



**Project Report**

**Advancing the conservation of sea turtles in India at  
a national scale through the monitoring of index sites  
and coordination of coastal management efforts with  
a network of partners**

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# 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 are of 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 reefs, 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 economic role in 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 their 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 formed to work towards sea turtle conservation and coastal ecosystem protection in India.

From 2008 onwards, 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 responsible for the execution of project activities and formulation of action plans for the project. In 2017, the grant was allocated and administered solely by Dakshin Foundation.

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](http://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 Indian coast. 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.

The following are summaries of the activities conducted over the years.

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

**2015-2016:** Advancing the conservation of sea turtles in India at a national scale through the monitoring of index sites and coordination of coastal management efforts with a network of partners: This year's grant of \$52,500 was utilised to continue sea turtle monitoring at Odisha and the Andaman Islands, and to initiate monitoring sea grass meadows in the Lakshadweep islands. It also contributed to the organisation of capacity building workshops, disbursal of small grants, and generation of outreach material.

**2016-2017:** Advancing the conservation of sea turtles in India at a national scale through the monitoring of index sites and coordination of coastal management efforts with a network of partners: This year's grant of \$52,580 was utilised to continue sea turtle monitoring at Odisha and the Andaman Islands. It continued the organisation of capacity building workshops, disbursal of small grants, and generation of outreach material.

**2017-18:** Advancing the conservation of sea turtles in India at a national scale through the monitoring of index sites and coordination of coastal management efforts with a network of partners: This year's grant of \$75,020 was utilised to continue sea turtle monitoring at Odisha, Lakshadweep and the Andaman Islands. It continued the organisation of capacity building workshops, disbursal of small grants, and generation of outreach material including a children's book by Kartik Shanker.

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 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 2017-18 were:**

1. To continue and strengthen the long-term monitoring programme of olive ridley turtles in Odisha, olive ridley and leatherback turtles in the Andaman and Nicobar Islands and to continue the monitoring programme for green turtles and their foraging ecology in the Lakshadweep Islands
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 upload and synthesise relevant data contributed by member organisations on the existing online data portal.
5. To develop appropriately designed educational and outreach material that can broaden the reach of the network to specific target groups including other stakeholder groups, educational institutions, governmental departments and the general public.
6. To conduct training programmes for capacity building in order to enable individual member organisations of TAG to become financially and programmatically independent.
7. To encourage and support independent, location specific conservation activities of member organisations through the provision of small grants.
8. To develop and support the establishment of coastal learning centres of the Forest Department in different states.
9. To strengthen a larger regional network in the Northern Indian Ocean region of the IOSEA through a regional level workshop, and hold consultations in addition to inter-regional exposure and exchange programmes for members of the network.

# 3.

## Project Activities and Outcomes

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

### 1. Monitoring programme for olive ridleys in Odisha

Odisha, with a 480 km long sandy coastline, is a suitable nesting habitat for olive ridley turtle nesting. Over the past decade, activities such as mechanised fishing have resulted in large scale turtle mortality 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 for 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 MCBT at Rushikulya rookery, a major olive ridley mass nesting site. The project is coordinated by the Indian Institute of Science, Dakshin Foundation and the Odisha Forest Department and funded by the USFWS Marine Turtle Conservation Act grant. For the past eight years, the project has worked in collaboration with the local Forest Department staff and NGOs involved in marine turtle conservation. As part of capacity building, the Forest Department staff, NGO employees, local and other researchers are trained in 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, 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 transect 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, while there were large *arribadas* in March 2015 and February 2017. Despite significant offshore

congregations, mass nesting did not occur at Rushikulya in 2016, but such fluctuations are not unusual. The year 2018 saw two arribadas in one season with a second wave of turtles coming onshore during the mass hatching event. A detailed report on this can be found in Appendix I.

In response to the training under this project, 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.

## **2. Monitoring of olive ridleys and 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 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, a satellite telemetry study was initiated at Little Andaman Island. A total of 10 turtles have been tagged with Platform Transmitter Terminals (PTTs) between 2010 and 2014 (tracks can be viewed at [www.seaturtle.org](http://www.seaturtle.org)). A detailed report is provided in Appendix II.

## **3. Monitoring green turtles and their foraging habitats in the Lakshadweep Islands**

The Lakshadweep group of islands are a significant foraging area for green turtles in the Western Indian Ocean. While the green turtle populations have been relatively healthy, there has been an increase in conflict with fishing communities, as the latter hold these turtles responsible for destroying sea grass meadows resulting in a decline in

fish catch. This threatens to impact not only long-term conservation of these species but also of their habitats. It is necessary to understand the ecological processes underlying the conflict, and to develop mitigatory measures.

Green turtle feeding populations are found in the lagoons of many islands, including Kavaratti, Kalpeni, Kadmat, Minicoy and Agatti. Large numbers of these turtles have been observed to show inter-island movement to forage and such high densities of turtles overgraze sea grass meadows in these lagoons. Fishermen believe that this reduces fish catch. In continuation of studies by Nature Conservation Foundation (NCF), Mysore, Dakshin Foundation and IISc have initiated a collaborative project to monitor green turtles and their movements on the islands. As part of this project, we propose to continue monitoring these populations in collaboration with local conservation groups. We plan to support this project partially from MTCA funding and want to integrate this with the larger research and conservation programme of the IISc, NCF and Dakshin Foundation in the region. The details of this study is listed in Appendix III.

#### 4. Website and online data repository

The website, [www.seaturtlesofindia.org](http://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](http://www.seaturtlesofindia.org/tag)). Information on the network's activities, workshop reports,

##### *Sea turtles of India Website*



##### *Talking Turtles blog*



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 enthusiasts. From first encounters with turtles to unusual observations to expert insights, the blog welcomes stories about marine turtles in the Indian Ocean.

## **5. Building capacities of local community members and government officials**

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 occupy.

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.

The initial focus of TAG was towards empowering community- based organisations by improving their capacities in raising grants, networking, improving their communication skills and making them self-reliant, in order for them to effectively engage with other networks, stakeholder groups and government agencies.

## *Turtle Conservation Training workshops for Forest Department Field staff at Andaman and Odisha*

ANET and Dakshin Foundation jointly conducted two training workshops at Betapur and Kalara for the North and Middle Andaman Forest Department staff last week. The workshop in Kalara had staff from Ramnagar, Kalipur, and Lamia Bay. A field training workshop was conducted on hatchery management and sea turtle research along with Action for Protection of Wild Animals (APOWA) for the Forest Department staff of Puri and Kendrapara divisions at Konark in Odisha in the month of January. These workshops help build on and refresh the knowledge of the field staff who work on sea turtle projects in the region. The workshops included an introduction to sea turtles, the turtles' life cycle, different research components, and conservation strategies and needs.

*Dakshin Foundation staff conducting workshops with Forest Department personnel in Odisha (left) and Andamans (right)*

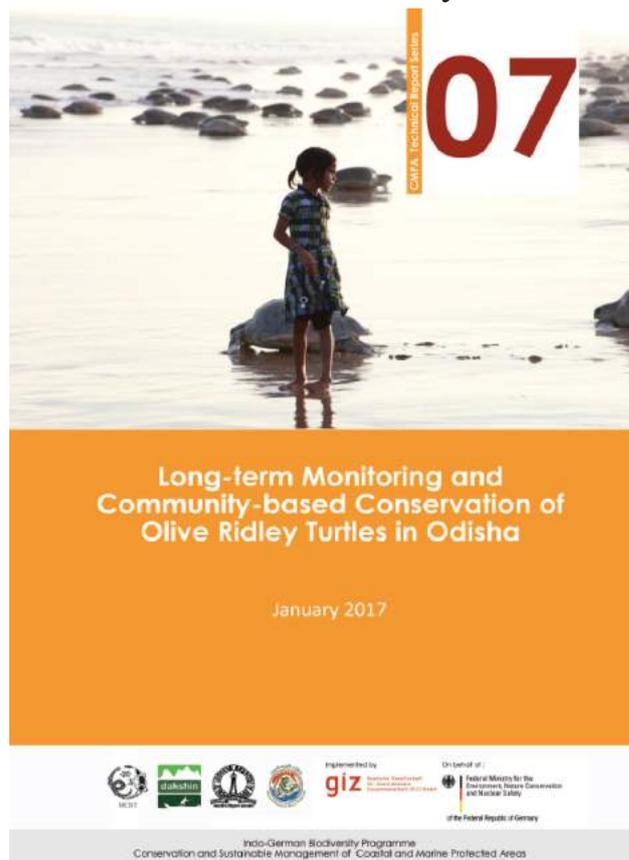


## **6. Understanding the potential for sea turtle based ecotourism in India and promoting its application at Rushikulya, Odisha**

Most traditional fishing communities are marginalised and poor and often do not have the luxury to practice 'conservation' as defined by modern (typically western) conservation biologists unless they can harvest some benefits from it. Involving the community in a meaningful way is thus important. This study, therefore, aimed to understand the reasons for the failure of past efforts at involving the community in conservation, the rationale behind the need for alternative livelihoods and, in particular, the potential of tourism focused on turtles as an alternative livelihood. A report titled *Long-term Monitoring and Community-based Conservation of Olive Ridley Turtles in Odisha* was published as an outcome of the study. The study found that most people in the community were in search of alternative sources of livelihood as a solution to many of their problems, which include access to basic amenities like clean drinking water, sanitation and medical facilities. People also believe that unsustainable fishing practices such as the large-scale fishing has led to a decline in their existing livelihoods.

Tourism can be a supplementary source of livelihood in these communities but not a primary source. Through the course of this study, it was found that local communities viewed conservation activity-related employment as a valuable source of livelihood. The study recommends that efforts should focus towards developing an effective tourism programme that benefits both turtles and communities through elaborate dialogue and discussion between stakeholders, while simultaneously addressing other developmental needs.

**Publication based on the study**



**7. Disbursing small grants to member organisations**

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)**
Prakruti Nature Club (Gujarat)	40000
Action for Protection of Wild Animals (Odisha)	40000

\* Appendix IV contains details of the projects

\*\* 1 USD ~ 63 INR

## 8. Developing educational material for sea turtle conservation

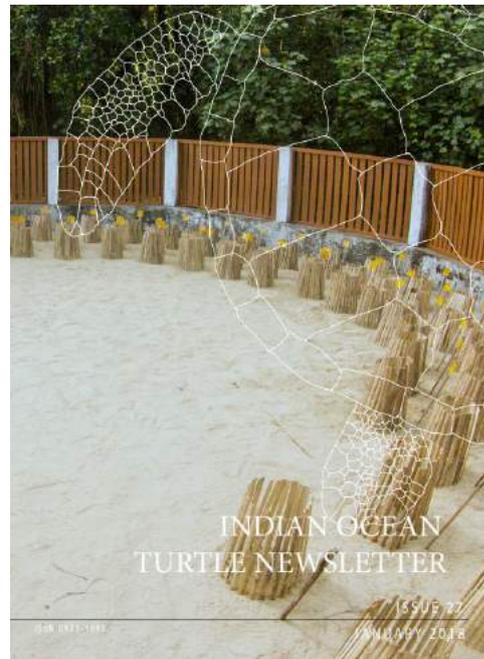
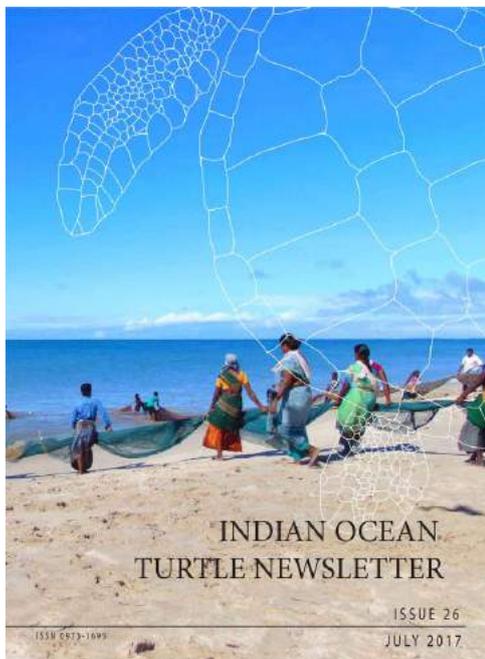
### *Indian Ocean Turtle Newsletter*

The Indian Ocean Turtle Newsletter (IOTN) is a biannual international newsletter dedicated to marine turtle conservation. This was initiated to provide a forum for exchange of information on sea turtle biology, conservation, management and education and awareness in the Indian subcontinent, Indian Ocean region, and south/southeast Asia. The newsletter covers related aspects such as coastal zone management, fisheries and marine biology.

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

### *The issues of IOTN published during the reporting period*



## 9. Design and development of learning centres in collaboration with the Forest Department

As part of the outreach and education initiative, an interactive life-size poster of the sea turtles of India was created. This poster was installed at Coastal and Marine Biodiversity Centre at Airoli, Navi Mumbai, Maharashtra in collaboration with the Maharashtra state forest department

*An interactive life size poster of sea turtles in the Biodiversity Centre at Airoli, Navi Mumbai, Maharashtra*



## 10. Organising a workshop involving members of the NIO-MTTF

The second meeting of the Northern Indian Ocean Marine Turtle Task Force (NIO-MTTF) established by the CMS IOSEA Marine Turtle MoU took place during 29-30 January, 2018 and was hosted by the Department of Wildlife Conservation, Sri Lanka in Colombo. Turtle experts and government officials from Bangladesh, India, Maldives, Pakistan and Sri Lanka participated in the meeting, supported by a number of other regional experts and representatives of NGOs. As an outcome of the meeting, a regional work plan was prepared. The task force suggested that the best practices from other countries should be adopted by NIO states. The meeting was chaired by Muralidharan M. of Dakshin Foundation and was supported by WWF-Pakistan and Dakshin Foundation.

*Participants at the IOSEA NIO-MTTF workshop*



# Future Plans for TAG (2018-19)

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 2018 – 2019 are:

## **a. To collectively address issues of common concern**

A variety of threats and issues on the coastline form the basis of conservation action undertaken by different groups. 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](http://seaturtlesofindia.org) website which will also be used as a portal to upload/download data and 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.

## **b. Capacity building and involvement and initiation of new community-based enterprises**

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 ecotourism as a means of generating revenue and opportunities for conservation has also been explored. 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 enable effective conservation efforts:

1. Promote collaborative monitoring of the arribada nesting sites at Odisha and the Andamans through continued engagement with fisher communities on alternate livelihood schemes and methods to reduce incidental bycatch.
2. Increase public engagement in monitoring of sea turtle nesting sites across island groups with a focus on the leatherback in the Andaman and Nicobar islands which have indicated signs of nesting recovery post the tsunami of 2004.
3. Introduce mechanisms of seagrass habitat protection and management in the Lakshadweep islands to ensure future availability of forage resources for the green turtles as well as help in reducing the perceived conflict with the local fishers.
4. Engage with regional networks in the Indian Ocean region as well as South Asia and assist in creating cheaper and more accessible facilities to conduct research in genetics as well as for training and outreach activities.
5. Increase interactions of TAG members with other similar regional and global organisations and networks to improve communication, and address conservation issues faced in other parts of the world.
6. 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.
7. Communicate with the central government through the Ministry of Environment, Forests and Climate Change (MoEFCC) regarding national issues to help the government in effective policy making that could serve as a solution to local conservation problems.
8. Conduct joint awareness programmes with other TAG members, especially within the state by sharing resources, ideas and staff.
9. Advertise network activities through media campaigns to attract other similar organisations and to highlight individual organisations' efforts to give them recognition.
10. Collaborate with local stakeholders including 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 for carrying out the research, outreach and administrative tasks under the project and lending their constant support as and when required.

We are also thankful to the Ministry of Environment, Forests and Climate Change (MoEFCC) 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

#### Monitoring olive ridley turtles in Odisha

Olive ridleys face various threats on the east coast of India. The direct threats to the ridleys are predation of sporadic nests by hyenas, jackals, feral dogs, kites and crows. With the introduction of mechanized fishing since 1990s, and incidental capture in shrimp trawls; several thousand olive ridleys die every year due to suffocation in the trawl nets. Odisha is known for its mass nesting beaches for olive ridley turtles, the only mass nesting rookeries outside Central America. It has a coastline of 480km that is largely sandy, thus making it suitable for nesting of turtles. Climate change driven sea level rise and several anthropogenic activities has made the coastline even more vulnerable. Considering the importance of these mass nesting rookeries, it is imperative to monitor the populations in the context of changing climate.

*Staff from Dakshin Foundation at Rushikulya during the arribada in Feb 2018*



### *Arribada monitoring*

Mass nesting events at the Rushikulya rookery were not monitored using standardised methodology before 2007. Since 2008, IISc 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 each arribada, a 20 m strip transect method is used to count the nesting females. **Table 1** provides estimates of mass nesting from 2007 to 2017. **Table 2** gives day-wise estimates of nesting turtles in 2018 at Rushikulya.

**Table 1.** Estimated numbers of nesting turtles at Rushikulya during arribada (2007- 2017)

<b>Year</b>	<b>Estimated Nesting Number</b>
2007	No arribada
2008	70985.9
2009	71645.1
2010	99887.3
2011	151828.5
2012	42931.1
2013	142550
2014	14849
2015	170939
2016	No arribada
2017	405783.9*

\*Expected overestimate due to shorter strip widths in comparison to previous years

**Table 2.** Estimated numbers of nesting turtles during arribada 2018 at Rushikulya

	<b>5m</b>	<b>10m</b>	<b>20m</b>
Day 1	39333.33	38848.48	29515.15
Day 2	45090.91	37090.91	29742.42
Day 3	62060.61	61545.45	50242.42
Day 4	33272.73	30000.00	23893.94
Day 5	23818.18	22121.21	17681.82
TOTAL	203575.76	189606.1	151075.8

### *Monitoring of hatchlings*

Data loggers were deployed to record air and sand temperatures in hatcheries built by the Orissa Forest Department to record hatchling sex ratios.

Due to the second arribada emergent and hatching success of wild nests could only be partially computed as many of the nests on the beach were destroyed by the second wave of incoming nesting turtles. This data is also in the process of analysis.

### *Monitoring offshore congregations of olive ridleys on the Odisha coast*

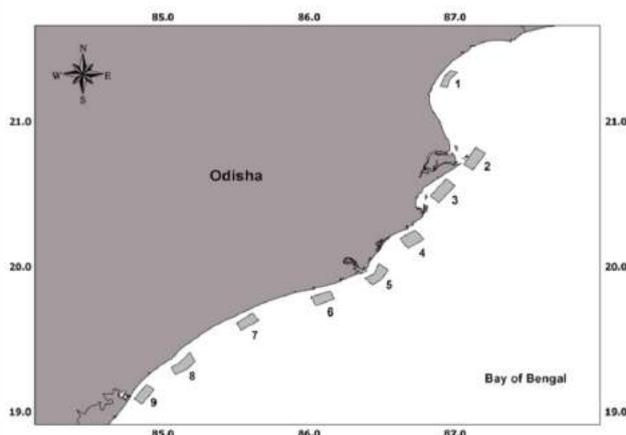
The team from IISc and Dakshin Foundation started offshore monitoring at Rushikulya in 2010. A line transect approach is used to measure the changing offshore abundances of turtles during the breeding season. Initially done only in Rushikulya, this was extended to cover the entire coastline of Odisha in January 2014. The other places included in the survey are Bahudha, 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 480 km coastline of Odisha was divided into transect blocks of 40 sq. kms every 48 km. All transects except Rushikulya are 2 km wide and 4 km long. In order to get a finer resolution of estimates, the transect effort in Rushikulya was intensified by surveying 1 km wide and 3 km long transects. The primary design of these transects will be within the confines of stratified random sampling within each sampling block. Along with observations of turtle numbers, abiotic factors (surface salinity and depth) were also sampled to get a better ecological perspective of these congregations. Due to logistical difficulties only three sites, viz., Chilika, Rushikulya and Bahuda, were surveyed for offshore monitoring this season and the data is yet to be analysed.

*Map showing transect design*



*Map showing different survey locations*



### *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 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 five 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 with us are: Orissa Marine Resources Conservation Consortium (OMRCC), Rushikulya Sea Turtle Protection Committee (RSTPC), Sea Turtle Action Program (STAP), Green Life Rural Association (GLRA), Action for Protection of Wild Animals (APOWA) and Alacrity.

*Local sea turtle monitoring staff at Rushikulya, Odisha*



## APPENDIX II

### Monitoring leatherback turtles in the Andaman & Nicobar Islands

The leatherback turtle is the only extant species of the family *Dermochelyidae*. Leatherback turtles are the largest of living sea turtles, growing up to 2 m 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 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 Islands, 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. Currently, very little is known about the status of leatherback populations from Indian waters, barring the work by the Andaman and Nicobar Environment Team (ANET) on Great Nicobar Island, and the collaborative efforts of the Andaman and Nicobar Islands Forest Department, Centre for Ecological Sciences (CES), Indian Institute of Science, Bangalore, Dakshin Foundation and ANET on Little Andaman Island (Figure 3).

Many prime nesting sites for leatherback turtles in the Andaman and Nicobar Islands were severely affected by the December 2004 earthquake and the subsequent tsunami. Not much was known about the impacts of this calamity on the populations of leatherbacks here. Further, there was no information on the turtles once they leave the coast of Andaman and Nicobar Islands, especially on their migratory patterns, feeding and foraging behaviour, breeding/mating aggregations and many other parts of their life cycle. Recently, new approaches using satellite telemetry and molecular genetics have been used to gain insights into some aspects of the leatherback's life cycle.

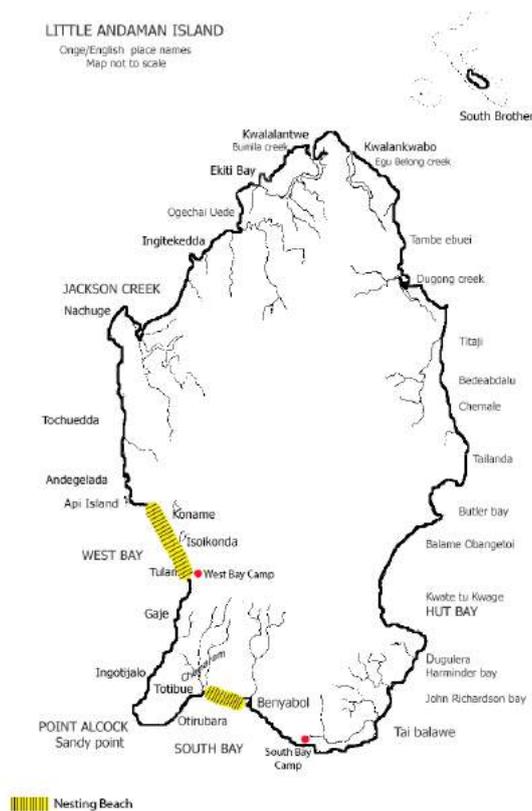
In December 2007, a rapid survey of the South Bay and West Bay beaches was carried out. It was found that some parts of the beach had recovered considerably and leatherback tracks and nests were observed. Subsequently, a project was initiated to monitor leatherback turtle nesting at South Bay in January 2008. 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.

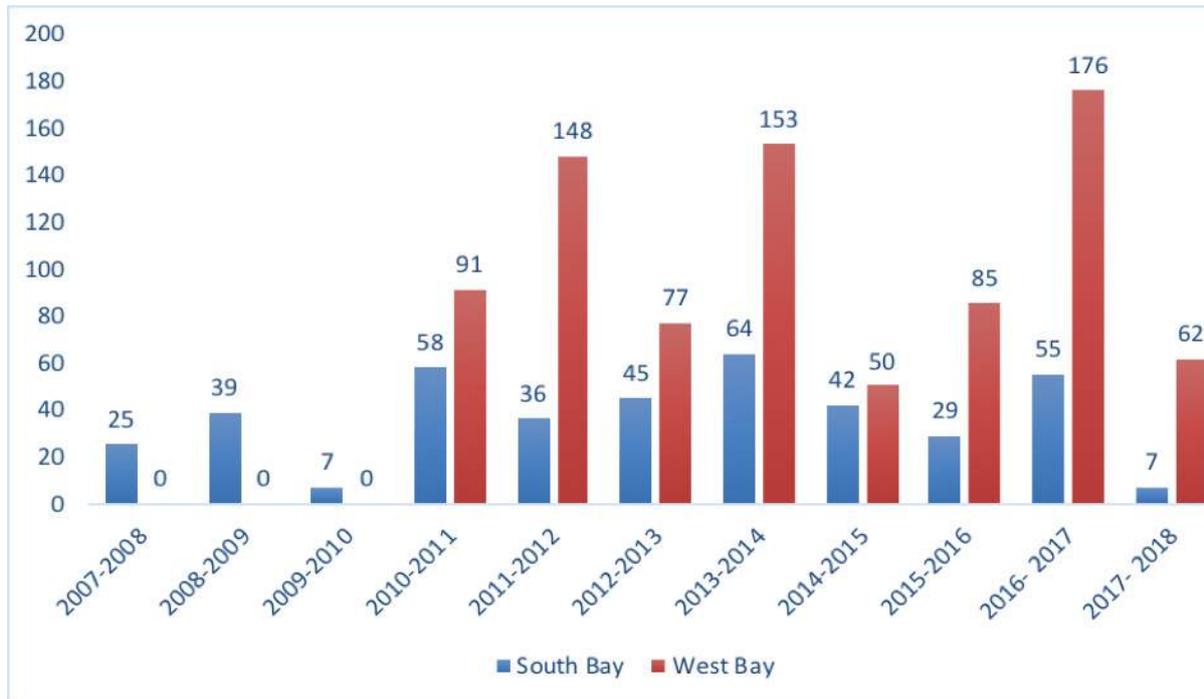
The objective of the surveys was to continue the long-term monitoring of leatherback nesting in South and West Bay, Little Andaman Island through a capture-recapture programme. Given the lack of knowledge of these populations, long-term spatio-temporal monitoring of leatherbacks using conventional tagging, satellite telemetry and genetic analysis was imperative to understand leatherback nesting patterns post-tsunami. Over the years, the objectives have evolved to continue the long-term monitoring of leatherback nesting in South and West Bay, Little Andaman Island. Intensive surveys have been carried out to monitor tag recaptures of nesting leatherback turtles through the seasons.

South Bay and West Bay nesting beaches have been monitored each season from 2008-18. However, surveys had to be restricted to daylight hours since 2010 as night surveys of the nesting beach were logistically constrained due to the presence of large river openings (Benyabol & Tothibue) and the presence of saltwater crocodiles. Since 2010, monitoring efforts have concentrated on West Bay and have been primarily through night surveys. No turtles were tagged with external or PIT tags from 2014 to 2018 due to lack of permits.

*Map of Little Andaman Island*



### Leatherback nesting patterns in South and West Bay



### Monitoring

The current monitoring programme at the beaches of South and West Bay, Little Andaman Island should be continued in order to understand trends in leatherback nesting at the site and the threats they face and changes in their nesting habitats. These beaches serve as index beaches for monitoring leatherback populations in the islands. Annual surveys records of the nesting sites at Great and Little Nicobar Islands are required to assess the status of these beaches and the abundance of leatherback nesting at these sites.

Survival percentage of nests needs to be determined by monitoring the entire season to gain insight into predation patterns, hatching success and emergence success of nests laid in these index beaches.

### Satellite telemetry

Since 2010, only 10 turtles have been tagged with satellite transmitters and only 5 of these turtles provided data for more than 100 days. Only three turtles have transmitted extensive data where we have been able to identify their foraging grounds.

While we have some insights into the post-nesting movement patterns of leatherbacks in the Indian Ocean, more satellite telemetry studies need to be carried out in subsequent years to assess if there are other migratory routes taken by the turtles nesting in Little Andaman. A better sample size will also help us assess their exposure to fishery related threats in the high seas. Supporting funds will be raised during the upcoming seasons.

### *Population Genetics*

Genetic studies are underway to assess the stock to which the Andaman and Nicobar leatherback turtles belong. Supporting funds will be raised for the same.

### *Capacity building and training*

The long-term conservation and management of leatherback turtles in the Andaman and Nicobar Islands depends on the involvement and support of local civil society and government. Since the leatherback turtle nesting beaches are currently in areas not accessible to the general public, the main focus of training needs to be forest department field staff. In addition, awareness programmes can inform the public about leatherback turtles and their value as a natural heritage of the islands.

The Forest Department officers and field staff at various sites have been supportive and dedicated to their sea turtle conservation efforts. In 2018, capacity building programmes such as training workshops were conducted for forest department personnel from North and Middle Andaman in Kalara and Betapur. The workshop in Kalara had staff from Ramnagar, Kalipur and Lamia Bay.

## APPENDIX III

### **Monitoring green turtles and their foraging habitats in the Lakshadweep Islands**

The lagoons of the Lakshadweep Islands are important foraging grounds for green turtles. These shallow lagoons house various seagrass species which form the diet of the green turtle. In the last decade, there has been an increase in green turtle numbers due to a hunting ban. This has led to overgrazing of seagrass meadows and drastically reduced seagrass abundance and biomass. These meadows also serve as breeding habitats for various fish species and a reduction in seagrass availability has been perceived to cause a decline in associated fish numbers. Consequently, fishers have developed some resentment towards turtles. Many fishers also endorse measures such as culling to manage the situation. This has led to direct and indirect conflict between fishers and turtles.

Despite being a source of this conflict, green turtles in the Northern Indian Ocean remain a poorly studied population. Past studies in the region have highlighted their role as ecosystem engineers, their part in the turtle-fisher conflict, and their dietary components. However, in order to manage this population and plan for seagrass recovery, information on their demography, distribution and foraging behaviour is important. Moreover, it is crucial to develop ways to reduce the turtle-fisher conflict, which if allowed to persist could be detrimental to the green turtle population.

The objectives of the study were to understand the demography and distribution of the green turtle populations found in the lagoons in Lakshadweep and to examine the constituents of their diet. It also aimed to investigate the extent of the conflict between fishers and turtles and ways to mitigate it. Additionally, experimental approaches and their effectiveness to increase densities of seagrass beds are being explored for the purposes of conservation of these habitats.

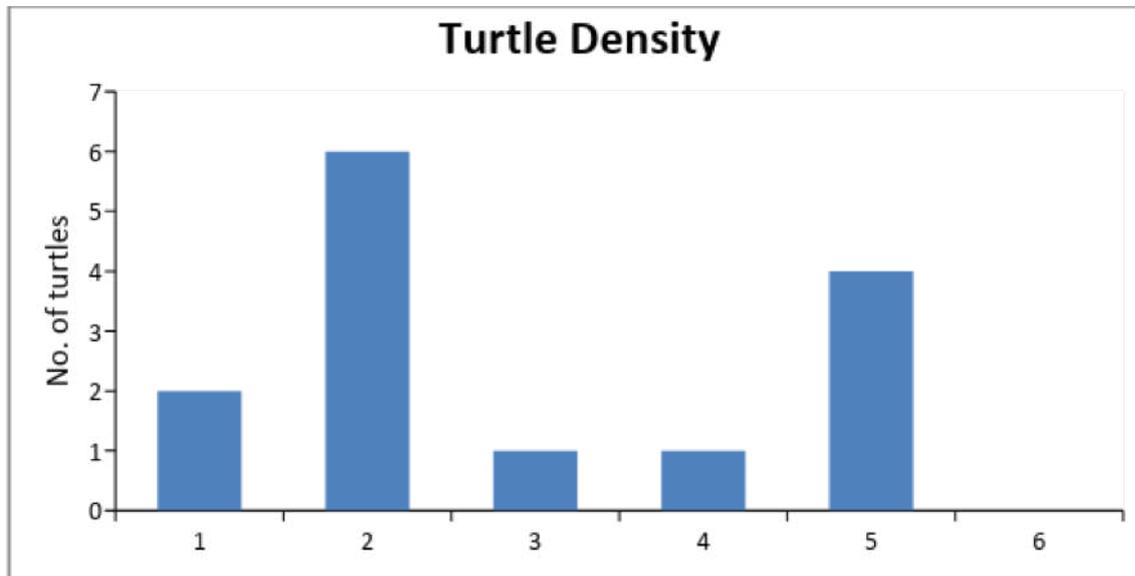
The islands of Agatti, Kadmat and Kalpeni were chosen because high densities of green turtles have been known to occur in these islands. Moreover, previous studies reported turtle-fisher conflict from Agatti while the fishers in Kadmat were indifferent. Kadmat and Kalpeni were chosen for their previously reported high turtle densities and Agatti as a site with low turtle densities at this time.

A total of 8 and 12 boat transects were conducted in Agatti and Kadmat (1km long). In both islands, the turtle encounters were low. Turtles were mainly observed in the northern part of the lagoons. The lagoon was divided into grids of 500x500m of which centres of 28 grids were randomly chosen using QGIS for the entire lagoon to survey for seagrass presence. The centres of these grids were surveyed for substrate in four directions: North, South, East and West by snorkelling.

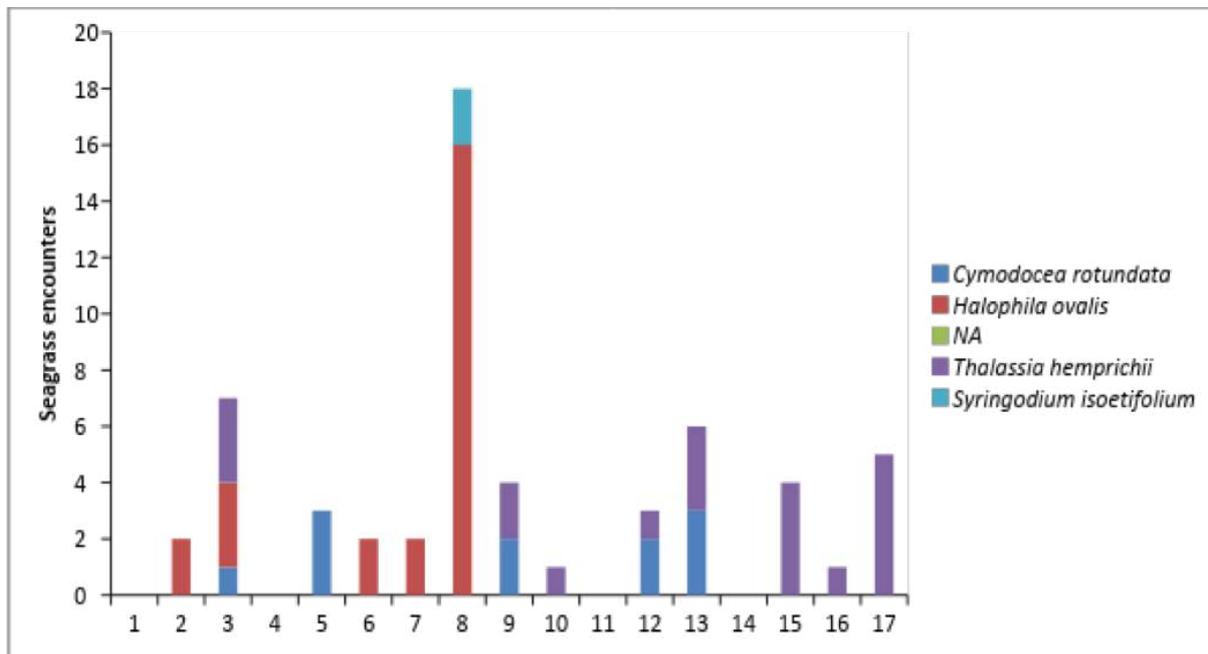
Seagrass surveys in Agatti showed presence of patches of *Thalassia*, *Cymodocea*, *Syringodium* and *Halophila* sp. whereas only *Cymodocea* and *Thalassia* were seen in Kadmat. Additionally, the eastern side of Agatti was observed to have *Cymodocea* growing in shallows near the beach where a few turtles were also observed during beach surveys.

Questionnaires were used to collect initial information from lagoon fishers. 10 fishers from each island were surveyed in Agatti and Kadmat. Snowball sampling was used to determine interviewees. Surveys with the lagoon fishers showed that there is currently very little to no resentment towards turtles in Agatti and Kadmat. Their only grievance was occasional capture of turtles in their nets which resulted in destruction of net or release of turtles by lifting the net. Some fishers mentioned that they check their fishing site for presence of turtles before casting nets. Older fishers recounted how turtle numbers were higher in the past but eventually decreased due to lack of seagrass in the lagoon. Some believe that green turtle numbers went up due to a ban on hunting and a change in boat type preference from wooden boats to fibre boats. Green turtles were previously caught to obtain fat for oil extraction, where the oil was used for caulking wooden boats. Some mentioned using turtle eggs and carapace to make medicine for piles and burns respectively.

No. of turtles observed in Agatti and Kadmat by boat transects



Seagrass surveyed in Agatti and Kadmat by snorkelling



*Scattered patches of Thalassia sp. in Kadmat*



*Observed fishing sites and turtle sighting points in Agatti*



*Observed fishing sites and turtle sighting points in Kadmat*

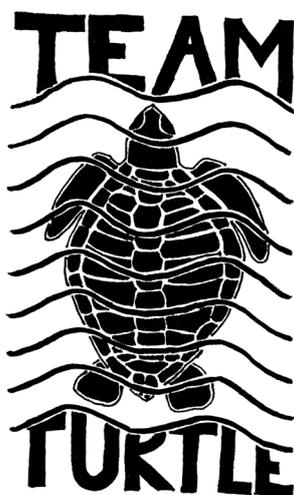


*Future plans*

Next season onwards, we will initiate a flipper tagging program which will be crucial in understanding their demography and distribution. Collection of skin tissue and carapace samples will provide details on genetic linkage with other green turtle populations and past and present dietary components respectively. Moreover, exclosure cage experiments will be tested to conserve seagrass and associated fishes.

Collectively, these methods will be important in understanding green turtle ecology, seagrass conservation and conflict management.

## APPENDIX IV



### Field staff and project personnel

#### Sea turtle monitoring



Alissa Barnes



Ridhi Chandarana



Meenakshi Poti



Sadhwi Sindura



Mugdha Kulkarni



Chetan Rao



Nupur Kale



Amrit Kumar Mishra



Sajan John



Ema Fatima



Adhith Swaminathan



Divya Karnad



Hariprasath. R

### Project Coordinators



Kartik Shanker



Naveen Namboothri



Muralidharan M

## Turtle Action Group



Terenia Berlie



Seema Shenoy



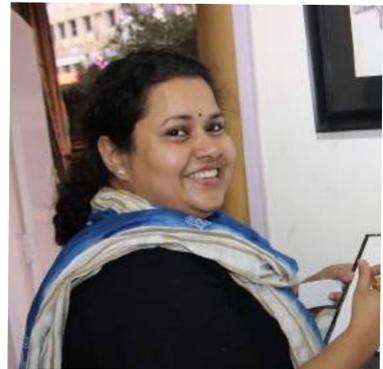
Mallika Sardeshpande



Rutuja Dhamale



Smrutica Jeetendranath



Amrita Tripathy



Prakriti Mukerjee

**Madras Crocodile Bank Trust**



Zahida Whitaker



Mohan Murugaiyan



Pavithra Munusamy



Manish Chandi



Gowri Mallapur

**Odisha field personnel**



Bipro Behera



Kedar Rao



Surendra Behera



Shankar Rao



Judishtir Behera



Sriramulu



Magata Behera



Mahendra Nayak



Dhambru Behera



Madhusudan Behera

### Andaman and Nicobar Islands field personnel



Sushil Lakra



Saw Berny



Saw Willy



Saw Colombus



Sabien Horo



Saw Watha (Agu)



Saw Kenik



Saw Samson



Saw Mumong



Sandeep



Saw Darius



Saw Isaac



Saw Thesorow

## APPENDIX V

### Other achievements by project personnel

#### *38th International Sea Turtle Symposium*

Kartik Shanker and Muralidharan M. attended the 38th International Sea Turtle Symposium in Kobe, Japan and showcased the highlights of the project. Muralidharan M. presented a talk titled “The Curious Case of Green Turtles and sea grass beds in Lakshadweep Islands, India”.

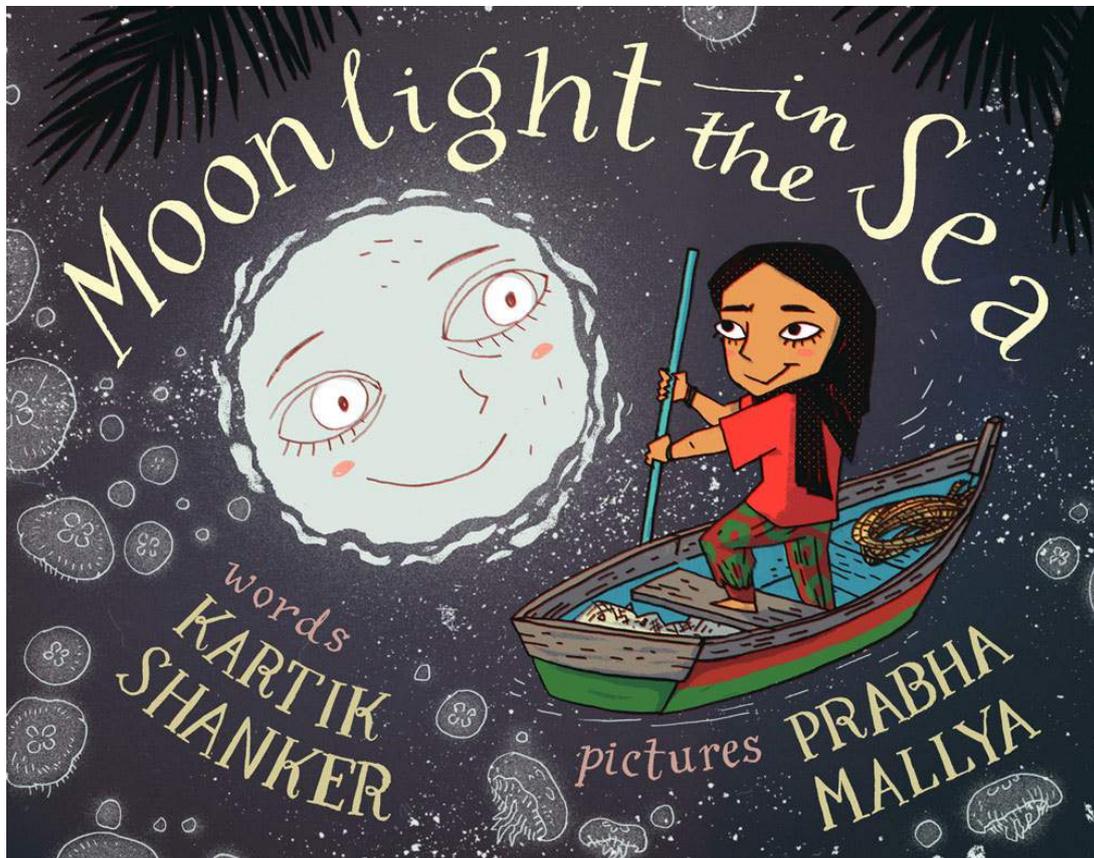
#### *IUCN-Marine Turtle Specialist Group*

Adhith Swaminathan and Muralidharan M. who were inducted into the MTSG of IUCN and are currently involved in collating information on marine turtles in the Northern Indian Ocean to submit the Regional Vice-Chairs. They both authored a national chapter to MTSG Annual Regional Report.

#### *Publication of a children’s book*

As a part of outreach endeavours, a children’s book called, “Moonlight in the Sea” by Kartik Shanker and illustrator Prabha Mallya was published. The book explores island and marine life through the adventures of a little girl.

*Cover of Moonlight in the Sea*



## APPENDIX VI

### 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	Naythal
Lakshadweep	Lakshadweep Marine Research and Conservation Centre (LMRCC)
Maharashtra	Sahayadri Nisarga Mitra
Odisha	Action for Protection of Wild Animals (APOWA)
Odisha	Alacrity
Odisha	Green Life Rural Association (GLRA)
Odisha	Orissa Marine Resources Conservation Consortium (OMRCC)
Odisha	Podampeta Ecotourism and Olive Ridley Protection Club (PEORPC)
Odisha	Project Swarajya
Odisha	Rushikulya Sea Turtle Protection Committee (RST-PC)
Odisha	Sea Turtle Action Program (STAP)
Tamil Nadu	Students' Sea Turtle Conservation Network (SSTCN)
Tamil Nadu	TREE Foundation

## National level organisations and research institutions that support TAG

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

## Core Committee members of TAG

Odisha - Mr. Mangaraj Panda

Andhra Pradesh - Mr. Pradeep Kumar Nath

Tamil Nadu - Mr. Harish

Kerala - Mr. Sudheer Kumar P.V.

Karnataka - Mr. Jeevan

Maharashtra - Mr. Bhau Katdare

Gujarat - Mr. Dineshgiri Goswami

Islands - Mr. Adhith Swaminathan

## Members organisations of the Turtle Action Group



## APPENDIX VII

### TAG Members Profile

1. Andaman & Nicobar Environment Team (ANET): Andaman and Nicobar islands  
Unique in being the only organisation 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 organisation 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 organised 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 Chettuwei, nesting turtles of Chavakkad beach, birds of Enamakkal Kole Islands 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.

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 VIII

### Small Grants Program 2017-2018

A part of the MTCA project fund is disbursed as small grants. The small grants programme was started in 2010. 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 80,000 has been disbursed to two organisations as follows:

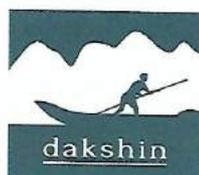
State	Organisation	Amount (INR)	Project title
Odisha	Action for Protection of Wild Animals	40,000	Community awareness campaigns on conservation of olive ridleys
Gujarat	Prakruti Nature Club	40,000	Hatchery management and awareness

\*1 USD ~ 66 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. TAG is now coordinated by a dedicated team of members from Dakshin Foundation who provide administrative support to the network.

## APPENDIX IX

### Statement of Expenditure



## Dakshin Foundation

### STATEMENT OF EXPENDITURE

For the period from: 01/10/2017 to 30/09/2018

**Project Title:** Advancing the conservation of sea turtles in India at a national scale through the monitoring of index sites, and coordination of coastal management efforts with a network of partners.

**Investigator:** Naveen Namboothri

Item (Description)	Sanction USD	Expenditures in USD	Sanction Balance USD
Salaries	\$ 34,786.00	\$ 34,786.00	\$ -
Travel	\$ 12,099.00	\$ 12,099.00	\$ -
Activities of Partners	\$ 3,490.00	\$ 3,490.00	\$ -
Production of Outreach material	\$ 7,945.00	\$ 7,945.00	\$ -
Training and workshops	\$ 3,173.00	\$ 3,173.00	\$ -
Equipment	\$ 282.00	\$ 282.00	\$ -
Consumables	\$ 840.00	\$ 840.00	\$ -
Communication	\$ 2,459.00	\$ 2,459.00	\$ -
Field station rent and maintenance	\$ 3,034.00	\$ 3,034.00	\$ -
Institutional overheads (@10%)	\$ 6,820.00	\$ 6,820.00	\$ -
<b>Total</b>	<b>\$75,020.00</b>	<b>\$ 75,020.00</b>	<b>\$ -</b>

Naveen Namboothri

  
Director

Raji Avy

  
Manager

Finance, Admin and HR

Date: 26-10-2018

Date: 26-10-2018

*For more information visit  
[www.seaturtlesofindia.org](http://www.seaturtlesofindia.org)*

Cover photo: A leatherback hatchling from the Andaman and Nicobar Islands, India

by Adhith Swaminathan

