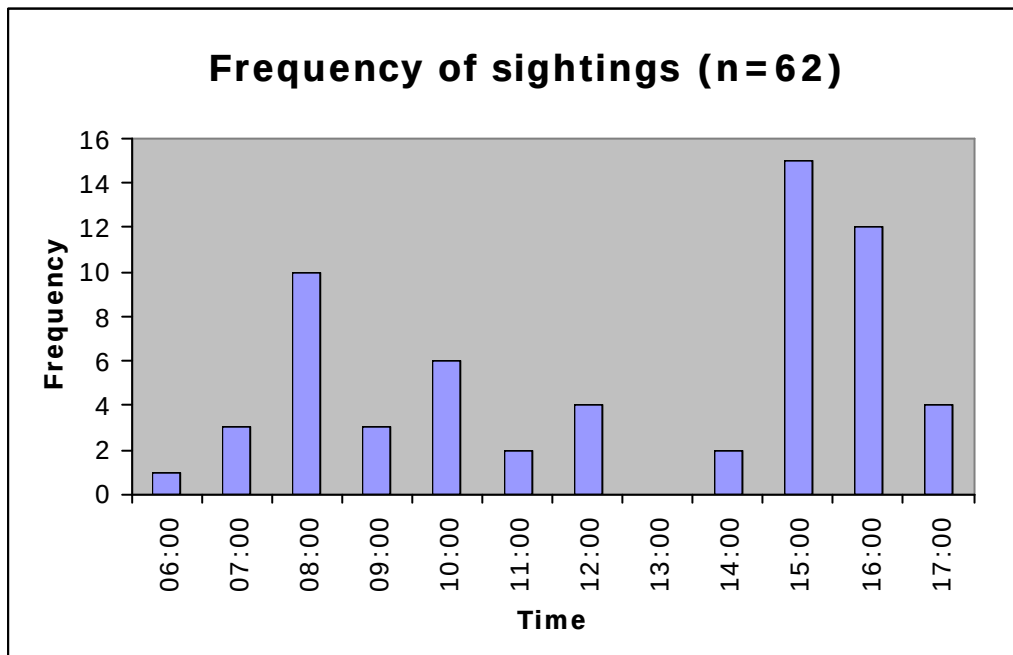


Figure 1: Frequency of Whale shark observations over time.

3.2 Photo-ID Images

The fieldwork was conducted over a period of 8 days, with 28 individual sharks sighted over 62 interactions. It was difficult to obtain detailed information of the sharks while diving because the whale sharks were a considerable distance from the divers and/or swam against the current. As a result, divers could not take appropriate photographs, accurately measure length, nor check gender. Many of the sharks observed by snorkelers were deeper in the water column and appropriate

photos could not be taken for many of the sharks from the side. The low number of underwater cameras also limited the number of photos taken.

Photo-ID images were obtained for 9 individual whale sharks. Table 1 contains descriptions for each individual, the position and time sighted, number of interactions and an ECOOCEAN i.d. number.

Table 1: Details of Whale Shark surveys in Southern Leyte for individuals that were photographed.

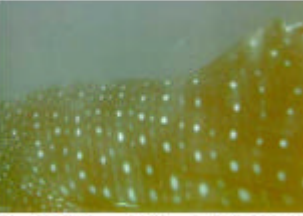
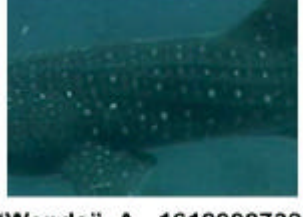
No.	Allocated name	Photographer (s)	Date Sighted	Length (m)	Gender	Interaction times	Position	ECOOCEAN Encounter No.
1	Sue	Sue Gibbins	30/03/07	6	Female	08:04 -0 8:14	09.9061 N, 125.2545 E	161200862918
2	Martin	Sue Gibbins	30/03/07	4.5	Male	08:39 - 08:51	09.9061 N, 125.2545 E	161200864033
3	Scarback*	Sue Gibbins & Angela Quiros	30/03/07	4.5	Female	1. 07:35-07:40	09.9072 N, 125.2876 E	16120086506
	"	"	"	"	"	2. 07:46-07:52	09.9072 N, 125.2876 E	"
	"	"	"	"	"	3. 11:05-11:08	09.9072 N, 125.2741 E	"
	"	"	"	"	"	4. 12:45-12:55	09.9056 N, 125.2861 E	"
	"	"	03/04/07	"	"	5. 15:32-15:36	09.9085 N, 125.2812 E	"
4.	Circle off Dorsal	Martin Woodward, Sue Gibbins & Angela Quiros	01/04/07	7	Female	1. 09:01-9:22	09.9057 N, 125.2722 E	161200871111
	"	"	"	"	"	2. 15:38-15:42	09.9064 N, 125.2882 E	
5	Big mouth	Sue Gibbins & Angela Quiros	01/04/07	4.5	Female	15:50-16:07	09.9073 N, 125.2873 E	161200873044
6	Wenda	Martin Woodward	04/04/07	7	Female	10:30-10:40	09.9081 N, 125.2765 E	16120087391
7	Discovery	Angela Quiros	03/04/07	n/a	n/a	n/a	n/a	161200874155
8	CCC	Angela Quiros	04/04/07	n/a	n/a	n/a	n/a	161200874536
9	2 Dots	Angela Quiros	04/04/07	n/a	n/a	n/a	n/a	161200874840

Note: The numbers in parentheses below refer to the number of images submitted to the EcoOcean database

1. "Sue" (2)
2. "Martin" (2)
3. "Scarback: (3) *Possible match with Shark 1 95200685932, seen on 3/23/2006 in Sonok Pt, Leyte
4. "Circle off Dorsal" (4)
5. "Big mouth" (2)
6. "Wenda" (3)
7. "Discovery" (1)
8. "CCC" (1)
9. "2Dots" (1)

Figure 2 (on following page):

Photo-ID Images submitted to The Shark Trust and Ecocean. Listed codes are Ecocean encounter numbers (<http://www.shepherdproject.org/overview.jsp>)

		
"Sue"- A - 161200862918	"Sue - B - 161200862918	"Martin"- A - 161200864033
		
"Martin"- B - 161200864033	"Scarback"- A - 16120086506	"Scarback"- B - 16120086506
		
"CircleOffDorsal"- A - 161200871111	"CircleOffDorsal"- B - 161200871111	"CircleOffDorsal"- C - 161200871111
		
"CircleOffDorsal"- D - 161200871111	"BigMouth"- A - 161200873044	"BigMouth"- B - 161200873044
		
"Wenda"- A - 16120087391	"Wenda" - B - 16120087391	"Wenda"- C - 16120087391
		
"Discovery"- 161200874155	"CCC"- 161200874536	"TwoDots"- 161200874840

3.3 Length and gender observations

96% of the 28 observed animals were between 4.5 and 7m in length, with a mean of 5.8m (SD=1.04). Of the 28 confirmed individual sightings, 22 were sexed, 4 were male and 18 were female.

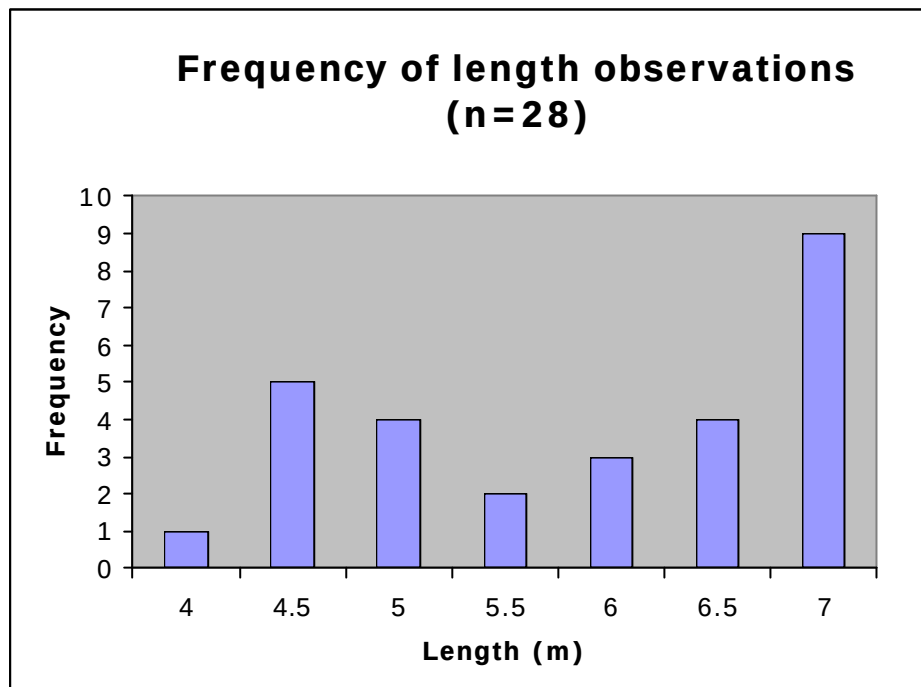


Figure 3: Length Frequency distribution for recorded individuals

3.4 Feeding and other behaviour

Out of the 62 interactions, whale sharks were observed feeding 26% of the time. Feeding behaviour included:

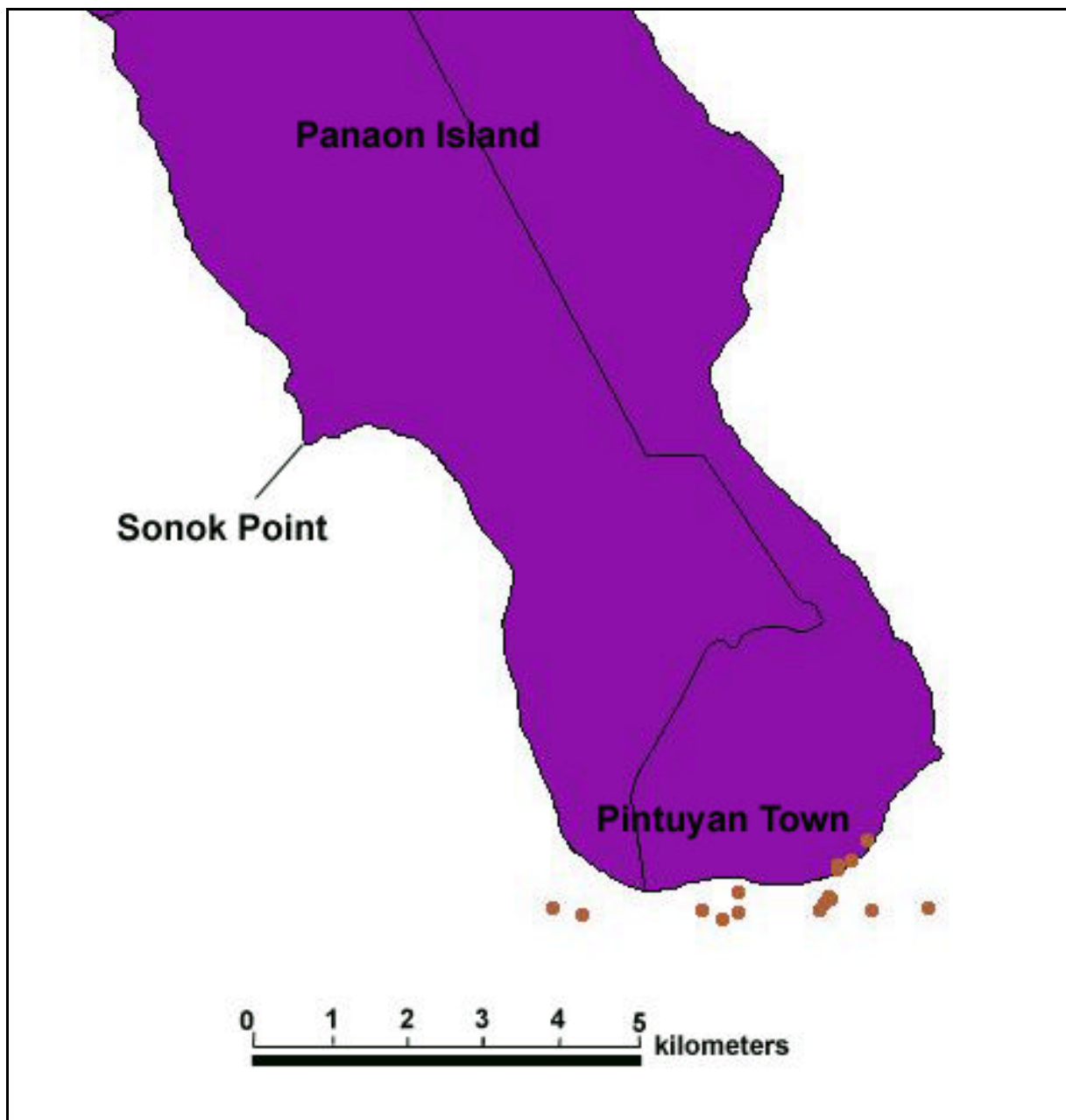
- Swimming in figures of 8 or swimming in circles while searching for prey;
- Swimming with the mouth slightly open
- Swimming with its mouth wide open
- 'Coughing' and gill flushing
- Actively chasing prey
- Vertical feeding
- Surface feeding with part of its mouth out of the water
- Swimming slowly on the surface with mouth open
- Swimming into the current, but remaining stationary.

An Interesting observed behaviour was when a whale shark winked its right eye at a diver. Other interesting behaviours included hovering motionlessly at the surface or over the sandy bottom. The most unique behaviour observed was when 2 whale sharks approached each other from opposite directions and twirled in a clockwise direction, bending to make a tight circle while banking slightly. After the twirling

encounter, the two whale sharks either swam off in the same direction along the coast or continued in opposite directions. During one encounter, a whale shark swam toward the surface, banked and dove to meet head on with a shark swimming in deeper water, the two twirled around each other, then separated. The twirling behaviour was observed on 3 separate occasions.

3.5 Location, movement and environmental parameters

GPS coordinates for all whale shark interactions were recorded. The following figure (Map 2) shows the locations for each of the 28 confirmed individuals, with the sightings concentrated around the town of Pintuyan.



Map 2 Locations for each of the 28 confirmed individual Whale Sharks observed in 2007.

Whale sharks were sighted in waters between 27 and 28 degrees Celsius. Individuals were observed mainly swimming parallel to the shore and along the reef or approached the DSV Discovery, which was anchored off the reef in deeper water. Whale sharks were observed at an average depth of 18m, in a depth range between 5 and 38 m (Figure 4).

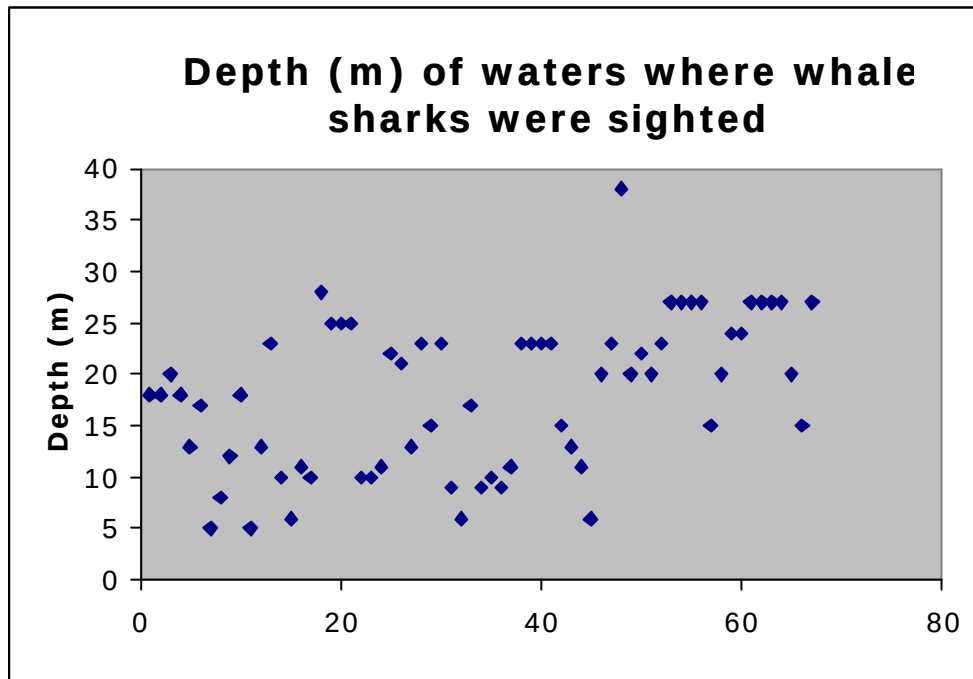


Figure 4: Distribution of whale shark sightings in the water column

3.6 Tourism and human interactions

There were up to 4 tourist boats in the vicinity each day during the survey. An average of 5 snorkelers were present in the water during each interaction, with a minimum of 1 snorkeller and a maximum of 17 snorkellers. Between 1 and 5 divers were present during each whale shark diving interaction. There were 5 incidents of rule breaking, out of the 62 interactions (8%). Rules broken included touching an individual by a dive master from a tourist boat and breaking the distance rule with snorkellers less than 1 m from the whale shark (4 incidents). Whale sharks exhibited avoidance behaviour 17 times out of the 62 interactions, or 27% of the time. Avoidance behaviour included steep dive, violent shudder (a writhing of the whole body from side to side), instant dive, banking, change in direction, and increased swimming speed.

4. Discussion

There is a possible match between “Scarback” and the 5m female (Shark 1 95200685932) sighted on March 23, 2006. Although the description of Shark 1 on the ECOCEAN database did not include scarring, Scarback’s scar could have been a relatively recent injury. Although the two lengths do not perfectly match, it is possible that length estimations by observers on the two years are not calibrated. Examination of multiple photos of Shark 1 in 2006 and Scarback from 2007 is necessary to confirm this match. This match would indicate that whale sharks return to Panaon Island in consecutive years.

Whale sharks that visited Panaon Island in 2007 appeared to congregate in an area further south than that recorded in 2006, which supports the 2006 observations and anecdotal evidence that whale sharks were moving further south each year. In 2006, most of the sightings were around Sonok Point, but in 2007, the majority of the sightings were next to the town of Pintuyan at the southernmost tip of Panaon Island. One theory for the movement south could be that the whale sharks may be disturbed by the increased motorized banca traffic around Sonok Point and could have swam into deeper water, undetected by the spotters on the surface or may have avoided the area. Another theory is that the whale sharks’ food source may have moved further south and the aggregation may have followed the food source.

Differing from findings of 2006, male whale sharks were observed in Sonok Point. Of the 22 individuals that were sexed in 2007, 82% were female, and 18% male. None of the male whale sharks sighted appeared to be mature individuals. The largest male was 7m in length but was not photographed.

As in 2006, the sightings were skewed towards early morning and late afternoon, with more interactions occurring in the late afternoon. During these hours, whale sharks were observed actively feeding on zooplankton including small jellyfish. This finding corroborates findings in 2006 of whale shark distribution being linked to the seasonal abundance and diel vertical migration of food. Although a plankton study was not conducted during this survey, we suggest that further surveys examine the type and abundance of zooplankton around Sonok Point.

Ecotourism activities in the area have increased with up to 17 snorkelers in the water with a whale shark at one time and up to 4 boats interacting with whale sharks around Sonok Point at a single time. Tourism pressures have also increased. We observed irresponsible behaviour of certain guides and dive masters from dive shops that frequent the area, including touching individual sharks underwater. The irresponsible behaviour shows the need for education and outreach for both dive operators and their clients. We suggest that a best practise certification scheme for dive operators is set up for those that wish to conduct whale shark tours around Panaon Island. This survey highlights the importance of tourist and tour operator monitoring, to ensure that dive tourism activities adhere to responsible ecotourism principles. CCC is very willing to collaborate with local stakeholders and communities to establish a stakeholder-based whale shark monitoring scheme.

In other whale shark interaction locations in the Philippines, like Donsol, Sorsogon or around the world, like Ningaloo Reef, Australia, Gladden Spit, Belize, and Holbox, Mexico, certified guides enter the water with the tourists. In Sogod Bay however, the interaction officers or local guides of Barangay Pintuyan do not enter the water with tourists, but serve as a liaison between the spotter boats and the tourist boat, directing the tourist boat on its approach towards the whale shark, and tell the tourists when to enter the water. This results in untrained dive guides from operators leading snorkelers in the water, or tourists entering the water by themselves with no prior experience of interacting with whale sharks. Although a tourism officer briefs tourists prior to whale shark interactions, one cannot be sure of a tourists' behaviour in the water, especially without a certified guide.

It is important to continue research on whale sharks in Sogod Bay as sightings have increased since 2006. Sogod Bay is likely to become a more popular whale shark ecotourism destination in the future, with increased tourism pressure. Interviews with the spotter association of Barangay Pintuyan and the interaction officers have shown that tourists wishing to see whale sharks have sometimes exceeded the capacity of interaction officers and spotters during the peak season in March and April, resulting in some tourist boats not having a interaction officer on board.

The majority of tourists that interact with whale sharks in Panaon Island come from foreign-owned or co-owned dive resorts at least an hour or two away in other locations around Sogod Bay or from overnight liveaboard dive boats that come from as far as Cebu and Bohol. The considerable distance dive boats travel makes a whale shark interaction tour expensive, amounting to around P3,500 for a day trip from around Sogod Bay and considerably more for a liveaboard. Few of the financial benefits trickle down to the locals of Barangay Pintuyan. Dive boats that visit Panaon Island and Sonok Point pay around P1,300-1,500 total for two spotter boats, an interaction fee, and the interaction officer, which is divided by the number of divers on each dive boat. Observations have shown that there can be up to 16 divers per dive boat. Barangay Pintuyan is not benefiting significantly from this type of tourism activity and local infrastructure is not being improved. The dive boats are day visitors and there is currently little mechanism to distribute the revenue from the whale shark tourism activity to the barangays.

A few tourists go directly to the municipality of Pintuyan. They travel to the southernmost tip of Panaon Island, a remote location with little tourism infrastructure. These visitors benefit the local communities by staying at home-stays, eating local food and renting local bancas for the whale shark interactions. However, Pintuyan is a very small town with small bancas, which can only fit a few tourists in each boat, thereby limiting that amount of local trips. Regulation of this local tourism initiative is recommended in combination with dive operator activity.

The question now is to ascertain whether Barangay Pintuyan and other towns in southern Leyte would consider developing their whale shark tourism infrastructure to model other locations in the Philippines, like Donsol in Sorsogon. The story of Donsol has shown that an ecotourism framework could help the community by being a tool for conservation development, but lessons learnt in Donsol have shown that local managers need to keep ecotourism principles foremost on their minds (Quiros, 2005).

Coral Cay Conservation can make a valuable contribution to the formation of a responsible ecotourism practise for whale sharks in Southern Leyte by providing scientific information and assistance to Barangay Pintuyan, as well as capacity building and environmental education. Data collected on CCC's photo-identification surveys of whale sharks can be used to support the management of the tourism resource by providing up to date information on sightings of individuals, working towards a baseline population study of whale sharks in Southern Leyte. CCC is able to provide assistance to set up responsible management practise of the tourism business to ensure the protection and conservation of the whale shark population in Southern Leyte waters. This can be achieved by providing capacity building through trainings of guides and spotters in the principles of ecotourism and interaction etiquette with whale sharks. CCC can also help empower underrepresented groups like local homestays and small banca owners, and liase between different stakeholder groups, particularly the spotters association of Barangay Pintuyan, the interaction officers, small banca owners and the dive boats travelling from other areas in Sogod Bay, Cebu and Bohol.

References

- Arzoumanian, Z., Holmberg, J. and Norman, B. 2005. *An astronomical pattern-matching algorithm for computer-aided identification of whale sharks, Rhincodon typus*. Journal of Applied Ecology DOI:10.1111/j.1365-2664.2005.01117.x
- Calumpong H.P., L.J. Raymundo, E.P. Solis- Duran, M.N.R. Alava and R.O. de Leon (Eds.). 1994. *Resource and Ecological Assessment of Sogod Bay, Leyte, Philippines- Final Report*.
- Chou, LM. 1998. *Status of Southeast Asian coral reefs*. In: Wilkinson CR (Ed.) *Status of coral reefs of the world*: 1998. Australian Institute of Marine Science. 184 pp.
- Clark, E. and Nelson, D.R. 1997. *Young whale sharks, Rhincodon typus, feeding on a copepod bloom near La Paz, Mexico*. Env. Biol. Fish. 50:63-73.
- Compagno, L.J.V., D.A. Ebert and M.J. Smale. 1989. *Guide to the sharks and rays of southern Africa*. New Holland (Publ.) Ltd., London. 158 p.
- Froese, R. and D. Pauly. 2006. (Ed) FishBase. World Wide Web electronic publication. www.fishbase.org, version (03/2006).
- Leiske, E. and Myers, R. 2001. *Coral Reef Fishes: Indo-Pacific and Caribbean*. HarperCollins Publishers, London. 2nd Edition. 400 pp.
- Mumby, P.J., A.R. Harborne, P.S. Raines and J.M. Ridley. 1995. *A critical assessment of data derived from Coral Cay Conservation volunteers*. Bulletin of Marine Science
- O'Farrell, S., Smith, I., Woodard, M and Raines, P. 2006. *Whale Shark Photo-Identification Project, Sogod Bay, Philippines, March 24-30, 2006*. CCC report 13 pp.
- Quiros, A. 2005. *Whale Shark Eco-tourism in the Philippines and Belize: Evaluating Conservation and Community Benefits*. Tropical Resources Bulletin. Yale University, New Haven.
- Quiros, A. 2007. *Tourist compliance to a Code of Conduct and the resulting effects on whale shark (Rhincodon typus) behavior in Donsol, Philippines*. Fisheries Research 84: 102-108.
- Spalding, M.D., Ravilious, C. and E.P. Green. 2001. *World Atlas of coral reefs*. Prepared at the UNEP World Conservation Monitoring Centre. University of California Press, Berkeley, USA.
- Taylor, J. G. 1994. *Whale Sharks, the giants of Ningaloo Reef*. Angus & Robertson, Sydney, 176 pp.
- Yapinchay, A. A. 1999. *Marine Wildlife Conservation and Community-Based Ecotourism*. Pp. 90-99. In *Proceedings of Conference-Workshop on Ecotourism, Conservation and Community Development*, Nov. 7-12, 1999. VSO publication, Tagbilaran City, Bohol, Philippines.