



Project Report

Monitoring and conservation of sea turtles in India through a network of partners and index sites

Submitted to the US Fish and Wildlife Service under the Marine
Turtle Conservation Act Fund
2013 – 2014

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Contents

1. Executive Summary.....	1
2. Project Objectives.....	4
3. Project Activities and Outcomes.....	6
4. Future Plans for TAG.....	17
5. Recommendations.....	19
6. Acknowledgements.....	20
7. Appendices:.....	21
Appendix I (a): Monitoring olive ridley turtles in Orissa.....	21
Appendix I (b): Monitoring leatherback turtles in the Andaman & Nicobar Islands.....	25
Appendix II: Summary Report – Capacity building workshops.....	30
Appendix III: List of Member Organisations of TAG.....	33
Appendix IV: Small Grants 2013-14 Details.....	39
Appendix V: Audit Statement: Financial Year 2013-14.....	40

1.

Executive Summary

The Indian coastline has significant nesting/feeding grounds for four species of marine turtles, namely leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and olive ridley (*Lepidochelys olivacea*). Of several nesting sites and populations in India, the most notable are the mass nesting beaches of olive ridley turtles in Odisha, feeding and nesting grounds for green and hawksbill turtles in the Andaman and Nicobar Islands and the Lakshadweep islands, and the nesting population of leatherback turtles in Little Andaman Island and the Nicobar Islands which are of high conservation importance. Though all four species are listed under Schedule I of the Indian Wild Life (Protection) Act, 1972, their populations in the Indian waters are under threat due to indiscriminate coastal development and incidental catch in fisheries. The olive ridley (*Lepidochelys olivacea*) population in Odisha is believed to be particularly at risk, where over 100,000 turtles have drowned as incidental catch in the last five years.

Sea turtles play an important role as flagship species for diverse habitats such as coral reef ecosystems, sea grass meadows, open seas and sandy beaches. The threats that sea turtle populations face are representative of threats that impact other marine and coastal flora and fauna. In the Indian subcontinent, coastal and ocean resources play an important role in the economy of fishing and other coastal communities.

Sea turtles have also been part of legend and culture in the region for more than a thousand years and some of the oldest conservation movements were started here. Current models of community based and participatory conservation in many states in India can serve as excellent examples which can be replicated elsewhere. Sea turtles move freely across socio-political boundaries and many factors need to come together for effective conservation.

For this reason, monitoring and outreach projects were started at key sites in India. This projects was started in 2008 and has since been involved in uniting organisations and individuals that work along the Indian coast on marine turtle ecology and conservation. In 2008, a consortium of NGOs (Non-Governmental Organisations) called Turtle Action Group (TAG) was also formed to work towards sea turtle conservation and coastal ecosystem protection in India.

From 2008 – 2014, the project's activities have been supported through grants from the Marine Turtle Conservation Act Fund of the US Fish & Wildlife Service (USFWS). For 2008-2009, the project funds were administered, and project activities executed through Ashoka Trust for Research in Ecology and

the Environment (ATREE) in Bangalore, India. Since 2009, project funds have been administered by Madras Crocodile Bank Trust (MCBT), Chennai, in partnership with Dakshin Foundation, Bangalore which is mainly responsible for the execution of project activities and formulation of action plans for the project.

2008 – 2009: Formation of a national level network: The first grant of \$5000 helped facilitate the formation of a network of committed groups and organisations from across the country's coastline and in the initiation of activities that were undertaken by the network.

2009 – 2010: Strengthening of the network and expansion of scope: The second grant of \$30,500 provided support to expand membership of the network to include local, community based organisations and strengthen the activities and broaden the scope of TAG.

2010 – 2011: Building and strengthening the network for conservation of marine turtles of India: The third grant of \$ 39,000 supported the initiation of new activities, and strengthening and expansion of existing programmes, ensuring inclusion of all community based groups from around the country working on sea turtle conservation.

2011– 2012: Building and strengthening ongoing conservation activities on marine turtles of India: The grant of \$45,000 provided support to strengthen and expand existing activities of the network, execute various capacity building workshops, and to disburse small grants.

2012 – 2013: Strengthening the network for monitoring and conservation of sea turtles in India: The grant amount awarded for this year was \$55,000. Similar to previous years, this year's grant was utilised to strengthen and expand the ongoing activities of the network, to disburse small grants, to conduct workshops for capacity building and to produce outreach material. In addition, an emphasis was laid on monitoring key index sites for sea turtles on the Indian coast.

2013 – 2014: Monitoring and conservation of sea turtles in India through a network of partners and index sites: The grant amount awarded for this year was \$45,000. This year's grant was used to monitor and promote conservation of sea turtles, specifically at the index sites for olive ridley turtles in Odisha and leatherback turtles in the Andaman Islands. In addition, similar to previous years, the grant was also used to conduct workshops, to disburse small grants and to produce outreach material.

The primary aim of the project is to provide a platform for sharing information, knowledge and experience amongst various groups and individuals. It has strived to strengthen community based NGOs from various coastal states by providing small grants, training and technical assistance. The project sought effective engagement of network members with other stakeholder groups, research institutions and government agencies in order to better execute conservation action. The project also disbursed small grants to member groups of the network to carry out specific activities related to outreach and monitoring. Sea turtle monitoring was carried out at index sites, including olive ridley turtles in Odisha, and leatherback turtles on Little Andaman Island. The grant was also utilised to conduct workshops at Odisha, Andaman Island and Kerala, and conduct a Researchers Meet held at IISc, Bangalore. The fund was used for website (www.seaturtlesofindia.org) maintenance and to

build an online data repository, which is still in progress. A portion of the fund was utilised for the publication of outreach and educational material, and partial support towards the production of the Indian Ocean Turtle Newsletter.

TAG, seven years old now, is a well-established network of over 25 organisations from across the country. The network has established a set of goals in the form of action plans to address sea turtle conservation effectively through cooperative and collaborative efforts. Research and monitoring capacities of the member organisations in collecting uniform and reliable data is being developed through monitoring protocols and training programmes. This will lead to standardisation of data collected during the nesting season at key sites along the mainland coast as well as the Andaman & Nicobar Islands and Lakshadweep Islands. The current project seeks to build and strengthen this network further, by continuing to support and coordinate sea turtle conservation activities along the Indian coast, and to undertake collaborative actions that can lead to better coastal and marine conservation.

This report provides details of project objectives, and activities carried out during the current funding cycle which include sea turtle monitoring programmes at index sites in India, functioning of the network and its member organisations, and the outcomes and outputs from the project. It also lists possible recommendations and future plans to further strengthen the network, for more effective conservation of sea turtles in India.

2.

Project Objectives

Goal:

To strengthen and sustain collective and collaborative sea turtle conservation through the monitoring of key sites and a network of partners in the Indian sub-continent.

The project objectives for 2013-14 comprised the following:

1. To continue and strengthen the long-term monitoring programme of olive ridley turtles in Odisha, leatherback turtles in the Andaman Islands and increase participation of local groups in these efforts.
2. To initiate a monitoring and conservation programme for green turtles in the Lakshadweep islands to resolve and mitigate fisher-turtle conflict in the region.
3. To continue monitoring the status of marine turtles at key sites along the Indian mainland and islands with the involvement of network partners, through the promotion and use of standardised data collection and monitoring techniques.
4. To enable the collation and analysis of data collected across sites to inform studies on population trends and impacts of climate change.
5. To develop and maintain an online portal for the upload and synthesis of relevant data contributed by member organisations.
6. To conduct training programmes for the capacity building in order to enable individual member organisations of TAG to become financially and programmatically independent.
7. To strengthen local networks through the organisation of intra-state level workshops, meetings and consultations in addition to inter-state exposure and exchange programmes for members of the network.
8. To encourage and support independent, location specific conservation activities of member organisations through the provision of small grants.

9. To define administrative tasks of elected representatives of the network in encouraging a transfer of ownership of the network, thereby ensuring long term sustainability.
10. To develop appropriately designed educational and outreach material that can broaden the reach of the network to specific target groups including other stakeholder groups, educational institutions, governmental departments and the general public.

3.

Project Activities and Outcomes

To achieve the objectives, the following activities were carried out:

1. Monitoring the status of marine turtles at key sites along the Indian mainland coast and islands

A. Monitoring olive ridleys in Rushikulya rookery, Odisha

Odisha, with a 480 km long sandy coastline, is a suitable nesting habitat for olive ridley turtles (*Lepidochelys olivacea*). In the last decade, activities such as mechanised fishing have resulted in large scale turtle mortality of turtles in offshore waters. Other factors that could affect their populations are sea level rise, climate change and various development activities (both onshore and offshore). It is imperative to protect their breeding habitat and to monitor populations in order to understand their biology and behaviour in relation to climate change, in order to overcome these threats.

With funding from Marine Conservation Society, U.K., a long term monitoring programme was initiated by Indian Institute of Science and Madras Crocodile Bank Trust at Rushikulya rookery, a major olive ridley mass nesting site in the world. The project is coordinated by the Indian Institute of Science, Dakshin Foundation and the Odisha Forest Department and funded by the USFWS Marine Turtle Conservation Act grant. For the past eight years, the project has worked in collaboration with the local Forest Department staff and NGOs involved in marine turtle conservation. As part of capacity building, the forest department staff, NGO employees, local and other researchers are trained in census of nesting populations during 'arribadas', shore line monitoring techniques, hatchery management, offshore turtle monitoring and other activities related to sea turtle monitoring.

The main aim of the project is to study the effects of climate change on the Indian Ocean olive ridley nesting populations. With the help of data loggers, variables such as air, sand and nest temperature are recorded to determine change in temperature and its relationship with hatchling sex ratios. A sample of nests is relocated to a hatchery from the natural nesting beach to understand hatching success. The nests are collected over a period of 3 months. Along with onshore monitoring, offshore surveys are

conducted to monitor the abundance and distribution of mating turtles in offshore waters.

Since 2008, during mass nesting, the population is estimated using a strip transects method. They are also checked for tags. The results show that the number of nesting females has increased over the years at Rushikulya. In February 2014, fewer turtles nested during the mass nesting event than in previous years, but such fluctuations are not unexpected in marine turtles. A detailed report about this is provided in Appendix I (a).

In response to the training, the Forest Department is actively involved in monitoring and protecting both offshore and onshore turtle habitat. Working with local NGOs, they help in spreading marine turtle conservation awareness through education programmes, setting up a sea turtle interpretation centre and small events such as beach cleaning with participation from local communities. There has been considerable increase in local awareness and interest generated by working in collaboration with the government and local NGOs.

B. Monitoring leatherback turtles in the Andaman & Nicobar Islands

A long term leatherback turtle monitoring project was started in the Andaman and Nicobar Islands by Indian Institute of Science (IISc), Dakshin Foundation, Andaman and Nicobar Environment Team (ANET), and the Madras Crocodile Bank Trust (MCBT). Since 2008, leatherback turtles have been monitored on West Bay and South Bay beaches of Little Andaman Island. Alongside collecting long term data on leatherback populations, the project aims to develop a conservation network in the region with a long-term education and outreach programme for local communities on the islands. Not much is known on the status of leatherback population in the Indian sub-continent except for studies by ANET, IISc and Dakshin Foundation on Great Nicobar Island and Little Andaman Island. Following the decline of the Pacific Ocean leatherback population, it is important to monitor Indian Ocean populations and threats to them.

The programme includes monitoring of nests, threats and tagging of leatherback turtles. In 2010, with support from the Indian Space Research Organisation (ISRO) and the Space Technology Cell of IISc, Bangalore, a satellite telemetry study was initiated at Little Andaman Island. A total of 10 turtles have been tagged with PTTs (Platform Transmitter Terminals) between 2010 and 2014 (tracks can be viewed at www.seaturtle.org). A detailed report is provided in Appendix I (b).

Along with the monitoring programme, various education and outreach activities have been conducted for the island communities, including screening of documentaries and distribution of posters. In addition to this, a capacity building workshop was held for local forest department officials on hatchery management and monitoring techniques.

2. Monitoring and conservation of green turtles at Lakshadweep islands

Due to lack of resources, we were unable to start a monitoring and conservation programme for green turtles in the Lakshadweep islands. However, we do hope to start this project in the future.

3. Website and online data repository

The website, www.seaturtlesofindia.org, is a platform for information on the biology and conservation of sea turtles and their habitats in Indian sub-continent. Numerous community based groups, local, national and international conservation organisations (NGOs), academic institutions and government departments have contributed to studies and surveys over the last two and half decades. The website hosts this information and makes it possible for students, researchers and others to get easy access to material. This site also includes a repository of papers, reports, notes, historical records and other grey literature. The bibliography section currently includes over 800 references, with PDFs for a large number of publications, many of which are not available anywhere else.

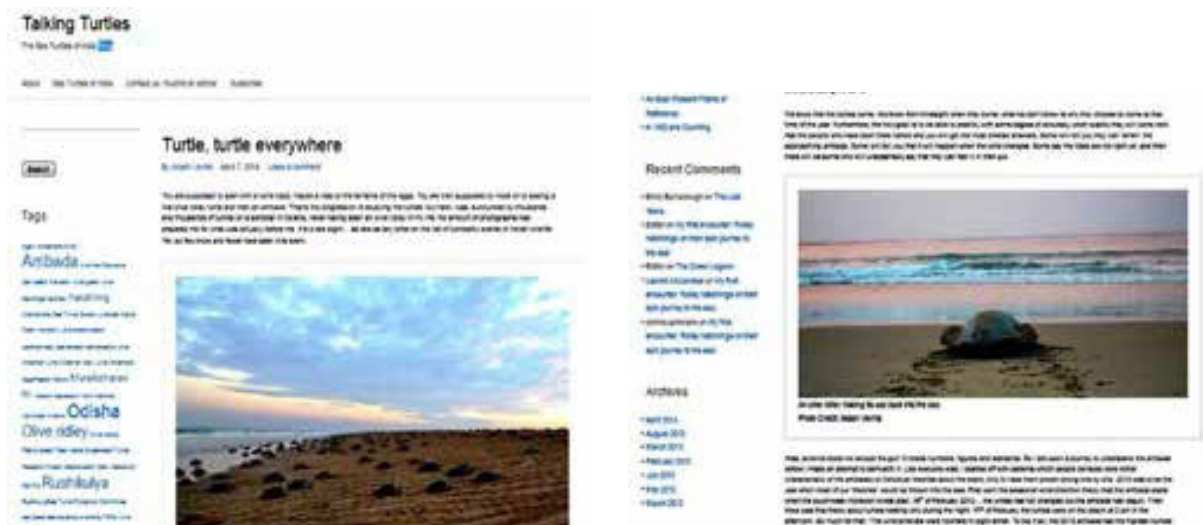
The website also carries content dedicated to the Turtle Action Group (www.seaturtlesofindia.org/tag). Information on the networks' activities, workshop reports, member organisations and their detailed profiles is currently made available here.

Since 2012, the blog 'Talking Turtles' has had 10 blogs by people working on marine turtles - from the natural to social sciences - sharing their experiences. From first encounters with turtles to unusual observations to expert insights, the blog welcomes stories about marine turtles in the Indian Ocean.

TAG-ABLE, an online repository for data collected on sea turtles in India was launched as a prototype in November, 2011 during 4th Annual TAG workshop. However, there have been many changes and modifications to make it user-friendly and accessible to others. The objectives of the database will be to create online repositories on turtle nesting patterns, hatcheries, mortality, habitat health and threats to sea turtles. A user-friendly analysis tool enables the members to carry out simple analysis of their data, create charts and graphs that they can effectively use in their reports and outputs.

Talking Turtles Blog





Sea turtles of India website



Welcome to [Sea Turtles of India](#)! Here you will find information about sea turtles in the subcontinent. Read about the [species](#) found here and their [distribution](#). We also have a 101 [sea turtle biology](#), [life history](#) and [identification](#). Find out about various [sea turtle cons organisations](#) and [individuals](#) in India. Feel free to look through the [resource section](#) for [r posters](#), popular articles and a detailed [bibliography](#).

If you would like more information or have any suggestions, do [contact us](#), we will be happy to help you.



4. Capacity building workshops at various nesting sites in India

In 2013-14, three capacity building workshops were conducted at key nesting sites across India, namely Calicut in Kerala, Siali in Odisha and Mayabunder in Middle Andaman Island. The workshops were conducted in collaboration with local Forest Department and NGOs. At these workshops, emphasis was laid on building capacity and creating awareness amongst local community members and local Forest staff for protecting sea turtles. The workshops mainly focussed on training the participants in beach monitoring techniques as well as hatchery management tools. The participants were also given training in habitat monitoring and efficient data collection and analysis methods. TAG-ABLE, an on-line repository for data collected on sea turtles in India, was introduced to the participants and they were encouraged to participate following the launch of the application. The summary on the workshops is attached as Appendix II.

5. Strengthening and expansion of TAG- the conservation and monitoring network on sea turtles

The Turtle Action Group

The Turtle Action Group (TAG) is a network of over twenty non-governmental organisations from around India, working towards sea turtle conservation and coastal protection. These groups initially came together in January 2009 at a workshop held in Chennai, where it was agreed that there has long been a need for a national level network to enable various groups to work together and collaborate towards more effective sea turtle conservation. It is acknowledged worldwide that effective sea turtle conservation requires collaboration between agencies and various stakeholders to ensure long term survival of the species and sustainable use of the resources of the habitats they represent.

Such a collaborative effort had not been undertaken before at the national level. TAG thus seeks to benefit from the pooling of resources and knowledge and to bridge the gap between conservation measures that are effective at local, state and national levels.

Functioning of TAG

Executing organisation

The network's fund is channelled through the executing organisation, the Madras Crocodile Bank Trust. Under the programme, a policy team oversees the network's activities and utilisation of funds, and guides the disbursement of funds to member organisations to carry out specific activities. The administrative staff at MCBT carries out specific administrative tasks which include coordinating training programmes, disbursing small grants, administering the work of network members, as and when required, and handling the financial aspects of the MTCA project till the end of the project term.

Members of TAG

The TAG network comprises a core group of community based and local NGOs from across the country. Currently, its membership includes more than 20 organisations from the mainland and one each

from the Andaman and Nicobar and Lakshadweep Islands. Appendix III lists the core member organisations.

Seven large organisations, including national level NGOs and research institutions, are part of the network. and do not receive funding support for their activities from TAG. Since 2010, TAG has been providing small grants to a few member groups after evaluating their proposals. Institutional representatives from MCBT and Dakshin Foundation contribute by way of resource personnel and providing inputs at annual workshops, and are represented on the advisory board of TAG.

The network also liaises with state level government organisations, primarily forest departments of coastal states within whose jurisdiction the protection of sea turtles and their nesting habitats fall. TAG also seeks regular inputs from other stakeholder groups and organisations working with fishing communities and coastal development to better inform conservation interventions that the network adopts.

Core Committee

The Core Committee constitutes elected representatives from amongst member groups of TAG. The main responsibilities of the Core Committee are to coordinate the activities of the network that are determined at annual workshops, and over the course of the following year through sustained communication with all members of the network. The Core Committee reports to the team at the executing organisation regarding the progress of activities that the network has set out, and identifies areas where a particular group, or the network as a whole, requires support in terms of inputs, resource material, or funds. Individual members of the network approach the core committee with suggestions or queries. The Core Committee is mandated to make decisions based on a consultative process and approaches the project team at the executing agency when required. The present constitution of the Core Committee ensures representation across the geographical scope of the network and its members belong to groups from the west coast, east coast and the islands.

Advisory Board

The network seeks inputs on its activities and agenda from an Advisory Board that includes various individuals from diverse backgrounds and fields of expertise, affiliated with research organisations such as the Wildlife Institute of India, Dehradun and the Madras Crocodile Bank Trust amongst others.

Network Volunteers

At each annual workshop, specific tasks are assigned to volunteers from within the network to take on the responsibility of coordination and ensuring completion. These volunteers communicate with and seek inputs from the Core Committee.

The member organisations are trained to follow standardised monitoring and data collection techniques, in order to study climate change and its consequences on important variables, such as egg and hatchling mortality and sex ratio. These would lead to more precise data collection and enable monitor-

ing changes at a large scale and help predict population trends. TAG members are given financial support to help them in data collection, monitoring and conservation activities. Every year, small grants are disbursed for supporting their on-going work during the turtle nesting season. These primarily include hatchery construction and maintenance during the season, egg relocation, and hatchling release. We also encourage TAG members to develop their own proposals to support their ongoing projects.

6. Small grants disbursed to TAG members

Grants were given out to members of TAG to support their data collection, monitoring and conservation activities. The respective amounts disbursed are provided in the table below. Details are provided in Appendix IV.

Name of the organisation*	Grant amount (INR)**
Action for Protection of Wild Animals (Odisha)	25,000
Prakruti Nature Club (Gujarat)	20,000
Sahyadri Nisarga Mitra (Maharashtra)	35,000
Students' Sea Turtle Conservation Network (Tamil Nadu)	35,000
Visakha Society for Protection and Care of Animals (Andhra Pradesh)	25,000

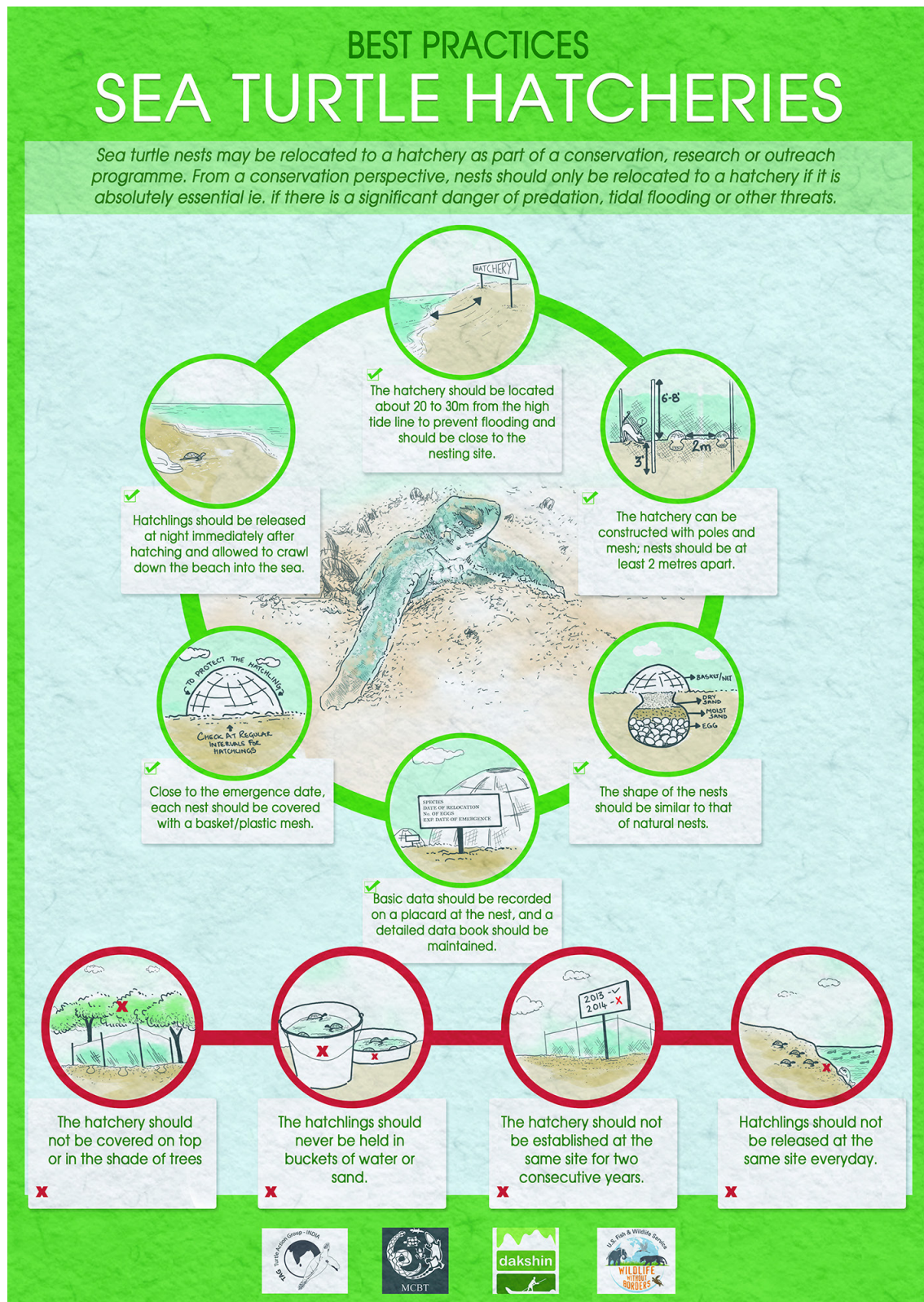
* *See Appendix III(c) for profiles of member organisations including activities carried out.

**1 USD ~ 60 INR

7. Outreach and education material

As part of outreach and education, posters and brochures explaining hatchery management techniques and 'Dos and Don'ts' were developed.

Sea turtle hatchery management poster



DON'Ts



✗ The hatchery should not be established at the same site for two consecutive years to prevent infestation by fungus and bacteria.

✗ During relocation, dry sand should not come in contact with the eggs.



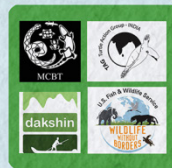
✗ The hatchery should not be covered on the top or in the shade of trees; fishing nets may be used as covers if required as they will not alter nest temperatures.

✗ The nests should not be shaded or watered too early during incubation as this could change the sex ratio. Nests may be shaded or watered towards the end of the incubation period to prevent mortality if temperatures are particularly high.



✗ The hatchlings should never be held in buckets of water or other containers after emergence as they are in a state of "juvenile swimming frenzy".

✗ Hatchlings should not be released at the same site everyday as it might create a feeding station for fish. Release sites should ideally be several hundred metres apart.



BEST PRACTICES

SEA TURTLE HATCHERIES

Sea turtle nests may be relocated to a hatchery as part of a conservation, research or outreach programme. From a conservation perspective, nests should only be relocated to a hatchery if it is absolutely essential i.e. if there is a significant danger of predation, tidal flooding or other threats.

DO's

✓ Ensure that you have the required permits for handling eggs and translocation.



✓ The hatchery should be located about 20 to 30m from the high tide line to prevent flooding and should be close to the nesting site.

✓ The hatchery should be close to the nesting beach to minimise the time and distance between collection of eggs and their relocation in the hatchery.



✓ The shape of the nest should be similar to natural nests i.e. narrow neck and flask shaped bottom. The eggs should be covered first with moist sand and then dry sand may be placed on top.



✓ The hatchery walls should be constructed using plastic or metal mesh, 6-8 feet high as a fence, and about 3 feet under the ground, to keep out predators such as dogs, foxes etc.

✓ A smaller mesh net or fencing should be used at the base to prevent hatchlings from escaping.

✓ The nests should be placed at least 1 to 2 metres from each other to ensure better hatching success.



✓ Hatchlings should be released as soon as possible after hatching. However, their time of release should be before sunrise/dawn or after sunset/dusk.



✓ While relocating nests, the eggs should be treated carefully, with as little jarring movement as possible.

✓ Close to the emergence date, each nest should be covered with a sheet/plastic mesh to protect newly hatched turtles from predators and desiccation.

✓ The area where the hatchery is to be erected should be devoid of plants, roots, and the sand type should be as similar as possible to that of natural nesting sites. The hatchery wall should be constructed as per the provided instructions.



✓ Data should be recorded accurately in a data book for monitoring and research. A placard using appropriate material with basic nest details should be placed above each nest.

The following publications were also supported to provide information on sea turtles of the Indian sub-continent and Indian Ocean.

Indian Ocean Turtle Newsletter

The 18th and 19th issues of the Indian Ocean Turtle Newsletter were published in July 2013 and January 2014 respectively, with partial funding support from the MTCA. The IOTN was initiated to provide a forum for exchange of information on sea turtle biology and conservation, management and education and awareness activities in the Indian subcontinent, Indian Ocean region, and South/Southeast Asia. The newsletter also intends to cover related aspects such as coastal zone management, fisheries and marine biology.

We have nearly 1000 e-copy and 1400 hard-copy subscribers for this biannual newsletter from different parts of the world. The website <http://www.iotn.org/> has an archive section with all issues to date.

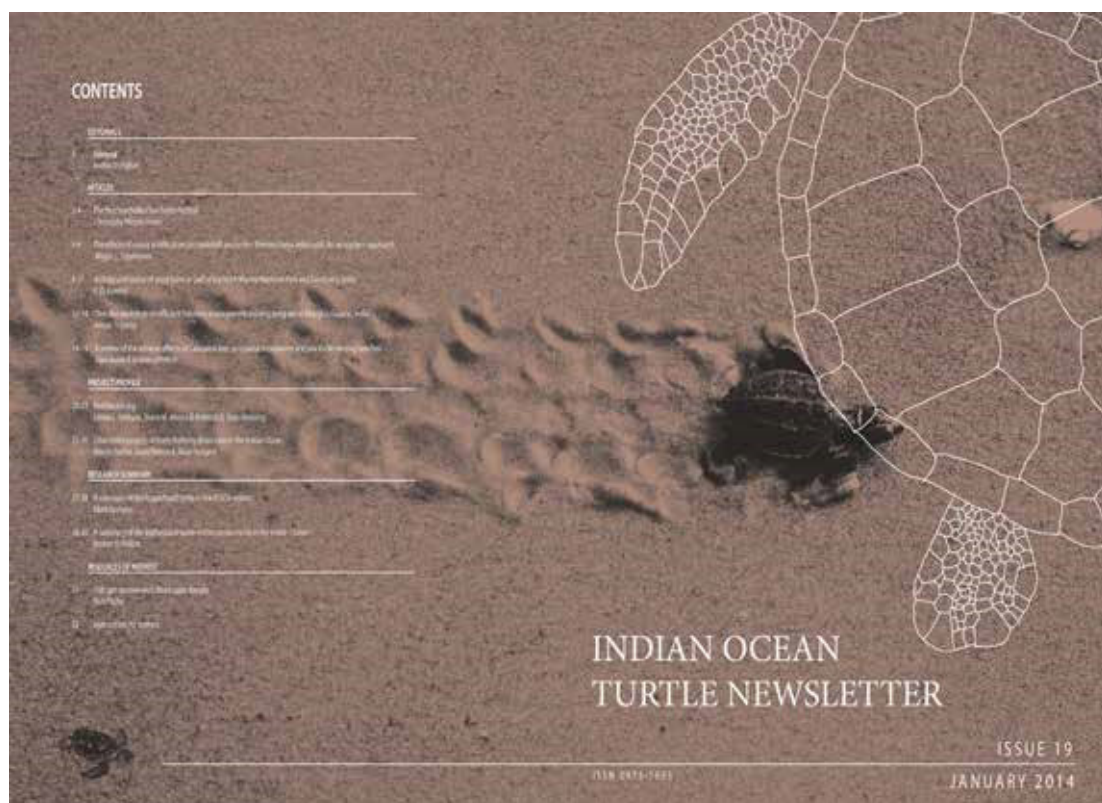
The newsletter aims to reach and serve:

- Central government agencies (Ministry of Wildlife, Fisheries and Environment)
- Coastal government agencies (local Forest Departments, Fisheries Departments)
- Coastal enforcement agencies (Navy, Coast Guard)
- Non-government organisations involved in environment and conservation
- Non-government organisations involved in social work in coastal areas
- Academic institutions
- Conservationist organisations
- Community-based conservation organisations
- Individual researchers, field biologists and ecologists

Sea Turtles of India Manual

Sea Turtles of India: A Comprehensive Field Guide to Research, Monitoring and Conservation, published during 2011-12, is a compilation of the series of manuals produced by the Centre for Herpetology/Madras Crocodile Bank Trust in 2003 under the GOI-UNDP Sea Turtle Project. The new manual features basic information on the biology, research and conservation of sea turtles and related issues, hence providing necessary information to coastal wildlife management authorities, coastal community groups, environmental organisations and other agencies. It also promotes the use of standardised data collection for research programmes in order to appropriately inform conservation strategies and management practices. Additional features of the manual include a glossary for technical terms, a directory of organisations carrying out sea turtle conservation activities in India and a bibliography for further reading. A Gujarati version of this manual translated in collaboration with Gujarat Ecology Commission is almost complete and a short Tamil version is being translated by Students Sea Turtle Conservation Network.

Publications produced during 2013-2014



4.

Future Plans for TAG (2014-15)

Having acknowledged the necessity for continuing the activities of the network, members of TAG have committed to sustaining interactions through annual meetings and workshops, in addition to individually carrying out activities towards meeting the larger objectives laid out by TAG. The specific activities laid out for the year 2014 – 2015 are:

a. To collectively address issues of common concern

A variety of threats and issues on the coastline form the basis of conservation action undertaken by different groups. There are certain problems that are common across most of the coastline. TAG has identified these specific issues that the network can examine and address. These include:

- i. **Standardisation of data collection and monitoring techniques:** In order to collate data and information collected individually by member organisations, TAG will develop standardised procedures for data collection and monitoring to enable this information to be shared. This would also allow for site-specific data to feed into distribution and abundance assessments at larger geographical scales. The collated data will be available on the seaturtlesofindia.org website which will also be used as a portal to upload/download data and will generate maps of distribution and temperature related data.
- ii. **Coastal development:** Unplanned and unsustainable coastal development along the country's coastline has threatened sea turtle nesting habitats. Although the impacts of such developmental activities (such as construction of sea walls, urbanisation, development of ports, etc.) vary from one location to the next, all members of TAG are individually contesting decisions made at the local scale. Common themes of the development agenda across sites, and across states can be collectively addressed and brought to the notice of higher authorities, including the central government. Demands can be made for more transparent decision making procedures, greater participation of local communities and stakeholders, and the development of sustainable and responsible coastal zone management plans.

b. Capacity building and involvement and birth of new community based initiatives

One of the focus areas of the network is capacity building for local forest department officials and interested local enthusiasts. By imparting knowledge on proper monitoring techniques and hatchery management, local communities can effectively work towards conservation. Three such workshops were conducted in 2013-14 in Kerala, Odisha and Andaman & Nicobar Islands. We hope to conduct similar such workshops in the other parts of the country in collaboration with the local departments and NGOs. This, in turn, will motivate local groups to start their own projects and pave the way for community based conservation.

5.

Recommendations

After careful assessment of the outcomes of the network and expectations of member organisations, the following recommendations were made to strengthen TAG and enable effective conservation efforts:

- Interactions of TAG members with other similar regional and global organisations and networks will help communicate and address conservation issues faced in other parts of the world.
- Collation of information on marine turtle status, biology, habitat and conservation techniques. By encouraging discussion, the member organisations can come up with effective solutions to frequently faced problems.
- Communication with the central government through Ministry of Environment and Forests regarding national issues to help the government in effective policy making that could serve as a solution to local conservation problems.
- Joint awareness programmes by co-coordinating with other TAG members, especially within the state by sharing resources, ideas and staff.
- Advertisement of the network activities through media campaigns to attract other similar organisations and to highlight individual organisations' efforts to give them recognition.
- Collaboration with local stakeholders such as non-members of TAG, individuals working on sea turtles and their conservation and related groups to develop holistic approaches to species-specific conservation.

6.

Acknowledgments

We are grateful to the US Fish & Wildlife Service for providing funding support under the Marine Turtle Conservation Act Fund.

We are also thankful to the staff at Dakshin Foundation and Madras Crocodile Bank Trust for carrying out the administrative tasks under the project and lending their constant support as and when required. We thank all our collaborators for the workshops held in Kerala, Odisha and Andaman and Nicobar Islands for their support, willingness to learn new techniques and dedication towards sea turtle conservation.

We are also thankful to the Ministry of Environment and Forests for endorsing the network. We are hopeful that representatives of the Ministry and coastal state government agencies will be actively involved in network activities in the future.

We would like to make a special mention of the late Dr. C.S. Kar, one of our Principal Investigators for the Odisha olive ridley monitoring project, who passed away in April 2014. His presence and guidance will be sorely missed.

Finally, we would like to thank all our member organisations whose enthusiasm in sustaining the network and efforts in carrying out network activities has validated our efforts in initiating and facilitating the Turtle Action Group.

7.

Appendices

APPENDIX I (a) Monitoring olive ridley turtles in Odisha

Odisha has a 480 km long coastline lined with sandy beaches suitable for olive ridley turtles (*Lepidochelys olivacea*) nesting. This population is an evolutionary source for other populations across the world and is facing large scale mortality due to natural and anthropogenic causes such as mechanised fishing, predation and development activities. Extreme changes in the nesting beach topography due to erosion have also affected nesting. In order to assess the population trends of this species in response to threats and climate change, it is important to understand their biology and behaviour to set conservation goals.

A long term monitoring project was initiated by the Madras Crocodile Bank Trust (MCBT) with funding from Marine Conservation Society, U.K. and USFWS Marine Turtle Conservation Act grant to study the population trends. Rushikulya rookery, one of the major mass nesting sites in the world, was chosen as the study site and since 2008, work has been going on in collaboration with the local Forest Department and NGOs involved in sea turtle conservation. The forest department staff, NGO employees, enthusiastic locals and other researchers have been trained in hatchery maintenance, beach monitoring, nesting population census and other monitoring methods through capacity building workshops. To understand the effect of climate change on the olive ridley population, air, incubation and sand temperatures are recorded by placing data loggers in a room, relocated nests and sand. A hatchery is maintained closed to the natural nesting site for relocated nests. Natural mortality hatchlings are collected and sexed using histological techniques to study the effect of climate change on the sex ratios (Figure 1).

Indian Institute of Science and Dakshin Foundation have been monitoring Rushikulya beach, recording both solitary and mass nesting data, using the scientifically robust strip transect method. During mass nesting, a 20 m strip transect method is used to count the nesting females. Table 1 provides estimates of mass nesting from 2008 to 2013. The arribada for 2013-14 occurred on February 10th and 11th, 2014 (Table 2).

Monitoring offshore congregations of olive ridleys on the Odisha coast

Offshore monitoring at Rushikulya by the CES team began in 2010. A line transect approach is

followed to measure the changing offshore abundances of turtles during the breeding season. Initially done only in Rushikulya, this was extended to cover the entire coastline of Odisha in January 2014. The 480 km coastline of Odisha was divided into transect blocks of 40 sq. kms at every 48 km. Each transect is 2 km wide and 4 km long. The primary design of these transects will be within the confines of stratified random sampling within each sampling block. Along with observations of turtle number, abiotic factors were also sampled (surface salinity and depth) to get a better ecological perspective of these congregations. Location data was collected using a handheld GPS. The purpose of collecting abiotic variables is to create a profile of them and overlay them with the aggregation sites (Figure 1).

Air and sand temperatures; hatchling sex ratios

Figure 2 shows sand and air temperature for years 2010-2014 ranging from 27-28.5°C. The highest sand and air temperature recorded was in 2011-12 at 28.56°C and 28.31°C respectively. On the other hand, the lowest temperatures recorded were in 2010-11 ranging between 27-27.5°C.

Natural mortality hatchlings were collected each year from relocated nests in the hatchery and wild (arribada samples). The hatchlings were sexed using standard histological procedures since they cannot be distinguished based on morphological characteristics. Table 3 shows the male proportion of hatchlings sexed observed from 2008-2014. It showed that most hatchlings sexed in 2011 were females; whereas 2014 shows majority of males. Hatchling samples will be collected in the forthcoming seasons to get a better understanding of sex ratios spanning over the decade.

The local NGOs involved with us are: Orissa Marine Resources Conservation Consortium (OMRCC), Rushikulya Sea Turtle Protection Committee (RSTPC), Sea Turtle Action Program (STAP), Green Life Rural Association (GLRA), Action for Protection of Wild Animals (APOWA) and ALACRITY.

Table 1: *Arribada* estimates from Rushikulya, 2008-2013

Year	Days	Count	Mean	Variance	LCL	UCL	CV	M	SE
2008	1	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-
	3	786	53138.0	7572.4	41372.0	64904.1	0.1	34609818.7	5883.0
	4	352	17847.9	1083.6	14509.7	21186.1	0.1	2785847.3	1669.1
	5	-	-	-	-	-	-	-	-
2009	1	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-
	3	608	30828.2	3282.9	25017.8	36638.5	0.1	8440068.2	2905.2
	4	612	31031.0	2694.3	25767.2	36294.8	0.1	6926825.6	2631.9
	5	193	9785.9	501.7	7514.5	12057.3	0.1	1289829.8	1135.7
2010	1	661	11171.8	3482.1	9177.1	13166.5	0.1	994688.4	997.3
	2	2765	46732.4	29515.7	40925.0	52539.8	0.1	8431384.2	2903.7
	3	1774	29983.1	11773.8	26315.3	33650.9	0.1	3363275.5	1833.9
	4	86	1453.5	193.2	983.7	1923.4	0.2	55189.0	234.9
	5	423	7149.3	1207.2	5974.8	8323.8	0.1	344845.9	587.2
	6	143	2416.9	296.9	1834.5	2999.4	0.1	84811.7	291.2
	7	58	980.3	136.4	585.5	1375.1	0.2	38963.7	197.4

2011	1	1738	28122.98	22991.2	23215.91	33030.05	0.09	6019836.4	2453.5
	2	2194	35501.62	16872.8	31297.89	39705.35	0.06	4417842.3	2101.9
	3	2090	33818.77	9176.3	30718.67	36918.87	0.05	2402650.8	1550.0
	4	1506	24368.93	3867.2	22356.42	26381.44	0.04	1012547.0	1006.3
	5	589	9530.74	3188.1	7703.47	11358.02	0.1	834734.1	913.6
	6	799	12928.90	2981.3	11161.77	14695.83	0.07	780600.3	883.5
	7	143	2313.92	151.7	1915.27	2712.56	0.09	39729.6	199.3
	8	140	4530.74	155.5	3723.70	5337.78	0.09	162828.2	403.5
	9	22	711.97	28.9	363.78	1060.17	0.24	30309.7	174.1
2012	1	2068	31634.99		28955.5	34314.47	0.04	1794909.3	1339.74
	2	710	9588.865		8633.87	10543.86	0.05	228002.93	477.5
	3	165	1707.245		1348.3	2066.19	0.10	32209.98	179.47
2013	1	1317	16347	6678.6	14487.72	18206.63	0.1	864395.5	929.73
	2	1340	19781	2682.7	18251.48	21310.95	0.0	585024.9	764.87
	3	4135	59290	16730.2	55462.47	63116.83	0.0	3661827.4	1913.59
	4	2018	30458	11974.5	27025.33	33890.6	0.1	2945741.8	1716.32
	5	564	7702	4674.1	5717.7	9685.93	0.1	984181.27	992.06
	6	657	8972	1609.6	7869.29	10074.31	0.1	303882.52	551.26

Table 2: Estimates of 2014 *arribada*

Days	Counted (n)	Estimated mean	Upper CL	Lower CL	CV	Variance
Day 1	409	6211	7314.76	5107.04	0.0	1427.1
Day 2	649	8638	10881.9	6394.03	0.0	6686.6

Figure 1: The distribution of turtle congregation all along Odisha coast

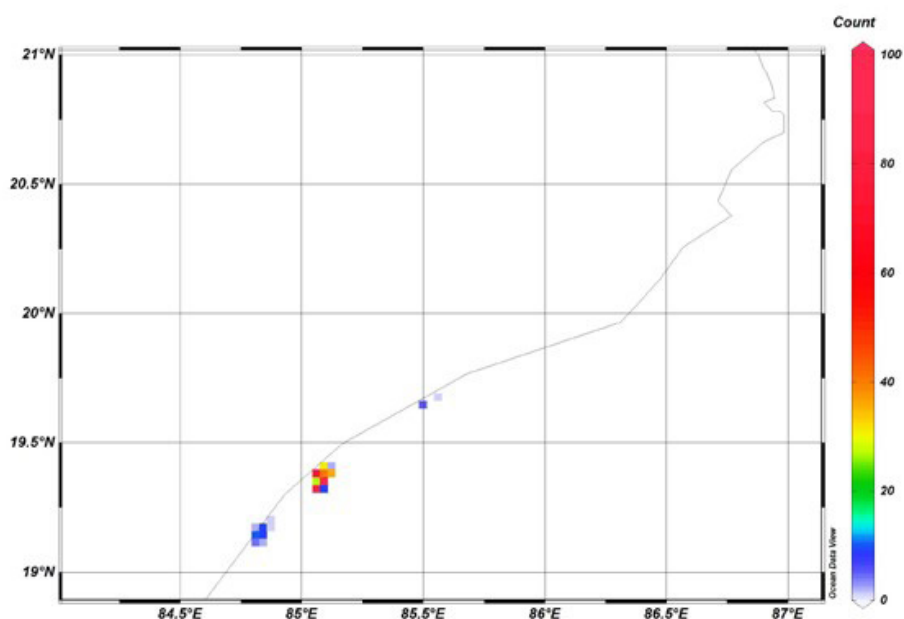


Figure 2: Average temperatures recorded at Rushikulya from 2010-2014

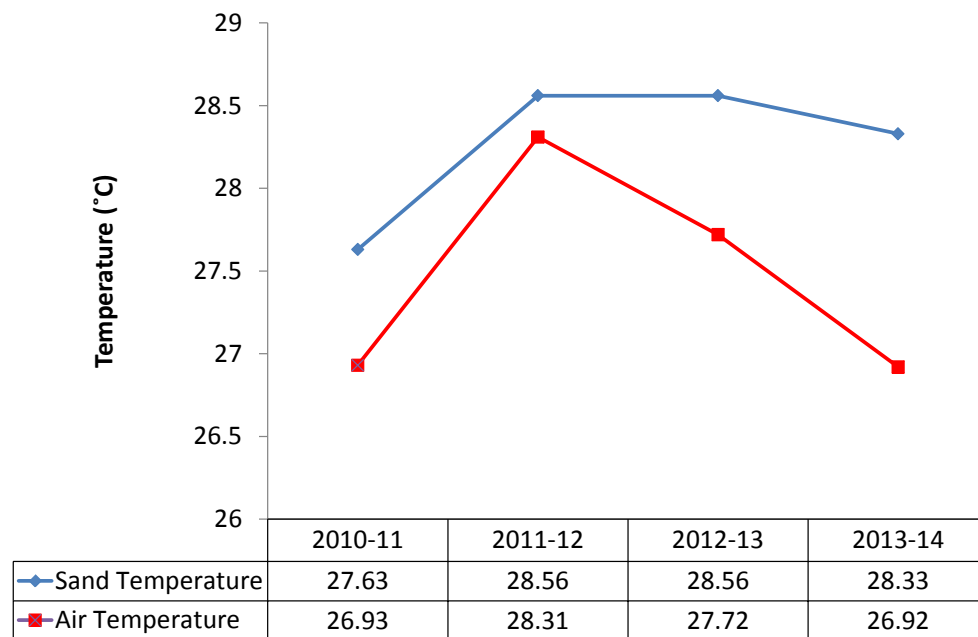
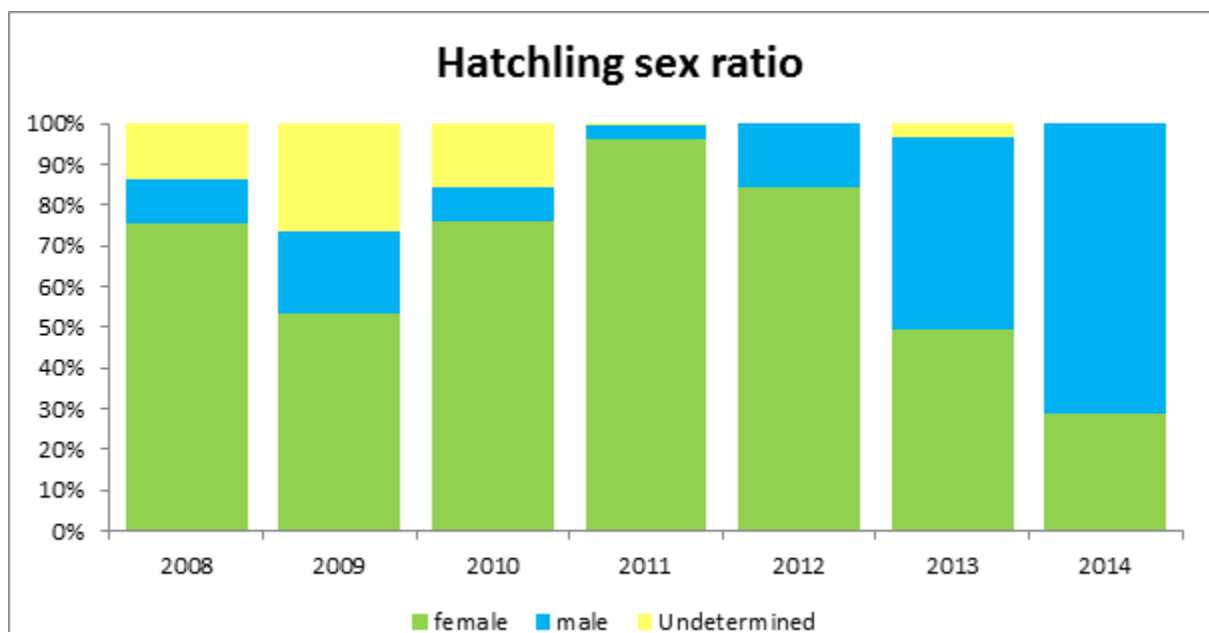


Figure 3: Percentage sex ratio from 2008-2014



APPENDIX I (b)

Monitoring leatherback turtles in the Andaman & Nicobar Islands

Introduction

The leatherback turtle is listed as Vulnerable by the IUCN and under Schedule I of the Indian Wildlife Protection Act (1972). There have been concerns over the decline of local populations of leatherbacks especially in the Pacific. In Asia, the Malaysian rookeries have undergone a considerable decline in nesting numbers from 5000 nests per year in 1960s to less than 10 nests in the 2000s. Very little is known about the status of leatherback populations from the Indian waters, barring recent work by the Andaman and Nicobar Environment Team (ANET) on Great Nicobar Island, and the collaborative efforts of ANET, Dakshin Foundation and Indian Institute of Science, Bangalore on Little Andaman Island.

Many of the prime-nesting sites of the Andaman and Nicobar islands were badly affected by the December 2004 earthquake and the subsequent tsunami. While the long-term monitoring projects by CES and ANET have indicated that leatherback nesting on beaches of Little Andaman Island have recovered substantially, not much is known about the impacts of this event on the populations of leatherbacks of the Nicobar Islands. In January 2008, a project was initiated to monitor leatherback turtle nesting at South Bay. Since the initiation of the project, the South Bay beach has been regularly monitored during the subsequent nesting season.

Methods

Every year, a camp has been established on the South Bay beach and monitoring of leatherback nesting has been carried out roughly between the months of January and March. Since 2010, a camp has been established on the West Bay beach for monitoring. Monitoring efforts have concentrated on West Bay ever since.

The objectives of the surveys were to continue the long-term monitoring of leatherback nesting in South and West Bay, Little Andaman Island through a capture-recapture programme. Intensive surveys were carried out to monitor tag recaptures of leatherback turtles from previous seasons. In addition, we intend to continue the satellite telemetry by tagging more leatherback turtles and continue the habitat monitoring component by collecting data on the profiles of the nesting beaches in South and West Bay to understand the effect of physical changes to the nesting beaches on leatherback nesting.

For satellite telemetry, the transmitters were attached to the medial ridge of the turtle's carapace where it is most prominent, usually posterior of the widest area of the carapace. This location provides the greatest bight for attachment and lessens drag effect in comparison with attachment near the leading edge of the carapace.

Along with satellite telemetry, the biometric and nesting information (clutch size, predation, location etc.) for nesting turtles are also collected. Measurements of diameter and weight of ten eggs each from

different clutches were also recorded.

The surveys are carried out in collaboration with the Forest Department, Andaman and Nicobar Islands and in coordination with ongoing research activities in the region.

Figure 1- Map of Little Andaman Island



Results

South Bay

At South Bay, surveys had to be restricted to daylight hours as the presence of large crocodile infested river openings (Benyabol and Tothibue) limited access to the nesting sites during low-tides.

A total of 85 nests were encountered, out of which 64 were leatherback nests. Out of the remaining 21 nests, 20 were olive ridley nests and one green turtle nest. A few night surveys were carried out, when conditions permitted, and two leatherback turtles were tagged and one turtle tagged in 2010-2011 nesting season was recaptured. The monitoring effort also indicated 35 leatherback nests were predated, mostly by monitor lizards. Sand deposition on the beach east of Benyabol River has increased and accumulated a great deal over the years and 10 leatherback nests were encountered on this freshly formed beach.

West Bay

Monitoring commenced at the West Bay beach on December 20, 2013. A total of 208 sea turtle nests were observed – 153 leatherback nests, 52 olive ridley nests and 3 green turtle nests. Nineteen nesting females were tagged out of which 15 were recaptured during the season. Two turtles tagged previously during the 2010-2011 nesting season were recaptured. 64 leatherback nests were predated during the monitoring period. Two nests were protected to record the nest temperature using electronic temperature loggers.

Two leatherback turtles were tagged with PTTs at West Bay (one on 5th January, 2014 and one on 8th January 2014) to study post nesting migratory routes. The data from PTT ID No. 113336 (tagged on 5th January) indicated that the turtle travelled southwest all the way to the Northeastern coast of Madagascar in 276 days, travelling 9917 km and data from PTT ID No. 113337 (tagged on 8th January 2014) indicated that the turtle is close to the Western coast of Mozambique in 266 days travelling, 13237 km (Figure 5). PTT ID No. 113337 travelled to the north west coast of the Andaman and Nicobar Islands during the inter-nesting period and was in the Andaman Sea for a few weeks (after the nesting season) before heading southwest. Both PTTs continue to transmit data to date.

Summary of 7 years of monitoring:

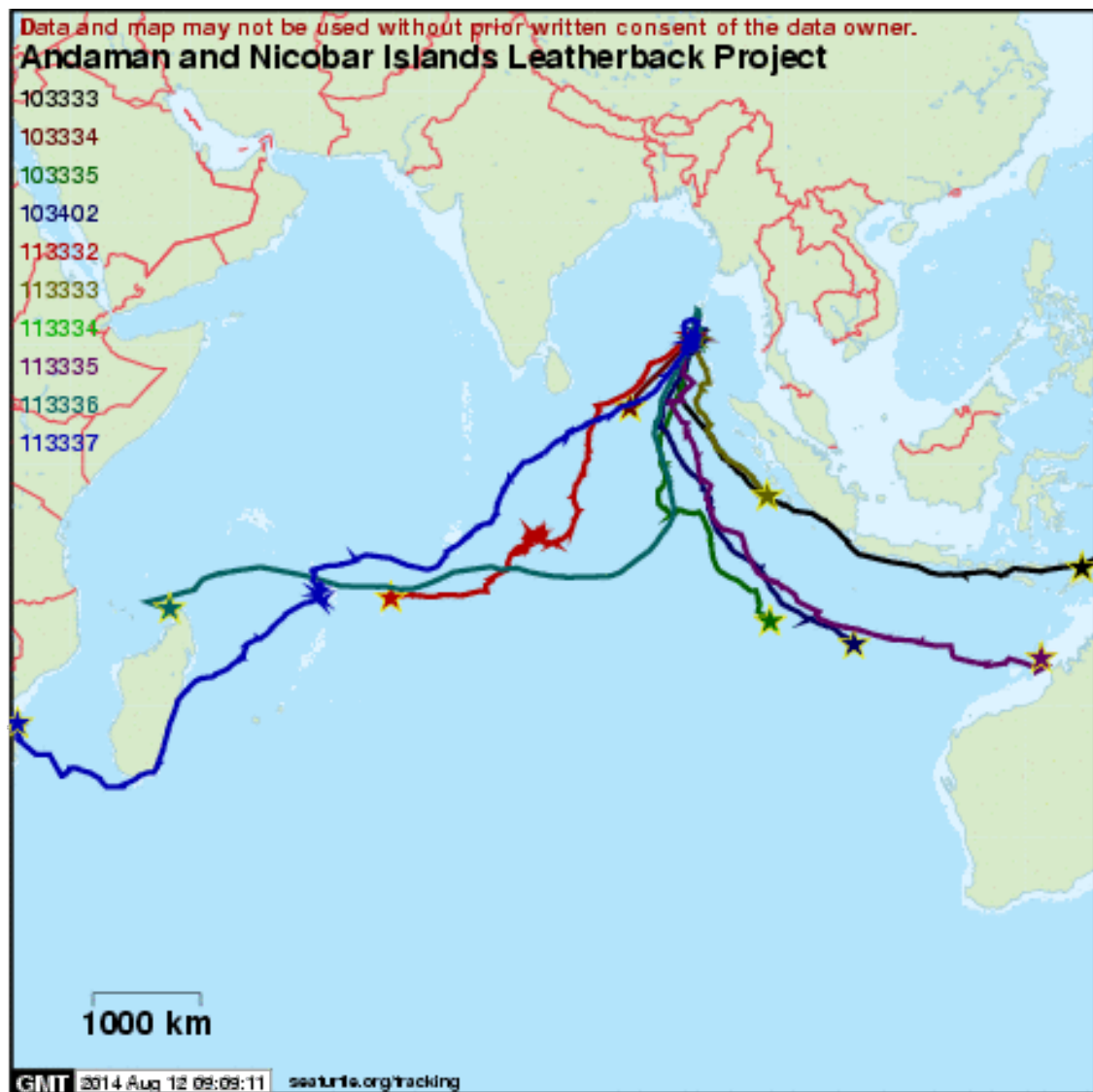
A. Tagging Data:

Year	Leatherback	
2007-2008	6	
2008-2009	9	
2009-2010	2	
2010-2011	South Bay	West Bay
	6	23
2011-2012	South Bay	West Bay
	0	20
2012-2013	South Bay	West Bay
	0	12
2013-2014	South Bay	West Bay
	2	19

B. Leatherback Nests and Predation Patterns:

Year	Total Number of Nests		Percentage of Nests Predated	
2007-2008	25		32	
2008-2009	39		20	
2009-2010	7		28	
2010-2011	South Bay	West Bay	South Bay	West Bay
	58	91	24	58
2011-2012	South Bay	West Bay	South Bay	West Bay
	36	148	50	30
2012-2013	South Bay	West Bay	South Bay	West Bay
	45	77	40	20
2013-2014	South Bay	West Bay	South Bay	West Bay
	64	153	54	33

C. Post Nesting Migratory Route Data:



APPENDIX II

Workshop Summary Report: Capacity building workshops in Kerala, Odisha and Andaman and Nicobar Islands

This document is a summary of the proceedings of three capacity building workshops that were held across India for the purpose of training forest officials, local conservation NGOs and enthusiastic locals in standard monitoring and conservation techniques. The workshops were conducted in collaboration and support of the local Forest Department (FD) of Kerala, Andaman and Nicobar Islands, and Odisha.

Introduction

The most effective way for conservation of a species is to efficiently monitor it and understand its biology and behaviour. The project year 2013-14 was a year of capacity building where three workshops were held across India in Kerala, Andaman and Nicobar Islands and Odisha.

These workshops were conducted in collaboration with the Forest Departments (FD) and FD officials along with local conservation NGOs; and participants were trained in monitoring techniques and hatchery management.

Below are the summaries of the proceedings of each workshop and future recommendations

1) Capacity building workshop for community initiated turtle conservation programs in Kerala

Kerala had a considerable amount of nesting on the west coast of India. However, indiscriminate sea wall construction, coastal development activities and sand mining significantly affected the nesting beaches for the turtles- reducing the nesting numbers. To combat these issues, the Kerala Forest Department initiated a 'Green partnership programme' aiming at sea turtle protection and their habitat by involving coastal fishing community and local NGOs under an umbrella project called "Haritha Keralam" (Green Kerala). To strengthen scientific knowledge on monitoring techniques, Kerala Forest Department (FD) invited Indian Institute of Science (IISc), Bangalore to organize a one day workshop on sea turtle conservation.

On 11th November, 2013, the workshop was conducted by Social Forestry of the Kerala FD in collaboration with IISc, Kerala Forest Research Institute and WWF- Kerala at Calicut. The participants mainly included members from local coastal NGOs and FD officials. After the inaugural address by the Principal Chief Conservator of Forests (PCCF) Dr. Bransdon Corrie, a technical session was started with a presentation on turtle biology and conservation by Sajan John (Dakshin Foundation). This was followed by presentation nest monitoring and hatchery management by Nupur Kale (Dakshin Foundation); and habitat monitoring techniques and management by Muralidharan M (Dakshin Foundation). After the presentations, members from coastal NGOs discussed various environmental issues in their respective regions. The common concerns raised by the NGOs were increasing coastal tourism, coastal development, sand mining and beach armouring.

Post lunch, a practical session was given on beach monitoring techniques such as beach profiling and use of GPS to the participants on Kolavaipalam beach. This concluded the training session after which the PCCF with other officials discussed a work plan to help tackle the issue raised by the NGOs. They also showed interest in conducting some research programmes in Kerala on sea turtles. The main aim of the workshop was to develop an action plan that would help train officials and NGOs for effective sea turtle conservation and the planning is underway.

2) *Capacity building workshop for local youth group at Siali, Odisha*

On invitation from Action for Protection of Wild Animals (APOWA), a capacity building workshop was conducted for members of Krishna Jew Youth Club of Siali, Odisha on 3rd February, 2014. The workshop was supported by Humane Society International (HSI) and conducted by Indian Institute of Science, Bangalore.

The workshop commenced with practical session on beach monitoring techniques that includes use of GPS and beach profiling on Siali beach. The participants were given description on hatchery construction and management. This was followed by a round of questions and answers to clarify any doubts the participants had. This was followed by a presentation on hatchery management, data collection for sporadic nesting and its analysis.

After the workshop, the local range officer informed the youth to contact him or his officials in case of assistance. The participants expressed their need for financial aid and permission to carry out monitoring with help from the FD. The day's proceedings came to an end after a note of thanks by Mr. Bijaya Kabi of APOWA.

Figure 1: Siali workshop banner



3) *Assessing sea turtle nesting sites of Middle Andaman Island*

Following the recent reports of mass nesting of olive ridley turtles (*Lepidochelys olivacea*) at Harguna beach, Middle Andaman, Drs Kartik Shanker and Naveen Namboothri from Indian Institute of Science, Bangalore got in touch with the DFO Mayabunder to carry out survey of the site and arrange a training programme for field staff involved in sea turtle monitoring.

The workshop was conducted on February 7-8, 2014 for about 30 staff members of the Middle and North Andaman ranges. On day one, Dr. Shanker gave a presentation on sea turtle biology and hatchery management which was followed by an interactive session with the staff to clarify issues on the same. Dr. Namboothri then gave an update on the ongoing leatherback monitoring programme of IISc, Dakshin Foundation and ANET at Little Andaman Island.

The next day, a brief visit was organized to the nesting site at the Dhani Nallah beach, south of the Cuthbert Bay Wildlife Sanctuary where the team inspected the existing hatcheries and discussed protocols for monitoring sea turtles, along with a visit to the Interpretation Centre at Betapur. The senior as well as frontline staff showed enthusiasm and pride in preserving their sea turtle populations and habitats and has been efficiently monitoring the beaches. It was observed that the Dhani Nallah mangrove walkway and nesting beach south of the Cuthbert Bay Wildlife Sanctuary along with the Interpretation centre can serve as an excellent resource to sensitize local communities and tourists.

At the end of the session, the team came up with following recommendations and suggestions for the monitoring programme and hatchery management:

- a) To maintain in-situ nest protection as much as possible by constantly patrolling the beach and by building fence around individual nests to keep predation under control.
- b) Nests should be relocated to temporary hatcheries situated at the nesting beach which will help reduce maintenance costs, chances of diseases and will improve survival. For permanent hatcheries, the sand needs to be replaced at the end of every season and not at the beginning of the season as is being done currently. This ensures that the fresh sand added will be sufficiently exposed to wind and rain and resembles the natural beach sand as much as possible.
- c) To initiate a capture-mark-recapture tagging programme using simple external metal tags or internal PIT (Passive Integrated Transponder); this will help generate information on the inter- and re-nesting intervals of turtles, their movement patterns and biometry.
- d) To conduct mass nesting counts using strip transect method; also used at Odisha mass nesting site. A field training programme can be conducted to ensure that the field staff is trained in the required technique.
- e) Additional monitoring techniques such as threats to the nesting habitats and turtles, nest temperature data and mortality of turtles can also be used.

APPENDIX III (a)
Member Organisations of TAG

Name of Organisation	State
Andaman & Nicobar Islands	Andaman and Nicobar Environment Team (ANET)
Andhra Pradesh	Visakha Society for the Protection and Care of Animals (VSPCA)
Gujarat	Prakruti Nature Club (PNC)
Karnataka	Field Services and Intercultural Learning (FSL)
Karnataka	Canara Green Academy
Kerala	Green Habitat
Kerala	Naithal
Lakshadweep	Lakshadweep Marine Research and Conservation Centre (LMRCC)
Maharashtra	Sahayadri Nisarga Mitra
Odisha	Action for Protection of Wild Animals (APOWA)
Odisha	Alacrity
Odisha	Green Life Rural Association (GLRA)
Odisha	Orissa Marine Resources Conservation Consortium (OMRCC)
Odisha	Rushikulya Sea Turtle Protection Committee (RSTPC)
Odisha	Sea Turtle Action Program (STAP)
Odisha	Podampeta Ecotourism and Olive Ridley Protection Club (PEORPC)
Tamil Nadu	Students' Sea Turtle Conservation Network (SSTCN)
Tamil Nadu	TREE Foundation

National level organisations and research institutions that support TAG

- Centre for Ecological Sciences, Indian Institute of Science
- Dakshin Foundation
- Greenpeace – India
- International Collective in Support of Fishworkers
- Madras Crocodile Bank Trust
- Wildlife Institute of India
- Wildlife Protection Society of India

APPENDIX III (b)
Core Committee members of TAG

East coast:

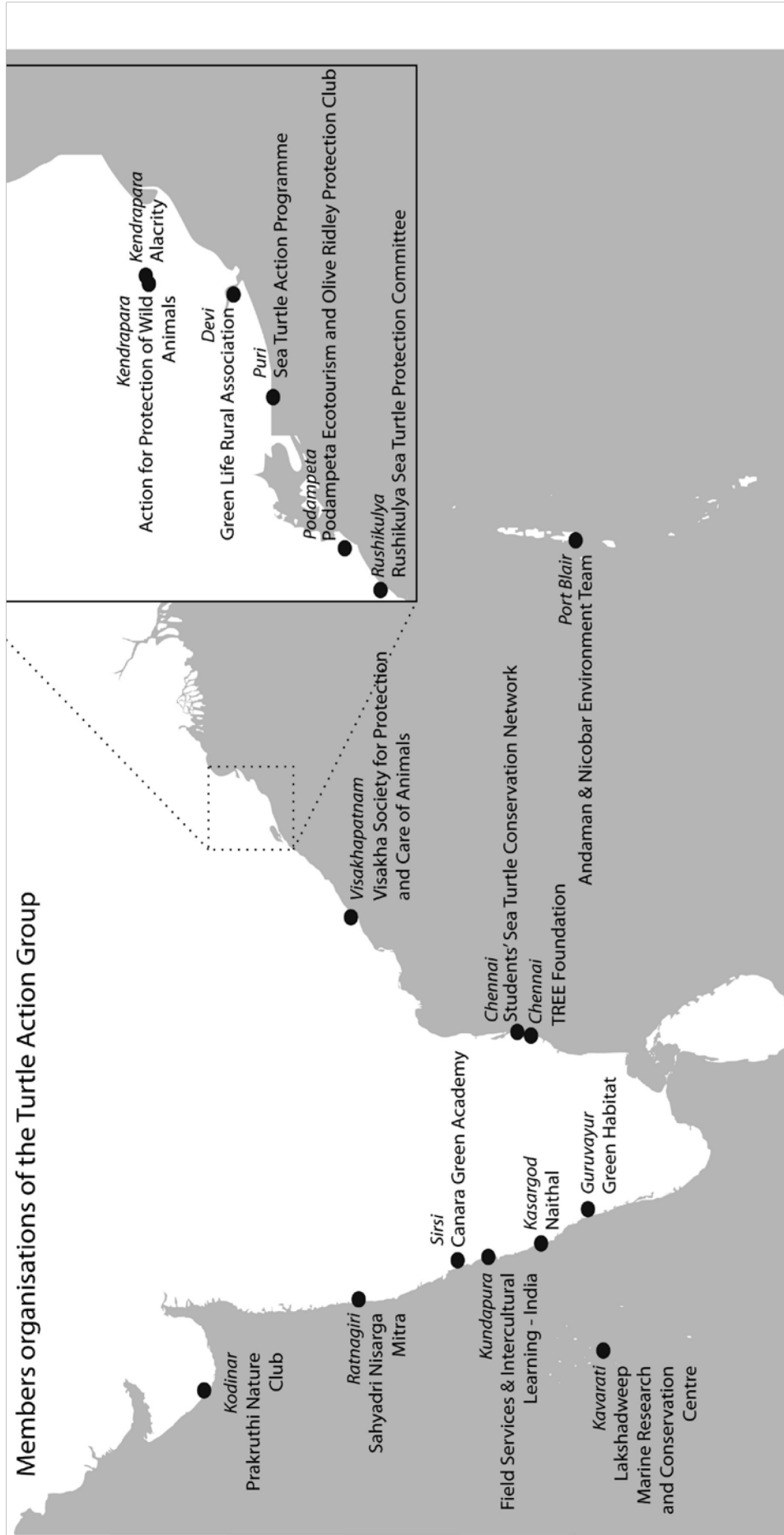
1. Supraja Dharini, TREE Foundation, Tamil Nadu
2. Mangaraj Panda, Orissa Marine Resources Conservation Consortium, Odisha
3. Pradeep Kumar Nath, Visakha Society for the Protection and Care of Animals, Andhra Pradesh

West coast:

1. Wesley Sunderraj, (Independent researcher), Gujarat
2. Sudheer Kumar, Naithal, Kerala
3. Ravi Pandit, Canara Green Academy, Karnataka

Islands:

1. Naveen Namboothri, Dakshin Foundation



Map showing locations of core member organisations of TAG

APPENDIX III (c)

TAG Members Profile

TAG members:

1. Andaman & Nicobar Environment Team (ANET): Andaman and Nicobar islands

Unique in being the only organization based on an island. Andaman and Nicobar islands are an important and prime nesting sites for sea turtles of all four species that occur in India, namely Green, Hawksbill and Leatherback.

2. Visakha Society for Protection and Care of Animal (VSPCA): Andhra Pradesh

Through its innovative awareness programs, VSPCA intends to educate the masses and build a strong and lasting bond between animals and human societies. They have field related expertise, necessary for effective conservation of sea turtles.

3. Prakruti Nature Club (PNC): Gujarat

PNC focus their activities along the Saurashtra and Gujarat coast. Their main focus is on protection of sea turtles, their nests and habitats, whale sharks and other sea turtle creatures. Having an excellent relationship with the forest department, they hope to contribute through the collection and distribution of information and data related to turtles.

4. Canara Green Academy (CGA): Karnataka

CGA's main mission has been conservation of turtles, mangroves and medicinal plants. Along with the Karnataka Forest Department, they have established 40 sea turtle breeding centres all over the Karnataka coastline. Potential sea turtle nesting beaches have been identified and both ex-situ and in-situ conservation are carried out, depending on the security of the nests identified.

5. Field Services and Inter-Cultural Learning (FSL India): Karnataka

They have been successful in creating awareness among fishermen community along 60km of North Udupi district of Karnataka state. They are unique in placing international volunteers in local community projects to support sustainable development and to bring inter-cultural dimensions to community projects.

6. Lakshadweep Marine Research and Conservation Centre (LMRCC): Lakshadweep

The organization established by a group of islanders, is the first that has a primary focus on community based marine conservation. Lakshadweep has a significant population of endangered green and hawksbill turtles. LMRCC work with the local community, school students, fishermen and the Forest Department to reduce the threats to these ocean ambassadors through education and awareness programs.

7. Sahyadri Nisarga Mitra (SNM): Maharashtra

They work towards conservation, awareness and research of region's biodiversity, focusing on conservation of marine turtles, white-rumped vultures and Indian swiftlet.

8. Action for Protection of Wild Animals (APOWA): Odisha

APOWA believes in finding solutions to animal welfare and conservation challenges that provide lasting benefits for animal and community. They have ten years of experience in sea turtle conservation in Odisha through research, conservation and action. Their work is carried out in the buffer zone of Gahirmatha sea turtle rookery site, world's largest olive ridley mass nesting site.

9. Alacrity: Odisha

Amongst several, their sea turtle activity involves imparting awareness to fishing community residing within the periphery of the Gahirmatha area. They have also developed 'eco-development' groups, with 60 so far, within the region for conservation of natural resources including mangrove forests.

10. Podampeta Ecotourism and Olive Ridley Protection Club: Odisha

They address various threats to the nesting turtles by carrying out awareness programs that inform people in nearby villages regarding the importance of turtles to the coastal ecosystem and the illegality of such activities.

11. Rushikulya Sea Turtle Protection Committee (RSTPC): Odisha

With the primary aim to help conserve olive ridley turtles and safeguard their nesting beaches along the Rushikulya coast, they began to monitor the nesting population and assist in the release of hatchlings during mass hatching. They also collect data on tagged turtles, recapture studies, distribution of mating congregation, satellite transmitter ranging studies and monitoring hatchling mortality rates.

12. Students' Sea Turtle Conservation Network (SSTCN): Chennai, Tamil Nadu

Sea turtle conservation began in 1971, when a few dedicated wildlife enthusiasts began walking the beaches of Chennai to document the status of and threats to sea turtles. The group has been mainly organized and operated by students from colleges and even schools and a few young working adults. The motive has always been conservation and awareness creation.

13. TREE Foundation: Chennai, Tamil Nadu

It involves the fishing community youth (Sea Turtle protection Force- STPF) in a sea turtle protection and conservation programs in South India. Education and creating awareness at the community level is an integral part of our conservation program.

14. Green Mercy: Andhra Pradesh

An NGO based in Srikakulam. They carried out intensive surveys in 2001, giving better picture of marine turtles status on the coast of Andhra Pradesh. They have contributed to the conservation of marine and coastal life by holding consultative meetings with fisherfolk and local communities.

15. Sea Turtle Action Program (STAP): Odisha

This is NGO based at Devi, another mass nesting site in Odisha. They work on sea turtle protection and community empowerment.

16. Green Life Rural Association (GLRA): Odisha

GLRA was formed in 1993, by a group of thirteen committed village youth who were then working

on the Wildlife Institute of India's sea turtle project. Members of GLRA also worked in Operation Kachhapa when it was launched, at the time as a joint operation with the Forest Department and Wildlife Protection Society of India. GLRA's activities are focused in the Devi river mouth region.

17. OMRCC: Odisha

It brought together divergent groups comprising of conservationists, biologists, fisherfolks to meet and interact which would be beneficial to both conservation as well as livelihoods. We continue to work closely with this organisation in monitoring the ongoing olive ridley project in Odisha.

18. Green Habitat: Kerala

Green Habitat came into form in 2002 as an independent organisation. The organisation pilots activities for wildlife and environmental conservation in Chavakkad taluk in Kerala. Our areas of focus include the mangroves of Chettuwei, nesting turtles of Chavakkad beach, birds of Enamakkal Kollam and house sparrows among others. A major part of our efforts at conservation is directed towards environmental awareness and education among local communities in the area.

19. Naithal: Kerala

It is an NGO based in Kasargod district of Kerala that works on coastal information, conservation and action. It was established in 2001 by a group of local enthusiasts. They have worked on sand mining issues and work extensively on sea turtle conservation.

More information about the TAG members can be found in the 13th and 14th issues of IOTN. The links to the issues are:

IOTN- 13: <http://www.iotn.org/iotn-13.php>

and

IOTN- 14: <http://www.iotn.org/iotn-14.php>

APPENDIX IV

Small Grants Program 2013-2014

A part of the MCTA project fund is disbursed as small grants through Madras Crocodile Bank Trust. The small grants programme was started in 2010. Till date, five rounds of small grants have been disbursed. The main aim of this initiative is to provide financial support to local NGOs and member organisations of TAG that work on sea turtle conservation in different parts of India. To make this more instructive for members, we have designed the grant making process to go through the usual steps of grant application/ proposal submission, review and approval and grant making.

The total amount disbursed through 2009-10 small grants was to 283, 000 INR (1USD ~ 60 INR). During 2013-14, we selected five TAG members to be awarded small grants for their consistency and commitment with regard to their ongoing work and timely report submission. The table below provides details about the small grants disbursed during 2013-14.

Table 1: 2013-2014 Small Grants Details

Name of the organisation	Grant amount (INR)*
Action for Protection of Wild Animals (Odisha)	25,000
Prakruti Nature Club (Gujarat)	20,000
Sahyadri Nisarga Mitra (Maharashtra)	35,000
Students' Sea Turtle Conservation Network (Tamil Nadu)	35,000
Visakha Society for Protection and Care of Animals (Andhra Pradesh)	25,000

*1 USD ~ 60 INR

Increased capacities of independent groups will ensure greater benefits to the network as a collective and allow for the creation of local networks that seek inputs from these groups. Financial support to individual efforts of member organisations in the nature of small grants can help sustain their interest and participation in the network, in addition to achieving the overall conservation objectives of the network. As a facilitating organisation, this demonstrated need has necessitated MCBT and partner organisations to commit additional resources towards meeting long term network objectives within the broader scope of sea turtle conservation and habitat protection. This has justified our need to solicit continued support from the Marine Turtle Conservation Fund towards continuing to facilitate and coordinate the network's activities. With the support of Dakshin Foundation, TAG is now coordinated by a dedicated team of members from both organisations who will continue their roles in providing administrative support to the network.

APPENDIX V
Audit Report 2013-14

FORM NO. 10B
[See rule 17B]

**Audit report under section 12A (b) of the Income-tax Act, 1961, in the case of
Charitable or religious trusts or institutions.**

I/We have examined the Balance sheet of **MADRAS CROCODILE BANK TRUST ,P.O BOX.4 VADANAMMELI POST MAHABALIPURAM ROAD CHENNAI-603104** as at **March 31st March 2014** and the Income & Expenditure account for the year ended on that date which are in agreement with the books of account maintained by the said trust or institution.

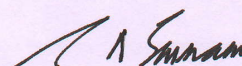
I/We have obtained all the information and explanations which to the best of my/our knowledge and belief were necessary for the purposes of the audit. In my/our opinion, proper books of account have been kept by the Head office and the branches of the above named trust/institution visited by me/us so far as appears from my/our examination of the books, and proper returns adequate for the purposes of audit have been received from branches not visited by me/us, subject to the comments given below:

In my/our opinion and to the best of my/our information and according to information given to me/us, the said accounts give a true and fair view:-

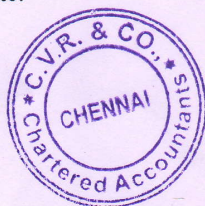
- (1) In the case of the Balance Sheet, of the state of affairs of the above named trust/institution as at 31.03.2014 and
- (2) In the case of the INCOME AND EXPENDITURE account, of the Excess of Expenditure over Income of its accounting year ending on 31.03.2014

The prescribed particulars are annexed hereto.

For C V RAMASWAMY & CO.,
Chartered Accountants,


Partner

Place: CHENNAI
Date:



[illegible]

For more information on the Turtle Action Group visit
www.seaturtlesofindia.org/tag

Cover photo: *Leatherback hatchlings, Andaman Islands*
Photo: Adhith Swaminathan

