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## Interaction of Sea Turtles with Indonesian Fisheries – Preliminary Findings

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### Introduction

Six of the world's seven turtle species are found in Indonesia: leatherbacks, greens, hawksbills, olive ridleys, loggerheads and flatbacks. With its numerous islands, extensive coastline, vast areas of sea grass beds and coral reefs, Indonesia provides important nesting and foraging grounds to sea turtles. Indonesia hosts the largest rookery for green turtles recorded in Southeast Asia, in the Berau Islands, East Kalimantan, and the largest nesting rookery for leatherback turtles located along the northern coast of Papua. Each season between 1,865-3,601 nests are recorded at Jamursba-Medi and 2,881 nests at Wermon (Hitipeuw *et al*, 2007). Satellite tracking data and tracing records of flipper tags indicate that these greens and leatherbacks migrate very large distances over open waters from their nesting grounds to get to their feeding grounds. These sea turtles face various threats while they are in Indonesian territory. Supporting the Indonesian government in their implementation of laws and regulations (Table 1), WWF-Indonesia has taken a strategic approach towards turtle conservation which includes:

- Habitat protection for green and hawksbill turtles mostly in Berau District, East Kalimantan and for leatherback and olive ridley turtles at Jamursba Medi, Papua.
- Reducing direct take in the turtle trade mostly in Bali in the traditional hunting for leatherback at the Kei Islands – Maluku.
- Reducing indirect take – by-catch, mostly in the tuna fisheries, the shrimp fisheries and some coastal fisheries.
- Support enabling policy, mostly through the facilitation of local, national and international meetings and campaigns.

There were three main reasons for the WWF involvement in assessing the interactions between Indonesian fisheries and sea turtles through observer programmes:

- In a previous FAO expert meeting, the potential significant threat of by-catch on already collapsing leatherback turtle populations was discussed and WWF decided to start collecting information for Indonesia. Only anecdotal evidence existed, very little was published on the issue and while the Indonesian government had mandated the use of Turtle Excluder Devices (TEDs) in the shrimp trawling since many years, previous NOAA (National Oceanic & Atmospheric Administration, US Dept. of commerce) studies indicated that the application of TEDs is very low.
- NOAA provided WWF with grant support to start training tuna long-line fishing crews in proper release of hooked turtles. WWF had no information on how many turtles were hooked and in what area, and needed to collate information to allow a selection of training participants.
- Also, the Indonesian government started taking a more active role in regional initiatives, and signed the IOSEA MOU (Indian Ocean South- East Asia Sea Turtle Memorandum of Understanding) in March 2005 in Bangkok, formalised the Sulu Sulawesi Marine Eco-region tri-national agreement in March 2006 in East Kalimantan, and signed the Bismarck Solomon Seas Eco-region MOU on leatherback conservation in September 2006 in Bali. Indonesia is also preparing to sign up as full member for Regional Fisheries Management Organisations (RFMOs) especially for the IOTC (Indian Ocean Tuna

Commission) and WCPFC (Western & Central Pacific Fisheries Commission). To fulfil information requirements for the RFMOs and other international and regional initiatives, Indonesian data on by-catch, total catch and geographical fishing patterns are needed. The system of on-board log-books introduced in the late 1970s is not well implemented.

National action on reducing by-catch in the Indonesian tuna long-line fishery was initiated on

June 7, 2005. A public consultation was held in Denpasar, Bali that resulted in a joined declaration and national action plan for addressing by-catch with coordination by the Research Centre for Capture Fisheries of the Ministry of Marine Affairs and Fisheries and supported by Indonesian stakeholders including the tuna. This paper summarises preliminary findings of the occurrence of by-catch and mitigation efforts taken since 2005.

**Table 1:** Relevant regulations for sea turtle conservation in Indonesia

Relevant national decrees	Year	Remarks
Presidential Decree No. 43	1978	Ratification of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)
Ministerial Decree agriculture No. 327	1978	Determination of several types of wild animals to be protected (whales, dolphins, crocodiles, leatherback turtles)
Ministerial Decree agriculture No. 716	1980	Determination of several types of wild animal to be protected (whales, grey, olive ridley and loggerhead turtles)
Act No. 4	1982	Basic provision for management of the living environment
Presidential Decree No. 26	1986	Ratification of the ASEAN agreement on the conservation of nature and natural resources
Act No. 5	1990	Conservation of living natural resources and their ecosystems
Presidential Decree No. 32	1990	Management of protected areas
Ministerial Decree Forestry no. 882/Kpts/-II	1992	Protection of the flatback turtle ( <i>Natator depressus</i> )
Act no. 5	1994	Ratification of the Convention on Biological Diversity
Ministerial Decree Forestry No. 771/Kpts/-II	1996	Protection of the hawksbill turtle ( <i>Eretmochelys imbricata</i> )
Government Regulation No. 7	1999	Protection of all turtle species including the green turtles

## Methods

Validation and up-to-date information on occurrence of sea turtles as by-catch in Indonesia's fishery was needed to assess the importance of the issue and to find the best strategy for reducing by-catch. We interviewed fishermen and initiated an on-board observer programme.

### *Interviewing fishermen*

There were long debates among stakeholders on the occurrence of by-catch in the Indonesian fishery. WWF worked with research institutions and local NGOs in Indonesia on a fisher survey using semi-structured interviews. The survey found

that there were interactions between sea turtles and several types of fishing gears. The fishermen often spotted sea turtles during their fishing activities and this indicates that their fishing grounds overlap with migratory routes for sea turtles.

Most respondents admitted that they caught sea turtles during fishing, at least one animal in their most recent trip (Appendix 1). They did not think it was a big problem, but considering the large fleet, a minimum of one animal per trip per vessel results in a large number of interactions throughout the year. From the survey it was also clear that all respondents were willing to release the turtles, and this allowed us to start training on proper handling methods of entangled and hooked sea turtles.

*On-board observers*

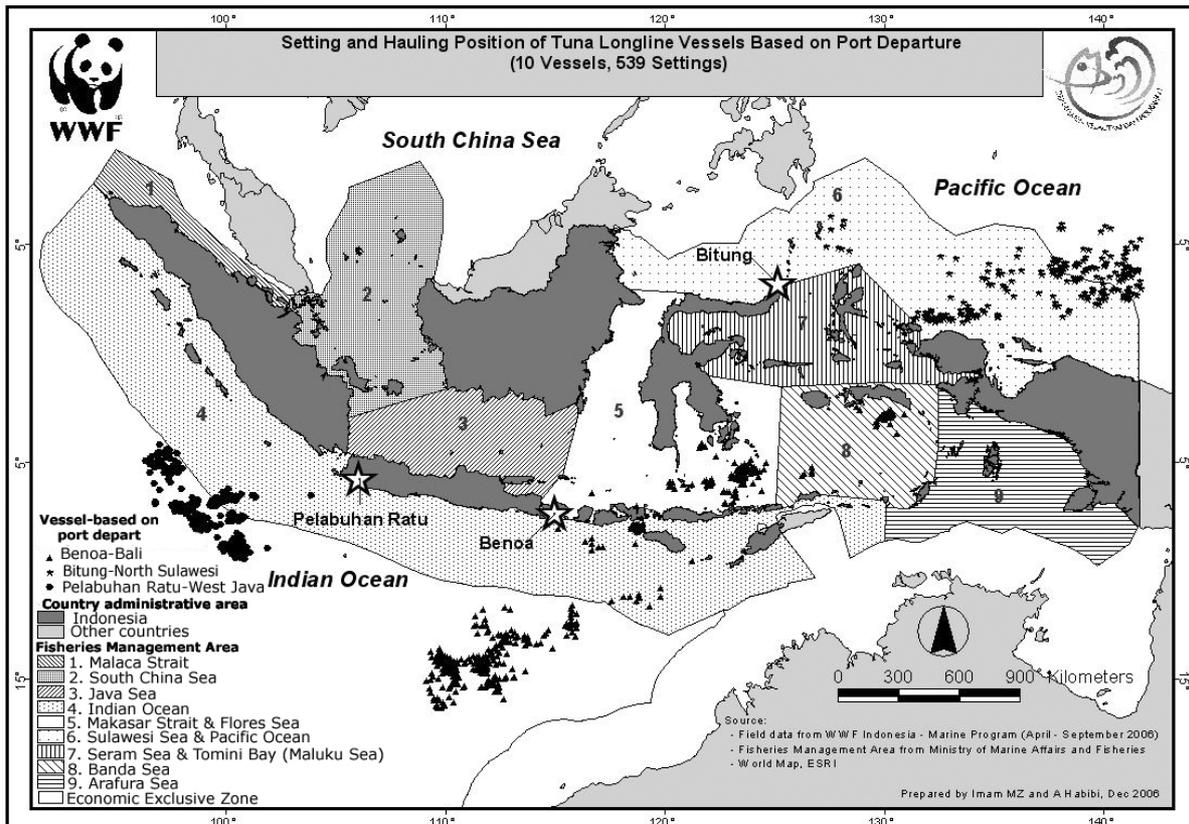
To validate the information from the interviews, WWF also implemented an on-board observer trial in the tuna long-line fleet and shrimp trawl.

In the first year, WWF needed to learn how to best implement on-board observer activities and developed the method and simple protocols together with volunteers from the fisheries academy in Sorong. Based on the information collected in the first year, WWF started a formal on-board observer programme in May 2006. The on-board observers collect data on tuna and shrimp fisheries and their interactions with protected and endangered marine species (e.g. sea turtles, marine mammals, sea birds and sharks).

**Observer findings in the tuna long-line fleet**

For the tuna long-line observer programme, WWF collaborates with the Research Centre for Capture Fisheries (PRPT). The on-board observers are well accepted and supported by the Indonesian Tuna Long-line Association (ATLI), the Indonesian Tuna Association (ASTUIN) as well as by other individual tuna long-line industry members. From May to December 2006, there were two observers in Bitung, North Sulawesi on-board two vessels, two observers in Pelabuhan Ratu-West Java on-board three different vessels, and in Benoa-Bali we have two observers and two boat captains who observe on five vessels. The resulting data set includes 539 sets of these 10 vessels that operated in the Indian Ocean, the Pacific Ocean and in the territorial waters of Indonesia (Figure 1).

**Figure 1:** Map of the region where the observer programme was conducted with the results of the findings.



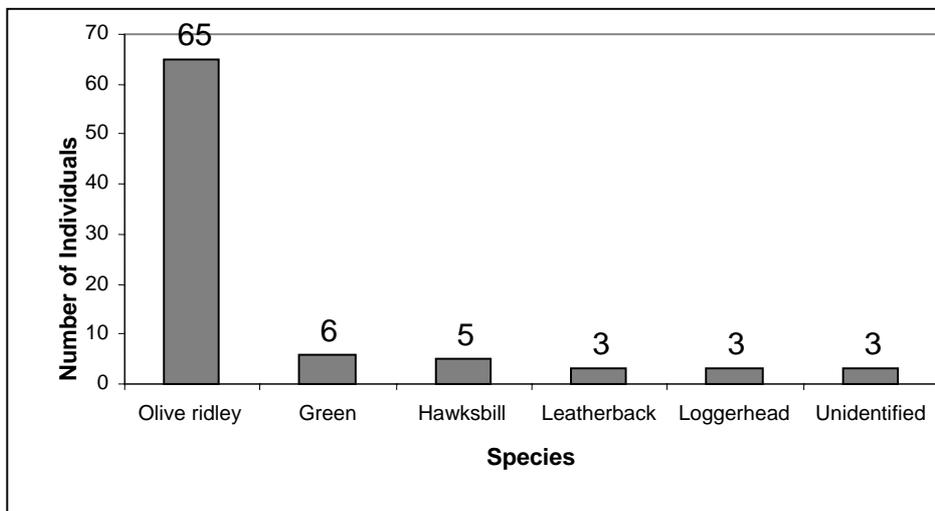
Many of Indonesia's tuna long-line vessels operate outside of the Exclusive Economic Zone of Indonesia (Figure 1). Recent efforts by the Indonesian Government to join with full membership the IOTC and the WCPFC are thus correct and are supported by the industry. It also emphasises that Indonesia must stay active in regional approaches to sea turtle conservation, as by-catch of sea turtles is a global issue.

Data collected between May and December 2006 show that 832,208 hooks caught 85 sea turtles, one whale, two dolphins, two sea birds and 507 sharks. Except for sharks, which are valuable for their fins, all animals were released back to the sea. Five of the sea turtles were dead. Based on their hook rate of 0.225 per 1,000 hooks, the tuna long-line fleets from Bitung-North Sulawesi caught the most turtles, followed by Pelabuhan Ratu-West Java with 0.034 takes and Benoa-Bali with

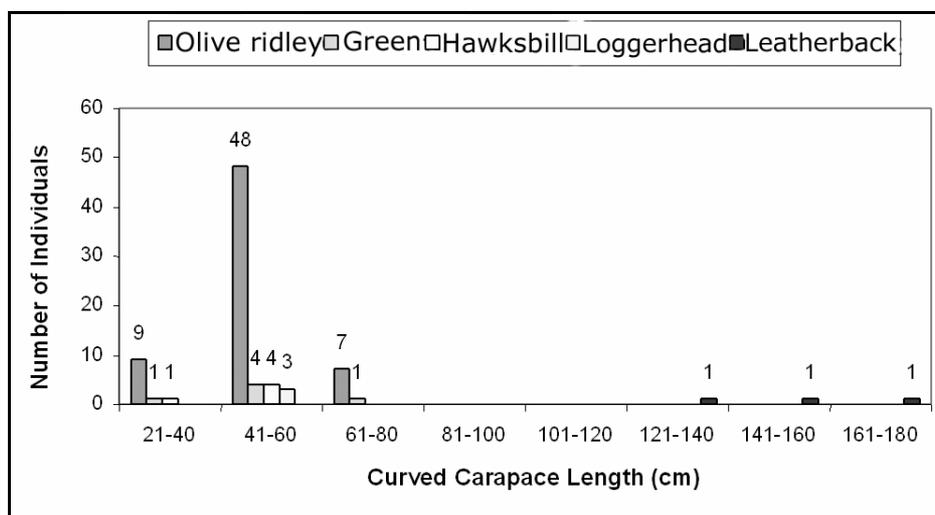
0.031 (Table 2). Most of the Bitung tuna long-line fleet fishes in the Pacific; they usually use shallow settings with 7 to 10 hooks between one float. They use various types of baits during one trip, including milkfish, squid and scads. Shallow setting and using squid and scads for the bait were predicted to result in many turtles being hooked in tuna long-line gears. The fleet from Benoa-Bali mostly uses sardines as bait and set their lines deeper as they target big-eye tuna.

Olive ridley turtles dominate the turtle by-catch and all animals captured were adults (see Figure 2 and 3 respectively) and most were males (Table 2). Sea turtles hooked in the Pacific represent a larger variety of species than those hooked in the Indian Ocean and Banda-Flores Sea (Figure 4). Migration of leatherback turtles is mainly through the Pacific and long-lines operate near leatherback, hawksbill and green turtle feeding and nesting areas.

**Figure 2:** Number of turtles hooked in tuna long-line gear recorded by observers between May-Dec 2006.



**Figure 3:** Size of turtles hooked in tuna long-line gear (Curved Carapace Length – CCL)

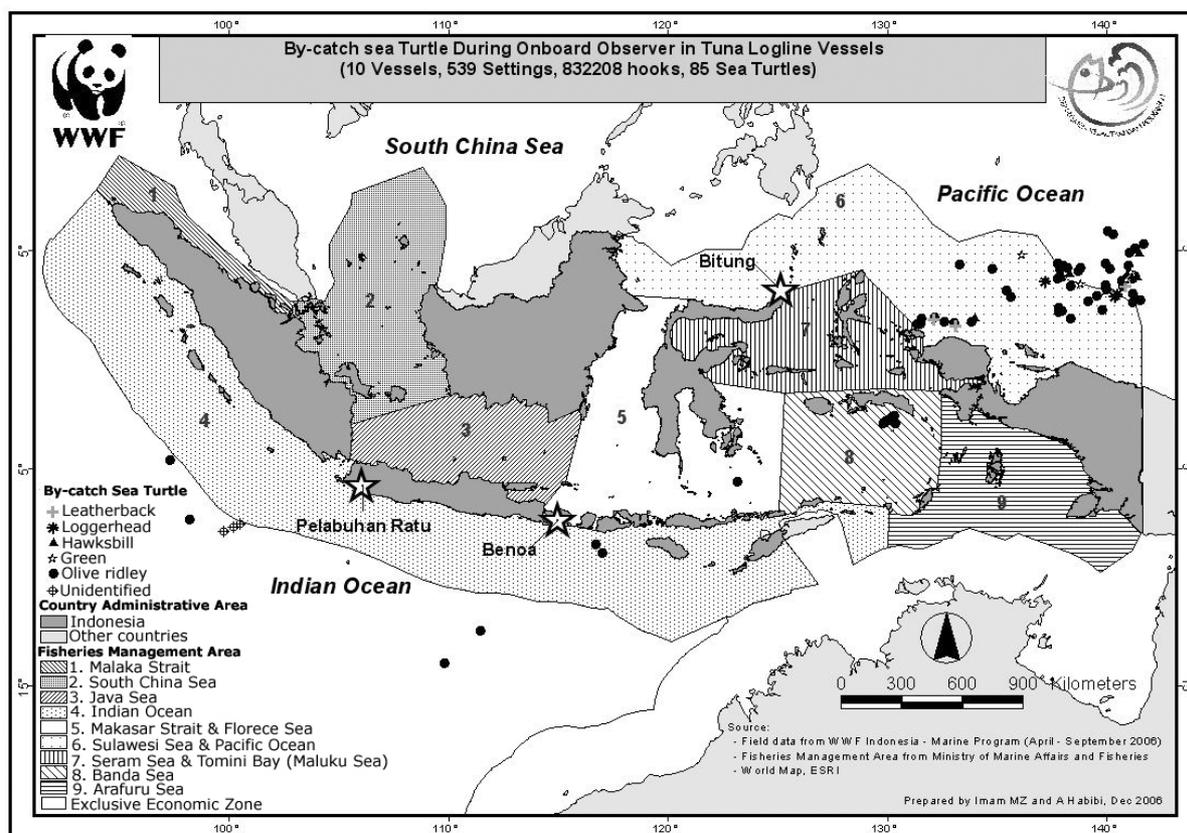


Our total number of observers on-board tuna long-line vessels is still limited and focussed on the fleet operating from Bitung-North Sulawesi operating in the Pacific,

Benoa-Bali operating in the Indian Ocean and territorial Indonesian waters such as the Banda Sea and the Flores Sea. This work needs to be expanded.

**Table 2:** Summary data from observers for May-December 2006.

No.	Remarks		Benoa-Bali	Pelabuhan Ratu-West Java	Bitung-North Sulawesi	Total amount
1	General Information	Numbers				
		Tuna Long-line Vessels	5	3	2	<b>10</b>
		Setting	243	135	161	<b>539</b>
		Hooks	381,800	148,680	301,728	<b>832,208</b>
	Hooks rate on sea turtle (per 1,000 hooks)	0.031	0.034	0.225	<b>0.097</b>	
2	By-catch	Sea turtles (Unidentified) <u>Total amount</u>	<u>0</u>	<u>3</u>	<u>0</u>	<u>3</u>
		Loggerhead turtles <u>Total Amount</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>3</u>
		Male	0	0	3	3
		Female	0	0	0	0
		Leatherback turtles <u>Total Amount</u>	<u>0</u>	<u>0</u>	<u>3</u>	<u>3</u>
		Male	0	0	2	2
		Female	0	0	1	1
		Haw ksbill turtles <u>Total Amount</u>	<u>0</u>	<u>0</u>	<u>5</u>	<u>5</u>
		Male	0	0	2	2
		Female	0	0	3	3
		Green turtles <u>Total Amount</u>	<u>0</u>	<u>0</u>	<u>6</u>	<u>6</u>
		Male	0	0	6	6
		Female	0	0	0	0
		Olive ridley turtles <u>Total Amount</u>	<u>12</u>	<u>2</u>	<u>51</u>	<u>65</u>
Male	6	0	49	55		
Female	6	2	2	10		



**Figure 4:** Location of occurrence of sea turtle by-catch during May-December 2006

**Observer findings in the shrimp trawl fleet**

For the shrimp trawl observer programme, WWF collaborated with Marine and Fisheries Agency of Sorong and also with the Fisheries Academy, Sorong. On-board observations in 2005 revealed that sea turtles are often caught in the trawls that mostly operate in the Arafura Sea. Between two to 33 sea turtles were caught in 12 shrimp trawls, with an average of 11 turtles per vessel (Table 3). Boat crews confirmed the finding and admitted that, on average, 2-20 sea turtles were incidentally caught during the trawl operations. Although most sea turtles caught were olive ridleys (14), green turtles (eight), and loggerheads (four), the occasional by-catch of hawksbill turtles also occurred (Table 3). Sometimes, leatherbacks were trapped in their nets. This frequent interaction confirms that the Arafura Sea and adjacent waters are important migratory routes for turtles.

Almost all captured animals were released to sea – 98.5 per cent (2005) and 100 per cent (2006), and

only 1.5 per cent of the animals (2005) were kept for consumption (Table 3). While the capture rates are high, almost all incidentally caught sea turtles were released back to the sea for several reasons: (1) crews were aware of the prohibition of sea turtle exploitation, (2) the large size of some captured animals made it difficult to pull the animals aboard, there is limited space on-board to keep the meat or there is a belief that sea turtles on-board would reduce potential catch. The main reason for the high number of animals caught is the lack of inclination to install TEDs (Turtle Excluder Devices) in their trawlers, as they believe that this would reduce the fish by-catch. Usually, boat crews are entitled to take and sell any fish by-catch as bonus and this additional income turns out to be higher than their monthly wages. This should be addressed when aiming to improve the application of TEDs, BEDs (By-catch Excluder Devices), and JTEDs (Juvenile Turtle Excluder Devices). Unless this is tackled, it is highly unlikely that the shrimp trawler industries will implement the regulations.

**Table 3:** Summary of observer data in shrimp trawl vessels (2005 and 2006)

No.	Description	Total		Interval		Average		Percentage		Remarks
		2005	2006	2005	2006	2005	2006	2005	2006	
1	Observed vessels	12	4	–	–	–	–	–	–	–
2	Days per trip (days)	519		9-79		52		–		–
3	Hauling (times)	–	1,406	–	240-545	–	352	–	–	
4	Sea turtles incidentally caught	133	26	2-33	2-16	11	6.5	–	–	In 2006, 4 of 26 sea turtle caught incidentally were dead
5	Sea turtles released back	131	26	–	–	–	–	98.50%	100%	–
6	Sea turtles consumed	2	0	–	0	–	0	1.50%	0%	For crew consumption and souvenirs
7	Sea turtle species often caught	–	–	–	–	–	–	–	–	In 2005: Hawksbills, greens, loggerheads, olive ridleys. In 2006: olive ridleys (14), greens (8) and loggerheads (4)
8	Fishing grounds	–	–	–	–	–	–	–	–	Arafura Sea, Digul, Kaimana, Timika

### The Circle Hook Trial

With technical advice of NOAA-NMFS, WWF started a circle hook trial in Indonesia. The trial is scheduled for the 4 major tuna long-line fleets in Indonesia, Pelabuhan Ratu-West Java, Cilacap-Central Java, Benoa-Bali, and Bitung North Sulawesi. The trial aims to compare the turtle capture rates for circle hooks (size C16/0) and normal tuna hooks used by Indonesian long-liners.

There were major challenges trying to engage fishermen in the trial. Many fishermen doubted whether they would catch any fish and comments included:

- The circle hooks sizes are bigger compared to their hooks.
- Their bait is too small for the circle hooks; they are afraid that their bait will fall off.
- They were not convinced that the new hooks would catch as much fish as the old hooks.

After working to convince captains and crews over a long time, in December 2006, one captain in Benoa-Bali agreed to try the circle hooks and on

December 20, he left the harbour with 1,000 circle hooks and 1,000 normal hooks. In the first 10 sets, the circle hooks showed better catch than the normal hooks with 10 tuna in circle hooks and seven tuna in normal hooks. After 36 sets, at the end of his trip the circle hooks had caught 53.5 per cent of the total catch and captured no turtles while the usual hooks accounted for 46.5 per cent of the total catch and hooked one olive ridley turtle (Table 4 and 5). Also, during this trip, the circles hook caught 12.1 per cent more target fish and 14.63 per cent less discards than the normal hooks. More big eye tuna were caught with the circle hooks.

The captain communicated these results to other tuna long-line vessels via radio and now, 4 vessels in Benoa-Bali use circle hooks; a total of 3,500

circle hooks. More vessels wanted to use circle hooks, but we did not have stock, and are currently trying to get additional circle hooks. These very preliminary results show that circle hooks could be

one important way to reduce by-catch but this research needs to be continued and expanded to other countries as well. The availability of circle hooks is also an issue.

**Table 4:** Catch composition

<b>Species</b>	<b>Circle hooks</b>	<b>Normal tuna hooks</b>
Albacora	13	9
Big-eye tuna	77	68
Big-eye tuna (fry)	1	1
Blue fin tuna	7	2
Yellow fin tuna	29	16
Skipjack	3	6
Sword fish	10	5
Marlin	1	0
Shark	14	14
Mahi-mahi	6	5
Opah ( <i>lampris spp.</i> )	1	3
Other fish	31	22
Other fish (discarded -ray etc.)	35	46
Olive ridley turtle	0	1
<b>Total</b>	<b>228</b>	<b>198</b>

**Table 5:** Summary of the circle hook experiment

<b>Analysis</b>	<b>Circle hooks</b>	<b>Normal tuna hooks</b>	<b>Total</b>	<b>Catch increase</b>
Utilised fish	189	151	340	38
Discarded fish	39	47	86	-8
Total fish	228	198	426	30
% Utilised fish	56.10	43.90	100	12.21
% Discarded fish	42.68	57.32	100	-14.63
% Total fish	53.52	46.48	100	7.04
<b>Analysis for big tuna only*</b>	<b>Circle hooks</b>	<b>Normal tuna hooks</b>	<b>Total</b>	<b>Catch increase</b>
Number of tuna	127	96	223	31
Catch (%)	56.95	43.05	100	13.90

\*Big tuna (albacora, blue fin, big eye, yellow fin)

## Conclusions and recommendations

The Indonesian long-liners try to minimise interaction with turtles as they believe that sea turtles on-board will reduce their catch. Also, if the vessel's captain is Chinese or Taiwanese, they always release the turtles as they believe that sea turtles are divine creatures and must be respected. Our observers have an important role to play here to ensure that turtles are released properly. With their guidance and proper use of de-hookers, observers can increase the survival of turtles significantly. Also, the observers are the best individuals to conduct general awareness and training activities as they spent several months together on-board. Observers can utilise the crew's natural curiosity to talk about nature and best practices. Training and outreach onshore is difficult as most crews are away for long periods of time and want to spend time with their families. Tackling the issue of low compliance with installing TEDs on shrimp trawl vessels requires a different approach. The financial incentive is too high to leave the TEDs unused as the fixed salaries are very low.

The observer programme must be expanded and could be formally adopted by the Indonesian Government. Students from fisheries academies

throughout Indonesia could be very suitable observers as they have the ability to work on vessels for long periods of time under harsh conditions. The gear trial with circle hooks must also be expanded to include more vessels fishing in other areas

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Research Institution	Fishing gear	Sea turtles caught incidentally in fishing gear	Incident by-catch – species specific	Number of respondents	Survey location
Takaendengan et al, 2005 (LIPI)	They are only mentioned in two categories – tuna long-line and non-tuna (gillnet, purse seine)	Average per trip 0 = 2.8%, 1-5 = 80.4%, 6-10=10.3%, >10=6.5%	The most frequent by-catch in the Indian Ocean and the Pacific Ocean is loggerhead turtles ( <i>Caretta caretta</i> ). Leatherback turtles ( <i>Dermochelys coriacea</i> ) were also frequently caught in both the oceans, although by-catch in the Pacific Ocean occurred more frequently. Green turtles ( <i>Chelonia mydas</i> ) are the least frequently caught turtles, mostly in the Indonesian inner waters (relatively close to the shores). Sea turtles entangled in the Indian Ocean and the Pacific Ocean were of a larger size (carapace diameter >50 cm), whilst the ones entangled in inner waters were of a smaller size (25-50 cm).	163	Bitung (North Sulawesi), Muara Baru (Jakarta), Cilacap (Central Java), Kendari/Bau-Bau (South East Sulawesi) and Makassar/Bone (South Sulawesi)
Musthofa Zainudin, 2005 (WWF)	Tuna long-line	<u>Average value of:</u> <ul style="list-style-type: none"> <li>• Sea turtle sightings per month: 5 times</li> <li>• Sea turtle by-catch per month: 2.7 times</li> <li>• Sea turtle by-catch during the latest trip: 2.3 animals</li> <li>• Number of sea turtle species incidentally caught during the latest trip: 1.8 species</li> </ul>	Respondents noticed that green turtles and leatherbacks were the most frequent by-catch species.	95	Benoa-Bali
Habibi et al, 2006 (TAKA)	Tuna long-line, mini purse seine, purse seine, seine nets (Payang, Cantrang, Pukat), gill net, long-line (coastal Fishery), others gears (hand-line, trap etc.)	Number of turtles caught incidentally in their latest trip (Based on the numbers of respondents). The categories are: a=0-10 turtles, b=11-20 turtles, c=21-30 turtles <ul style="list-style-type: none"> <li>• Tuna long-line (b=81%, a=19%, c=0%)</li> <li>• Mini purse seine (a=69%, b=31%, c=0%)</li> <li>• Purse seine (a=68%, b=33%, c=0%)</li> <li>• Seine nets (a=56%, b=44%, c=0%)</li> <li>• Gill nets (b=85%, a=15%, c=0%)</li> <li>• Long-lines (coastal Fishery) (b=58%, a=42%, c=0%)</li> <li>• Others gears (b=75.6%, a=22%, c=2.4%)</li> </ul>	–	-	Java (Pekalongan, Cilacap, Pati, Pelabuhan Ratu, Rembang, Tegal, Cirebon, Lamongan)

### Appendix 1: Information on sea turtle interactions in various fishing gears in Indonesia (result from interviews with fishermen)

## Indigenous Management of Marine Turtles Coordinated Across the North of Australia

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### Introduction

Traditional Owners (TOs) are working together to develop a community-driven approach towards the sustainable management of dugongs and marine turtles across the north of Australia. This approach has been the participation in the Dugong and Marine Turtle Project (DMTP) that is coordinated by the North Australian Indigenous Land and Sea Management Alliance (NAILSMA). Communities extending from the Kimberley, across the Top End of the Northern Territory, Gulf of Carpentaria, and Cape York to the Torres Strait are taking a “bottom-up approach” in which Traditional Owners identify their concerns and aspirations and the corresponding research and management activities they wish to undertake through the DMTP. The DMTP provides a foundation on which to fulfil Indigenous cultural obligations in looking after dugongs and marine turtles, which is also in the national and international interests.

The NAILSMA was developed by the Kimberley Land Council, Northern Land Council and Balkanu Cape York Development Corporation in response to the ever-increasing need to have effective communication to support community driven management action by Traditional Owners across the wet-dry tropics of northern Australia. The membership of the alliance is steadily growing to include other regions within North Australia. The Dugong and Marine Turtle Project is one of many initiatives that NAILSMA is currently undertaking across the north.

NAILSMA, which is hosted by the Cooperative Research Centre Tropical Savannas Management, started the DMTP in 2005 and expects to complete the project by 2008. The project has been funded by the Australian Government’s Natural Heritage Trust and receives significant contributions from the project partners. Project partners include the

Kimberley Land Council, Northern Land Council, Carpentaria Land Council Aboriginal Corporation, Balkanu Cape York Development Corporation and the Torres Strait Regional Authority. Technical and scientific advice is provided to the DMTP by a Technical Reference Group, which is made up of about 24 members – researchers, government, non-government organisations and industry representatives.

### The significance of marine turtle management

Northern Australia is regarded as one of the great strongholds for marine turtles in the world. It is home to six of the seven species of marine turtles. The vast coastline and beaches in this region support globally significant rookeries for green (*Chelonia mydas*), olive ridley (*Lepidochelys olivacea*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), and the Australian endemic flat back (*Natator depressus*) turtles.

Marine turtle populations face a range of global and local impacts, including habitat loss and modification, the significant impact of disused fishing nets (ghost nets) and pest species (i.e. feral pigs) and over-harvesting eggs and turtle meat. TOs are concerned with the long-term survival of marine turtles as it affects their culture, social systems and subsistence. TOs are also seeking recognition and protection of their cultural obligation of protecting marine turtles. TOs seek support and engagement in contemporary management and research for the long-term management of marine turtles.

One of the great strengths of the DMTP is that it provides for coordination of marine turtle management across a vast geographic area given the migratory behaviour of marine turtles, and hence, the need to understand impacts on populations across their range. Sound partnerships

between Indigenous people and communities and non-Indigenous scientists and managers allow Indigenous knowledge and contemporary research and management techniques and understandings to be combined.

*Indigenous concerns and aspirations for the management of marine turtles:*

The types of concerns and aspirations shared among TOs across the north of Australia include:

- the importance of Indigenous knowledge and customary practices as the basis for sustainable management plans;
- the need to build the capacity of Indigenous Land and Sea Management organisations and ranger programmes to engage in contemporary management and research;
- a lack of information including data on population sizes and distribution;
- improved working relationships and partnerships among TOs, researchers, government and industry;
- stronger linkages between coastal Indigenous communities responsible for dugongs and marine turtles; and,
- improved public understanding of the many threats to dugongs and marine turtles, and of the rights, roles, responsibilities and activities of Indigenous Australians in managing dugongs and marine turtles.

*Indigenous management of marine turtles:*

The coordinating role of NAILSMA includes activities such as:

- facilitating communication amongst participating Indigenous communities;
- developing standardised information recording and storage;
- training and coordinating information exchange among participating communities;
- commissioning relevant reviews and analyses, such as socio-economic studies of the 'value' of dugongs and turtles to Indigenous livelihoods;
- ensuring Indigenous representation in government initiatives, planning and committees; and,

- implementing communication activities to improve public understanding of the rights, roles, responsibilities and achievements of Indigenous people in managing dugongs and marine turtles.

NAILSMA's project partners oversee the local delivery of the DMTP through Regional Activity Plans (RAP) in selected 'pilot' communities. Each RAP is developed through community consultation, and identifies the needs and aspirations of TOs and community members on issues and threats facing dugong and turtle management, and identifies the types of management and research activities that communities wish to undertake.

**Regional activities in turtle management**

Through the Land and Sea Unit of the Kimberley Land Council <[www.klc.org.au/landsea.htm](http://www.klc.org.au/landsea.htm)>, the Bardi Jawi people of Western Australia are working in key areas along the Dampier Peninsula (Ardayaloon, Lombadina/Djarindjin). The Regional Facilitator is working with Head Rangers to coordinate implementation of their Regional Activity Plan (RAP). Their RAP provides scope for setting up a ranger programme that undertakes cultural mapping, catch management, beach nest surveys, coastal clean ups, management of tourism and access to significant breeding sites, as well as conducting community workshops to increase awareness of customary laws and the management of resources. Their RAP also functions to build relationships and share information among government agencies and scientific institutions, and, provide training to rangers in Land and Sea Management.

The Dhimurru Land Management Aboriginal Corporation employs Yolngu Aboriginal Sea Rangers across the coast of North East Arnhem Land in the Northern Territory. Dhimurru's Senior Ranger for Sea Country and Sea Country Facilitator are working with Sea Rangers to manage dugongs and marine turtles as part of their Yolngu Monuk Gapu Wanga – Dhimurru Sea Country Plan <[www.dhimurru.com.au/sea.html](http://www.dhimurru.com.au/sea.html)>. As a part of this plan, rangers are conducting turtle nesting surveys on Bremer Island, an important breeding site for hawksbill, olive ridley and green

turtles. In addition to this, sea rangers conduct turtle rescue flights each dry season to regularly survey the beaches for turtles caught in ghost nets. The Dhimurru Sea Rangers are also coordinating a satellite tracking programme to monitor the health of turtles that are rescued from nets, and, developing community management plans for the long-term protection of turtles.

The li-Anthawirriyarra Ranger Group is piloting a RAP across the east coast of the Northern Territory that was developed through the Northern Land Council <[www.nlc.org.au/](http://www.nlc.org.au/)>. Although dugongs and marine turtles are harvested on a customary hunting basis, communities have strongly expressed a wish to control the development and implementation of management and monitoring regimes. The li-Anthawirriyarra Ranger Group has already proven experience, and has developed their marine and coastal management and administrative capacities over many years. The li-Anthawirriyarra Sea Rangers have worked collaboratively with the World Wildlife Fund (WWF) in tracking the daily movements of marine turtles and gathering information from satellite tracking to help protect these species.

In the Southern Gulf of Carpentaria, the Regional Facilitator of the Carpentaria Land Council Aboriginal Corporation works in consultation with the TOs of the Wellesley Islands and adjacent mainland. This region comprises the traditional land and waters of the Lardil, Kaiadilt, Yangkaal and Gangalidda peoples, whose native title over the sea was recognised by the Federal Court in 2004. Dugongs and marine turtles are central to the culture, identity and economy of all the Indigenous groups of the Wellesley Islands region. Through their RAP, the TOs of this region have indicated their commitment to the long-term management of dugongs and marine turtles, which they have harvested sustainably for thousands of years.

In Cape York, the Regional Facilitator of Balkanu – Cape York Development Corporation <[www.balkanu.com.au/](http://www.balkanu.com.au/)> works with communities at Injinoo and Pormpuraaw on the west coast and Lockhart and Hopevale on the east coast. Injinoo and Pormpuraaw are busy recording knowledge of customary law and biology of dugongs and marine turtles as part of the Traditional Knowledge

Revival Pathways project <[www.tkrp.com.au/](http://www.tkrp.com.au/)>. This knowledge will form the basis of community based management plans. In Lockhart River and Hopevale, information and data that scientific researchers have collected on dugongs and marine turtles is being collated and given back to those communities.

In Torres Strait, and unlike anywhere else in Australia, both dugong and marine turtles are considered Fisheries under the Torres Strait Treaty and are managed through the enactment of the Torres Strait Fisheries Act, 1992. Dugongs and marine turtles are a traditional food source of 19 Torres Strait Islander and Aboriginal communities within the Maluiligal (Western Islands), Guda Maluiligal (Top Western Islands), Kulkalgal (Central Islands), Kaurareg (Inner Islands), Kemer Kemer Meriam (Eastern Islands) Nations and of adjacent coastal communities in Papua New Guinea and the Gudang Nation of Cape York Peninsula. The Treaty recognises the harvest of dugongs and turtles as a traditional right of all traditional owners and inhabitants in the region. Sustainable use and management of dugongs and turtles will, therefore, require the active involvement of, and collaboration between, all of these communities, particularly at a national level.

The Regional Facilitator & Project Liaison Officer of the Torres Strait Regional Authority <[www.tsra.gov.au/www/index.cfm?ItemID=1](http://www.tsra.gov.au/www/index.cfm?ItemID=1)> (TSRA) is working with Project Officers for communities on the Iama, Boigu and Badu Islands. Additional resources have also allowed five new island communities, Mer (Murray Island), Erub (Darnley Island), Dauan, Mabuig and Ngurapai (Horn Island), to participate in the community-based project. Activities in these regions focus on the cultural management of turtles and dugongs, recording catch sizes, monitoring nesting sites, as well as providing training and education on the management of these resources. The Australian Government is presently working in conjunction with Torres Strait Regional Authority and the Papua New Guinea (PNG) Department of Environment and Conservation to engage western province PNG villages in raising awareness about the sustainable management of dugongs and marine turtles.

### Cross organisational marine turtle management activities

NAILSMA also works closely with other major Indigenous sea country management initiatives in North Australia, such as the Carpentaria Ghost Nets Programme <[www.ghostnets.com.au/index2.html](http://www.ghostnets.com.au/index2.html)>.

Ghost nets found in north Australian waters predominantly come from foreign fishing vessels. These disused fishing nets pose significant risks to the environment due to their entanglement with and subsequent stranding of marine wildlife on coastal beaches.

Four of the marine turtle species listed as either endangered or vulnerable under Australian legislation have been found entangled in ghost nets. Indigenous communities around the Gulf of Carpentaria and the Torres Strait are monitoring and removing nets from beaches, as well as providing valuable data to national and international activities to assist in fixing this issue at its source.

### Conclusion

NAILSMA, the project partners and communities are working together towards a long-term vision of healthy and sustainable populations of dugongs and marine turtles that sustain Indigenous livelihoods across North Australia. Successful community-based management plans built on long-held Traditional Knowledge and Customary Law that are integrated with contemporary knowledge, research and management planning, are essential to achieving this goal. Scientific research will continue to improve the understanding of the complex life histories of marine turtles and dugongs, but research alone cannot ensure the survival of these populations.

*For further information:*

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## Importance of temperature in ex-situ hatchery management in Chennai

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Olive ridley turtles nest on the coast of Chennai on the east coast of India. TREE Foundation and the Wildlife Wing of the Forest Department support a community sea turtle conservation programme, namely the Kadal Aamai Padhukavalargall (KAP) (Sea Turtle Protection Force).

This study was carried out in five selected villages along the Chennai coast from December 2006 to April 2007. The first nest was recorded on December 20, 2006 and the last one on March 26, 2007. A total of 107 nests were recorded during this period (Periyar Neelangarai – 20, Injambakkam – 19, Panaiyur – 20, Nainar Kuppam

– 35, and Reddy Kuppam – 11) (Table 1). Peak nesting was recorded during February, with a total of 40 nests, including 16 nests that were left in-situ. During 2007, five in-situ nests were lost to predation by feral dogs. There was no poaching in these areas.

**Table 1:** Nests recorded during 2006 and 2007

	2006	2007
Total nests	90	107
Total eggs	10,273	10,980
Hatchlings	8,821	8,791
In situ nests	15	28

Hatchling emergence started from February 8, 2007 onwards and the hatching success was documented by excavation of nests. During the previous year, hatching success was very low, especially towards the end of the season. Based on the suggestions of turtle conservationists, loosely woven coconut leaves (thatch) were placed over the hatchery from March 15, 2007. Temperatures were periodically checked and recorded with a thermometer placed 22.5 cm (10 inches) below the surface. During the period from March 17 to April 7, the day temperatures were about 28°C (at seven a.m.), while the afternoon temperatures ranged from 30°C-31°C and the night temperatures ranged from 30°C-31°C (at nine p.m.) within the hatchery. From April 14 onwards, the morning temperatures ranged from 29°C-30°C, afternoon between 32°C-33°C and night 31°C-32°C.

The data presented below is for nests which emerged after April 25 each year. On April 25, 2007, between 7:00 p.m.- 9:30 p.m., we witnessed 395 hatchlings emerge from four nests at the

Periya Neelangarai hatchery. At this time of the year in 2006, nests produced practically no hatchlings at all. Thus the thatch may have proved successful in reducing temperatures during the day and preventing mortality of the hatchlings. During 2007, the last hatchlings emerged on May 7, 2007.

It was also observed that most of the hatchlings that emerged during this period were well-formed, healthy and very active. On checking the residual nest contents, there were few dead hatchlings and only a few unhatched eggs. It was also observed that nests with more than a hundred eggs had a high mortality rate in the middle of the season. In Periya Neelangarai, the KAP members placed nests with large numbers in wider nests than normal natural nests. The experiment appeared to be successful: in one case, 148 out of 165 eggs hatched and emerged successfully. The appointment of 8 KAP members as Turtle Guards by Ashish Kumar Srivastava, IFS, Wildlife Warden has encouraged the KAP members to get more involved in conservation.

**Table 2:** Hatching success of relocated nests in different villages in 2006

<i>Village*</i>	<b>Nests</b>	<b>Eggs</b>	<b>Hatchlings</b>	<b>Dead in pipped Eggs</b>	<b>Dead hatchlings</b>	<b>Unhatched eggs</b>	<b>Hatchings (%)</b>
PN	1	109	0	0	0	109	–
IB	0	0	0	0	0	0	–
PK	8	923	91	120	57	655	9.9
NK	9	997	310	26	–	592	31.1
RK	0	0	0	0	0	0	–
Total	18	2,029	401	146	126	1,356	–

**Table 3:** Hatching success of relocated nests in different villages in 2007

<i>Village*</i>	<b>Nests</b>	<b>Eggs</b>	<b>Hatchlings</b>	<b>Dead in pipped Eggs</b>	<b>Dead hatchlings</b>	<b>Unhatched eggs</b>	<b>Hatchings (%)</b>
PN	5	609	525	15	6	63	86.2
IB	1	100	93	4	0	3	93.0
PK	2	214	144	18	25	27	67.3
NK	11	1040	950	78	18	94	91.4
RK	0	0	0	0	0	0	0
Total	19	1,963	1,716	115	49	187	–

\* *PN* – Periya Neelankarai; *IB* – Injambakkam; *PY* – Panaiyur Kuppam; *NK* – Nainar Kuppam; *RK* – Reddy Kuppam

## Review of the Environmental Impacts of the Sethusamudram Ship Canal Project (SSCP)

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### Introduction

The Sethusamudram Ship Canal Project (SSCP) is a 167 km long shipping canal, and envisages the creation of a navigable canal from the Gulf of Mannar to the Bay of Bengal to facilitate the movement of ships. The proposed SSCP site is located in a globally significant marine ecosystem – the Gulf of Mannar Biosphere Reserve, one of world's richest marine biological resources. A total of 10 true mangrove and 24 mangrove associated species have been recorded from the islands in the Biosphere Reserve (Jeganathan, *et al*, 2006). It has 3,600 species of plants and animals that make it India's biologically richest coastal region (Global Environment Facility, 1999). It is, of course, specially known for its corals, of which there are 117 species belonging to 37 genera (Kelleher, 1995). Out of the 14 species of seagrasses under six genera known from Indian seas, thirteen species occur in the Gulf of Mannar Biosphere Reserve (Venkataraman & Wafar, 2005). And 5 species of sea turtles have been recorded here – olive ridleys, green turtles, hawksbills, leatherbacks and loggerheads. Green turtles and olive ridleys are found in significant numbers and this area serves as an important feeding ground (Bhupathy, 2007).

The project will also adversely affect the Palk Strait between India and Ceylon which is about 75 km-wide, with a water depth of 9-13 m, except where local coral reefs rise above the sea level (Ramesh and Kannupandi, 1997). The Palk Strait is an inlet of the Bay of Bengal. The Palk Strait is 64 km to 137 km wide and 137 km long. The Palk Bay is also considered as one of the five major reef formations in India<sup>1</sup>. A total of 61 species of algae are distributed among the three major groups –

green algae (14 genera and 28 species), brown algae (eight genera and 13 species), and red algae (17 genera and 20 species). Of the 14 species of seagrasses under six genera known from Indian seas, 11 species are known to occur in the Palk Bay (Venkataraman and Wafar, 2005).

The project documents claim that ships moving from the west coast to the east coast of India do not need to navigate around Sri Lanka but can use the channel to save 36 hours of shipping time and 570 nautical miles. It involves dredging in an 89 km-stretch for a width of 300 m and for a depth of 12 m for ships less than 30, 000 DWT (dead weight tonnage) with draft restricted to 10m. The project route is shown below<sup>2</sup>:



The proposed canal has the potential to have very significant consequences on some of the most important marine biodiversity areas of mainland India. The Gulf of Mannar and Palk Bay regions have some of India's richest coral reef ecosystems and are also home to some of the most extensive

<sup>1</sup> Also see [http://envfor.nic.in/report/9798/con\\_nat.html](http://envfor.nic.in/report/9798/con_nat.html)

<sup>2</sup> Source: <http://sethusamudram.tamilar.org/>

and diverse seagrass meadows in the country. Apart from being ecosystems of high productivity and diversity, they perform vital ecosystem functions, protecting coastal systems, and serving as nursery grounds for fish stocks that sustain local fishing communities. Given the shallow nature of the Palk Bay and the Adam's Bridge area, it will require considerable dredging of the sea floor to attain this depth. The Palk Bay is considered to be one of the biggest sediment sinks along the east coast (Chandramohan *et al.*, 2001), and in order to keep the canal open, a certain level of dredging will have to be maintained through the operating life of the canal. These activities will introduce dramatic changes in the marine environment of the Gulf of Mannar and Palk Bay. This article is aimed at evaluating the project planning and design and explore if it has considered the biological diversity of the region as well as predicted the potential environmental impacts of the project on the region. This involved an analysis of all the SSCP documents and relevant literature to arrive at a multi-pronged assessment of the implications of the SSCP. Only some of the key issues of the project are discussed here.

#### **Technical aspects in Project Design, EIA and related studies**

For a project such as the Sethusamudram Ship Canal Project (SSCP) to be environmentally sound and well-designed, a full understanding of the project area, its ecology, its environmental processes, the project activities – namely dredging and waste disposal and movement of ships in the region is a must. It has been stated that the navigation channels of ports on the east coast of India face three major and persistent problems (1) Problems due to sedimentation, (2) Problems due to tropical cyclonic disturbances, and (3) Issues related to dumping of dredged material (Ramesh, 2005a). Thus, to arrive at an environmentally sound and well-designed channel, the Sethusamudram Ship Canal Project should have been backed by a complete scientific understanding of the several parameters and factors in the project area, including sub-surface geology, bathymetry, sedimentation process and transport regime in the project, impacts of monsoon, cyclones, storm surges etc., impacts of dredged disposal and impacts on biodiversity and fisheries.

The sub-surface geology and bathymetry help determine the alignment of the canal and the type of dredging required. Once this is known, the sedimentation from the dredging activity as well as dredge disposal can be ascertained. This also determines the amount of capital dredging and its costs. This sediment dispersion can be predicted by knowing the sediment quality (from the sub-surface geology studies) coupled with the modelling of various scenarios of ocean-met and physico-chemical parameters. The scenarios should be based on primary data as well as past historical data. Once this is done the impact of the sedimentation on biodiversity especially reefs can be extrapolated. Sedimentation and transport regimes and factors affecting these determine the level of maintenance dredging required, as well as the possible sites for disposal of dredged material and the environmental impacts of this activity.

#### **Sub-Surface Geology, Sedimentation and Disposal**

All documents especially the NEERI EIA (National Environmental and Engineering Research Institute) reflect a poor understanding and information of the sub-surface geology. Consequently, the kind of dredging that is required in this region and its impacts on the environment were not estimated scientifically. Thus the present views on environmental impacts of dredging and disposal of the dredged material in this region is incomplete and is potentially much greater than stated in the NEERI EIA.

The lack of studies and data in the EIA and other documents on the littoral processes and flow characteristics that will affect the channel in the Palk Straits region have been pointed out by many experts (Rajendran 2005a; Rajendran, 2005b; Ramesh, 2004; Ramesh, 2005a; Ramesh 2005b). In fact, critics have pointed out that the NEERI EIA failed to incorporate the information and data from the most important research papers on the sedimentation process in the project area that had been published in peer reviewed science journals after the year 1989 (Ramesh 2004b; Ramesh, 2005a; Ramesh, 2005b). Some of these are Sanil Kumar *et al.* (2002), Ramasamy *et al.* (1998), and Chandramohan (2001). In fact, the L&T Ramboll Detailed Project Report (DPR) observation

(section 4.3.3, page 4-5) on the NEERI Techno Economic Feasibility Assessment Report (TFEAR) is that “the annual maintenance dredging in the Adam’s Bridge area is mentioned to be 0.1 million cu.m in the NEERI report, which is not substantiated by scientific assessments or calculations.”

Though the project area comprises of three distinct water bodies – the Gulf of Mannar, Palk Bay and the Bay of Bengal, which are governed by different forcing factors with respect to the wind and tides, which results in different wave climates and circulation patterns, the NEERI EIA report assessed the maintenance dredging in the Sethusamudram Ship channel based on the silt movement pattern on the east coast and not any data from the project region. Thus one can conclude that the NEERI EIA and other project documents have not addressed the question of sedimentation dynamics comprehensively, rendering the estimates on capital and maintenance dredging conclusion of the modelling studies to be wrong on scientific grounds. This also makes the prediction of the environmental impacts of the dredging and disposal of dredged material incomplete and inaccurate. Furthermore, the exact role of cyclones in influencing the sedimentation pattern has also not been studied in detail (Ramesh, 2005a; Ramesh, 2005b).

The SSCP’s EIA should have included information on suitable disposal sites, since the project is located in an ecologically sensitive area and this activity involves obvious environmental implications. Rajendran further states that the EIA is ambivalent on the identification of sites for environmentally safe disposal of dredged material thus posing an environmental hazard to marine organisms (Rajendran, 2005a; Rajendran, 2005b). There is ample evidence that the NEERI EIA, a decisive document which should have contained critical information on the impacts of the SSCP, does not adequately assess impacts of dredge disposal on the environment. Aspects such as disposal of dredge spoils have implications for the ecosystem and also for the very activity of dredging, which the TFEAR alludes to, in highlighting the costs of dredging (NEERI, 2004b). By deferring such critical and decisive

studies, the project pays short shrift to its own economic and ecological viability.

### **Loss of Scheduled / Protected Species**

Section 3.2 of the NEERI EIA states that the “Presence of corals along the proposed ship canal alignment is negligible”. Again in Section 1.3 it states, “The corals along the proposed channel alignment in Adam’s Bridge do not exist though major groups of biological resources like sea fans, sponges, pearl oysters, chanks and holothuroids at various sampling points have been recorded.” From the above statements it may be inferred that corals (along with sea fans, sponges, pearl oysters, chanks and holothuroids) though negligible, do exist along the proposed ship canal alignment. Further, the EIA report in section 6.4.1.2 and 6.6 states, ‘Due to dredging, the bottom flora and fauna on an area of about six sq km along the channel alignment in Adam’s Bridge and about 16-17 sq km in Palk Bay/Palk Strait area will be lost permanently. The same is also mentioned on page 12-4 section 12.6.2.3, paragraph 2 of the L&T Ramboll DPR.

Reading the above three points together, it is clear that the dredging activity for the canal will result in the loss of corals, sea fans, sponges and holothurians which are all protected species under the Indian Wild Life (Protection) Act, 1972.<sup>3</sup> This under the WLPA would mandate permission and clearance of the Central Government i.e. Ministry of Environment and Forests (MoEF) (if the species were in Schedule I and from Chief Wildlife Warden of Tamil Nadu for species other than those under Schedule I). There is no evidence that the project authorities even took measures to inform the State Board for Wildlife, or the Chief Wildlife

<sup>3</sup> MoEF (2001), S.O.665 (E), [11/7/2001] - Amendments to Schedule I and Schedule III of the Wild Life (Protection) Act, 1972 (53 of 1972), MoEF, New Delhi.

Available at

[http://envfor.nic.in/legis/wildlife/so665\(e\).htm](http://envfor.nic.in/legis/wildlife/so665(e).htm)

All Corals- Part IV A of Schedule I Entries nos. 1 to 4., All Sea Fans -Part IV A of Schedule I Entries no. 5, All Sea cucumbers (All Holothurians) -Part IV C of Schedule I Entries no. 1, Sponges - Schedule III Entries no. 20

Warden of Tamil Nadu, or the Central Government of the loss of these species by the project activities.

### **Economics of the Project**

Even if the environmental impacts have not been properly evaluated, the project must justify these from the economic benefits that will accrue. A closer look at the financial and economic aspects of the project reveals many glaring gaps. First among them is that the cost savings by ships have not been adequately detailed out and are grossly exaggerated. This is especially true for ships (non-coastal) coming from Europe/Africa or other locations. The fuel savings for many of these ships is actually negative, while the total savings (including reduction in time charter) actually works out to just 30 per cent of what is claimed by the L&T Ramboll DPR for most non-coastal ships. This significantly lower level of savings implies that the tariff that can be charged by SSCP will be much lower than that claimed by the L&T Ramboll DPR. The above three factors have significant revenue implications, as over 60 per cent of these non-coastal ships (which contribute to a projected 70 per cent of the revenue of the project) that 'benefit' will not be willing to pay the amount as claimed in the L&T Ramboll DPR. For argument's sake let us ignore the above gap and assume that ships would use the canal. The project estimates that US \$ loans will have to be repaid at an interest of four percent, and rupee loans at an interest of eight percent. These rates might have been accurate when the DPR was prepared; today lending rates hover around eight per cent for dollar loans and 13 per cent for rupee loans. The cost of credit and capital has been grossly underestimated and if current figures are used, the project is likely to drain the Indian economy. The project should either be a revenue earner for the government or serve some larger public purpose (like roads contribute to infrastructural development) and in this case the SSCP does not seem to do either.

### **Conclusion**

This article has summarised several major shortcomings in the EIA and other related documents of the project in terms of adequacy and gaps and methods used to assess environmental impacts, but

more importantly, in terms of data on basic parameters such as sub-surface geology, bathymetry, and sedimentation process in the project area. These data gaps are responsible for the poor design of the project, under-estimations of costs, and the poor assessment of risks, hazards and environmental impacts of the project. Most importantly the project itself admits to the loss of corals, sea fans, sponges, holothurians, which are all protected/scheduled species under the Wild Life (Protection) Act, 1972 for which the proponents failed to seek clearance from the Chief Wildlife Warden and Central Government as required by law. Some of the basic requirements as per the EIA Notification 1994 and guidelines laid down by the MoEF, such as risk analysis/assessment and disaster management plan, have simply not been done. The economic analysis of the project calls for a revised study of economic benefits and reveals that in the present scenario, the project will be a financial white elephant.

In light of the above, one can conclude that the project has not been adequately assessed for the environmental impacts to the biodiversity of the Palk Strait, Palk Bay and the Gulf of Mannar and will have serious impacts and cause drastic changes to the biodiversity of the region. It is likely to also cause major impacts and losses of fisheries and livelihoods to the region. Reviewing the current status of the implementation phase of the project, considerable environmental and economic damage has probably already been done.

*(This article is an abridged version of a few chapters from a more comprehensive report titled 'Review of Environmental and Economic Impacts of the SSCP' by Sudarshan Rodriguez, Jacob John, Rohan Arthur, Kartik Shanker and Aarthi Sridhar which is to be published soon.)*

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## Research Summaries on Sea Turtles

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**Hamann M., Schäuble C.S., Simon T., Evans S. (2006). Demographic and health parameters of green sea turtles *Chelonia mydas* foraging in the Gulf of Carpentaria, Australia. *Endangered Species Research* 2:81-88.**

Historically, sea turtle populations have been assessed in terms of whether the number of nests laid have been increasing or decreasing (or not changing at all). While these kinds of data provide a rough index of the general status of a nesting population, they only reflect the changes occurring to a relatively small segment (nesting females) of the larger population. To more adequately assess the status of the larger population, other kinds of demographic data are needed in addition to annual numbers of nests laid. These include: numbers of different age classes (e.g. small juveniles, subadults, and adults), sex ratios, growth rates, and health status. The latter can be particularly important when trying to understand observed changes in a population. For instance, an increased number of observed stranded turtles might be linked to disease or pollution; conversely, data on physiological health of turtles might also help rule out these possible causes. The study by Hamann and his colleagues on green turtles in the waters of Northern Australia was stimulated in part by increased reports of observed turtles that appeared to be sick. To collect data, the researchers captured

free swimming turtles at various locations and at various times of the year. They carefully collected small amounts of blood from these turtles and had them analysed by a veterinary laboratory for information on more than a dozen physiological values such as levels of protein, glucose and uric acid. Overall, they found that the values for the blood analyses from green turtles from Northern Australia were similar to values of green turtles studied in the Middle East, Hawaii and the northern Caribbean. Interestingly, the values for glucose of the Australian turtles were lower than green turtles studied elsewhere, although this might reflect geographic differences in the kinds of food available for green turtles. More information on foraging behaviour and prey availability across different populations is needed to fully understand the variation in glucose levels. One of the long-term benefits of this study is the establishment of a baseline of physiological data for this green turtle population. Future studies will be able to look back and compare data to those of Hamann *et al.*, thus providing greater context in which to interpret the information.

**Mrosovsky N. (2006). Distorting gene pools by conservation: Assessing the case of doomed turtle eggs. *Environmental Management* 38:523-531.**

Sometimes, female sea turtles deposit their eggs below the high tide line on a nesting beach. Excessive seawater over-wash experienced by the eggs during the tidal cycle generally leads to greater embryonic death or even loss of the entire clutch through inundation or normal sand erosion.

These kinds of nests are often called doomed or suicide nests and it remains a challenge to understand why turtles would swim hundreds or thousands of kilometres from foraging grounds to nesting beaches, only to make a poor choice about where to lay their eggs. Fortunately, it is a

relatively simple process for conservation workers to relocate the eggs of a doomed nest to a safer place, usually further up the beach or into a protected hatchery. If done properly, relocated eggs will successfully produce hatchlings at rates similar to natural non-doomed nests. As such, nest relocation is a powerful tool and has been reported to be partly responsible for the dramatic increase in a leatherback nesting population in the Caribbean (Dutton *et al.* 2005. *Biological Conservation* 126:186-194). However, with power comes responsibility, and indeed several reports over the years have highlighted some of the potential negative impacts of nest relocation. One possible negative impact is an alteration of the sex ratio of hatchlings of relocated eggs, as sand temperatures tend to increase with distance from the high tide line: higher incubation temperatures usually produce more or all female hatchlings (see Morreale *et al.* *Science* 1982. 216:1245-1247). Also, some researchers have suggested that relocation of eggs to centralised hatcheries may result in predator attraction and thus increased predation of hatchlings during the first few hours after they leave the nest and enter the surf (Stewart and Wyneken. 2004. *Bulletin of Marine Science* 74:325-335). Both of these kinds of impacts are potentially manageable by being careful about where to place relocated doomed eggs, for example by avoiding areas that are too hot (or cool) or using

several decentralised hatcheries. What about other kinds of unforeseen impacts? In his recent paper, Nicholas Mrosovsky suggests that relocation of doomed nests may have long-term genetic impacts on sea turtle populations.

This idea is based on recent research on nest site selection of individual leatherback and hawksbill turtles – it appears that females tend to “repeat” their decisions about whether to nest far up the beach or closer to water, so that there are some turtles that “prefer” to nest closer or even below the high tide line. This in turn suggests that there is some genetic component to nest site selection. If true, then relocation of doomed nests may serve as a means of “selecting” for the gene(s) that are responsible for causing turtles to lay doomed eggs in the first place. Although the argument remains speculative, Mrosovsky suggests that all of us who engage in nest relocation should reflect on both the pros and cons of this technique. He goes further and suggests that some doomed eggs might be better used for human consumption; this is likely to raise concern of sea turtle workers who wish to preserve all sea turtles and their eggs. Nevertheless, Mrosovsky’s general point – that we should carefully consider all possible impacts of a commonly used conservation tool – is important. It also adds to the ongoing debate about when nest relocation should be used.

**Dethmers K. E. M., Broderick D., Moritz C., Fitzsimmons N., Limpus C. J., Lavery S., Whiting S., Guinea M., Prince R. and Kennett R. (2006). The genetic structure of Australasian green turtles (*Chelonia mydas*): Exploring the geographical scale of genetic exchange. *Molecular Ecology* 15, 3931-3946.**

**Bourjea J., Lapegue S., Gagnevin L., Broderick D., Mortimer J., Ciccione S., Roos D., Taquet C. and Grizel H. (2007). Phylogeography of the green turtle, *Chelonia mydas*, in the Southwest Indian Ocean. *Molecular Ecology* 16: 175-186.**

Studies of marine turtle population genetics are rapidly gaining momentum throughout the Indian Ocean and South East Asian region, and these two recently published studies provide excellent advances to the field. However, for a non-genetics person what can these population studies tell us and how can the information be used by other researchers, managers and policy developers? While genetic studies can provide detailed information on gene flow and genetic structure,

one of the most valuable management orientated outcomes is that they identify population structure i.e. which rookeries are genetically similar enough to form discrete genetic populations. These genetic populations are often also referred to as stocks or management units. The studies by Dethmers *et al.* and Bourjea *et al.* have concentrated on two different regions of the Indian Ocean and South Pacific area. Dethmers and colleagues identify 17 distinct populations from 27 rookeries sampled in

the South East Asia and South Pacific Ocean. Bourjea and colleagues sampled 10 rookeries in the South West Indian Ocean and found 3 distinct populations; two in the southern Mozambique Channel (Europa and Juan de Nova) and one in the northern Mozambique Channel (comprising rookeries of Aldabra, Cosmoledo, Glorieuses, Nosy Iranja, Moheli, Mayotte, Farquhar and Tromelin).

Genetics theory suggests that gene flow between each of the discrete populations is very low or is not detectable. Hence if one of these populations was to undergo large-scale decline it is unlikely that the population would be replenished from another adjacent one. Hence the results of Dethmers *et al.* (2006) and Bourjea *et al.* (2007) can help managers define and focus management priorities such as the establishment and/or maintenance of index beaches to monitor population trends. Furthermore, a main factor when assessing population status is the level of

threat the population is exposed to. Thus another important application of having genetic populations identified is that it allows managers to assess the genetic composition of turtles at foraging areas, or from which population turtles that are caught in fisheries originate. These two sets of data are important for managing healthy populations of marine turtles.

Clearly there are still gaps in our understanding of population boundaries for green turtles and other species such as leatherback and hawksbill turtles nesting in the Indian Ocean and South East Asian region. However, the capacity to undertake a coordinated approach towards understanding marine turtle population genetics is rapidly developing in the region. The challenge now will be to use the results from studies such as Dethmers *et al.* (2006) and Bourjea *et al.* (2007) as a basis for developing strategies to manage healthy populations of turtles in the region.



A leatherback lays a clutch of 'doomed eggs' close to the shoreline in French Guiana.  
© Matthew Godfrey

**Native Oceans/Oceanos Nativos  
Loreto, Baja California Sur, Mexico  
International Sea Turtle Symposium, 2008**

**Wallace J. Nichols, President, ISTS**

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**Symposium dates:** *January 22, 2008 – January 26, 2008*

**Venue:** Loreto, Baja California Sur, Mexico

**Meeting agenda:** The 28<sup>th</sup> Annual Sea Turtle Symposium integrates the Grupo Tortuguero annual meeting with International Sea Turtle Symposium (ISTS), in order to introduce folks from both backgrounds, broaden networks, and facilitate research connections. Grupo Tortuguero operates as the heart of sea turtle conservation in and around Loreto, Mexico. Therefore their presence and participation at the symposium is very crucial.

Due to limited resources and space in Loreto, the two proposed meetings will be staggered; however, folks are welcome to stay for both meetings if desired.

**Theme:** Native Oceans/Oceanos Nativos

The emphasis of the 2008 Symposium is on Native Oceans. Indigenous conservation is a key component of international conservation efforts, as native peoples have some of the deepest cultural ties with sea turtles and other species and have a direct need to co-exist with animals such as sea turtles. Therefore, we are placing this issue at the forefront of the 2008 Symposium, and are hoping to include Indigenous populations from all over the world. The Native Oceans' theme will carry over into the symposium's scientific papers as authors will be urged to consider the historical composition of natural marine systems, pre-exploitation populations, and the shifting baseline concept as it relates to sea turtles.

The Comcáac, more widely known as Seri, tribe of the Sonoran coast and midriff islands of the Gulf of California will be an integral part of the meeting. They will perform a traditional four-day ceremony honouring the leatherback turtle, to which they have looked up to as an ancestor for hundreds of years.

**Greening the Symposium:** The 2008 Symposium, when combined with the Grupo Tortuguero meeting could be the largest to date.

To reduce the environmental footprint, we will be taking many measures to reduce waste, support the local economy, prevent pollution, and set an example for subsequent meetings. Participants will receive a traditional gift from the Seri and be given reusable mugs and sporks to reduce solid waste.

We will encourage tent camping to reduce energy usage and promote the purchase of carbon offsets for travel. In addition, we will feature local foods and bike rentals for transportation.

**Abstracts and registrations:** Participants are encouraged to sign up early and make travel and accommodation arrangements as soon as possible to ensure maximum efficiency and preparation time. The early registration and abstract submission deadline is September 15, 2007.

**New this year:** This symposium will be very different from previous years in an exciting and groundbreaking fashion. Posters will be displayed outside along the main street of Loreto, some folks may be camping or staying aboard boats, and the Loreto plaza, home of the oldest mission in the Californias, will host a traditional four-day

ceremony by the Seri Indians. People are encouraged to come early and stay back to explore the pristine local flora and fauna. We are asking folks to bring their sense of adventure and an open mind; and be prepared to have a lot of fun!

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**IUCN-SSC Marine Turtle Specialist Group  
Quarterly Update  
(April, 2007)**

**Roderic B. Mast<sup>1</sup>, Brian J. Hutchinson<sup>1</sup> & Nicolas J. Pilcher<sup>2</sup>**

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**MTSG Annual General Meeting, 2007**

The 2007 Marine Turtle Specialist Group (MTSG) Annual General Meeting was held at the 27<sup>th</sup> Annual Sea Turtle Symposium in South Carolina, U.S.A., between February 24 and 28. The meeting's format was modified from the previous years to include greater opportunities for member discussions. Two half-day sessions were held; one at the beginning and one at the end of the Symposium.

The first session offered the Co-Chairs and Regional Vice Chairs a chance to make brief presentations on specific themes. Rod Mast provided an overview of the results of the BI: 3 Meeting held in August, 2006 and Brian Hutchinson presented the results of the Red List survey undertaken by Jeff Seminoff (who was unable to attend). Regional overviews were provided by Dimitris Margaritoulis and Paolo Casale for the Mediterranean (they were generous enough to halt the concurrent Mediterranean

meetings and bring the entire Mediterranean contingent in to participate in the MTSG session), Kartik Shanker for South Asia, Alberto Abreu for the Wider Caribbean (including a fascinating look at the status of hawksbills in the Yucatan), Alejandro Fallabrino for the Southwest Atlantic, Manjula Tiwari for West Africa, and Blair Witherington for the North Atlantic. Their presentations and minutes of the meeting are in preparation and soon to be posted online at <[www.iucn-mtsg.org](http://www.iucn-mtsg.org)>. The second MTSG session was held on the closing day of the Symposium, and attended by more than 120 members and visitors. The first half of the session focussed on the Red Listing, and specifically on the re-assessment of the olive ridley. The second half of the session was a discussion on MTSG's plans to address the subject of use as it relates to marine turtles.

For the first half, an overview on the olive ridley assessment and challenges was given by Principal Assessor, Alberto Abreu, which triggered off an active discussion on several related issues. In

particular, there were deliberations over the application of A1 or A2 categories from the IUCN Red List Guidelines, and the complications posed by the fact that *arribada* nesting olive ridleys and solitary-nesting ridleys exhibit strikingly different population trends. The full minutes of this meeting have been posted on the MTSG website and can be accessed by MTSG members.

In the second half of the session, Nick Pilcher spoke on marine turtle use and led a discussion on MTSG's role and future directions as they relate to this important theme. The main issues are a lack of responsiveness from potential donors on funding a workshop to bring MTSG members together, and a call for someone within MTSG to take the lead in moving the issue forward. Since then, we are pleased to announce that several MTSG members, including Bill Irwin, Dave Owens and Pat Opay have offered to help drive the topic within the MTSG. Key tasks include coming up with a list of definitions of use (e.g. consumptive and non-consumptive), and their impacts on marine turtles. Please be on the lookout for more information on this topic.

### **Asia and Pacific Islands By-catch Consortium**

The inaugural meeting of the Asia and Pacific By-catch Consortium was held between February 15 and 16 in Honolulu, U.S.A., hosted by the Western Pacific Regional Fisheries Management Council. The Consortium was developed to foster collaboration among participants/members of the commercial fishing industry; management authorities; seafood retailer industry; experts in fishing technology, marine ecology and fisheries science; and other interested parties working to promote the efficient direction of resources to solve by-catch problems in Asia and Pacific pelagic fisheries.

The IUCN was invited to be part of this new initiative due to its global reach and organisational interest in solving by-catch-related issues, particularly with regard to endangered species. Nicolas Pilcher represented IUCN in his capacity as Co-Chair of the MTSG and also as a member of the SSC Marine Conservation Sub-Committee.

The Consortium envisions to set up a novel regional-level, voluntary, industry-lead approach to solve fishery related by-catch problems, and the sharing of information with fishery management authorities and amongst the fishing and retail industries, and providing an efficient means to support implementation of recommendations and resolutions of the International Fishers Forum series, Regional Fisheries Management Organisations and other international organisations.

The inaugural members first set out to determine the Consortium's initial objectives, namely to support and address specific pelagic long-line and purse seine by-catch issues. With regard to long-line fisheries (large-scale vessels and smaller vessels <24 m. in length), and at a visionary level, the consortium intends to (i) monitor and reduce by-catch of sea turtles and seabirds; (ii) monitor and promote management measures to ensure that shark catch levels are sustainable; and (iii) encourage practices to maximise post-release survival. For purse seine fisheries, the Consortium will monitor and reduce by-catch of juvenile target and other species. Within this framework, several short and long-term initiatives were then agreed upon by the inaugural members.

### **SPREP Marine Turtle Action Plan Review Meeting**

Nicolas Pilcher and Milani Chaloupka (Regional Vice-Chair, Pacific Region) recently provided MTSG with inputs on the development of a new, five-year plan for the conservation of marine turtles in the South Pacific, which was hosted between March 12 and 14 by the South Pacific Regional Environment Programme (SPREP) in Apia, Samoa. Other MTSG members in attendance included Ian Bell, representing the Queensland Parks Service, and Irene Kinan, from the Western Pacific Regional Fisheries Management Council.

As a bit of background, in 2003 SPREP members agreed to a Regional Marine Species Programme Framework 2003, which included individual plans for dugongs, whales and dolphins, and marine turtles. These plans, which were developed with the expert advice of Col Limpus and George Balazs, were intended to enable the people of the

Pacific to take a primary role in achieving the following vision: *A Pacific Ocean where populations of whales, dolphins, dugongs and marine turtles have recovered to healthy levels of abundance, have recovered their former distribution and continue to meet and sustain the cultural aspirations of Pacific peoples.*

The action plans are a collective responsibility of SPREP member states, the SPREP Secretariat, partner non-governmental and inter-governmental organisations, and private sector organisations. Network members agreed that the SPREP Secretariat would take primary responsibility for networking, information management and archiving, and annual reporting. The purpose of the recent meeting was for South Pacific countries to provide updated information from their work/country/territory regarding implementation of the agreed actions from the previous Marine Species Action Plans, and to develop a new five-year-agenda and prioritise action items for the region with regard to marine turtle conservation.

Milani gave an overview of population status by species, including major rookeries and nesting areas, while Nick made a presentation on threats to marine turtles, broken down by known and quantifiable and the unknown, unquantified threats. Both also provided inputs to the discussions, and guided deliberations pertaining to known status and biology of the species in question.

We feel it is important for MTSG to continue to play a role providing the best available scientific information and skills to regional programmes around the globe, and it was a great pleasure to be invited by the SPREP Secretariat to assist with the recent revisiting of their five-year-conservation plans. For more information, log on to [www.sprep.org](http://www.sprep.org)

### **SWOT Report II Launched at the 27<sup>th</sup> Sea Turtle Symposium**

As a founding partner in the State of the World's Sea Turtles (SWOT) Initiative, MTSG and its members have played an important role in this effort. This beautiful publication highlights global success stories that demonstrate positive actions,

which can serve as models to conserve sea turtles and their habitats and replicated by policy makers, developers, fishers, polluters and coastal communities world over.

The *SWOT Report* is coordinated by Conservation International's Sea Turtle Flagship Programme and the content is generated by a growing global network of hundreds of volunteers – the “SWOT Team” – that provides both data and an audience for a broad SWOT Initiative. *SWOT Report, Vol. II's* centrepiece is a compilation of data on loggerhead and leatherback turtles nesting on beaches world over.

Over the coming five years, this dataset will be expanded to include all the seven species of sea turtles, and will become a valuable means to visualise trends in sea turtle abundance on a planetary scale. These data can also be accessed online [www.seaturtlestatus.org](http://www.seaturtlestatus.org), where SWOT has recently developed a mapping tool using Google Maps.

Another aspect of SWOT is an Outreach Toolkit that provides user-friendly, multi-lingual documents on “How to run an education/outreach campaign...” with a variety of different audiences from fishers to religious leaders, business interests and policy makers. These documents are available for free in English and Spanish on [www.seaturtlestatus.org](http://www.seaturtlestatus.org)

### **MTSG Laments the Loss of an Old Friend**

Sea Turtles and MTSG have lost one of our greatest advocates, Ms. Frances Velay (1914-2007). An engaged philanthropist and deeply committed to the conservation of turtles, Miss Velay will be greatly missed. She was an ardent supporter of MTSG and numerous other sea turtle related causes through her Panaphil Foundation. She truly loved turtles, and converted that love into action through her heartfelt support towards our work. Co-Chair, Roderic Mast was able to speak to her by cell phone from Indonesia just minutes before her passing on January 20, and to thank her one last time for her lifelong love and commitment to turtles.

## NOTES

### Release of Juvenile Green Turtles in North Karnataka

**Ravi Pandit**

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At dawn on May, 17, 2006, N.D. Bhat, Shankar Hegde and I gathered at Gangavali village near Honavara, North Karnataka to release an olive ridley and a green turtle into the wild. We were joined by Anand Udar, Range Forest Officer, Hiregutti. The green turtle had been caught as incidental catch by a fisherman in Gangavali about a year and a half prior to this day.

Turtles in these parts are revered and worshipped as an incarnation of Lord Vishnu, and hence most fishermen do intentionally not kill or harm them. However, they are often caught as by-catch in fishing nets; unless the nets are recovered on the same day, the turtles die. This turtle was very fortunate that it was recovered on the same day from the net, and hence it was alive. The olive

ridley hatchling was obtained from a relocated nest and brought up at the Gangavali Turtle Breeding Centre. The breeding centre was developed by Anand Udar and maintained by Gulabi Tandel and her family, changing the water periodically and feeding them with fish.

Anand Udar, N.D. Bhat, Shankar Hegde, the Tandel family and I watched along with dozens of curious locals as the turtles moved seawards. On reaching the tidal area, Gulabi Tandel approached the turtles, put her hand on their carapaces and said, “Both of you take care”. As both the turtles disappeared into the sea, we could only hope they overcome the many hurdles that they have to face and return to nest at Gangavali and produce a new generation of hatchlings.

### Sea Turtle Conservation in Kasargod District, Kerala

**Sudheer Kumar**

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Olive ridley turtles nest along the northern coast of Kerala from September-March. Naithal was established in 2001 and is involved in sea turtle conservation. The project area covers 15 km of the coastal belt of Kanhangad Municipality, Nileshwar Grama Panchayat and Padanna Grama Panchayat of Kasaragod District of Kerala. The eggs that are laid are collected and hatched at hatcheries constructed with the support of the Kerala Forest Department. The project has been undertaken with the support and co-operation of the Department of Forests and Wildlife.

In Kerala, such a participatory conservation project is undertaken only at Thaikadappuram (Nileshwaram) of Kasargod District and Kolavi of Calicut District. The project intends to instill the need and importance of protecting sea turtles among the people, who were formerly using turtle eggs for food. The project also intends to involve the public in conservation activities. The Environment Monitoring Forum, Cochin conferred the P.V. Thampi Memorial Environmental Award on Naithal in 2004 in recognition of our turtle conservation project.

In addition, Naithal has conducted a study on solid waste deposits and encroachment of Nileshwaram River and the report has been handed over to the Nileshwar Grama Panchayat. Naithal members were in the forefront of the fight against the

burning issue of aerial spraying of Endosulfan in Kasaragod District. School children of the area, under the banner 'Naithal Kids' are also contributing to conservation activities in these areas.

**Table 1:** Relocation of sea turtle nests by Naithal from 2002 to 2007

Year	Number of Nests	Number of eggs collected	Number of hatchlings
2002 - 03	12	1,548	927
2003 - 04	26	3,216	1,853
2004 - 05	21	2,913	2,514
2005 - 06	24	3,119	2,817
2006 - 07	21	2,518	880 (out of 8 nests)

### Letters to the Editor

#### Acquisition of land and construction of a tourism resort at Thaikadappuram

Sir,

This is an appeal to protest against the acquisition of land and construction of a tourism resort at Thaikadappuram, which will jeopardise turtle conservation in the area. Naithal, an organisation for coastal information conservation and action, was established in the year, 2001. Prior to its establishment, a group of youth were active in environmental issues of the area especially against sand mining in the coastal areas of Kanhangad municipality, and Nileshwar Grama Panchayat of Kasaragod District, Kerala. The organisation came into being as a result of their aspiration to give such activities a structured form. The organisation won the battle against sand mining in the area that comes under the Coastal Regulation Zone Act. The tangible consequence of preserving pure drinking water enabled it to get the wholehearted support of the locals. However, there is a new problem. The constructions of the tourist resort at Ozhinhalappu in Kanhangad Municipality, Kasaragod District is a site where olive ridley turtles nest in greatest abundance. Beach lighting and tourists are sure to prevent turtles from nesting at this site. Interestingly, the construction is very close to the high tide line, whereas permission is

not granted for poor fishermen to construct houses in the zone.

Further, no Environmental Impact Assessment has been carried out while starting such a huge project in this ecologically sensitive area. The exploitation of drinking water will be another major threat; this is one of the few coastal areas in Kerala where the ground water is not saline. We appeal to you, to protest against construction of this resort so that this breeding site may be saved. Kindly make your appeal (with a copy to us) to:

1. Hon'ble Chief Minister, Government of Kerala
2. Ministry of Environment and Forests, New Delhi
3. Chief Conservator of Forests (Wildlife) and Chief Wildlife Warden, Kerala Forests and Wildlife Department, Govt. of Kerala.
4. District Collector, Kasaragod
5. Municipal Chairman, Kanhangad Municipality, Kasaragod

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## NEWS AND UPDATES

This section is compiled by Sudarshan Rodriguez, Coordinator of WAVES, a weekly marine and coastal E-news compilation.

You can submit news items via email and subscribe to WAVES by writing to Sudarshan

### **Endangered turtles swim in Pacific "race"**

San Jose, Costa Rica (Reuters): Eleven leatherback turtles are swimming across the Pacific Ocean to the Galapagos Islands in a "race" that will be tracked online to draw attention to the plight of the endangered creatures.

The turtles have been tagged with satellite communication devices that give their positions as they head south from their nesting sites on Costa Rica's Playa Grande beach to feeding grounds near the Galapagos, about 950 miles away.

Online participants can choose a turtle and track its course at <http://www.greatturtlerace.com> from April 16 with the winner being the animal that travels furthest in two weeks of swimming.

There is no prize for the winner of the race, aimed at highlighting the dangers facing a creature that has graced the oceans for 100 million years.

"It's fascinating to consider that we are able to bring together these prehistoric animals with such cutting-edge science," said Stanford University researcher George Shillinger, one of the race organisers.

Environmentalists say 95 per cent of leatherbacks in the Pacific Ocean have vanished in the last 20 years due to human activity like fishing, poaching of their eggs and building near their nests, and they could become extinct in the next decade.

Thousands of leatherbacks nested at Playa Grande 10 years ago but the number has dropped to below 100 in the last five years.

Leatherbacks, which can reach a shell length of 1.7

Rodriguez ([sudarshanr@yahoo.com](mailto:sudarshanr@yahoo.com)). News items are taken directly from various media sources and do not necessarily reflect the views or opinions of the editorial members of the IOTN.

metres (5.6 feet) and a mass of 700 kg (1,540 lb), often die after being entangled in fishing lines and nets. Others choke on plastic bags, wrongly believing they are jellyfish, which are a delicacy for turtles.

The Galapagos Islands, which lie west of Ecuador, are home to hundreds of unique species, including giant tortoises, exotic birds and iguanas. The variety of natural life there inspired 19<sup>th</sup> century British naturalist Charles Darwin's theory of natural selection.

The leatherback race will not be live because the turtles left Costa Rica at different times. Instead, environmentalist group Conservation International will provide a day-to-day showing of the first 14 days of their journeys simultaneously as if they were racing.

The event will raise funds to protect Playa Grande. It is being organized by Conservation International, Costa Rica's Environment Ministry, the Leatherback Trust and the Tagging of Pacific Predators programme.

*Source: <http://www.sciam.com/article.cfm?alias=endangered-turtles-swim-p&chanID=sa003&modsrc=reuters>*

### **PTTs glued to seven olive ridleys**

Staff Reporter

Behrampur: Platform Terminal Transmitters (PTT) were glued to seven olive ridley turtles in mid sea near Rushikulya rookery coast by wildlife experts.

According to Behrampur Divisional Forest Officer (DFO) S.N. Mahapatra, this has been done because olive ridleys are not venturing to the coast for mass

nesting this year. But they can still be seen in sea a few km from the coast. Usually, the PTTs that can be tracked by satellites are fixed to turtles when they come over to the coast to nest. Mr. Mahapatra says the PTTs may unravel the reasons for which olive ridleys are not coming to their preferred nesting zones on the Orissa coast. There has been only one mass-nesting spell at Gahiramatha. But the Devi rookery and the Rushikulya rookery coasts are yet to experience mass nesting.

Forest officials still have hopes that the turtles would come and nest till April as they are at sea near the coast. In the past, mass nesting had been seen in April also.

This year, over 70 PTTs are being glued to olive ridleys near the Orissa coast under a research project of New Zealand-based SIRTRACK, wildlife trafficking experts. Each PTT costs about \$2,000.

Wild Life Institute of India and the State Forest Department are involved in this research project. The information received from these modern communication devices would unravel the unknown facets of their lives, especially during their nesting period.

It would also hint at the protection and management efforts needed at shore and sea for the olive ridleys coming to Orissa coast to nest, said Mr. Mahapatra. These endangered turtles are highly vulnerable as some studies say that one out of 1,000 hatchlings of olive ridleys survive to reach adulthood.

*Source: <http://www.hindu.com/2007/03/19/stories/2007031906410500.htm>*

### **Ocean fisheries maxed out**

By Stephen Leahy

Brooklin, Canada, Mar 5 (IPS) Two-thirds of fish stocks in the world's high seas are overfished, while most of those closer to shore are failing or fished to the maximum, a new U.N. report said Monday.

More and stronger regional fisheries management organisations are needed to rebuild depleted stocks

and prevent the collapse of other stocks, warned the FAO's latest "State of World Fisheries and Aquaculture" (SOFIA) report.

Ocean fisheries have "most likely" reached their zenith, said FAO Assistant Director-General for Fisheries Ichiro Nomura.

In fact, that peak may have been reached some time ago. The annual world fish catch since the late 1980s has been stalled at between 85 million and 95 million tonnes. The SOFIA 2006 report records marine fisheries catch at 85.8 millions tonnes and notes that 25 per cent of marine stocks are overexploited or depleted while 52 per cent are "fully exploited".

In the open ocean, where the deep-sea trawlers roam unrestricted, stocks of hakes, Atlantic cod, halibut, orange roughy, bluefin tuna and sharks are all in deep trouble. "They (open ocean species) are key indicators of the state of a massive piece of the ocean ecosystem," said Nomura in a statement.

In recent years, numerous scientific studies of the oceans have clearly indicated they are in trouble. A major study published last fall in Science magazine projected that every commercial fishery in the world will be wiped out before 2050 and that the oceans may never recover without significant reform of the fisheries industry.

A month later, U.N. talks failed to establish a moratorium on deep-sea bottom trawling, widely acknowledged as wasteful and damaging to ocean bottom ecosystems.

In February, researchers at the University of British Columbia in Canada calculated that these trawlers receive 152 million dollars a year in fuel and other subsidies. Without these subsidies, the few hundred ships that make up the global deep-sea trawler fleet would actually lose millions of dollars a year, said Rashid Sumaila, a researcher at the University of British Columbia. Japan, South Korea, Spain, Australia and Russia are the five largest payers of such subsidies, Sumaila said in an interview.

"These subsidies pay the deep-sea trawlers to do something appalling and something they'd never do on their own because it's uneconomic," said

Elliott Norse, president of the Marine Conservation Biology Institute, a scientific environmental group in the U.S. state of Washington.

"It's an example of unintended consequences of some government policies," Norse told IPS. But it is something that governments need to fix and fast, he added.

Also in need of fast repair are the world's 39 multilateral regional fisheries management organisations (RFMOs), he said.

RFMOs are the fisheries managers in charge of most of world's fish stocks outside of the unregulated high seas. Despite the FAO's strong support and hopes of expanding RFMOs everywhere, the SOFIA report notes that some of the most depleted fisheries such as the Northeast Atlantic and Southeast Atlantic have been run by RFMOs for many years.

Countries often opt out of an RFMO if they want to catch more fish than their allocation, says Daniel Pauly, a professor and director of the Fisheries Centre at the University of British Columbia.

Small countries like those in the Caribbean region can't afford RFMO membership fees, so the catch quotas in the waters around their countries are decided by global fishing nations like Japan and Taiwan, Pauly told IPS.

Despite his reservations, "We need strong RFMOs and to have them protect the high seas," he said.

"Local countries should automatically be members and not have to pay membership fees. And if the science says 'no more fishing', then countries cannot opt out," Pauly said. Currently, politics trumps science in most decisions about fish stocks, he noted.

For that to change, the mandate for RFMOs must switch from management of fish stocks for

maximum exploitation to protection of the stocks and the ecosystem.

"The primary mission of RFMOs should be to prevent fisheries from wrecking the marine ecosystem," Pauly told IPS.

A global network of off-limits marine preserves is equally important. Currently less than 0.6 percent of the oceans is in reserves and much less than that is fully protected from fishing, says Pauly.

Nearly all countries have agreed at international meetings, such as 2002 World Summit on Sustainable Development in Johannesburg and at the Convention on Biodiversity, to create a global network of marine protected areas (MPAs) by 2012. Experts suggest 30 to 50 per cent of the oceans may need to be off-limits to fishing if the oceans are to recover.

While most countries already protect 10 to 12 per cent of their land in parks and reserves, only the United States has actually made major additions to its MPAs, such as last year's creation of the world's largest reserve off Hawaii.

A global fisheries institution that uses science to determine how many fish, of what kind and where can be caught on a sustainable basis without harming the marine ecosystem, which that would also be good for fishers and their communities, would be the ideal solution, says Norse.

"Maybe that should be the FAO's job instead of producing more statistical reports," he commented. "We don't have time for more fruitless discussion."

Pauly is also impatient. "Our institutions are not responding fast enough to the industrial might and scale of change that is happening," he said. "The rate at which our institutions take action is simply too slow."

*Source: <http://www.ipsnews.net/news.asp?idnews=36811>*

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