Project Report

Promoting conservation of sea turtles in India at a national scale through a network of partners and index sites

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1. Executive Summary

The Indian coastline has significant nesting and feeding grounds for four species of marine turtles, namely leatherback (*Dermochelys coriacea*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*) and olive ridley (*Lepidochelys olivacea*) turtles. The most remarkable among these 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. These sites hold high importance in terms of conservation. Even 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.

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 this region for more than a thousand years. They 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 project 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 to 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), 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: Expansion of the network and its 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 expansion of existing programmes, ensuring inclusion of all community based groups from around the country working on sea turtle conservation.

2011– 2012: 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: 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 activities of the network, to disburse small grants, to conduct workshops for capacity building and to produce outreach material. Additional 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. Also, as in the previous years, it was used to conduct workshops, disburse small grants and produce outreach material.

2014 - 2015: Conservation of sea turtles in India through a collaborative network: The grant award of $52,500 was utilised to sustain and augment the activities and reach of the sea turtle conservation network. Certain new projects were undertaken, as elaborated in the appendices. The annual workshop, small grants program and publications were also continued.

The primary aim of the project is to provide a common platform for sharing information and experience amongst various groups and individuals working on sea turtles in India. It has strived to strengthen community based NGOs from various coastal states by

providing small grants, training and technical assistance. The project seeks effective engagement of network members with other stakeholder groups, research institutions and government agencies in order to better execute conservation action. The fund is being used for website (www.seaturtlesofindia.org) maintenance and to develop an online data repository, which is under progress. A portion of the fund is utilised for the publication of outreach and educational material, and partial support towards the production of the Indian Ocean Turtle Newsletter.

Turtle Action Group is a well-established network of over 25 organisations from across the country. The network has established a set of goals and 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 are 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 continue 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 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 2014-15 were as follows:

1. To continue the long-term monitoring programme of olive ridley turtles in Odisha, and leatherback turtles in the Andaman & Nicobar Islands and increase the participation of local groups in these efforts.

2. 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.

3. To enable the collation and analysis of data collected across sites to inform studies on population trends and impacts of climate change.

4. To develop and maintain an online portal for the upload and synthesis of relevant data contributed by member organisations.

5. To conduct training programmes for capacity building in order to enable individual member organisations of TAG to become financially and programmatically independent.

6. To strengthen the network through the organisation of workshops, meetings and consultations in addition to inter-state exposure and exchange programmes for members of the network.

7. To encourage and support independent, location specific conservation activities of member organisations through the provision of small grants.

8. To define administrative tasks of elected representatives of the network as a way of

encouraging a transfer of ownership of the network, thereby ensuring long term sustainability.

9. To develop and design 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*). Over the past decade, activities such as mechanised fishing have resulted in large scale turtle mortality of turtles in offshore waters. Other factors that possibly affect their populations are rise in sea level, climate change and 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 with respect to climate change. This knowledge will be instrumental overcoming these threats.

With funding from Marine Conservation Society, U.K., a long term monitoring programme was initiated by Indian Institute of Science (IISc) and Madras Crocodile Bank Trust (MCBT) at Rushikulya rookery, a major olive ridley mass nesting site in the world. The project is coordinated by the IISc, 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 conducting a census of nesting populations during '*arribadas*', shore line monitoring techniques, hatchery management, offshore turtle monitoring and other activities related to sea turtle monitoring .

The primary aim of the project is to study the impact 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 set of nests is relocated to a hatchery from the natural nesting beach to understand hatching success. These 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, the population is being estimated using a strip transects method during mass nesting. The nesting turtles 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 unusual. March 2015 saw a remarkable resurgence in nesting numbers. A report on this is provided in Appendix I (a). Between January and February 2015, necropsies on landed dead olive ridleys were undertaken in collaboration with the forest department. The purpose behind these necropsies was to understand the physiology and reproductive biology of the Indian Ocean olive ridley population and also to ascertain the cause of death. A detailed report on this can be found in Appendix I (b).

In response to the training, the Forest Department is actively involved in monitoring and protecting both offshore and onshore turtle habitats. Working with local NGOs, they help in spreading marine turtle conservation awareness through education programmes. A sea turtle interpretation centre has been set up and small events such as beach cleaning with participation from local communities have been undertaken. 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 IISc, Dakshin Foundation, Andaman and Nicobar Environment Team (ANET), and the 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 about the status of leatherback populations in the Indian sub-continent except for studies by ANET, IISc and Dakshin Foundation on Great Nicobar Island and Little Andaman Island. In light of the decline of the Pacific Ocean leatherback population, it is important to monitor Indian Ocean populations and threats to them.

The programme involves 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 (c).

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

C. Sea turtle based ecotourism in west India and its potential application

A review of sea turtle based eco-tourism models in India was conducted. The prospect of introducing such eco-tourism as a symbiosis between conservation and livelihood generation is being explored. The details are elucidated in Appendix I (d).

2. Website and online data repository

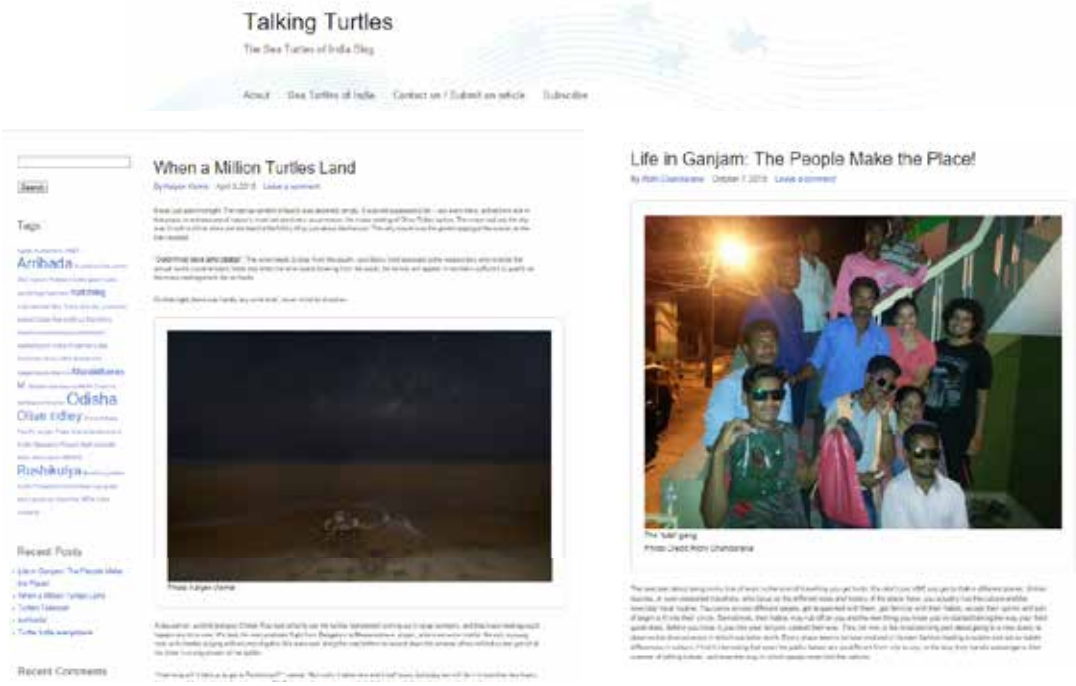
The website, www.seaturtlesofindia.org, is a platform for information on the biology and conservation of sea turtles and their habitats in Indian sub-continent. Numerous community based groups, local, national and international conservation organisations (NGOs), academic institutions and government departments 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 700 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.

The blog 'Talking Turtles' was started in 2012 to host posts by people working on marine turtles. It features pieces by scientists, journalists, activists, students and enthusiast. From first encounters with turtles to unusual observations to expert insights, the blog welcomes stories about marine turtles in the Indian Ocean. The latest updates are from the spectacular olive ridley mass nesting in March 2015.

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 more user-friendly and accessible. The database aims 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. The data portal is currently undergoing changes in the final stages.

Sea turtles of India Website

Talking Turtles blog



4. Workshops and meetings

In September 2014, a meeting of researchers working on sea turtles was held at IISc, Bangalore. Researchers from India and Sri Lanka discussed their ongoing work and potential collaborations. A report on this is presented in Appendix II (a).

The 6th TAG meeting was held at Visakhaptnam in March 2015. It saw enthusiastic participation from most of the member organizations. The NGOs presented updates on their work and future plans. A workshop on eco-tourism was also conducted with a view to exploring potential initiatives with the network members. The meeting also included a revision and restructuring of the core committee. A plan of action was formulated in conclusion. The minutes of the meeting are in Appendix II (b).

5. TAG - the sea turtle conservation and monitoring network

The Turtle Action Group

The Turtle Action Group (TAG) is a network of 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 the need for a national level network to enable various groups to work together and collaborate towards more effective sea turtle conservation was acknowledged. There is worldwide consensus 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 at the national level was lacking and TAG was formed to fulfil this need. TAG 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 21 organisations from the mainland and one each from the Andaman and Nicobar and Lakshadweep Islands. Appendix III (a) 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 falls. 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, 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 each coastal state and both 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. Appendix III (b) contains details of the core committee and advisory board members.

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 monitoring changes on a larger spatio-temporal 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. TAG members are also encouraged to develop their own proposals to support their ongoing projects. Appendix III (c) presents the profiles of the member organizations of TAG.

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 amounts disbursed are provided in the table below:

Name of the organisation	**Grant amount (INR)**
Sahyadri Nisarga Mitra (Maharashtra)	30,000
Students' Sea Turtle Conservation Network (Tamil Nadu)	30,000
Green Life Rural Association (Odisha)	20,000
Manthini Ujwala Society (Andhra Pradesh)	20,000

Appendix IV contains details of the projects

7. Outreach and education material

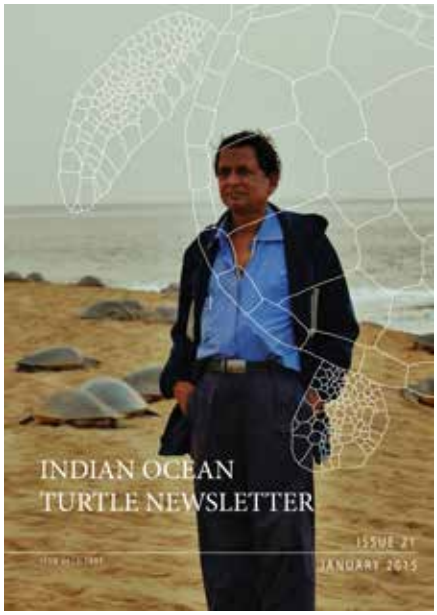
Indian Ocean Turtle Newsletter

The 20th and 21st issues of the Indian Ocean Turtle Newsletter were published in July 2014 and January 2015 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 covers related aspects such as coastal zone management, fisheries and marine biology. There are 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.

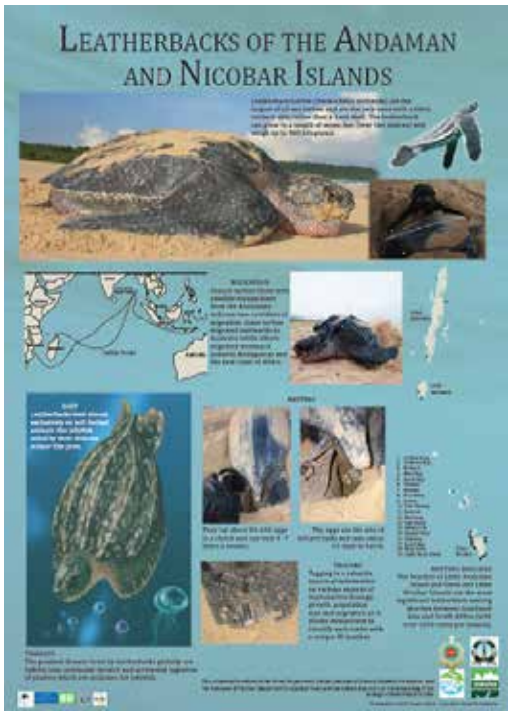
The newsletter aims to reach and serve:

• 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
- Community-based conservation organisations
- Individual researchers, field biologists and ecologists



As part of outreach and education, a poster on the Leatherback turtles of the Andamans was developed.



4. Future Plans for TAG (2015-16)

Members of TAG are 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 plans for the year 2015 – 2016 are:

1. 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. 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 states have to be 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.

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

A primary focus area 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. The potential of eco-tourism as a means of generating revenue and opportunities for conservation has also been put forth. Collaboration between the local government and NGOs will motivate local groups to start their own projects and pave the way for such 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:

1. 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.

2. 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.

3. Communication with the central government through the 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.

4. Joint awareness programmes with other TAG members, especially within the state by sharing resources, ideas and staff.

5. Advertisement of the network activities through media campaigns to attract other similar organisations and to highlight individual organisations' efforts to give them recognition.

6. 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. Acknowledgements

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 the Madras Crocodile Bank Trust for carrying out the administrative tasks under the project and lending their constant support as and when required. We thank Visakha Society for Protection and Care of Animals, our collaborators for the annual TAG workshop held in Visakhapatnam for their support.

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.

Finally, we would like to thank all our member organisations, whose enthusiasm in sustaining the network and dedication towards sea turtle conservation 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 turtle (*Lepidochelys olivacea*) nesting. This population is an evolutionary source of other populations across the world. This population is facing large-scale mortality due to natural and anthropogenic causes such as predation, mechanised fishing and other related development activities. Extreme changes in the nesting beach topography due to erosion have also affected nesting within the area. 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. This is essential to set and achieve conservation goals.

The Madras Crocodile Bank Trust (MCBT) initiated a long term monitoring project with funding from Marine Conservation Society, U.K. and USFWS Marine Turtle Conservation Act grant to study the population trends of these turtles in 2007. Rushikulya rookery, one of the major mass nesting sites in the world, was chosen as the study site. In 2008, long term monitoring began in collaboration with the local Forest Department and NGOs involved in sea turtle conservation. The forest department staff, NGO employees, enthusiastic locals and researchers have been trained in activities such as 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 respectively. A hatchery is maintained close to the natural nesting site, for relocated nests. Hatchlings succumbing to natural mortality are collected and sexed using histological techniques to study the effect of climate change on the sex ratios.

Arribada monitoring

Mass nesting events at the Rushikulya rookery were not monitored using standardised methodology before 2007. Since 2008, the Indian Institute of Science and Dakshin Foundation have been monitoring the Rushikulya beach, recording both solitary and

mass nesting data, using a scientifically robust method known as a strip transect. During the event of a mass nesting, a 20m strip transect method is used to count the nesting females. Table 1 provides estimates of mass nesting from 2008 to 2015. The *arribada* for 2014-15 occurred from the 12th to 17th of March 2015 (Table 2).

Table 1: Arribada estimates from Rushikulya, 2008-2014

Year	Estimated number of egg-laying females (± SE)	Arribada duration	Average oviposition duration	Number of turtles counted in transects
2008	70985 (±15104.2)	5(2)*	17.75	1138
2009	71645 (±13345.5)	5(3)*	17.75	1413
2010	98433 (±13621.6)	7	17.75	5910
2011	151828 (±19371.6)	9	18.54	9212
2012	42931 (±3993.4)	3	18.12	2943
2013	142550 (±13736.0)	6	20.46	10031
2014	14849 (±3347.9)	2	19.54	1058

*number in brackets denotes the num ber of days when the arribada estimation could be carried out

Table 2: Estimates of arribada in March 2015

Date	Estimated number of egg-laying females	(M)	Stan-dard error	Upper Confidence Interval	Lower Confidence Interval	Mean oviposi-tion time	Number of turtles counted in transects
12/03/2015	33177	4954014.7	2225.76	37628.9	28725.9	19:23	2182
13/03/2015	44703	4809343.25	2193.02	49088.88	40316.8	19:23	2940
14/03/2015	49234	3996410.67	1999.1	53232.15	45235.74	19:23	3238
15/03/2015	25043	2799305.47	1673.11	28388.94	21696.49	19:23	1647
16/03/2015	12666	3165053.57	1779.06	16223.92	9107.68	19:23	833
17/03/2015	5683	362392.98	601.99	6886.65	4478.69	19:23	210

Monitoring offshore congregations of olive ridleys on the Odisha coast

The team from the Indian Institute of Science and Dakshin Foundation started offshore monitoring at Rushikulya in 2010. A line transect approach is used to measure the changing offshore abundances of turtles during the breeding season (Fig 1). Initially done only in Rushikulya, this was extended to cover the entire coastline of Odisha in January 2014. The other places included in the survey are Bahuda, Chilika, South Devi (Puri-Konark), Devi, Hukitola and Jatadhar. Due to logistic constraints and lack of permits, Gahirmatha Marine sanctuary and Chandipur could not be covered. The result of the number of turtles encountered in all the sampled locations is shown in Fig 2. 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 these and overlay them with the aggregation sites (Figure 3).

Figure 1: The distribution of turtle congregation all along Odisha coast. The highest numbers were recorded in Rushikulya

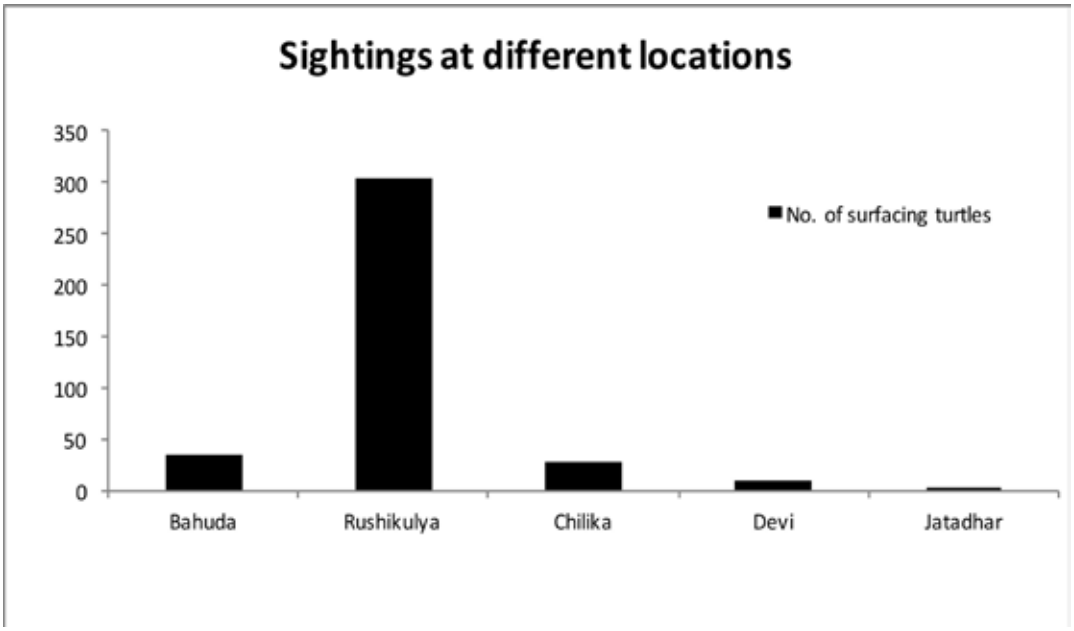


Figure 2: Number of surfacing turtles encountered per month at Rushikulya

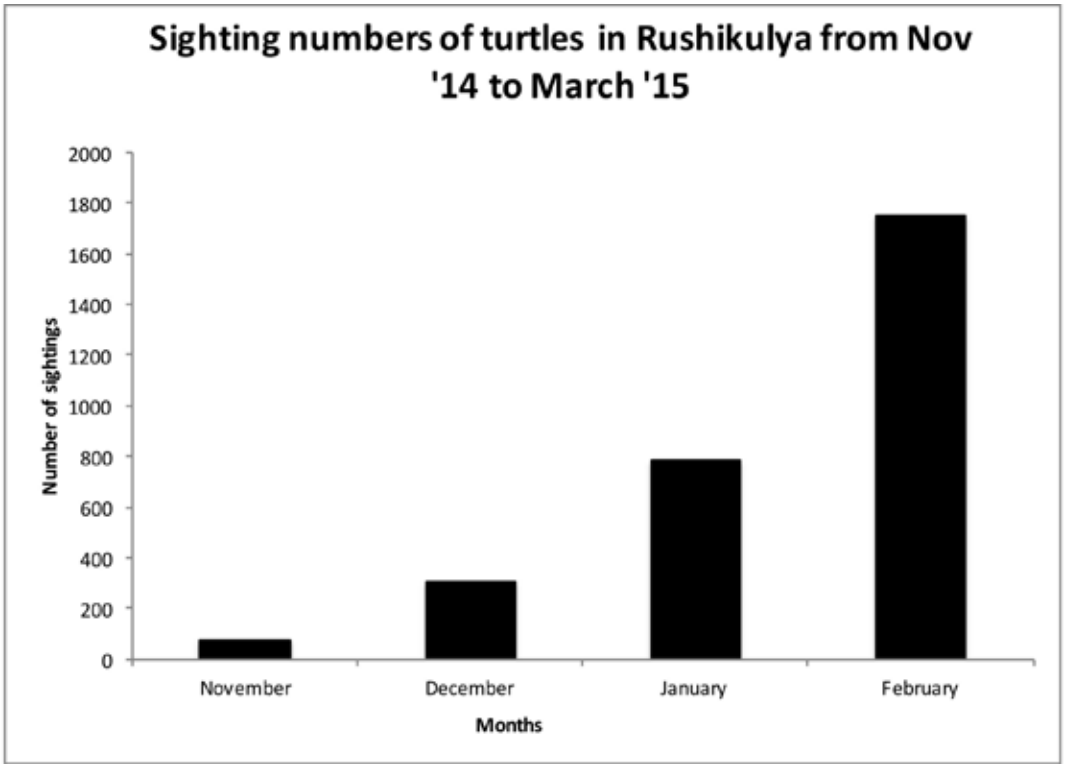
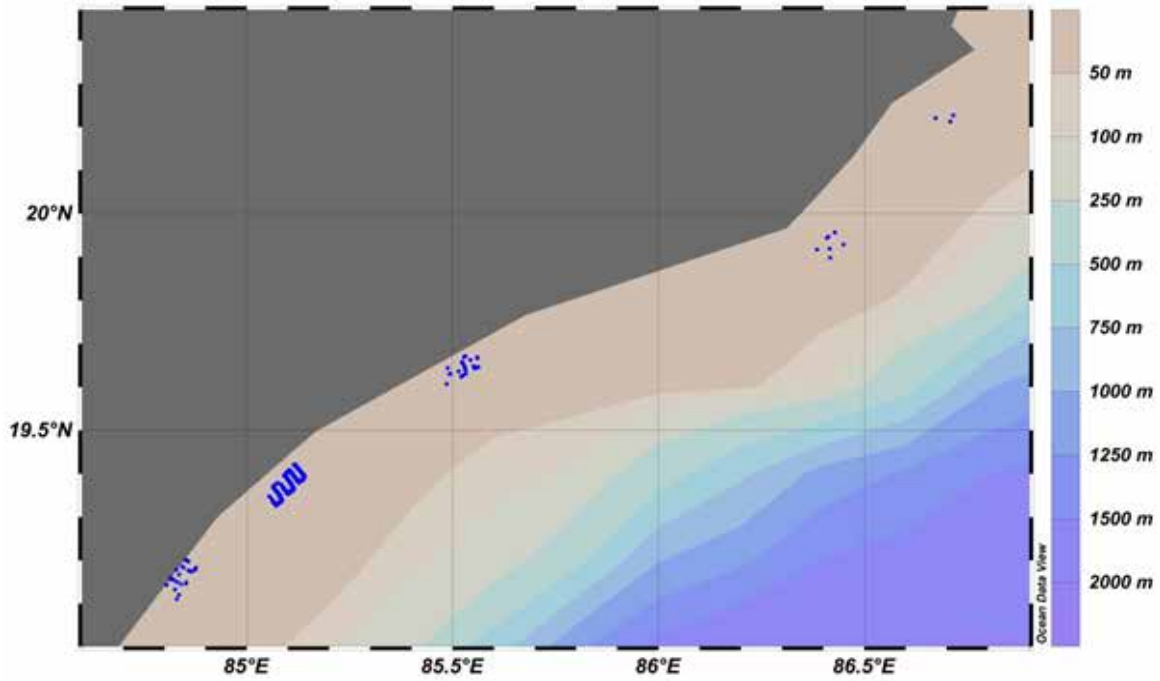


Figure 3: Observed distribution of turtles along the Odisha coast.



The surveys were conducted during the last week of December and continued till the 14th of January 2015. The average number of turtles sighted has been listed in figures 1 and 2. The density data was analysed using Distance Software version 6.2.

Maximum turtles were observed in Rushikulya (n=1751), with an average cluster size of surfacing turtles being 2.9 turtles/km^2 and at a density of 9.43 turtles/km^2 (%CV= 19.2). The summary of the analysis is listed in Table 3.

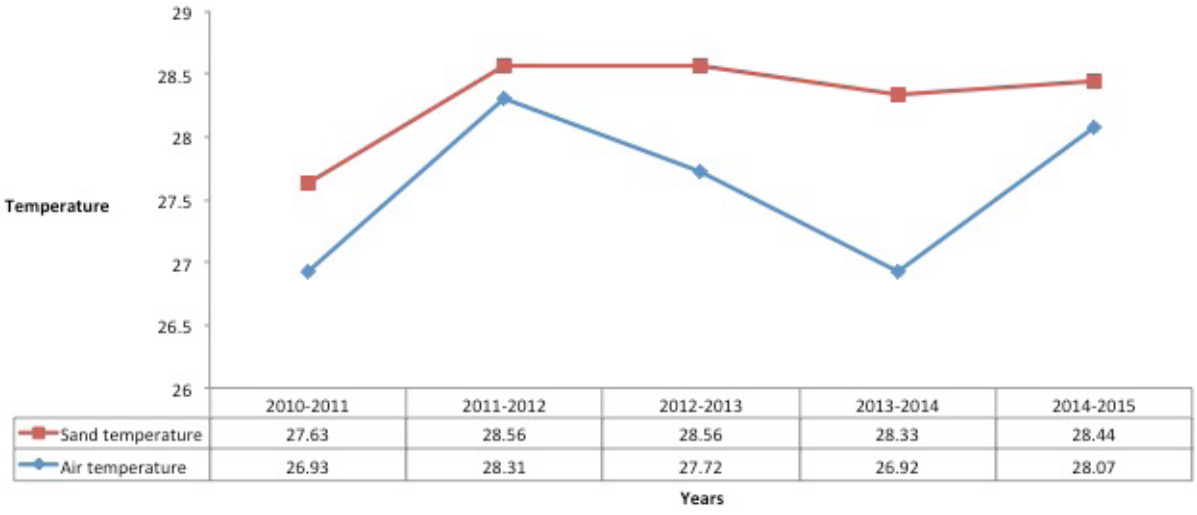
Table 3: Density measurement

Parameter	Point Estimate	Standard Error	Percent Coef. Of Variation	95% Percent Confidence Interval
Density	9.4327	0.18175	19.26	0.064602 0.13786

Air and sand temperatures; hatchling sex ratios

Sand and air temperature for years 2010-2015 ranged from 27 to 28.5^{0}C (Figure 4). The highest sand and air temperature ever recorded was in 2011-12 at 28.56^{0}C and 28.31^{0}C respectively. On the other hand, the lowest temperatures recorded were in 2010-11 ranging between 27-27.5^{0}C.

Figure 4: Average temperatures recorded at Rushikulya from 2010-2015



Average sand and air temperatures recorded in Rushikulya from 2010-2015

Local involvement:

A majority of the NGOs working along the Odisha coast are community based and employ local youth in carrying out their activities. They are trained in the latest *arribada* population census techniques. However, despite their interest and enthusiasm, many of the individuals from local NGOs are also forced to seek alternate options to secure a steady income (particularly during the non-nesting season). Therefore, projects are being initiated like coastal monitoring and beach profile data collection which would keep them involved all through the year. By developing skills in sea turtle monitoring, individuals from local community based NGOs have managed to find employment in sea turtle research and monitoring programmes carried out by academic research institutions and by the forest department. This has helped create synergy not just between NGOs and academic organisations, but between NGOs and the forest department as well. As a result of this sustained partnership over the past 5 years, it has been possible to involve a considerable number of field staff from the local communities and organisations in the *arribada* census and in collecting scientific data on sea turtle mortality and nest temperatures. A further step would be to initiate community based eco-tourism for income generation for these groups.

The local NGOs involved 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.

APPENDIX I (b)
Necropsies on olive ridleys in Odisha

A recent study conducted in loggerhead (*Caretta caretta*) turtles along the east coast of Spain reported a clinicopathological condition consistent with decompression sickness (DCS)-like syndrome, similar to that seen in human divers and certain marine mammals, following by-catch in trawls and gillnets of local fisheries. Since the 1990s, tens of thousands of dead olive ridleys have been counted along the Odisha coast. Given that, till date, no study has focussed on understanding the cause of their mortality, this project was initiated with an objective to collect baseline data on whether DCS-like syndrome and its allied complications is the cause of mortality of the olive ridleys along the Odisha coast.

A total of 8 dead olive ridley (*Lepidochelys olivacea*) turtles were necropsied in Devi (n = 5) and Rushikulya (n = 3), Odisha in the months of January and February 2015. On thorough gross post-mortem examination, it was found that all 8 turtles necropsied suffered from moderate to severe DCS-like syndrome, and injuries observed externally were traumatic. They were in good body condition and did not show signs and symptoms of any other illness or syndrome which is of concern as they represent the healthy breeding population.

Although a confirmatory diagnosis using laboratory techniques could not be achieved due to the quality of carcasses encountered, and the sample size of this project was too small to comment on the actual prevalence of DCS-like syndrome leading to death of the ridleys along the Odisha coast, it has provided useful insights. Intensive investigation is required to understand the methods followed by the fishermen to get rid of the turtles from fishing gears, which suggests a need to educate them about sea turtle conservation. It has also provided a foundation for definitive diagnosis of DCS in sea turtles which could open a new avenue for research in sea turtle diving physiology, conservation, and by-catch impact mitigation, as well as for comparative studies in other air breathing marine vertebrates and human divers.

With a view to understanding the reproductive biology and population dynamics of the olive ridleys of Odisha, necropsies on dead female turtles were also carried out. A total of 11 dead female olive ridley (*Lepidochelys olivacea*) sea turtles were necropsied in Devi (n = 7) and Rushikulya (n = 4), Odisha in the months of January and February, 2015. The reproductive structures were studied closely with an objective to gather baseline data to understand the stage structure and thus population parameters of ridleys along the Odisha coast.

All of the turtles necropsied were adults and had bred in the past. A majority of the carcasses (n = 10) were of poor quality and thus due to the degree of decomposition, the reproductive structures (ovarian stroma, follicular size and number, corpus luteum size and number and oviductal shape and colour) could not be studied adequately. Although

the presence of intraoviductal eggs in 7 of these 10 carcasses indicated that they were potentially breeding this season, an accurate assessment of the current and future reproductive status (current clutch number and future clutch size) could not be done.

Only one turtle that was encountered at Rushikulya was of a fair quality and allowed a comprehensive assessment of the past, current and future breeding status. By extending this study to live solitary and mass nesting turtles by using advanced diagnostic techniques such as ultrasonography and laparoscopy in conjunction with hormonal assays, it is possible to understand their stage structure and seasonal reproductivity and thus population biology along the Odisha coast. Such studies can also provide insights into the general and reproductive health of olive ridley turtles in Odisha.

APPENDIX I (c)
Monitoring leatherback turtles in the Andaman & Nicobar Islands

Introduction

The leatherback turtle (*Dermochelys coriacea*) is the only extant species of the family Dermochelyidae. Leatherback turtles are the largest of living sea turtles, growing up to 2 meters and weighing as much as 900 kg. It is also the only sea turtle that lacks a bony shell. The adult leatherback is also the widest-ranging reptile migrating longer distances than all other sea turtles. It is found in tropical and temperate waters of the Atlantic, Pacific, and Indian Oceans. The leatherback, previously listed as Critically Endangered, is now listed as Vulnerable by the IUCN and under Schedule I of the Indian Wildlife Protection Act (1972). There is great concern over the declines in the nesting populations of this species throughout the world, especially the Pacific. The Malaysian rookeries have undergone a well-documented decline from approximately 5000 nests per year in the 1960s down to less than 10 nests per year in the 2000s. Based on the lessons learned from the population declines in the Pacific and Southeast Asia, it is imperative to understand the nesting trends of leatherback turtles in the Andaman and Nicobar and where these turtles migrate and the threats they face throughout their range.

Information on leatherback populations from India is still very patchy. Though there are earlier records of sporadic leatherback nesting from the Indian mainland, current nesting populations are entirely restricted to the Andaman and Nicobar islands. The first confirmation of leatherback nesting in the region came from Satish Bhaskar at Jahaji beach, Rutland.

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.

Objectives and 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. Given the lack of knowledge of these populations, long term spatio-temporal

monitoring of leatherbacks using conventional tagging, satellite telemetry and genetic analysis was imperative. Therefore, the project was initiated in 2008 with the objective of monitoring the post-tsunami leatherback nesting recovery.

Over the years, the objectives have evolved to continue the long-term monitoring of leatherback nesting in South and West Bay, Little Andaman Island through a capture-recapture programme. Intensive surveys have been carried out to monitor tag recaptures of leatherback turtles from previous seasons. In addition, we intend to continue the satellite telemetry studies by tagging more leatherback turtles as well as 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.

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

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 64 nests were encountered from 22nd December, 2014 to 10th February, 2015. Out of the 64 nests, 42 were leatherback nests and the rest were olive ridley nests. The monitoring effort also indicated that 40 nests were predated, mostly by monitor lizards.

West Bay
Monitoring commenced at the West Bay beach on December 22, 2014. A total of 118 nests were encountered– 50 leatherback nests and 68 olive ridley nests. 51 nests were predated during the monitoring period.

Figure 1. Map of Little Andaman Island

A. 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
2014-2015	South Bay	West Bay	South Bay	West Bay
	42	50	42	52

* Only South Bay was monitored during 2007 to 2010.

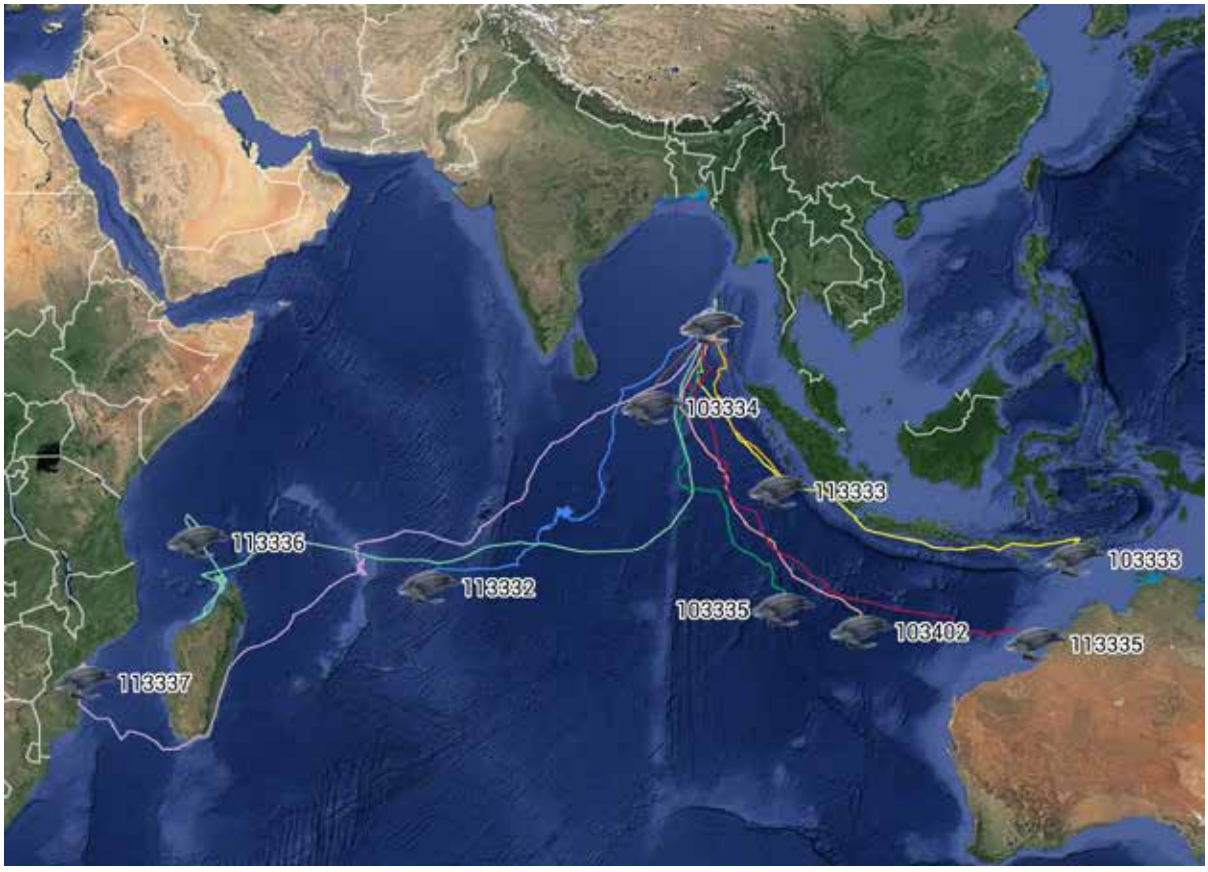
B. Leatherback tag and recaptures

Year	Leatherback Turtles Tagged and Recaptured	
2007-2008	6 (3)	
2008-2009	7 (4)	
2009-2010	2 (1)	
2010-2011	South Bay	West Bay
	6 (2)	23 (20)
2011-2012	South Bay	West Bay
	0	20 (16)
2012-2013	South Bay	West Bay
	0	12 (13) [1]
2013-2014	South Bay	West Bay
	2 [1]	19 (24) [2]
2014-2015	South Bay	West Bay
	0	0 [1]

( ) Represents the number of tagged turtles recaptured within the season and not the number of individuals recaptured (certain individuals were recaptured multiple times within a season)

[ ] Represents recaptured turtles tagged during the previous nesting seasons.

C. Post Nesting Migratory Route of Leatherback turtles:



APPENDIX I (d)
Sea turtle based ecotourism in west India and its potential application

A preliminary review of eco-tourism based on sea turtles was conducted in 2014-15. The focus was on the west coast, where a particularly successful and long lived model of eco-tourism is thriving.

Ecotourism promotes conservation while imparting awareness to tourists of their natural surroundings. It is said to be one of the fastest growing division of the tourism industry (Tisdell, 2003) and in countries where the coastline is lined with settlements, ecotourism initiatives have usually been driven by the dual purpose of fulfilling local demands such as employment and protection of native flora and fauna.

Several projects that combine sea turtle conservation and tourism have been running successfully at Heron Island & Mon Repos in Australia, Rekawa in Sri Lanka (Tisdell & Wilson, 2005) and at Tortuguero in Costa Rica (Jacobson & Lopez, 1994). These locations have also served as important research sites and provide volunteering opportunities for nature enthusiasts. The programs in Tortuguero and Rekawa also have the local communities participating in this initiative whereas Mon Repos is mainly looked after by the Australian Wildlife Department.

Similar to Tortuguero and Rekawa, ecotourism projects were started in Maharashtra, Goa and Karnataka in India. Out of the three, Velas in Maharashtra has gained immense popularity and is still operational.

The Indian subcontinent sees a significant amount of marine turtle nesting mostly by olive ridleys (*Lepidochelys olivacea*) and leatherbacks (*Dermochelys coriacea*) on mainland India and Andaman and Nicobar Islands. Odisha on the east coast is, particularly, famous for its mass nesting or arribada beaches, namely Gahirmata, Devi and Rushikulya rookeries. There are a number of olive ridley nestings and reports of green turtle (*Chelonia mydas*) sightings on the west coast, mostly in Gujarat and Maharashtra. Interestingly, most sea turtle based ecotourism initiatives are based on the western coast.

Maharashtra

Since 2006, Velas beach has hosted an olive ridley sea turtle hatchling release festival organized by a local NGO- Sahyadri Nisarg Mitra (SNM) in collaboration with the Maharashtra Forest Department (http://www.snmcpn.org/marine-turtles/turtle-festival). Tourists from cities and foreign countries visit the beach to view the release. The organizers arrange for local home stays due to the absence of hotels/lodges in the area. Olive ridley nesting ranges from 70-80 nests at Velas (http://www.snmcpn.org/), which are monitored and relocated to a hatchery by the villagers. Hatchlings after emergence are released into the sea by the volunteers in front of tourists.

The ecotourism project in Velas, Maharashtra was initiated using a 'bottom-up' approach where the local NGO, Sahyadri Nisarg Mitra, Chiplun (SNMC), started by convincing the local communities to participate in a sea turtle hatchling release festival, resulting in sea turtle conservation. This eventually went on to be endorsed by the Maharashtra Government.

For beach monitoring, the nests are collected by the villagers and relocated to a hatchery. The locals who monitor the beach and hatchery are paid by the Maharashtra Forest Department.

The tourism is taken care of by a trust called Sanyukt Van Samiti (SVS), comprising of the Forest Department, Gram Panchayat and home-stay owners, which handles the accounts and facilitates equal distribution of funds. All donations made to the hatchling festival or sea turtle conservation are given to SVS and deposited in an account for future festival expenditure. The trust is in charge of hatchery management and persons involved in beach monitoring. They declare the hatchling festival dates and decide and manage the proceedings of the festival.

For tourist accommodation, 'home-stays' have been arranged in local homes where tourists are provided with mattresses and bedcovers, food (local dishes) and clean toilets. In order to introduce the locals to the concept of home-stays, SNMC conducted various workshops such as sea turtle awareness, hospitality and management sessions to equip them in dealing with tourists and tour operators. In a Gram Sabha, the Gram Panchayat of Velas decided to not allow any private investment in the form of resorts or hotels to come up in the region. This has helped in keeping the project purely community based.

The idea of 'home-stays', initiated in Velas, was pitched to the Maharashtra Tourism Development Corporation (MTDC) which is now in the process of legalizing this method of accommodation (www.maharashtratourism.gov.in) and promoting the same in other parts of Maharashtra. After successful application, the home-owner gets a certificate from the MTDC to allow home stays at their place.

During the main hatchling release festival, Sahyadri Nisarg Mitra members and locals help in regulating the crowd. However, the day-to-day management of the activities has been handed over entirely to the local community, thus making it a successful community based initiative.

Goa

Goa, despite being a tourist haven, does not have any such festival. Morjim, in north Goa, is reported to have had olive ridley nesting since the early 1990s. Ever since, efforts by the local community and the Forest Department have helped conserve the beach. The local community involved in conservation decided to start an ecotourism programme by involving local youth in protection of turtle eggs and attracting tourists by showing

them turtles and hatchlings.

Although the group faced various challenges such as lack of resources on the beach and payment of a hefty licence fee to the Tourism Department, the locals managed to continue their programme. The enthusiasm of the local community led to the erection of shacks on the beach for tourists to view turtles from and to relax. It also resulted in others organizing home-stays for tourists. However, it resulted in unchecked commercialization of the beach and more shacks started coming up which proved detrimental to nesting. It attracted unwanted attention from local politicians and bureaucrats who encouraged unprecedented development of the beach including street lights and an increased number of shacks.

There were other flaws such as retention of hatchlings in basins for tourists to see (this is harmful to hatchlings and their development). There was also a conflict of interest between groups of locals where one side supported economic gain and the other, conservation. The project slowly began to decline in the 2000s due to lack of support and conflict within the community. The tourism initiative died out but the local shack owners agreed to help the Forest Department in patrolling and protection of the beach. Currently, the forest department has been monitoring the nests and erects temporary fences around them to protect from predation. However, currently there is no on-going turtle based tourism (Kutty,2002; Shanker, pers comm.).

Karnataka

Not much is known about the tourism initiative in Karnataka. The nesting location is known as 'turtle bay' with couple of nearby resorts offering turtle nesting viewing in their packages as one of the 'must see' experiences. Apart from some volunteer work done by an NGO for a few years, there is little information on this location.

In 2001, Kutty (2002) from a Pune-based NGO, Kalpavriksh studied community based conservation at Morjim in Goa, Kolavipaalam in Kerala and Rushikulya rookery in Odisha. An extensive study was conducted at the three locations where the ecological, socio-economic, historical and administrative profiles were analysed along with the reasons for failure of the initiatives. Although ecotourism was pitched as a possible solution to ensure longevity and success for community based conservation, reasons such as non-involvement of key stakeholders and opposition from some villagers led to the non-initiation of such programs.

Conclusion

The Velas turtle festival has been going on for a decade and became a community run initiative 2-3 years ago. The right amount of participation by all the stakeholders is the most important reason for its success. Over the past decade, the organisers have safeguarded their interests and realised the importance of turtles in their livelihood. SNMC

has been trying to replicate this model in other parts of Maharashtra such as Mochemaad and Sindhudurg by making changes in it in accordance to the requirements and available resources at the site.

The system has been set in place for the Velas festival and there are plans to expand it by adding few other attractions such as mango or cashew festivals. Efforts are going on in other parts of Maharashtra such as conducting wildlife and temple tours in Harihareshwar, 'Kurma festival' similar to turtle festival in Velas but with a religious angle in Mochemaad. Compared to others, the Velas festival has been going steady in terms of continuity and popularity.

While Velas model has the potential to be replicated in other parts of India, it needs to be done with the right amount of participation and coordination between the stakeholders. Home-stays or other alternatives for accommodation can be implemented depending on the conditions at site. Velas festival also proved that for tourism to work in a region, having a large population of the species in focus is not integral. With an increase in similar such projects, the dual cause of conservation and economic benefits will be strengthened.

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APPENDIX II (a)
Sea turtle research biologist meet 25th September 2014

A small focussed group of individuals gathered at the Indian Institute of Science, Bangalore on the 25th of September 2014. It included Lalith Ekanayake (Bio Conservation Society (BCS), Kandy – Sri Lanka), Suresh Kumar (Wildlife Institute of India (WII), Dehradun), Nachiket Kelkar (ATREE, Bangalore) and Kartik Shanker, Sajan John, Nupur Kale and Adhith Swaminathan (IISc &Dakshin Foundation, Bangalore). This meet was aimed at having a focussed discussion session between currently active research biologists along the coasts of Indian Ocean to discuss potential future collaborative studies.

Each person presented an overview of their key research programs and interests in different coastal areas and this culminated in a discussion on potential areas of collaborative research. Some of the areas of common interest were as follows:

• Monitoring the key *arribada* nesting population in the Bay of Bengal. It was proposed that a common long term monitoring programme could be followed by the teams at the different nesting sites at Gahirmatha and Rushikulya. Restarting the flipper tagging programme at Odisha was discussed as well. The other parameters to regularly monitor included *arribada* census protocol, offshore distributions, beach profiles, nest temperatures, hatchery records, hatching success, etc.

• Lalith had mentioned rescues of several juvenile & sub-adult olive ridleys in the coastal waters of Sri Lanka (roughly around the areas where earlier satellite telemetry data had shown the nesting turtles from Orissa were moving to), this was also included as an interesting field of research which could be followed up in the future.

• Leatherback monitoring in the Andamans: The team was briefed about the monitoring programme that has been initiated by IISc at Little Andaman along with the results of the satellite telemetry programme. Lalith mentioned his earlier work on leatherback monitoring in Sri Lanka, which had been discontinued to lack of funds, and a joint proposal to raise funds for monitoring leatherbacks in the Indian Ocean was put forth.

• Green turtles of Lakshadweep: Nachiket Kelkar of ATREE presented the work conducted by the NCF team in monitoring the sea grass beds at certain islands of Lakshadweep and the impact of the possible boom in green turtle populations at these sites. This was an aspect of keen interest for all the teams.

• The potential for a low cost transmitter programme which could track the inter-island movement of the turtles was also a point of discussion. It was suggested that this programme could involve the partnership of the different institutions who are involved in

sea turtle research.

• The development of a national database on sea turtle records using the existing network of the Turtle Action Group (TAG), to develop a map of important turtle nesting beaches on the Indian coast.

• It was suggested that a formal partnership between organisations would be the best solution to maintain a continual relationship. This would help in preparing formal proposals to raise funds for larger programs, subsequently giving each institute the independence to carry out their respective research programs. This could also be used for easier acquisition of permits for future work.

APPENDIX II (b)
6th Turtle Action Group Workshop

The Turtle Action Group (TAG) meeting is organized annually with the aim of furthering sea turtle conservation through exchange of information, experience and ideas between individuals and community-based non-government organizations (NGOs) working on sea turtles and coastal conservation. This year, the meeting was held in Visakhapatnam on the 28th and 29th of March in collaboration with local partner Visakha Society for Protection and Care of Animals (VSPCA).

The objectives of the workshop were:
1. To bring together various people working towards sea turtle conservation and marine protection across the Indian coast for an exchange of ideas and to address common concerns
2. To review TAG as an entity, set up a fresh organizational framework, and make an agenda for the upcoming year
3. To seek collaborations between stakeholders, NGOs, government departments and researchers to further the cause of sea turtle conservation

The workshop ensued as follows:

Day 1: 28 March 2015, Saturday

Time	Session	Presenters	Region
08:30-09:30	*Breakfast & Registration*		
09:30-9:45	An introduction by everyone		
9:45-9:50	Welcome by Kartik Shanker		
9:50-10:30	Monitoring programmes of Dakshin Foundation and IISc along the Indian coast	Muralidharan M, Chetan Rao, Adhith S	Dakshin Foundation
10:30-10:40	Addresses by Mr. Ram Mohan Rao, DFO, Visakhapatnam & Mr. A Bharatkumar, CCF, Vizag Circle		
10:40-11:00	"CS Kar, turtle man of Odisha" - a tribute by Dr Sudhakar Kar		
11:00-11:10	*Tea break*		
11:10-11:35	Prakruti Nature Club	Dinesh Goswami & Jignesh Gohil	Gujarat
11:35-11:45	*Discussion on ideal hatcheries*		
12:45-12:35	TREE Foundation	Supraja Dharini	Tamil Nadu
12:35-12:50	Visakha Society for Protection and Care of Animals	Pradeep Kumar Nath	Andhra Pradesh
12:50-13:05	Field Services and Intercultural Learning	Nico & Anna	Karnataka

13:10-14:20	*Lunch*		
14:30-15:10	Ecotourism Workshop	Anirudh Chaoji	Pugmarks Eco-Tours
15:10-16:00	Discussion on ecotourism		
16:00-16:30	*Tea*		
16:30-17:30	*Discussion*		
17:30-18:30	*Travel Reimbursement*		
20:00	*Dinner*		

Day 2: 29 March 2015, Sunday

Time	**Presentation**	**Presenter**	**Region**
08:00-09:00	*Breakfast*		
09:10-09:40	Sahyadri Nisarg Mitra	Vaibhav Rajdeep	Maharashtra
09:40-9:50	*Discussion on community involvement*		
9:50-10:05	Action for Protection of Wild Animals	Bijaya Kabi	Odisha
10:05-10:30	Students' Sea Turtle Conservation Network	Vinod Kumar	Tamil Nadu
10:30-11:05	Project Swarajya	Ashis Senapati	Odisha
11:05-11:25	*Discussion on habitat protection*		
11:25-11:45	Naithal	Sudheer Kumar PV	Kerala
11:45-12:00	Rushikulya Sea Turtle Protection Committee	Rabindranath Sahu	Odisha
12:00-12:20	Green Life Rural Association	Sovakar Behera	Odisha
12:20-12:30	Green Habitat	NJ James	Kerala
12:30-12:45	Manthini Ujwala Welfare Society	Ramesh Naidu	Andhra Pradesh
13:00-14:30	*Lunch*		
14:40-14:55	Orissa Marine Resources Conservation Consortium	Mangaraj Panda	Odisha
15:00-17:00	Plan of action		
17:00-18:00	*Tea*		
20:00	*Dinner*		

Day 1: 28 March 2015, Saturday

The meeting began with representatives from various member organizations introducing themselves. Kartik Shanker then welcomed everyone to the TAG meeting. A brief presentation was made on the major sea turtle monitoring programmes undertaken along the Indian coast. Muralidharan M of Dakshin Foundation presented an update on olive ridley monitoring in Odisha by Dakshin and Centre for Ecological Sciences (CES), IISc. The presentation also included an introduction to a project on mapping sea turtle nesting sites along the Indian coastline supported by with the National Centre for Sustainable Coastal Management (NCSCM). The importance of community involvement in these initiatives was emphasized. Chetan Rao made a presentation on the offshore monitoring of turtle congregations in Odisha. The data collected is indicative of the importance of river mouths and their proximal beaches for sea turtle nesting. Adhith Swaminathan presented a report on the leatherback monitoring programme in the Andamans. The remarkable factor here is the high hatchling success rate due to low predation and natural mortality threats. This project also aims to determine the effect of the tsunami on sea turtle nesting.

At this juncture, Mr. Ram Mohan Rao, DFO, Visakhapatnam & Mr. A Bharatkumar, CCF, Vizag Circle, arrived and were welcomed to the meeting. They addressed the audience, encouraging NGOs to continue their good work. They also extended their support and called for collaborations to further the cause of sea turtle conservation. Sudhakar Kar of the Odisha Forest Department was a special guest. He paid a tribute to his colleague and eminent sea turtle biologist, the late Chandra Shekhar Kar, who passed away in 2014. CS Kar was a pioneer of sea turtle conservation in Odisha and India. A minute of silence was observed in his memory. Sudhakar Kar then made a presentation on the Odisha Forest Department's conservation initiatives and efforts this year. These included an action plan, several onshore and offshore camps for monitoring, provision of funding, hatcheries and vessels, deployment of the Coast Guard, Marine Police and Revenue Department to patrol the seas and dimming of industrial lighting during nesting and hatching periods.

The NGOs showcased their past and ongoing efforts in sea turtle conservations and also their future plans. Dinesh Goswami and Jignesh Gohil of Prakruti Nature Club, Kodinar (Gujarat) said they had come a long way from their simple beginnings. They collaborated with the World Wildlife Fund in 2013, and are now looking at training their staff in satellite tagging, data logger management and tissue collection. They also intend to take up a survey on abandoned nets on nesting beaches. A small spontaneous discussion on ideal hatchery practices followed. Supraja Dharini of TREE Foundation, Chennai (Tamil Nadu) screened a documentary showcasing their work on involving the trawl fishermen community in sea turtle conservation. They have conducted workshops and demonstrations for these communities, explaining the importance of turtle excluder de-

vices (TEDs). Pradeep Kumar Nath of Visakha Society for Protection and Care of Animals (VSPCA), which hosted this meeting, reiterated the role of hatcheries in creating public awareness. He discussed the positive impact of cyclone Hudhud and added that citizens must take responsibility to protect nesting habitats. Nico Nettelman and Anna Hiller from Field Services and Intercultural Learning (FSL Karnataka) presented their local network-based model for monitoring sea turtle nesting and awareness-centric socio-biological approach to conservation.

In the afternoon session, a presentation on eco-tourism was made by Mr. Anirudh Chaoji, director of Pune-based Pugmarks Eco-tours. The session explored the economics of eco-tourism and its beneficiaries. It suggested an evolved, multi-faceted form of responsible tourism that generates employment for the youth and revenue for the stakeholders. Additionally, it also provides education, training and reverse migration opportunities for locals.
A discussion followed, about the role of eco-tourism in conservation and setting up of effective models, the sustainability of such tourism, examples of successful models and problems and hindrances. Various recommendations were made, such as:

- Setting up of interpretation zones to facilitate awareness
- Promotion of lesser known places through the media
- Diverting tourists to multiple sites and activities
- Even distribution of the generated income
- Marketing the eco-tourism experience
- Engaging government agencies

The conclusion was that eco-tourism is a means of providing a better livelihood to stakeholders and paying for conservation.

Day 2 :29 March 2015, Sunday

The second day began with more presentations by member NGOs. Vaibhav Rajdeep of Sahyadri Nisarg Mitra (SNM) Chiplun (Maharashtra) asserted that the core of their Velas project was the principle of strengthening the community to conserve their environment. They have been monitoring nesting and hatching and have the most successful turtle festival and community-based eco-tourism model in India. They are also working on micro-financing sustainable alternative livelihoods for locals. Their future plans include increasing the participation of the government, setting up a turtle rescue centre and biodiversity management committees. A small spontaneous discussion on community followed, involving management of tourist crowds, inspiring awe for sea turtles and alternative livelihoods. Bijaya Kabi of Action for Protection of Wild Animals (APOWA) Odisha presented their work that stresses on community participation, adaptive management and mediating conflict. Vinod from Students' Sea Turtle Conservation Network (SSTCN), Chennai (Tamil Nadu) presented an update on the pioneer-

ing minimally funded organization that has produced many passionate conservationists while working in an urban environment.

Ashis Senapati from Project Swarajya, Cuttack (Odisha) exposed the many threats and challenges faced by sea turtle habitats and also their local inhabitants. Unplanned development by the government, indiscriminate land acquisition by corporations, poor implementation of compensation schemes and conflicts with locals resulting in poverty and violence were points of contention. Another spontaneous discussion followed, stressing on the importance of community participation, habitat protection and activism as conservationists. Sudheer Kumar PV of Naithal (Kerala) spoke of the educational programmes they undertake with students and suggested that matters regarding ports and coastal power plants be taken up with the government. Sovakar Behera of Green Life Rural Association (GLRA), Devi (Odisha) spoke of the proposed port coming up in their area (Astaranga) and how this is bound to destroy important nesting beaches as well as displace several locals without their consent or an environmental impact assessment. Everyone pledged their support in seeking a review of this decision by the government. NJ James of Green Habitat, Kasargod (Kerala) displayed their awareness programmes for schoolchildren and women. Ramesh Naidu of Manthini Ujwala Society, Vijaywada (Andhra) also displayed their work in nest monitoring and other social initiatives. Mangaraj Panda of Odisha Marine Resources Conservation Consortium (OMRCC), Ganjam (Odisha) showcased their projects in partnership with government and non-government agencies, alternative livelihood initiatives and media advocacy.

The meeting culminated in the Action Plan for 2015. There was a consensus on forming a core committee of state representatives to initiate collective action of TAG as a body representing sea turtle conservation across India. An ad-hoc committee of present state representatives was formed in order to coordinate the formation of a core committee within a month.

Advocacy initiatives were suggested in the form of letters to authorities with regard to the hazards of sea walls and port development to the coastal ecosystem. The role of TAG in making a collective impact on sea turtle conservation and marine protection in India was reiterated. Muralidharan M and Kartik Shanker closed the meeting with a vote of thanks to the host organization VSPCA and all the members.

17 member organizations of TAG attended this meeting, listed below:

1. Action for Protection of Wild Animals
2. Alacrity
3. Field Services and Intercultural Learning
4. Green Habitat
5. Green Life Rural Association

6. Manthini Ujwala Welfare Society
7. Naithal
8. Orissa Marine Resources Conservation Consortium
9. Podampeta Ecotourism and Olive Ridley Protection Club
10. Prakruti Nature Club
11. Project Swarajya
12. Rushikulya Sea Turtle Protection Committee
13. Sahyadri Nisarg Mitra
14. Sea Turtle Action Programme
15. Students' Sea Turtle Conservation Network
16. TREE Foundation
17. Visakha Society for Protection and Care of Animals

APPENDIX III (A)

Member Organisations of TAG

State	Name of Organisation
Andaman & Nicobar Islands	Andaman and Nicobar Environment Team (ANET)
Andhra Pradesh	Visakha Society for the Protection and Care of Animals (VSPCA)
Andhra Pradesh	Manthini Ujwala Welfare Society
Gujarat	Prakruti Nature Club (PNC)
Gujarat	Green Future Foundation
Karnataka	Field Services and Intercultural Learning (FSL)
Karnataka	Canara Green Academy (CGA)
Kerala	Green Habitat
Kerala	Naithal
Lakshadweep	Lakshadweep Marine Research and Conservation Centre (LMRCC)
Maharastra	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	Podampeta Ecotourism and Olive Ridley Protection Club (PEORPC)
Odisha	Project Swarajya
Odisha	Rushikulya Sea Turtle Protection Committee (RSTPC)

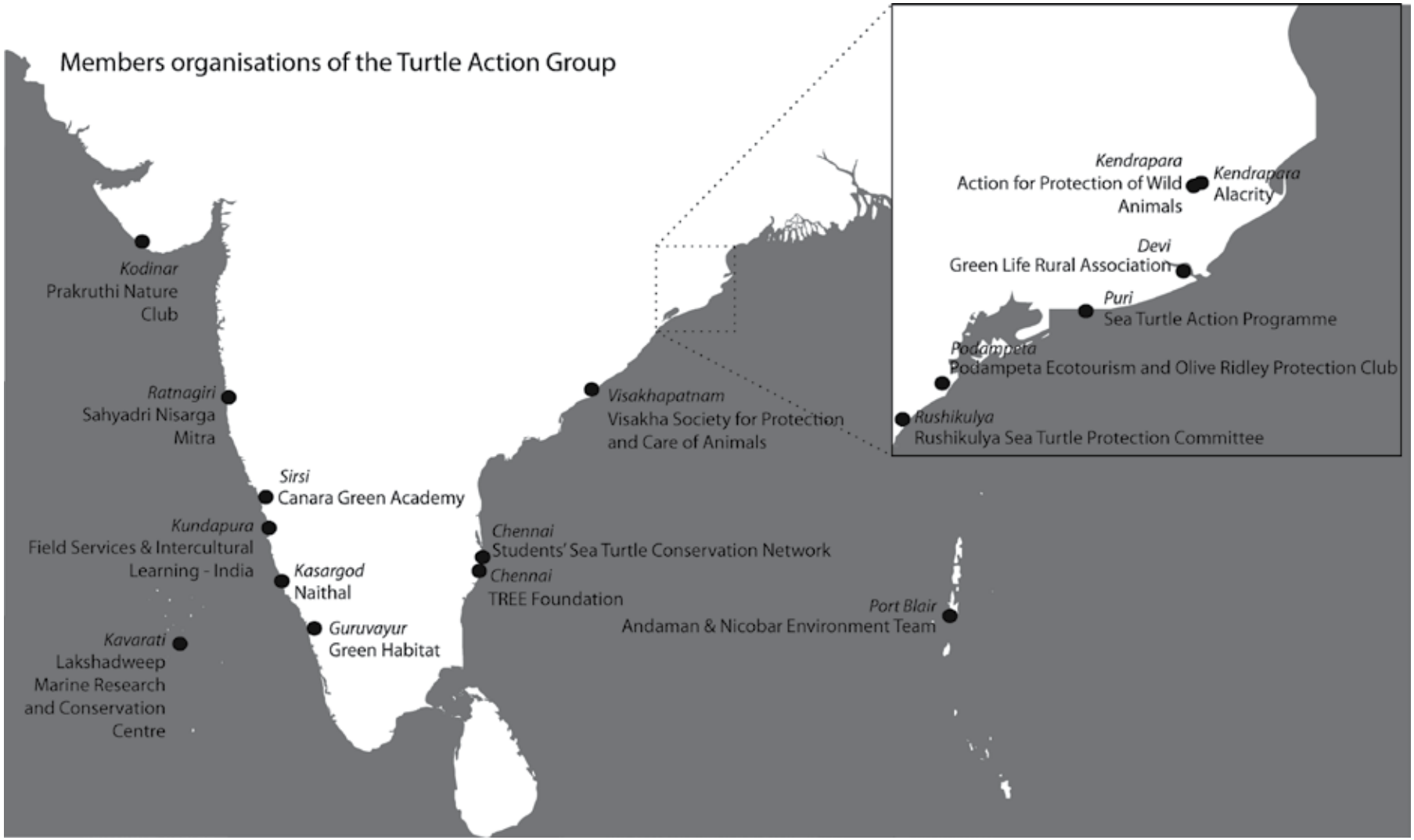
Odisha	Sea Turtle Action Program (STAP)
Tamil Nadu	Students' Sea Turtle Conservation Network (SST-CN)
Tamil Nadu	TREE Foundation

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

Odisha - Mangaraj Panda
Andhra Pradesh - Pradeep Kumar Nath
Tamil Nadu - Harish
Kerala - Mr. Sudheer Kumar P.V.
Karnataka - Jeevan
Maharashtra - Bhau Katdare
Gujarat - Dineshgiri Goswami
Islands -Adhith Swaminathan


Members organisations of the Turtle Action Group
Kodinar
Prakruthi Nature Club
Ratnagiri
Sahyadri Nisarga Mitra
Sirsi
Canara Green Academy
Kundapura
Field Services & Intercultural Learning - India
Kasargod
Naithal
Guruvayur
Green Habitat
Kavarati
Lakshadweep Marine Research and Conservation Centre
Visakhapatnam
Visakha Society for Protection and Care of Animals
Chennai
Students' Sea Turtle Conservation Network
Chennai
TREE Foundation
Port Blair
Andaman & Nicobar Environment Team
Kendrapara
Action for Protection of Wild Animals
Kendrapara
Alacrity
Devi
Green Life Rural Association
Puri
Sea Turtle Action Programme
Podampeta
Podampeta Ecotourism and Olive Ridley Protection Club
Rushikulya
Rushikulya Sea Turtle Protection Committee

APPENDIX III (c)
TAG Members' Profiles

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 prime nesting sites for sea turtles of all four species that occur in India, namely Green, Hawksbill, Olive Ridley 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 works along the Saurashtra and Gujarat coast. Their main focus is on protection of sea turtles, their nests and habitats, whale sharks and other sea 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 the region's biodiversity, focusing on conservation of marine turtles, white-rumped vultures and Indian swiftlets.

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 others, 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 congregations, 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 program in South India. Education and creating awareness at the community level is an integral part of their conservation program.

14. Green Mercy: *Andhra Pradesh*
An NGO based in Srikakulam. They carried out intensive surveys, giving a better picture of marine turtle 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 an 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 and fisherfolk to meet and interact, which would be beneficial to both conservation as well as livelihoods. They continue to work on 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. Their areas of focus include the mangroves of Chettuwai, nesting turtles of Chavakkad beach, birds of Enamakkal Kole Ilands and house sparrows among others. A major part of their 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.

20. Project Swarajya: *Odisha*
Project Swarajya works primarily with human rights in the tribal communities of Odisha. However, they have been active in sea turtle conservation for many years and have organised workshops to promote TEDs among trawlers. They also work on horseshoe crabs and mangrove ecosystems in Odisha.

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 2014-2015

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. To date, five rounds of small grants have been disbursed. The Small Grants programme provides financial support to local NGOs actively involved in sea turtle conservation, demonstrating consistency and commitment in their projects. This year, a total of INR 1,30,000 has been disbursed to four organizations as follows:

State	**Organization**	**Amount (INR)**	**Project title**
Odisha	Green Life Rural Association	20,000	Community Based Sea Turtle Conservation along Devi Coast, Odisha
Andhra Pradesh	Manthini Ujwala Welfare Society	20,000	Awareness training for Conservation of Sea Turtles and its importance
Tamil Nadu	Students Sea Turtle Conservation Network	30,000	Sea Turtle conservation in Chennai coast and Awareness Creation in coastal Tamil Nadu
Maharashtra	Sahyadri Nisarg Mitra	30,000	Turtle Conservation Outreach Material for turtle festival at Harihareshwar

*1 USD ~ 60 INR

Increased capacities of independent groups ensure greater benefits to the network as a collective. 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. With the support of Dakshin Foundation, TAG is now coordinated by a dedicated team of members from both organisations who provide administrative support to the network.

APPENDIX V
ProjectBudget andAudit Report 2014-15

Item	**Budget**	**Expenditure**
Salaries	15600.00	15631.01
Travel	11500.00	11513.26
Activities of Partners	2200.00	2192.86
Production of Outreach material	3500.00	3464.23
Training and workshops	3600.00	3609.52
Equipment	2600.00	2576.05
Consumables	0.00	0.00
Communication	1500.00	1493.51
Field station rent and maintenance	1500.00	1499.81
Institutional overheads (@15%)	4500.00	4512.27
Total	**46500.00**	**46492.53**

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 2015** 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 31.03.2015 and

(2) In the case of the INCOME AND EXPENDITURE account, of the Excess of Expenditure over Income of its accounting year ending on 31.03.2015

The prescribed particulars are annexed hereto.

For C V RAMASWAMY & CO.,
Chartered Accountants,

Partner

Place: CHENNAI
Date: 25.09.2015

C.V.R. & CO. CHENNAI Chartered Accountants

MADRAS CROCODILE BANK TRUST

VADANEMMELI VILLAGE, MAHABALIPURAM

CONSOLIDATED INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31/03/2015

PREV YR.	EXPENSES	AMOUNT(Rs.p)	AMOUNT(Rs.p)	PREV YR.	INCOME	AMOUNT(Rs.p)	AMOUNT(Rs.p)
	FEED AND REPTILE RELATED EXPENSES						
				13,024,595	Gate Contributions		13,126,145
3,108,987	Feed Expensea - Reptile	3,151,881					
1,421,977	Maintenance of Sheds	920,834			**CONTRIBUTIONS RECEIVED FOR :**		
1,193,144	Pit Maintenance	1,643,672		10,000	Adopt an Animal	8,000	
66,810	Certification Fees	114,279		175,333	CEPF Lantana Project		
153,677	Lab / Veterinary Expenses	78,930		20,920	Crocodile Transportation		
140,028	Water Supply	22,409		542,360	Education		
	Frontage	198,069		36,475	Fish Project	47,904	
					Contribution for LSSF Project	351,487	
18,449	Crocodile Transportation	78,738	6,208,812	2,812,271	Contribution for MTCA	2,805,611	
				2,967,803	Contribution for SCCS	659,364	
	ADMINISTRATION EXPENSES			3,506,425	Gharial Task Force	1,595,217	
4,802,010	Travel and Conveyance	6,209,034		-	Contribution-USFWS lantana Project	2,114,241	
3,232,113	Food and Lodging Exp	4,332,735		-	Contribution-Rufford Lakshadweep Project	459,478	
929,494	Croc Shop Expenens	919,840		624,850	ARRS Donations	1,200,000	
1,469,893	Stationery and Printing	1,151,280		206,590	Journal Contributions	110,437	
762,616	Electricity Charges	916,253		2,863,090	Madras Turtle Project	8,295,292	
560,715	Fax/email	503,570		40,660	Contribution -N.Leithli Assurance Proj	40,550	
149,418	Outstation Travel & Conveyance	43,672		1,438,294	Contribution for Venom Project		
224,599	Hospitality Expenses	69,085		511,655	Contribution-Contested cultural Knowledge		
382,545	Vehicle Maintenance	457,331		214,036	Contribution for IOTN Project		
309,271	Telephone Expenses	295,311		789,474	Contribution for whitely Nature Fund		
213,013	Vechicle Hire Charges	256,554		271,000	Central Zoo Authority(Compound wall)		
136,003	Computer Maintenance	168,884		2,211,438	ANET Donations	23,000	
68,299	Postage	71,194		661,177	ANET Research	681,684	
78,342	Publicity and Advertisement	130,978			ANET-Seacology project	858,417.00	
38,740	Library / Books / Journals	37,995		1,000,475	ANET Contributions	3,568,105	
23,550	Rates,Fees and Taxes	13,200			Contribution-Art lab Project	309,521	
40,137	Audit Fees	44,150		1,498,436	Other Contributions	1,000,438	
64,774	Boat Maintenance	82,110			Contribution Adventure Travel Programme	947557.00	
27,911	Pooja Expenses	30,604			Contribution- Dst Workshop	1,900,000	
2,400	Office General Expenses	7,890			Contribution-Padi Project	299,627	
2,000	Office Equipment (Project)				Contribution-Renewing Livelihood resources	859,231	28,135,161
7,407	Bank Charges	9,114					
46,959	ANET Marchandize Purchase	8,250					
	Equipment and Maintenance	84,456	15,843,490		**BANK INTEREST**		
				37,568	SB Interest received	128,388	
	Other research related expenses			1,102,708	FD Interest	882,663	1,011,051
918,912	Education	1,161,491					
421,826	Field Expenses	768,235			**OTHER RECEIPTS:**		
	Field materials	397,050		105,015	ANET Marchandize Sales	94,295	
527,471	ANET Research Expenses	495,631		908,097	Accomodation and other charges	807,358	
168,337	Research Expenses	695,872		194,835	ARRS Accomodation Charges	859,101	
250,840	Field Station Rent	241,000		1,582,936	ANET Accomodation Charges	1,754,503	
	ANET Diving Expenses	845,071		44,563	Vehicle Hire Charges	64,035	3,579,292
	Pond Construction (Assam Zoo)	219,347					
	Temple Turtle Survey(Assam)	204,974	5,028,671	1,361,470	The Croc Shop Sales	1,222,895	
				29,150	ARRS Marchandize Sales		1,222,895
1,962,667	Carried Forward		27,080,972	40,793,699	Carried Forward		47,074,543

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

Cover photo: Olive ridley hatchling emerging from a nest at
Rushikulya, Odisha
Photo Credit: Chetan Rao


MCBT


WILDLIFE
WITHOUT
BORDERS


dakshin


TAG
Turtle Action Group - INDIA