

MADRAS CROCODILE BANK TRUST/ CENTRE FOR HERPETOLOGY ANNUAL REPORT 2016-2017



The year of the komodo exhibit... fundraising, designing/ planning, and building. And almost done!



INTRODUCTION

This has been a crucial year in the history of the Madras Crocodile Bank Trust, or “Croc Bank”. August 2016 marked 40 years since it was started by a group of idealistic conservationists. The facility was started in 1976, initially with private funds and a lot of goodwill and support from friends and family, as a desperate effort to save India’s dwindling crocodylian populations from extinction. At that time the gharial was particularly endangered, with only 300 or so left in the wild. The mugger and saltwater crocodile were in better shape but hunting and habitat depletion were serious threats for them as well. Today, after 40 years of cutting-edge science/research and grassroots education and awareness building, the Croc Bank is recognized as a world leader in the field of frontline conservation of species and habitats. Its infrastructure and programs include a reptile zoo on the East Coast Road south of Chennai, and field stations and study sites reaching as far afield as the Nicobar Islands. The zoo receives about 4.5 lakh visitors annually, making it one of the popular tourist attractions in the region.

Originally designed to be a living repository of crocodylians for genetic safekeeping, the Croc Bank is now no longer confined to crocodile conservation but includes all reptiles in its mandate and its title includes “Centre for Herpetology”. The release of captive bred crocodiles into the wild, which was the original goal, has not happened because of shrinking wilderness areas and the lack of suitable habitats. There are therefore about 2000 crocodiles in residence. The mandate has also extended to crocodylians from other countries, in fact all the world’s species, ie 23. Of these, 17 are housed at the Croc Bank currently, the only place in the world where such a sizeable chunk of the total species can be seen. Of the 18 species represented, 2 are listed as *Critically Endangered* by the IUCN, and 3 as *Threatened*.

In 2003, the Trustees of the Croc Bank decided to expand its mandate and reach, and become a centre for herpetology. Its work now includes the conservation of all reptiles, ie snakes, chelonians and lizards as well. The need for chelonian conservation has grown in recent years and MCBT now breeds several threatened species including 2 that are listed as *Critically Endangered* by IUCN. Field work, namely surveys and ecological studies, are a large part of its activities; in fact our core operation is as much a field based conservation outfit as it is a captive gene pool of endangered species.

Over the years, the Croc Bank has developed into a world-renowned conservation NGO with strong community and government support at the local and national level. Apart from its commitment to research and conservation of herpetofauna, it is a recognized resource for environment education and interpretation. Its strength has been to maintain a relatively small but effective operation that is dynamic in action and prolific in results. An example of this is its field station in the Andaman Islands, ANET (Andaman and Nicobar Environment Team).

Shortly after its foundation in 1976, the Croc Bank team realized that there was a serious and urgent need for herpetological surveys and conservation action in the then little-known and neglected Andaman and Nicobar archipelago. ANET was conceived and started, and has since carried out extensive work on marine turtles and marine ecosystems, herpetofaunal biogeography and many other biological studies. In addition, ANET has also been productively involved in the broader ecological and social spheres, including projects on natural resource utilization, sustainable development and protected areas management. As one of the oldest and most known and trusted NGOs in the Islands, ANET played a pivotal humanitarian role after the 2004 tsunami devastated the region including getting relief supplies to desperate victims. Today, although still active in the herpetological arena, ANET carries out a broad range of environmental work including marine and terrestrial components. It remains the only research base in the archipelago and voices ecological concerns on many local committees which advise government on development policies and assessments. Its education and awareness building work includes programs and presentations for local and mainland schools, colleges and other institutions and groups on the amazing ecology of these islands and the need to conserve it.

Another such field station is ARRS, Agumbe Rainforest Research Station. It is situated in Agumbe in the Western Ghats, which was set up by Rom Whitaker in 2005 and is now run by the Croc Bank. It was the result of concern for the king cobra, after field studies on its biology and status. Agumbe is one of the world's last refuges of the "king". Other iconic herpetofauna in the area, include Draco (flying lizard), pit vipers and several species of endangered amphibians. A black panther routinely strolls down one of the pathways that adjoins the ARRS campus. Research projects range from frogs to lapwings, and of course the king cobra. A rescue-release project for king cobras is the "call centre" for farms and households in the district, which have now become increasingly tolerant to this occasional visitor, thanks to the public education work being done by ARRS staff. The snake is removed and relocated, and the family/community is given moral support and confidence because superstitions and erroneous fears are negated, and scientific information provided. This has been named the most successful snake rescue services in the country, because it deals with one of the most threatened species of snake in the world.

2000 kms to the north on the mighty Chambal River, is Garhaita: the base of the Gharial Ecology Project, one of the most long-term and in-depth crocodile studies in the world. Using sophisticated data collection techniques including telemetry, the study is tracking the home ranges and observing the habits of this wonderful and rare animal. Local inhabitants are being trained in these techniques, and the need for conserving the species. Interesting and surprising data and information has emerged about the natural history of the gharial, such as the extensive riverine range of adults and the protection of hatchlings by adult males.

MCBT's education programs include school camps and family activities, as well as hands-on zoo experiences for youngsters such as Zoo Keeper for a Day. There are also presentations in rural schools and this year the Croc Bank received a grant from the Ocean Park

Foundation, Hong Kong, to continue and expand this work. 30 schools were identified in this district and four programs conducted in each: on crocodiles, lizards, chelonians and snakes. They included current best-practice in snakebite first aid and treatment. Education is definitely the key to long term sustainable conservation. We devote a large part of our time and resources towards educating people of all ages and backgrounds on the importance of conserving reptiles and natural ecosystems. Workshops and training programs are also tailor made and carried out for other zoos, schools, colleges, conservation agencies and government departments on topics related to reptile conservation, husbandry and management. These include groups from other countries as well, since we hold husbandry experience for species in those regions (eg the Siamese crocodile).

To celebrate Croc Bank's exciting journey, we hosted a talk by Rom Whitaker followed by lunch on 26 August, the day the first tickets were sold in 1976!

ADMINISTRATIVE DETAILS

Office Bearers

Ex Officio Trustees:

Romulus Whitaker (Founder)
Zai (Zahida) Whitaker

Trustees:

| | |
|-------------------------------------|-----------------|
| Ashish Gupta | Samit Sawhny |
| Prof Satyajit Mayor, Director, NCBS | Kamini Sundaram |
| M.M. Venkatachalam | Zhayynn James |

PERSONNEL-Office and Administration

| | |
|----------------------------|-----------------------|
| Director | Zahida (Zai) Whitaker |
| Assistant Director | Allwin Jesudasan |
| Curator | Nikhil Whitaker |
| Assistant Curator | Ajay Kartik |
| Education Officer | Anjana Srimathi |
| Zoo Educator | C.V. Arul |
| Veterinarian | Dr ArunPari |
| ANET Field Director | Dr Manish Chandi |
| ARRS Field Director | Anup Prakash |
| ARRS Research Coordinator | Dhiraj Bhisare |
| ARRS Education Officer | Ajay Giri |
| ARRS Operations | Shankar C.M. |
| Gharial Ecology Project PI | Dr J.W. Lang |

ACCOUNTS, HUSBANDRY AND MAINTENANCE

| | |
|--------------------------------|----------------------------------|
| Mr M. Mohan | Accountant |
| Ms M. Pavithra | Asst Accountant/Office Assistant |
| Mr K. Kannappan | Ticket Counter Clerk |
| Mr V. Gangadurai | Chief Reptile Keeper |
| Mr S. Nagarathinam | Chief Reptile Keeper |
| Mr S. Sampath | Snake Keeper |
| Mr R. Thangaraj | Office Assistant |
| Mr C. Dhanasekaran | Assistant to Education Officer |
| Mr L. Gunasekaran | Maintenance Assistant |
| Mr V. Mohanasundaram | Research Assistant |
| Mr T. Mohan | Jr. Office Assistant |
| Mr C. Purushothuman | Jr. Office Assistant |
| Mr N. Selvamani | Ticket checker |
| Mr R. Gnanamurthy | Ticket checker |
| Ms M. Indradevi | House Keeping |
| Ms V. Amutha | Enclosure Maintenance |
| Ms S. Shanthi | Enclosure Maintenance |
| Ms J. Parimala | Enclosure Maintenance |
| Mr M. Ramu | Driver |
| Mr S. Janakiraman | Assistant Animal Keeper |
| Ms N. Pushparani | Shop Keeper |
| Mr G. Ashok Somai Magar | Chief Cook |
| Mr S. Mohan | Cleaning and Maintenance Asst |
| Mr G. Gowri Shankar | Assistant Animal Keeper |
| Mr Tek Bahadur Somai Magar | Security Guard |
| Mr BudibalSomal Magar | Security Guard |
| Mr Krishna Bahadur Somai Magar | Security Guard |
| Ms V. Yuvarani | Maintenance and Cook Assistant |
| Ms A. Kumari | Maintenance and Cook Assistant |

RESEARCH

Gharial: Dr J.W. Lang, Pankaj Kumar, AshutoshTripathi, Jailabdeen

Human Ecology-Nicobars: Dr Manish Chandi

Snakebite, Venoms: Rom Whitaker, Gerry Martin

Marine Conservation:

MuralidaranManoharakrishnan, AdhithSwaminathan, RidhiChandarana, Allisa Barnes, Hari Prasath

AT THE CROC BANK...



Celebrating 40 Years

On August 28, 2016, the Croc Bank celebrated 40 years of conservation activity and achievement with a function at the Radisson Blue, Mamallapuram which included a wonderful lunch and talks by Rom (Croc Bank founder) and others. It was a heart-warming reflection of the goodwill and support that MCBT has earned within the Chennai community. Rom presented a power-point about his life and work in India including setting up of the Croc Bank. We are very grateful to the almost 100 guests who attended the function, and to Radisson Blue for their generosity and support.

Cyclone Vardah

For the second year in succession, the Croc Bank was battered by several days of stormy weather including heavy rains and cyclonic winds, culminating in Cyclone Vardah hitting the coast on December 12 and damaged buildings and enclosures. It also took down many trees including some of the earliest ones planted as part of the MCBT afforestation project over thirty years ago. Luckily no animals or people were injured and there were no escapes from enclosures. Once again we are grateful to our staff for their concern and participation in the clearing and damage control process. Our grateful thanks also to the donors who came forward to help, including those who anonymously contributed to our cyclone relief donation box at the Croc Bank. Ambadi Enterprises Ltd very generously donated funds for the rebuilding of our vet lab, which was an old building and was further damaged by the cyclone.

Responsible Tourism Award

At the Indian Responsible Tourism Awards 2016 ceremony in Delhi in September, the Croc Bank won the Silver award for Best Contribution to Wildlife Conservation. We were congratulated for our work in education, research, spreading public awareness and conservation initiatives as well as inspiring young people to be active conservationists, through our volunteer and docent programs. The Director and Assistant Director received the award.



Workshop: Veterinary Management of Reptiles

When we initially brainstormed about holding a reptile medicine workshop for veterinarians, the concept seemed straightforward. We were confident that we had the necessary personnel and equipment to pull it off. The support of our excellent resource vets, Dr. Abraham Mathew from the Singapore Zoo & Dr. Paolo Martelli from Ocean Park, Hong Kong only made us more certain that this program would be a resounding success. Our consultant vet Dr. Arun Pari also pledged his time and his expensive diagnostic equipment for use during the workshop!

Mother nature had other ideas and a month before the workshop, cyclone Vardah hit the east coast of India and caused significant damage to our premises. Thankfully, no people or

reptiles were hurt. Our staff worked tirelessly to remove fallen trees and debris and repair buildings and get MCBT up and running again!

When it rains, it pours and soon we faced our next challenge. Dr.Martelli wasn't able to come after all! This notwithstanding, we were able to go ahead thanks to Dr.Abrahamwho took up the challenge of conducting the workshop by himself, with support from the MCBT team. Hotel rooms booked, Croc Bank spruced up and presentations prepared, we were finally ready.

10 Veterinarians from across India (and one from Malaysia) gathered at the Croc Bank on 16th January 2017 to kick off proceedings. The zoos represented were: Bannerghatta, Byculla, Pilikula, Nandankanan, Tata Steel and Rajkot, and there were some independent vets as well. Over the three day period, the participants learnt capture and restraint, clinical and diagnostic techniques and surgical methods among several other subjects! At the end of it, we were exhausted but satisfied that we managed to convey a substantial amount of information within a short span of time. The participants unequivocally agreed that they learnt a lot over the span of the workshop and everyone enjoyed themselves. There are already requests for a follow-up workshop.

Interpretation Centre and Signage

Thanks to a grant from Oracle, we have been able to upgrade our signage and re-build the interpretation centre. This was called Young Reptiles, but is now "Reptales", a pun which had the contractor thinking we had made a spelling mistake. It contains a tv set on which reptile conservation films are shown, a croc hatchling , some croc art from Papua New Guinea and croc skulls of different species, showing the differences in structure and size. One of our zoo educators is always there, to answer questions and do special talks for student groups. The grant also covered the cost of several attractive hand-painted information boards.



Reptales has become a popular spot at the Croc Bank

The Komodos Are Coming!

The Komodo enclosure is underway, or shall we say way under, as you can see from the picture! Komodos are serious diggers, which is why the foundation has to be deep. The design is the result of a team effort which included our architect Trustee Zhayynn James, MCBT staff, and friends from international zoos which have reared komodo and know their habits and needs. Grateful thanks to Cholamandalam Investment and Finance Company Limited and MRF for the sponsorship of this unique enclosure, which will have the first komodo on exhibit in the country. And to Bronx Zoo, for the donation of these wonderful animals and for sending their great keeper Andrew with them, to help and train our staff in komodo care.



Accessibility

World Tourism Day is celebrated globally on 27 September to foster awareness of the importance of tourism. In 2016, the theme was “Accessible Tourism For All” and this gave Croc Bank an opportunity to explore and create an environment that caters to the needs of people with disabilities; our motto was CROCS FOR ALL. This project was a collaborative effort between Croc Bank and Explore Differently. Explore Differently is an NGO that works for improving accessible tourism and exploration, and provides new experiences for people with disabilities. The response was wonderful, with participation from over 300 people belonging to about a dozen special and inclusive schools and NGOs working with disabled persons. Activities such as snake talks, croc talks and games were organized. A dozen volunteers from Croc Bank and Explore Differently worked together to make this event possible. The use of plastic access mats and ramps to ease mobility for wheel chair users, use of sign language at times and the inclusive spirit of all visitors added to the success of the event.



World Accessibility Day

Additionally, Explore Differently is designing and supervising the making of a wheelchair for MCBT, with balloon tyres that work on sand. These tyres have been imported from the U.S. The frame and accessories will be made of light weight metals. We are grateful to ED for their help and support in this project and a sand-friendly wheelchair will definitely be a great asset to the Croc Bank.

Crocs for All!
Celebrating World Tourism Day-2016
Madras Crocodile Bank
Joins
Explore Differently
To
Improve Accessibility for all

Herpetofaunal Survey in Sakaerat

Assistant Curator Ajay Kartik visited Sakaerat, Thailand between the July 19 and August 1, 2016, along with two Irla snake catchers, Maasi and Vadivelu. This was on invitation from the Sakaerat Environmental Research Station (SERS) to help with their herpetofaunal surveys. Mr.Gowrishankar, a king cobra researcher from Bangalore, was also part of the team. SERS is conducting some great research and are currently doing radio telemetry on SIX! (6) reptile species including King Cobras, Indochinese spitting cobras and Elongated tortoises. Ajay and the others expended nearly 270 man hours of work in the field and managed to find 12 species of snakes. They also assisted with the recapture of 2 king cobras and a monocled cobra which needed their radio transmitters replaced. This was the first time the Irlas travelled abroad and they thoroughly enjoyed the experience, right from

their first time on an airplane! The chance to test their snake tracking skills in an unfamiliar environment was a challenge, not to mention the food there, which took them some getting used to!

Apart from all the grunt work, there was also the opportunity to visit the Queen Saovabha Memorial Institute (QSMI) Snake Farm in Bangkok. The QSMI is the primary producer of antivenin in Thailand, and they were able to check out this world class facility, as well as its extensive collection of venomous snakes.

Overall the trip was extremely productive and we are grateful to the team at SERS for being excellent hosts. We hope that this collaboration can continue and lead to more extensive surveys in the future.

New Assistant Director

Yamini Bhaskar's one year at the Croc Bank ended in January, and we are very grateful to her for having given us this time and been a great team player and contributor. Yamini has returned to Singapore but will continue her association with MCBT as Goodwill Ambassador.

Allwin Jesudasan joined us in mid February. He has an MSc in Biodiversity, Conservation and Management from the University of Oxford and has worked in Greenpeace, ATREE and WCS. His publications include scientific and popular articles and papers, and a contribution to a book on the wetland birds of south Tamilnadu.

Solid Waste Management (SWM) Project

Avan Antia, a Fellow of the William J. Clinton Foundation who is at MCBT for 10 months, is helping us reduce our carbon footprint. Her project, planned and being executed with her mentor Nikhil Whitaker, strives to develop an eco-friendly, sustainable, and financially favourable plan for dealing with various solid wastes produced on campus. The goal of this project is to bring a greater awareness of proper waste management strategies to MCBT and the surrounding community. This past year, the following tasks have been completed by Avan:

- A full-day interactive SWM and environmental science workshop at the BKM School.
- Short presentations on environmental protection at the majority of the schools involved in the Croc Bank's rural outreach program.
- Hosted the theater group *Uataeist*, from the Academia Teatro Dimitri (Switzerland) to perform their original piece, "Plastikkatti" in Vadanemelli village. The performance was geared towards teaching the audience about the effect of anthropogenic waste on wildlife and the importance of recycling and not littering.
- Initiated the use of Effective Microorganisms (EM) as a natural cleaner for the public toilets.
- Created a network of people from a range of organizations and fields who can be contacted for assistance in the future.

- Conducting growth trials in *Casuarina equisetifolia* and *Centellaasiatica* to test the usability of the compost (containing crocodile manure) produced at MCBT.
- Consolidated a list of scrap dealers, or “kabadiwallas,” who will purchase our recyclables. This includes plastic bottles, metal sheets, etc.
- Designed 5 signs that relate to environmental protection, which were painted by local artists and placed around the park.
- Gave a talk at the Keystone Foundation (Kotagiri, Tamil Nadu) on sustainable SWM practices and composting methods.
- Hosted representatives from Hand in Hand (NGO) to give a presentation to MCBT staff, titled “The Role of the Individual in Environmental Protection.” Topics of discussion included composting methods and the importance of reducing, reusing, and recycling.
- Celebrated Earth Day on April 22 with a variety of interactive stations throughout the park for the public. Activities included a water filtration station, a soil erosion demonstration, a waste sorting game, and a “Jeopardy-style” quiz game regarding various Earth and environment related topics.

Ongoing tasks:

- a. A database of environmental education resources and activities is being created for the Education Staff to use in their future programs. This database will include links to external education sources as well as original ideas for activities, games, and experiments that demonstrate various aspects of sustainable waste management and environmental science.
- b. Bags of “Crocodile Compost” made at the Croc Bank will be placed at the Croc Shop. This in itself will be a way to advertise our compost to the public, so it can be sold in the future.

WHAT??? PYTHONS IN FLORIDA???



This year, MCBT helped control a hugely destructive exotic species in South Florida: the Burmese python. The population, now in the hundreds, resulted from escapees from pet shops during a hurricane two decades ago, and the snakes have been decimating indigenous small mammals. In fact this is probably the biggest invasive reptile problem that has ever existed on the planet. They are now officially considered a threat to biodiversity in the Florida Everglades. Some scientists report that observations of some mammal species have declined by more than 99%. A study in the Everglades before and after pythons became common, found a connection between the spread of pythons and drops in sightings of racoons, rabbits, bobcats and other native species. No rabbits or foxes have been seen during the more recent surveys; and earlier, rabbits were among the most common mammals here. And the absence of natural predators has allowed python populations to balloon.

Burmese pythons (*Python bivittatus*) are also known as Asiatic rock pythons and black-tailed pythons and are native to India, lower China, the Malay Peninsula and some islands of

south and southeast Asia. They commonly grow to 3 m in length but can be over 5 m long. This snake's camouflage is perfect for these swamps and marshes, and despite all kinds of controlling attempts including The Python Challenge, an annual contest to draw attention to and mitigate this eco-disaster, these snakes remain an environmental challenge.

Enter two Irulas, Masi and Vadivel, along with MCBT Trustee Rom Whitaker and wife Janaki Lenin as translators. Their two month visit was funded by the Florida Fish and Wildlife Conservation Commission, and the Irulas' catch totalled 33 pythons, averaging 8 to 10 feet in length with one female of over 16 feet caught with 3 others at an abandoned NIKE missile base in Key Largo which weighed 166 lbs. For comparison: 1,000 hunters, mostly amateurs, in the state's annual Python Challenge contest caught 106 snakes over the course of a month last year and 68 the year before. Some of the techniques used over the years, include using tagged pythons (called Judas snakes) to find other pythons during the mating season, poisoned prey, and a reward system.

Walking many miles a day, and armed with simple tyre irons, the Irulas did what they do best: use their amazing snake-focused vision to spot the faint track in the wet mud, or a piece of shed skin hanging from sedge grass or thorn bush. Part of their mission was to teach their American snake-catcher counterparts how to spot and catch these snakes, and hopefully this technology-transfer will prove useful in eradicating the problem. The main difference in the two techniques, was that Masi and Vadivel went straight into the thick bush instead of looking for basking areas along roads and levees.

Curatorial News

- Jim Foster, Conservation Director, Amphibian and Reptile Conservation, visited MCBT in April 2016.
- A workshop on veterinary management of reptiles was conducted at MCBT on 16-18th January, 2017. The workshop was facilitated by Dr. Abraham Mathew, Senior veterinarian at Singapore Zoo, who kindly consented to conduct this workshop with the curators and our consultant veterinarian. It was attended by 10 vets from across India and we received positive feedback about the program.
- IUCN//SSC/ Fresh water turtle Specialist Group meeting in Delhi: Between 16th – 18th February, the Curator attended a workshop on re-assessment of the status of Indian chelonians, with recommendations given for changes in the Wildlife (Protection) Act, 1972. The last IUCN/SSC FWT group meeting was in 2005.
- The Curator is continuing his PhD with Annamalai University, Chidambaram. To date, contacts have been made with a previous MSc student from the University, who can help with permissions from the PWD/Irrigation Departments, and with an ecotoxicologist, and a bio-tech student from the University who will assist with cataloguing oral microbes from mugger at MCBT.

- The new vet-lab is being constructed, and a housing room for the snakes that were in the lab has been made from one of the snake rooms behind the komodo dragon off-exhibit pens.
- The lighting company K-Lite, is being scheduled for a trial setup of lights in June; this is to avoid reflection from enclosure glass to enable better viewing of our animals.
- AvanAntia has been working towards management of solid waste at MCBT, in addition to conducting growth trials on Casuarina and spinach using croc manure. This is further explained in the solid waste management section in this report.
- Construction of the on-exhibit komodo dragon exhibit has started, these lizards continue to be trained to enter shift boxes (so staff can clean ponds), and are responding well to interaction with humans.
- Ajay Kartik attended a Herpetology course at IISc Bangalore to present a talk on crocodile behaviour.

The following individual projects were undertaken and completed by volunteers during this year:

1. Farai Patel - Basking patterns of Red-crowned roof turtles
2. Pallavi - Travancore tortoise behaviour
3. Thomas Halton - Calotes thermal selection/home range project
4. Rajesh – Calotes thermal selection/home range project
5. Vaishali Rawat- Mugger social hierarchy
6. Vignesh C - Photos and videos for Croc Bank
7. Colonel Yash - Photos for Croc Bank
8. Sai Pradhan - Educational Sign survey data collection and data entry
9. Debroop Dhar, Adhiraj Sen and Avanthika Anand - Live prey data collection
10. Nikhil Raut - Mugger nesting behaviour/tolerance of females with nests near each other. VikasKukreja Bhatt-Gharial dive durations and Live prey data collection
11. Milan Venkataraman -Museum work
12. Kim Derringer- Correlates between mugger egg, clutch size, and female body size.
13. Chandrasekhar Srinivasan - Media work

Education News

The Education department runs awareness programs at Madras Crocodile Bank Trust, local schools and communities with the assistance from the Curatorial Department. A brief report on the activities conducted for the period of April 2016 to March 2017 is provided below.

Workshops

2016

1. Be an Environmentalist – April 22nd 2016, Earth Day
2. What's That Reptile? Series

- What's that Snake? – April 16th and 17th
 - What's that Crocodile? – April 30th and May 1st
 - What's in that Shell? – May 14th and 15th
 - What's that Lizard? – May 14th and 15th
3. What's That Reptile? Junior Series – May 11th and 12th
 4. Junior Keeper for a Day – June 11th
 5. Zookeeper camp (Adults) – July 9th and 10th
 6. Junior Keeper for a Day – July 23rd
 7. Snake Walk – August 15th
 8. Vruksha Montessori 2 Day camp – August 22nd and 23rd
 9. Zookeeper camp (Adults) – September 17th
 10. Poorna School, Bangalore (3 Day camp) – October 1st, 2nd and 3rd
 11. MUWCI camp – October 8th to 15th
 12. Junior Keeper for a Day – November 26th
 13. Snake Walk – December 4th
 14. Junior Keeper for a Day – December 24th

2017

1. Hebron School – February 12th
2. Snake Walk – March 4th
3. Zookeeper camp (Adults) – March 25th and 26th

Tours and Sessions

2016

1. Guided tour for the Environmental Group of Vidya Mandir, Mylapore – July 2nd
2. Know Your Reptile session for birthday party group (Vipul Sekhsaria) – July 3rd
3. Know Your Reptile session for Al-Qamar Academy – August 11th
4. A Know Your Reptile session for TATVA school – August 16th and 18th
5. A Know your Reptile session for M.K.M Sec. School – September 14th
6. Know Your Reptile session for Kalpavriksh Montessori Community School – November 25th
7. Know Your Reptile session for birthday party group (Aravind) – December 6th

2017

1. Guided tour for 5 Senses Tours and Travels
2. Guided tour for CASFOS Range Forest Officers Trainees
3. Guided tour for trainees from Wildlife Institute of India
4. Know Your Reptile session for a family group
5. Know Your Reptile session for Grassroots School – February 10th
6. Know Your Reptile session for a birthday party group (Kapil Srinivasan) – February 19th

Guided tours were also provided to dignitaries such as the Home Minister of Meghalaya, Kapil Saratkar- D.I.G., IPS, Mr. Kandasamy – A.D.G.P (TS), IPS, Crocodile India Mr. Prabhat Mishra, IFS and Mr. Thirumal, D.F.O, IFS to name a few.

Night Safaris were conducted throughout the year from Tuesday to Saturday.

Talks in the park

Feeding demos and talks were done on Sundays at 11:30 am, 12:30 am, 4 pm and 5 pm. JAWS feeding talks were conducted at 4.30 pm every Sunday. Snake talks were conducted on Saturday and Sunday. If docents were present, talks were assigned to them and conducted under the supervision of the Curatorial and Education department. Educators were present during the week to interact with visitors. During feeding demos, educators and docents interacted with the visitors thereby ensuring an informed audience.

Events and Environmental Days

These days were celebrated at Croc Bank with various activities.

1. Independence Day
2. MCBT's 40th Anniversary- 27th and 28th August
3. Accessibility Day- 27th of September. This was a collaboration with the NGO "Explore Differently".
4. World Wildlife Week – October 2nd to 8th
5. World Wetlands Day – February 2nd
6. World Wildlife Day – March 3rd

Adoption Program

The following animals were adopted this year (April 2016 to March 2017):

1. JAWS – KarthikeyanHaridoss
2. Aldabra Giant Tortoise – Mrs. TehnazBahadurji
3. Aldabra Giant Tortoise – Mr. Mohd. Miqdad Hussain
4. Aldabra Giant Tortoise – Mr. Vijay Raman
5. One of our Water Monitor – Mr. Praveen HN
6. Two of our Water Monitors – Dr. Raj Kumar
7. Our American Alligators – Mr. SaravananUddayar
8. Reticulated Python – Ms. SowmyaRajan
9. Green Anaconda – King's College, Thanjavur
10. Green Anaconda – Mr. Swamynathan Rajagopal
11. Gharial Enclosure – Crocodile India
12. Underwater Gharial – Mr. Daksh Pandi

Volunteer and Docent Program

We had 22 volunteers this year. The docent program has 9 new recruits. The list of active docents is provided below:

| S. No: | Name | Batch |
|--------|-----------------------|-------|
| 1 | Kaushik Shelat | 2009 |
| 2 | Mohit Mudliar | 2014 |
| 3 | Dr. Raj Kumar Jayapal | 2014 |
| 4 | SundarVignesh | 2014 |
| 5 | Subhiksha Maxima | 2015 |
| 6 | DhireshMohapatra | 2012 |
| 7 | Nikhil Shankar | 2017 |
| 8 | Karthik Ashok | 2017 |
| 9 | Maheshwaran EG | 2017 |
| 10 | JaanuSurendran | 2017 |
| 11 | Radhika Shan | 2017 |
| 12 | Dilip R | 2017 |
| 13 | ManasiRavindranath | 2017 |
| 14 | Balasubramanium | 2017 |
| 15 | Praveen.H.N. | 2017 |

Reptile Conservation in Rural Tamil Nadu

The Croc Bank has always been active in conducting programs on reptile conservation in rural areas. Thanks to support from the Ocean Park Conservation Foundation, Hong Kong, this activity was formalised into a project called Reptile Conservation in Rural Tamilnadu. The objectives are:

1. To sensitize students and teachers about the role of reptiles in the environment and the need to preserve them.
2. Spread accurate information about snakebite: The Big Four and how to avoid them, and current-science treatment of snakebite.
3. Extend the knowledge of the environment, specifically reptile-related, among local teachers.

The project started officially in August 2016 as a collaborative effort between OPCFHK and the Croc Bank. The project team included, Zai Whitaker (Principal Investigator), Anjana Srimathi (Project Manager), Arul CV (Zoo Educator), Shobana B (Animator) and Pavithra M (Translator). So far we have successfully implemented the program in 31 schools in Kanchipuram District, Tamil Nadu. Additionally, a program was conducted at MCBT for 11 of these schools.



International breeding loan results in first successful captive breeding of the Northern River Terrapin at MCBT

Nikhil Whitaker wrote in *Turtle Survival* (2016, pg 32:)

At the Madras Crocodile Bank Trust (MCBT), a male Northern River Terrapin, *Batagurbaska*, was acquired on breeding loan from ZooVienna in April 2014, and paired with two females that had been acquired as juveniles back in the late 1980's. 2015 saw no production of eggs from this group. However in 2016, the females were captured on camera trap digging in the sand. Based on crawl tracks in the nesting area, searches began and on 26 March 2016, 10 eggs were located. At this stage, 3 eggs were banded, 6 showed signs of sub-embryonic fluid at candling, and 1 was infertile.

Fertile eggs were separated into two Tupperware boxes, one containing vermiculite (Box I) as an incubation medium, and the other a fine grain sand (Box II). The incubation period for Box I was 54 days, and 51 days for Box II. Average temperatures throughout incubation were 30.6 C (87.0 F), and 31.1 C (87.9 F), respectively.

A total of seven eggs hatched, with one hatchling dying in the egg after pipping. Hatchlings are currently housed in a rectangular enclosure, with water varying from 2 cm - 40 cm deep. A haul out wooden ramp, beneath a spotlight, is regularly utilized. They are fed on fingerling fish and various types of seasonal greens.

The first *Batagurbaska* to be successfully hatched at the Madras Crocodile Bank Trust, after two long term captive females were finally paired with a male from Europe.

AT OUR FIELD STATIONS...

Gharial Ecology Project, Garhaita, on the Chambal River

(Project report period: January -December 2016)

Principal Investigator Jeffrey Lang's report:

OVERVIEW

The only viable, self-sustaining population of gharial inhabits the Chambal River where a mass die-off occurred in 2007-2008. With international zoo support, ecological studies (2008-2016) of these gharials have been conducted in the National Chambal Sanctuary (NCS), utilizing telemetry to record their movements, activities, and behaviours relevant to the die-off, and critical to their conservation. To date, the results reveal new information about gharial spatial habitat use and seasonal movement patterns, as well as social structure and breeding biology. For the first time worldwide, this project provides the biological basis for science-based conservation actions to protect the remaining wild gharials in their natural river habitats. A training/education component develops an awareness of this magnificent species among the river folk it lives with.

Telemetry Component: Monitoring, Tagging of Additional Small Gharial & Nesting Surveys

The major activities for this component in 2016 are: 1) tracking gharial tagged in 2014 and in 2015, 2) downloading GPS loggers from gharial, tagged in Nov 2014 and 2015, 3) making detailed observations on crèche attendance and hatchling guardians, 4) monitoring nesting success on the lower Chambal, and 5) tagging additional gharial with GPS loggers, primarily juveniles. International zoo support provided major funding for tracking, downloading, observing nest behaviors, and monitoring nest success in the NCS. Long distance seasonal movements of 200+ km are now well documented in this Chambal population of wild, free-living gharial, indicating the importance of an open, dynamic river ecosystem, free of dams and sand mining. The exceptional care behaviors shown by guardian adults, both male and female are documented in detail. A nesting survey, conducted yearly since 2010, was extended another 50+ km upriver to include a major site utilized by many tagged females for nesting upstream, where sandmining was extensive.

Training Component: Program Coordinator, Training Workshops, Education Programs

In 2016, the training/education component supported a part time, but very experienced Program Coordinator, Ashutosh Tripathi. Previously, Ashutosh has conducted innovative training and education programs, in his capacity with TSA-India. One workshop was conducted by GEP staff for UPFD staff. A Teacher Training Program was conducted for elementary school teachers in riverside villages, including those proximate to gharial habitats. In addition, week-long environmental awareness programs and educational activities were conducted at the Garhaita base education centre and in the local schools with support, provided by the international zoo support.

More than 20 environmental education programs were conducted during 2016-17.

This season, we are very fortunate to have Jailabdeen A., a PhD student and former TSA staff member on the Chambal, working with us to help with game camera surveillance at the creches. Jai's special interest is in how gharial are communicating amongst themselves at the creches, and also documenting the extensive feeding observed by hatchlings, prior to the creche break-up with the advancing monsoon and resultant high water.

Funders for the Gharial Ecology Project include Prague Zoo, Los Angeles Zoo, Crocfest, MetroParks Zoo-Cleveland, Saint Augustine Alligator Farm, Eddy Evens, Wildlife Conservation Society.



Captured gharials are tagged and released within several hours on-site



In mid January, 2017, MCBT Director Zai Whitaker, and Assistant Director Yamini Bhaskar, made a short visit to the GEP base on the Chambal River. They participated in an educational program in the Garhaita village school, toured the facilities, and took a field trip on the lower Chambal between Chikni Tower and Sashon village within the UP stretch of the National Chambal Sanctuary.

ANDAMANS AND NICOBARS ENVIRONMENT TEAM (ANET)

The beautiful rainwater harvesting pond in front of the canteen at ANET



From Manish Chandi, Field Director:

Project title: Renewing livelihood resources of *Nypafruiticans*, *Pandanus leram* and technological interventions in the Southern Nicobar Islands

Summary of progress Sept 2014 - Dec 2016

The project primarily has sought to restore two species of flora- *Nypafruiticans* and *Pandanus leram* on Little Nicobar Island and parts of Great Nicobar Island (both proximal to the Great Nicobar Biosphere Reserve in the Southern Nicobars), and is envisaged as a means to ensure sustainable resource utilisation while addressing a few economic needs as well. This process aims to strengthen resource catchments, their traditional tenure and management in each region among participants (Indigenous Nicobar islanders).

Summary:

| <i>NYPA FRUITICANS - 7 villages – 2015 saplings survived out of 2500 planted</i> | | |
|--|------------|---------------------|
| Villages and total number of saplings planted | Households | No: of Participants |
| Makachua (630) | 41 | 13 |
| School point (40) | 3 | 3 |
| PuloPanja (450) | 28 | 10 |
| PuloPatia (250) | 4 | 4 |
| PuloUlon (320) | 26 | 12 |

| | | |
|--|------------|---------------------|
| Muhincohn (280) | 1 | 1 |
| Afra bay (45) | 35 | 0 |
| | | |
| <i>PANDANUS LERAM: 4 villages, - 659 cuttings planted 395 survived</i> | | |
| Villages and total number of saplings planted | Households | No: of Participants |
| PuloPanja – 80 | 28 | 12 |
| School point – 45 | 3 | 3 |
| Makachua – 120 | 41 | 5 |
| Muhincohn/Bahua – 150 | 1 | 1 |

Five traditional houses have been constructed over the last year (2015-2016) [3 in Afra Bay, 2 in School Point], two of which were ceremonially ‘opened’ (in May 2016) at Afra bay through a traditional ritual by the owners, involving community members from all villages. For these houses, *Nypa* thatch was sourced from the remaining wild stock (2 houses) as well as planted stock (three houses). A few more traditional houses are planned for construction in the current year (2017).

While the regeneration of *Nypafruiticans* and *Pandanus leram* species began with consultative meetings and a workshop for maintenance of a nursery (2015), the nurseries for both species were dispensed with by the community after the initial training, as they found direct transfer of seed (*Nypafruiticans*), and of regenerating stalk (*Pandanus leram*) a quicker and direct method of regeneration suited to their conditions and requirements. *Pandanus leram* has always been planted by the community using regenerating stalks/branches and juvenile saplings in the creation of plantation plots. *Nypafruiticans* on the other hand was never regenerated until the project started post tsunami and the need/requirement was felt for supply of thatch material, the method used was collection of seed and saplings from the wild and transplantation along creeks to disperse the species and ensure availability within resource harvesting regions.

Two hydraulic coconut oil presses were purchased from Aureka in Auroville and handed over to the Chairman and Secretary Tribal Council, to be installed at Makachua and Afra Bay villages for the use of the community members on a trial basis. Quality tests of raw material (toddy) for estimation of raw material to produce organic vinegar and palm syrup were undertaken in two villages after which the instrument was not producing accurate results.

According to how this objective of the project progresses, an eventual task will be to explore marketing opportunities for palm vinegar, palm sugar and virgin coconut oil based on value addition and strengthening socio-cultural processes while enhancing livelihood diversity.

Education and Research at Anet:

Treasured Islands

The formulation of the 3rd edition of *Treasured Islands* highlights a novel attempt at developing a context-specific and holistic environmental education syllabus that targets middle schools of the Islands. Primarily a teacher's manual, *Treasured Islands* provides information and activities, as aligned to the requirements laid out by the NCERT environmental education programme, to encourage independent thinking, questioning skills and hands on problem solving skills while helping to build a sense of stewardship and connections to the Islands and their environmental challenges.

Produced by Dakshin Foundation in collaboration with ANET, Srishti School of Design, Bangalore, the book is a completely reworked volume developed much beyond the original version published by Kalpavriksh, Pune and MCBT in 1996. This redesigned version of *Treasured Islands* is expected to serve as a textbook for 147 middle schools in the ANI and is expected to reach out to thousands of middle school students every year. This process was done in consultation with the Directorate of Education, Andaman and Nicobar Islands Administration.

The last year has been spent reorienting the new Deputy Education Officer, Science and Administration to the project. The book and its corresponding file is currently with the Directorate of Education for their approval, printing and distribution.

Coastal Clean Up

Dakshin Foundation and ANET initiated the organisation of a one-day event on September 17th, 2016 in celebration of International Coastal Cleanup Day with support from the Forest Department, Andaman and Nicobar Islands. The objective of Andaman Coastal Clean-up Day, as part of an international initiative, was to bring as many students as possible to beaches in different areas to understand the quantum of marine debris, its source, its impacts and the actions they can take to prevent it from reaching the coast in the first place.

A total of 75 students from Government Middle School, Wandoor (19 students), Government Middle School, Manglutan (27 students) and Government Senior Secondary School, Manglutan (29 students) participated in the activities planned for the day, excluding time at the beach due to torrential rainfall.

Instead, we hope that based on the activity to understand the impact of marine debris on organisms that inhabit the beach and the interactions between students, forest department officials, the pradhan, and staff from ANET and Dakshin, the students were able to assimilate and appreciate the impact that marine debris has on the ecosystem and its inhabitants, recognising the sources of waste and hence the role that they can play in helping control the situation.

Research at Anet:

From Zoya Tyabji: A wrap-up of her work during the September 2016 to March 2017 Season. (Zoya is a researcher who helps with the education program at ANET).

Educational Programs:

- Ozone day awareness program (16th September 2016) - an awareness program for 50 students from Andaman College. This included a presentation, an interactive session and an activity.
- Coastal Beach clean-up (17th September 2016) - a presentation as part of the program organized by Dakshin, ANET and the Forest Department. The program was targeted towards the local school students with the Forest Department authorities in attendance.
- Jain International School educational program (4th and 5th of October 2016) – conducted a two day program introducing students to the avifauna of the Islands, mangrove, forest, and the coral reef ecosystem.
- American International School (12th to 19th November 2016) – conducted the education program, with help from Mahira and Sahir (Dakshin). Modules included the mangrove ecosystem, history and culture (Port Blair day) , forest ecosystem, community engagement and intertidal ecosystem.
- Wandoor local school (30th January 2017) – ANET facilitated a social involvement program between the Wandoor local school and the Foliage group from Pune.
- Christchurch School (7th & 8th March 2017) – conducted a two day program for the students. Students were introduced to the various ecosystems around ANET – mangroves, avifauna, forest and history and culture of the place. With the help of the resident researchers, we carried out an interaction session with researchers.

ANET work:

- contributed to the content for activities and research conducted by ANET and associated/affiliated researchers for the ANET website.
- helped with the administration and logistics work from September 2016 to January 2017.
- conducted orientation walks around ANET, early morning birding walks, day and night mangrove walks and forest walks for guests from September 2016 to February 2017.

ANET Projects:

- ANET participated in the Great Backyard Bird Count held from the 12th of February to the 15th of February 2017. The areas covered included the ANET campus, the Lohabarack beach, *Ghumai* (Junction), and Sippighat.

- ANET participated in the Asian Waterbird Census held in December, and facilitated the event and coordinated with the locals who participated in it as well. Helped to cover the sites in and around ANET with the rest of the researchers present on base.

Research:

- Rufford Small Grant: I have received the grant to assess the biology, fisheries and conservation aspects for sharks in the Andaman Islands. The project duration is for a year, up to January 2018.

Abstract: Sharks are globally threatened due to overfishing. In the Andaman archipelago, 39 species of sharks have been reported all of which are data deficient. Targeted shark fisheries, incidental catch in fishing operations, along with rising sea temperatures, and natural disasters could lead to their local extirpations. In this project, I propose to systematically assess shark stocks, trace the fishing industry and its roots, and collect local knowledge regarding sharks and shark product utility. The results are targeted to inform authorities, and to encourage local communities to participate in shark conservation.

- I interned with a researcher to study the post-bleaching effects in Mahatma Gandhi Marine National Park and Ritchie's archipelago, South Andaman Islands.



From Ashwini V. Mohan: Genetic diversity of geckos in the Islands

Geckos are among the least explored fauna in the Andaman and Nicobar Islands and this study aims to inventory species of geckos, map their distribution, and assess their conservation status).The study aims to utilize both inter- and intra- specific genetic diversity to prioritize species and islands for conservation.

Classifying conservation areas through exploration of species richness and genetic diversity is an important step in the Islands. Smaller vertebrates are limited by the sea, which results in small populations and genetic drift, reducing their capacity to recover from extinction risk. In absence of native herbivorous mammals, the Islands' flora depend on birds, reptiles, and small mammals for pollination and dispersal of seeds. The Andaman and Nicobar Islands are threatened by increasing human population and invasive species. Identifying genetic diversity is the first step towards conserving species, if diversity in space is underrepresented, we would fail to recognize the need for conservation action. Though much of the smaller islands of archipelago are protected, they are not expected to harbour much genetic diversity; actual conservation effort is required in major human dominated islands.

The study will sample all currently recognized species: *Cnemaspis andersoni*, *Cnemaspis* sp., *Hemidactylus aff. platyurus*, *Gehyra mutilata*, *Gekko verreauxi*, *Cyrtodactylus rubidus*, *Hemidactylus frenatus*, *Lepidodactylus lugubris*, *Phelsuma andamanensis*, *Gekko smithii*, *Hemidactylus garnotii*, *Hemiphyllodactylus typus* and *Ptychozoon nicobarenis*.

Objectives:

1. To identify the genetic diversity of Gecko species distributed on the Andaman and Nicobar islands
2. To recognize the factors governing patterns of genetic diversity across space (dispersal ability, barriers of dispersal, Isolation-by-distance, human mediated dispersal)
3. To prioritize gecko species and islands incorporating species diversity and genetic diversity
4. To identify endemic lineages, resolve taxonomic uncertainties and identify origins of Geckos in A&N islands

I have been successful in obtaining permits from the Department of Environment and Forests to carry out this study on the Andaman and Nicobar Islands. We have surveyed Landfall, North Andaman, Middle Andaman, South Andaman, Havelock, Interview, Long and Neil Island. I am beginning field work in the Nicobar Islands and expect to complete field surveys by the end of April, 2017. From May, 2017 I will begin molecular lab work in Dr.KartikShanker's lab in the Indian Institute of Science, Bangalore. All the tissues and specimens collected will be deposited in the Centre for Ecological Sciences, Indian Institute of Science. We expect to complete this project by February, 2018.

From Nitya Mohanty: invasive species in the Andaman Islands

The invasive Indian bullfrog *Hoplobatrachus tigerinus* on the Andaman Islands: Evaluating drivers of distribution, density, and trophic impact of an early stage invader.



Photo: Harikrishnan S.

An introduced population of any organism is one that arrives at a site, beyond its native range, with intentional or accidental human assistance. Such a population that maintains itself without further human assistance and spreads is called an invasive population and more generally, the species in question is termed an invasive species. The Indian bullfrog (*Hoplobatrachus tigerinus*) is reportedly spreading in the Andaman Islands after its recent introduction. The arrival of a large frog with a varied diet comprising of birds, mammals, arthropods, reptiles and frogs, could put the native biodiversity at risk, a high proportion of which are endemic.

The study aims to understand five major aspects of the Indian bullfrog's invasion on the Andaman Islands (objectives scheduled for 2016-17 are in bold, along with current status):

- i) Geographical range of the bullfrog and pathways of dispersal : Achieved
- ii) Population density and habitat preference: Ongoing
- iii)** Impact on small vertebrates and mechanisms of impact: Ongoing
- iv) Facilitative interaction with introduced tilapia, and
- v) Future of the invasive spread and efficacy of potential management strategy.

Key Findings:

1. Introduced populations of the bullfrog occur in most inhabited islands of the Andaman archipelago, spanning North, Middle, South Andaman, Havelock and Neil Island but *not in Little Andaman, Long and Baratang Island*.
2. A questionnaire survey of farmers, plantation workers, and pond owners in villages with bullfrogs pointed to multiple introductions in the past and *a rapid spread all over the Islands post 2007-08*.
3. Major pathways of introduction and spread of the bullfrog are thought to be through the *aquaculture trade* (where tadpoles & eggs could go unnoticed) and *intentional release* for consumption.
4. Perceived loss through *depredation of chicks, ducklings and fingerlings* by the frog is high, though, some attribute a reduction of giant centipedes (seen as a benefit) to the bullfrog.

Outputs:

1. Mohanty NP, Sachin A, Selvaraj G, VasudevanK (in review) Using public surveys to reliably and rapidly estimate the distributions of multiple invasive species on the Andaman archipelago, *Biotropica*
2. Mohanty NP. 2016. Have you seen this? Tapping into the memory of islanders to uncover an invasion. *Sanctuary Asia* 36(8)

From Sachin Vaishampayan: cetacean-fisheries interactions in the Islands

Given that they share common space and resource, cetaceans (whales, dolphins and porpoises) and fisheries have been in close contact with each other all across the world. However, such interactions often turn into conflict, with cetaceans ending up as bycatch in various fishing gears and fishermen incurring damage due to depredation and damage to gear by cetaceans.

It is estimated that more than 10000 dolphins and porpoises are affected by fisheries each year in the Indian mainland.

Eight cetacean species have been reported from Andaman and Nicobar Islands. Andamans also have an expanding fisheries sector which is expected to grow steadily in the coming years. Therefore, it becomes important to document interactions and relationship between cetaceans and fisheries in the Andaman waters at an early stage.

This project aims to create baseline information on interactions between the fisheries sector and cetaceans present in the Andaman waters. Various interactions such as use of dolphin presence as indicators of underlying fish stocks, effects of cetaceans on the catch and instances of depredation and bycatch are being looked into by conducting fishermen interviews. Fishermen's knowledge about cetaceans present on the islands such as number species, seasonality of sightings, areas of occurrence, their views on cetaceans are also being studied.

Objectives:

- To get a general idea on the knowledge of the fishermen about cetaceans in Andaman waters.
- Examining the fate of cetaceans that are accidentally entangled in the fishing gear or injured by fishing vessels
- Assessing any financial impacts on the fisherfolk due to cetaceans
- Documenting perceptions, their drivers and tradition knowledge of the fishermen linked to cetaceans

This information will be compared across various gradients such as type of craft and gear, remoteness with respect to access to the market and reach of law enforcement and ethnicity to determine how these factors affect the perceptions of the fisherfolk about the cetaceans present in the Andaman waters.

Timeline:

Till now, Port Blair and South Andaman region has been covered where most of the commercial fisheries in the islands is located. This region is also very diverse with respect to ethnicity and fishing practices involved.

| | |
|----------------------------------|---|
| October, 2016- November, 2016 | Recce across the major landing sites across Port Blair and South Andaman. Familiarising with the fishermen, refining and reorganising the questionnaire |
| November, 2016- March, 2017 | Conducting interviews across the major landing centres in the Port Blair-South Andaman zone Landing Centres Covered: Janglighthat Paanighat Chatham Dignabad Guptapara Burmanallah Wright Myo Shoal Bay Wandoor |
| April, 2017- September, 2017 | Interviews at North and Middle Andaman, Little Andaman and Havelock and Neil Islands |

Key Findings:

- Areas of high cetacean presence have been identified through the interviews

- Sightings of whales are rare and mostly towards the deeper ocean. Intimidated by their size, fishermen try avoiding whales and have very less knowledge about them. Dolphin sightings, on the other hand, are frequent, with fishermen describing two to three different species
- Some fishing gears such as gill nets have more encounters with cetaceans as compared to others such as hook and lines
- Though instances of depredation and damage to gear occur, they do not significantly affect the catch or profits of most of the fisherfolk. Fishermen using gill nets of small mesh size are more susceptible. If dolphin presence is detected in water, they will avoid putting their nets in or pull them out if already deployed, hence mitigating their losses
- Overall, the instance of accidental entanglement is not very frequent and restricted to the 'surmai' gill net (nylon gill nets of bigger mesh size) and long lines
- Dolphins are perceived positively by majority of fishermen in the area, given their behaviour traits like bow riding and a widespread belief that they rescue fishermen
- Most of the fisherfolk are aware of the protected status of the dolphins, even though there is no instance of them hunting dolphins for meat and oil in the past

From Tanmay Wagh: role of herbivore fishes in maintaining the coral-algal balance

Brief Summary:

The reefs of the Andaman and Nicobar Islands have been impacted by a series of natural disturbance events, the most recent being the mass coral bleaching of 2016. Post bleaching events, dead reefs can get colonized by fast growing algal communities. Considering the importance of coral reefs to the island communities for coastal protection, tourism and fisheries, my project aims to understand the ecological role of herbivore fish communities which help in promoting reef recovery.

I propose to study these processes, by which herbivory acts as a top-down force in controlling algal overgrowth and maintaining the coral-algal balance on the disturbed reefs through underwater visual and videographic surveys to estimate the extent of herbivory.

Objectives:

The broad goal of my study is to understand how herbivory plays a role in controlling algal growth and maintaining overall composition of corals and algae in the Andaman Islands.

The specific objectives that I want to focus on are as follows

1. To identify the gradient of algal cover (high, medium, low etc.) and the algal species composition across selected regions of the Andaman Islands.

2. To identify the associated herbivorous fish community, the dominant fish group and the dominant feeding guild across this gradient.
3. To understand the role of herbivorous fish in controlling the algal communities on reefs post-disturbance.
4. To understand the preferential feeding of herbivores towards certain macroalgal groups and its implications to phase-shifts from coral to macroalgal states and vice-versa.

AGUMBE RAINFOREST RESEARCH STATION (ARRS)

A report of the activities carried out during this year:

Details of the King Cobra Rescue and Monitoring protocol

| Snake species | Rescued | Monitored |
|------------------|------------|-----------|
| King cobra | 91 | 43 |
| Spectacled cobra | 60 | 11 |
| Python | 10 | 2 |
| Rat snake | 5 | 1 |
| Trinket snake | 1 | - |
| Total | 167 | 57 |

224 conflict calls were attended to.

Outreach programs about snakes

| Target audience | Total programmes | Addressed |
|-----------------------------|------------------|-------------|
| School and Colleges | 17 | 1552 |
| Forest department officials | 1 | 70 |
| Local communities | 3 | 260 |
| Totals | 22 | 1942 |

Educational material and information was distributed after every conflict mitigation session and workshop.

Workshops

1. Community college, Valencia. Florida for their regular field course.
2. 3 monsoon madness camps conducted.
3. Started annual Field Botany certification course with NCBS
4. Annual Butterfly flying camps.
5. Annual Otter workshops with Wild otters.
6. Collaboration with The Gerry Martin Project.
7. NCBS Wildlife Students' Field Initiation camp.
8. NCBS PhD North East students' Field Methods camp.
9. Afforestation camp with Oracle-Aviratha.
10. Camps with Sanjeev Pednekar, SuhasPremkumar, RamitSingal and Vipul Ramanuj.
11. Knowledge exchange camp by University of Exeter, England.
12. Rainforest ecology camps with Nikhil Bhopale and Kodandaramaiah.
13. Camp for FSL India.

14. Camp for Mountain View Public School, Chikmagalur.
15. Day camps for Government School, Tumkur and FSL India.

Research

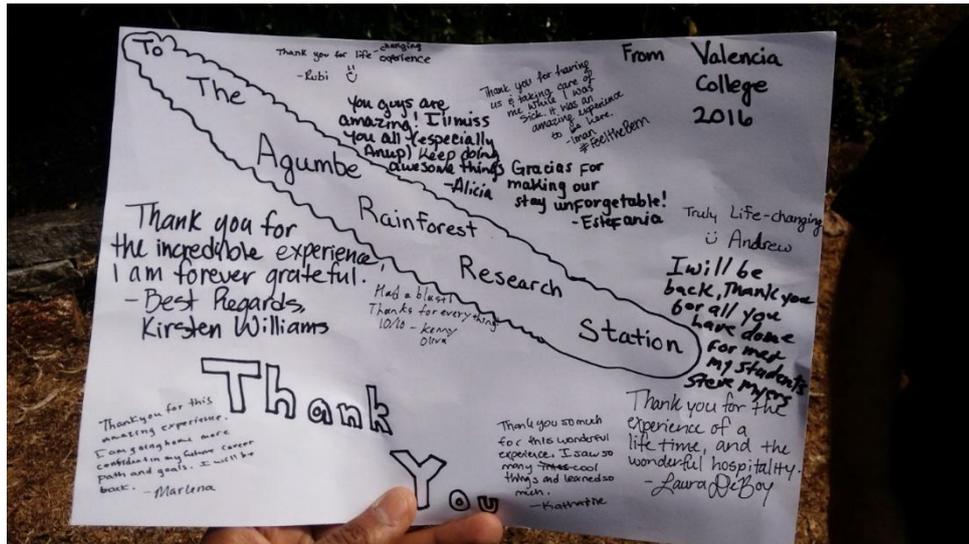
1. Year 7 of the yellow wattled lapwing breeding ecology – winter 2016
2. Breeding ecology of the endemic *Uperodon mormorata* – monsoon 2016.
3. Climate change project with EMPRI – September 2016 to September 2017.
4. Rainforest regeneration with the Forest Department.
5. Year 4 of the rainforest moth life cycle project with NCBS.
6. Behaviour work on honey bees with NCBS.
7. Sexual dimorphism in Indraneil's day gecko (*Cnemaspis indraneildasii*) with TERI University.
8. Long-term mammal monitoring. Started in March 2017. Data is collected through regular camera trapping and transect walks around the field station.
9. M Sc dissertation work by Priyanka Upadhyay, TERI.
10. PhD field work on gliding mechanism of *Draco dussumieri* by Pranav Khandelwal, University of North Carolina.
11. Small clawed otter behaviour work with Wild Otters, Goa.

Base Maintenance

1. Section 109 conversion of ARRS land from agricultural to educational space.
2. New photovoltaic system 1 kW solar panels donated by Aviratha-Oracle.
3. New generator donated by Sanjay Sane.
4. Honey boxes maintenance.
5. Maintenance and sale of areca plantation and produce.
6. Solar water heater to reduce dependency on firewood.
7. Designed field tech such as UV Torch and DC Charger made by ARRS to supplement income.



ARRS staff with the professors of the University of Exeter.



Testimonials from Students of University of Florida, Valencia.



Workshop on King Cobra rescues for officials of the forest department.

SEA TURTLE CONSERVATION 2016-17

Advancing the conservation of sea turtles and coastal management efforts in India through monitoring of index sites and network partners (in partnership with Dakshin Foundation)

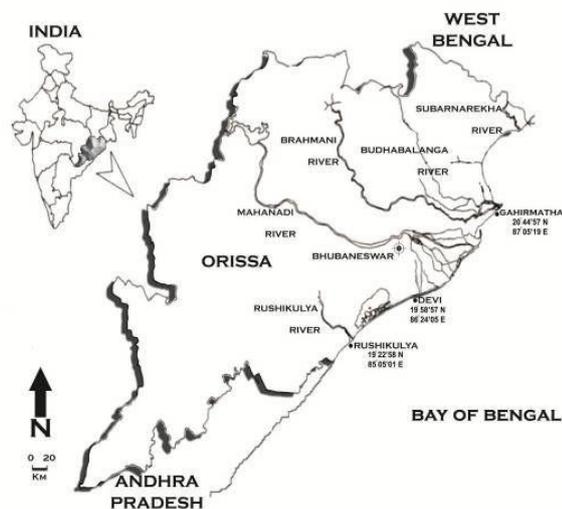
The long-term monitoring programme for sea turtles along the Indian coast has been assessing trends to determine and implement conservation actions in collaboration with Dakshin Foundation and the Centre for Ecological Sciences, Indian Institute of Sciences. This is being carried out at key sea turtle nesting sites at the mass nesting beaches of Olive Ridley

turtles in Odisha and nesting beaches of the Leather back in the Andaman and Nicobar Islands. This is complemented with programmes that train local agencies by building networks. Sea turtle nesting occurs throughout the east and west coasts and in the islands of India. Monitoring at this larger spatial scale has been promoted through the Turtle Action Group (TAG), established in early 2009. TAG is a well-established network of over 25 organisations from across the country working on sea turtle conservation and coastal habitat protection. An online database has been developed which helps standardise monitoring protocols across these sites, where the data can be visualised and shared. Over the last eight years, member organisations of TAG have come together for nationally organised workshops to share experiences and discuss collaborative actions. It is necessary to further build capacity through sub-regional meetings and develop material for training and education in a locale specific manner, including in local languages. This project has promoted collaborative efforts to address coastal management issues which have significant impacts on sea turtle conservation.

The project activities for this year included:

1. Monitoring programme for olive ridleys in Odisha, including census of the mass nesting events at Rushikulya using standard methods, monitoring of offshore populations along the entire Odisha coast, and monitoring of temperatures and sex ratios to assess impacts of climate change

Figure 1: Mass nesting sites of olive ridleys on the Odisha Coast



2. Monitoring of olive ridley and leatherback turtles in the Andaman and Nicobar Islands, including long term monitoring at Little Andaman Island and island wide surveys.



Figure 2: important leatherback nesting sites in the Andaman and Nicobar islands

3. Supporting long-term monitoring programmes across various sites in India to collect, collate and appropriately represent collected data.
4. Building capacities of local community members and government officials in the techniques of data collection and maintenance of records through training workshops and promoting the use of the data portal for collection, collation and representation of data and maintaining content.
5. Understanding the potential for sea turtle based ecotourism in India and promoting its application at Rushikulya, Odisha through the training of local communities and field staff.
6. Disbursing small grants to member organisations to support independent activities towards sea turtle conservation through the process of grant application and review.
7. Developing educational material that builds on previously developed material and enabling translation and adaptation into local languages and contexts with the

assistance of member groups. This included the production of 2 issues of the Indian Ocean Turtle Newsletter.

8. Design and development of learning centres including educational material and displays for different states in collaboration with the Forest Department.

Project Personnel:

1. AdhithSwaminathan: Andaman and Nicobar Islands Research Assistant
2. Alissa Barnes: Marine turtle and fisheries association Research Assistant
3. Hariprasath R: Odisha monitoring programme Research Assistant
4. Muralidharan M: Programme Officer
5. RidhiChandarana: Conservation and sustainable livelihoods Research Assistant
6. RutujaDhamale: TAG Coordinator

MCBT Details...

Donors 2016-2017

| Donor name | Name of the project/organisation |
|---|--|
| Seacology | Andaman and Nicobar Environmental Team |
| Rufford Foundation | Diversity of geckos in the Andaman and Nicobar Islands: identifying islands and species of conservation importance |
| Rufford Foundation | Assessing biology, fisheries and conservation aspects of sharks in the Andaman Islands. |
| Rufford Foundation | A social perspective of the cetacean-fisheries interactions on the Andaman Islands |
| Charities Aid Foundation, India | Enriching the crocodile bank education program |
| Ocean Park Conservation Fund Hong Kong | Reptile conservation in rural Tamilnadu |
| Dr Jeffery Lang | Gharial telemetry |
| Prague Zoo | Gharial telemetry |
| Ocean Foundation | Sea turtle conservation |
| Turtle Survival Alliance | Freshwater turtles and gharial |
| Marine Turtle Conservation Alliance | Sea turtle monitoring project |
| Give2Asia | Snake rescue and snakebite awareness |
| University of Florida | Can Irula snake-catchers from India improve our ability to detect and capture pythons in greater everglades ecosystems? |
| Cholamandalam Investment & Finance Company Limited (CIFCL), | Master plan phase 1 and komodo dragon enclosure construction |
| Department of Science and technology, Seed Division, Government of India. | Renewing livelihood resources of <i>Nypafruiticans</i> and <i>Pandanus leram</i> and technological interventions in southern Nicobar Islands |

| | |
|------------------------------|--|
| USV Private Limited | Snakebite mitigation |
| Ambadi Enterprises Limited | Vet lab construction |
| SP Apparels Ltd | Development, maintenance and husbandry for gharial pen |
| Stichtung Herpetofauna | Vardha cyclone donation |
| Indiegogo | Vardha cyclone donation |
| The Crocodylian Conservation | Vardha cyclone donation |
| Gereinschaft der foerderer | Vardha cyclone donation |
| Mrs. KaminiSundaram | 40 th anniversary celebration |
| Mr. Murad Futehally | 40 th anniversary celebration |

Financial Overview

INCOME

| | | INR |
|----|-----------------------|----------------------|
| 1 | Ticket Sales | 15,266,760.00 |
| 2 | Research Grants | 23,350,844.79 |
| 3 | Donations & Rent | 1,644,526.00 |
| 4 | Environment Education | 1,904,980.00 |
| 5 | Croc Transfer | 215,936.00 |
| 6 | Adopt an Animal | 375,000.00 |
| 7 | Bank Interest | 293,326.00 |
| 8 | Croc Shop sales | 1,444,737.00 |
| 9 | ARRS | 1,391,863.00 |
| 10 | ANET | 2,297,561.00 |
| | TOTAL | 48,185,533.79 |

EXPENDITURE

| | | |
|----|----------------------------------|----------------------|
| 1 | Salary and Wages | 8,809,855.00 |
| 2 | Reptile Feed Costs | 2,801,555.00 |
| 3 | Maintenance and Upkeep | 3,195,682.00 |
| 4 | Pen Maintenance and Upkeep | 2,447,915.00 |
| 5 | Research | 18,053,966.69 |
| 6 | Environmental Education Expenses | 627,744.70 |
| 7 | ANET | 3,649,923.00 |
| 8 | ARRS | 2,477,939.86 |
| 9 | Croc Shop Expenses | 981,496.00 |
| 10 | Administrative Expenses | 612,165.17 |
| | TOTAL | 43,658,242.42 |

Visitation to Madras Crocodile Bank 2016-2017

| Month | Total no of visitors |
|--------------|----------------------|
| April'16 | 30496 |
| May'16 | 49943 |
| June'16 | 26216 |
| July'16 | 33339 |
| August'16 | 30518 |
| September'16 | 29464 |
| October'16 | 40644 |
| November'16 | 28443 |
| December'16 | 37841 |
| January'17 | 56163 |
| February'17 | 31405 |
| March'17 | 30280 |
| Total | 424752 |

AFFILIATED INSTITUTIONS

(Committees/ Membership/ Collaboration/ Consultation/ Editorial/ Networking) The World Conservation Union (IUCN)
IUCN/SSC Crocodile Specialist Group
IUCN/SSC Tortoise and Freshwater Turtles Specialist Group
IUCN/SSC Marine Turtle Specialist Group
IUCN/SSC Indian Subcontinent Reptile & Amphibian Group
IUCN/SSC Captive Breeding Specialist Group
IUCN/SSC Sustainable Use of Wild Species Group
National Centre for Biological Sciences, Bangalore
Centre for Cellular and Molecular Biology, Hyderabad
World Congress of Herpetology
World Wide Fund for Nature (WWF) - India & International Wildlife Institute of India, Dehradun
Bombay Natural History Society, Mumbai
Centre for Environment Education, Ahmedabad
Chicago Herpetological Society, USA
Fauna and Flora International, UK
Development Alternatives, New Delhi
Chennai Snake Park Trust
Irula Tribal Women's Welfare Society, Chennai
Irula Snake Catchers' Cooperative Society, Chennai
International Association of Zoo

Educators, UK Jersey Wildlife Preservation Trust,
UK
Turtle Survival Alliance
Niligiri Wildlife Association,
Ootacamund Central Zoo Authority of
India, New Delhi
Salim Ali Centre for Ornithology & Natural History,
Coimbatore
Madras Veterinary College, Chennai
Madurai Kamaraj University,
Madurai Pondicherry University,
Pondicherry
Andaman & Nicobar Islands State Wildlife Board, Port Blair
Andaman & Nicobar Islands State Level Environmental Council, Port Blair.
Andaman & Nicobar Islands 'Monitoring Committee for the Working Plan for the South
Andaman Division'.
Andaman & Nicobar Coastal Zone Management
Authority. Andaman's Science Association, Port Blair
Society for the Andaman & Nicobar Ecology, Port
Blair Auroville Index Seminar, Tamil Nadu
Ashoka Innovators for the Public, New
Delhi Kalpavriksh, Pune
Coral Reef Monitoring Network- South East Asia, Sri
Lanka Dakshin Foundation, Bangalore Karnataka
Survival International, UK
Trust for Environmental Education (TREE), Chennai
Zoo Outreach Organisation, Coimbatore
The Indian people's Tribunal on Environment & Human Rights, Mumbai
The Wildlife Trust of India, New Delhi
Smithsonian Institution, USA
Marine Conservation Society, U K.
UNEP/Conservation for Migratory Species of Wild Animals, Germany



The new Selfie Wall is a huge success!!

