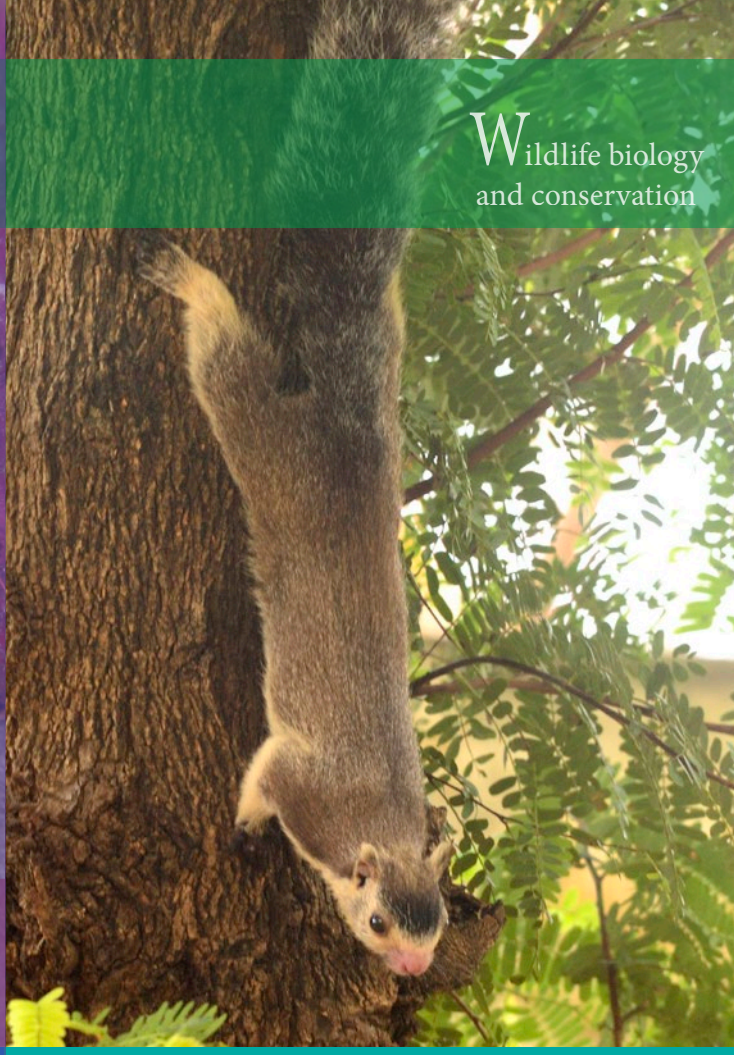
Marine science



Wildlife biology and conservation

Islands and reefs

ANNUAL REPORT 2012-13

FERAL

Natural resource management

Water, sanitation and hygiene

Learning and study abroad

Foundation for Ecological Research, Advocacy and Learning (FERAL)

Registered Office:
FERAL Campus,
170/3 Morattandi, Auroville Post,
Vanur Taluk, Villupuram District,
Tamil Nadu 605 101,
India

Tel: 91-413-2671566
Fax: 91-413-2671567
Web: http://www.feralindia.org
Email: feral@feralindia.org

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List of Acronyms:
ATREE - Ashoka Trust for Research in Ecology and the Environment
CEPF - Critical Ecosystems Partnership Fund
DST - Department of Science and Technology, Government of India
IFP - French Institute Pondicherry
KSAC - Keystone Study Away Consortium
MOES - Ministry of Earth Sciences, Government of India
SEED Division - Science For Equity Empowerment and Development, DST
UNICEF- United Nations Childrens Fund, Chennai

Mandate

Our mandate is to provide a base and support for researchers to follow their academic interests and priorities. Furthermore to impart training in ecological research, techniques and tools. And fnally, to collect, analyse and use information from ecological and environmental research to solve issues in natural resources management, conservation and advocacy.

FERAL – once wild, run wild again.

Foundation or goal of our organisation is to find ways to help natural processes return to a more natural or less degraded state.

Ecology, as we define it, is the study of the interactions of organisms within and across species in a shifting landscape of communities subject to the physical environments they inhabit. Our primary focus of work studies the interface and relationship between ecology and society.

Research is the key ingredient to our understanding of ecological systems. We believe that ecological science is not well enough established to make broad prescriptions that apply universally. Thus each ecological dilemma needs rigorous analysis that can then provide guidelines for local action.

Advocacy for appropriate natural resource management is the fourth lynchpin of our organisation. For us this is a mix of negotiation, facilitation and mediation where possible, but as a last resort litigation is also a potential option.

Learning is the final head on our chimera. To keep abreast of developments in this young science, we continuously strive to learn more and pass on these learnings. Newer techniques for analysis, new tools and new developments in the field of ecology, action research and advocacy keep us constantly on our toes.

FERAL is a non profit Trust formed on the 22nd of July 1997. We have six programmes through which we attempt to meet our mandate for data driven ecological research which addresses issues of conservation, livelihoods, natural resources, education and outreach. Our activities are co-ordinated from the campus close to Pondicherry and our office in Bangalore. We also have field stations located at Ariyankavu (Kerala), Saptur and Emerald (Tamil Nadu) and Sirsi (Karnataka).

The year that was

2012-13 saw the completion of five projects, initiation of four new projects and continued work on yet another eight projects, of which two received additional funding, under the various programmes. This was largely a year of consolidation and completion with an emphasis on influencing policy though engagements at many levels. Among these were numerous workshops with policy makers in the departments of forests from both Kerala and Tamil Nadu, work with the fisheries departments of Tamil Nadu and Pondicherry.

Wildlife biology and conservation

The focus of this programme is to undertake scientific research on wildlife and use the outputs to steer conservation interventions. In the year gone by, we had eight projects under this programme.

In the Periyar-Agastyamalai landscape we studied the status and distribution of arboreal mammals. Results suggest that some of the key areas with arboreal mammals exist outside the current Protected Area network. Field work to assess functional connectivity for large mammals within the landscape has been completed, and preliminary results indicate the lack of connectivity for tigers and elephants across the Shencottah Gap. Our project on Payment for Ecosystem Services approach to procure conservation services in the Shencottah gap was continued. Along with making community payments we also progressed in making direct payments to individuals to enhance biodiversity on private lands.

The collaborative project with The Rainforest Alliance to certify rubber plantations continued, during this year key indicators were developed and preliminary market assessments were carried out.

This year we also completed a study in the Great Himalayan National Park and its surroundings to understand the effects of recurring forest fires and grazing system on the grasslands found in this landscape. Results from this study show that both protected and unprotected grasslands fared poorly in vegetation composition as a result of grazing restrictions. It was found that grazing was a more important factor in shaping the vegetation when compared to forest fire.

We trained over a hundred ecologists and conservation practioneers working the Western Ghats in the use of spatially explicit tools. These training programmes has built capacities of these researchers to use spatially explicit data from a variety of sources in conservation related research.

Consumer control and vegetation response: The fire-vegetation-grazing dynamics in the Western Himalayan landscape.

Project period: *July 2011 - December 2012*
Budget: ₹ *4,27,080*
Supporting partner: *The Rufford Small Grants Foundation*
P.I.: *Rajat Ramakant Nayak*

This project attempted to understand the dynamics and relationships between fire, vegetation and grazing in the western Himalayas. Its overall objective was to contribute to better management practices locally and at the policy level. The project area was a mosaic of human modified high altitude grazing lands or "thach", forests and habitations in and around the Great Himalayan National Park in Himachal Pradesh.

Thachs have been traditionally maintained by seasonal livestock grazing systems but, of late have been abandoned as they fall under the national park. This is leading to a change in their vegetative composition, with unpalatable perennial species replacing palatable annuals leading to a drop in overall forage availability in these regions. Fire is another major driver of species composition and is used extensively in the community pastures - outside the national park. The withdrawal of traditional grazing grounds from pastoralists has resulted in a many fold increase in grazing pressure on community "ghasni" can potentially lead to numerous undesirable consequences including loss of nutrients from soils.

The project has established that both protected thaches and local ghasni's have fared poorly as a result of grazing restrictions. It was found that grazing was a more important factor shaping the species composition in thaches and ghasnis when compared to fire. Species composition was also closely related to the elevation and area of the thaches. Management recommendations from the project include the re-institution of controlled grazing or alternative mechanism to maintain the species structure of the thatches. Further research on the impact of overgrazing on soil nutrients is required as is the need to institute rotational grazing in ghasni's.

A high altitude grassland, protected from livestock grazing for last 10 years, dominated by perennial plants.

A high altitude grassland, thach is rich in biodiversity and form an important part of traditional livestock grazing system.

Gap analysis of the Periyar - Agasthyamalai landscape for arboreal mammal conservation

Project period: *August 2011 – February 2013*
Budget: *$ 19,047*
Supporting partner: *CEPF-ATREE Western Ghats Small grants Programme*
P.I.: *H.S. Sushma*

The Periyar - Agasthyamalai landscape in the southern Western Ghats contain some of the least fragmented forest stretches in the entire Western Ghats. Several endemic and globally threatened species as well as unique ecosystems such as the Myristica swamps are found here. The Periyar – Agasthyamalai landscape is one of the key areas for biodiversity conservation. This landscape extends across 5758 km^2 of which 3054 km^2 is under Protected Area (PA) network.

However there is still a large extent of biodiversity rich forests outside this network (2704 km^2). Given the forest contiguity, this landscape is expected to support viable populations of endemic lion-tailed macaque (*Macaca silenus*) and Nilgiri langur (*Semnopithecus johnii*). In addition to these, other diurnal arboreal mammals that occur in the landscape are the bonnet macaque (*Macaca radiata*), tufted gray langur (*Semnopithecus priam*), grizzled giant squirrel (*Ratufa macroura*) and the Indian giant squirrel (*Ratufa indica*). It is therefore an important site for conservation of these species.

In order to step up ongoing conservation efforts at a landscape level, we carried out gap analysis for a community of diurnal arboreal mammals that occupy a wide array of habitats in this landscape. The main aim of the study was to identify and prioritize sites outside the current PA network that are critical for conservation of these species, assess existing PAs for adequate representation of these species and finally to prepare a draft of site specific recommendations for arboreal mammals conservation in the landscape.

We carried out a detailed review and collation of existing information on arboreal mammal occurrence and conducted field surveys in sites where information was poor. Gaps in information regarding arboreal mammal occurrence were identified and surveys were carried out in sites which lacked information on occurrence. Several sites for example Ranni, Konni, Punalur, Thiruvananthapuram Forest Division, Neyyar and Peppara Wildlife Sanctuaries in Kerala and Srivilliputhur, Kanyakumari Wildlife Sanctuaries in Tamilnadu lacked recent information on occurrence of arboreal mammals. Information from secondary sources were combined with information obtained from field surveys and they were used to build species distribution modeling using a maximum likelihood estimation method. These distribution maps were then used in prioritizing sites for conservation.

Our results indicate that a large extent (~ 1265 km^2) of important sites for arboreal mammals outside the existing network of PAs. In the Agasthyamalai landscape ~ 90% of the landscape has already been incorporated under the existing PA network. On the other hand, in the Periyar landscape, 2336 km^2 of contiguous forests exist outside the current network of Protected Areas. Based on the results of the study, a working draft of recommendations was prepared which was discussed and finalized during a consultative workshop with managers and scientists working in the landscape.

Important recommendations from the study are: rationalizing boundaries of existing Wildlife Sanctuaries to include crucial sites; mitigation measures for linear barriers such as deploying canopy bridges at appropriate places to facilitate movement of arboreal mammals across the Shencottah gap, regulating traffic on roads passing through forested sites; habitat improvement and fostering connectivity through stream corridors; research recommendations such as establishing baseline population estimates and habitat assessment for long term monitoring; protection of grizzled giant squirrels outside the Srivilliputhur Wildlife Sanctuary boundary by fostering incentive based mechanism with the local farmers. The final technical report of the study can be downloaded from this link: *http://www.feralindia.org/drupal/users/sushma-h-s*

Functional connectivity for large mammals in the southern Western Ghats, India: linking movement and distribution

Project period: *May 2011 - October 2013*
Budget: *$ 65810*
Supporting Partner: *Wildlife Conservation Society and US Fish and Wildlife Service*
P.I.: *Aditya Gangadharan*
Co-P.I.: *Srinivas Vaidyanathan*

This project tried to identify the locations of linkages between contiguous stretches of wildlife habitat at the large scale, as well as smaller movement corridors, across the Shencottah Gap in the southern Western Ghats. Its primary objective was to identify these corridors so that functional connectivity between larger the larger landscapes of Periyar and Agasthiyamalai could be restored.

Intensive camera trapping to monitor large mammal use of the region was done. After more than 30,000 trap-days of effort over an area of 300 km^2, we documented the presence of more than 20 large mammal species. We found that both tigers and elephants approach the national highway and railway line - the major linear barriers that pass through the gap, but fail to cross. Elephants appear to have attempted a crossing of the Gap in the summer of 2013, and at least one leopard regularly crosses the gap. The locations of these crossing areas correspond with historical movement, as verified through conversations with local residents. It appears that corridors across the Shencottah Gap are still functional, even with the current high levels of human disturbance and vehicular movement.

The data therefore suggests that restoration of the Shencottah Gap is ecologically feasible. Importantly, this may be possible without any displacement of local residents provided adequate and targeted management efforts are made. The two major bottlenecks are a 500 m stretch without houses at MSL, and a stretch of less than 200m at the Kottavasal where animals are able to go around the settlements. It is critical that no further encroachments take place here and vegetative cover is restored.

Fieldwork has been completed for this project, and the results have been communicated to governmental authorities and the conservation scientists working in the region.

Study of the distribution of the primates the genus Semnopithecus and understanding factors that influence parapatry between the Common langur (*Semnopithecus priam*) and Nilgiri langur (*Semnopithecus johinii*) in the southern Western Ghats, India.

Project period: *April 2010 - February 2013*
Budget: ₹ *9,97,992 and* ₹ *11,53,943*
Supporting Partner: *Women Scientists Scheme, DST, Govt. of India and Primate Conservation Inc., USA.*
P.I.: *Sunita Ram*

This project, comprising of three major components, tried to unravel the status of two closely related primate species which exhibit parapatry - or overlap in ranges. The study was concerned with the push and pull of natural and anthropogenic factors which facilitated range overlap and potential hybridisation of the two species.

The larger question, which remains only partially answered, is whether the species hybridise and whether these hybrids are viable? Further, what factors could influence the continued co-occurrence of the two langurs and whether these would lead to hybridisation or keep them genetically isolated? The first component of the project determined the vegetation composition of the habitats in which the two species tended to occur independently or together. It was found that areas where the Nilgiri Langur and Hanuman Langur were allopatric, i.e. areas where only one of the langur species was found, differed considerably while areas of co-occurance was more similar to that of the Nilgiri Langur than the Hanuman Langur.

The second component studied the relative parasitic load of the two primates in varying ecological contexts, particularly in regions of overlap. While results from this study are not conclusive, they suggest that gastrointestinal parasites could be a potential driver in delineating the common boundary between the two langur species.

The final component of the project will attempt to map regions where the langurs exhibit parapatry in an effort to understand whether habitat composition itself is a driver for co-occurrence. It is clear that additional long term monitoring of the overlapping langur troops is required to understand aspects of behaviour and ecology. Genetic studies will probably be necessary to determine whether visually different offspring of the langurs are actual hybrids or not and whether they are reproductively viable.

Rhabditoid larva of the Strongyloides sp.

Forest areas adjoin many of the rubber plantations in Shencottah gap

Exploring sustainable landuse practices in rubber plantations in a critical wildlife corridor.

Project period: *January 2012- June 2014*
Budget: *$ 39,833*
Supporting Partner: *Critical Ecosystem Partnership Fund*
P.I.: *Sunita Ram*
Co.P.I.: *Srinivas Vaidyanathan*

Critical wildlife corridors often pass through land under different types of ownership. This includes government owned forests, individual landowners and company owned estates. Restoring/maintaining connectivity in areas under the control of the Forest Department is easily achieved. However, doing so on privately owned areas needs alternatives especially when outright purchase is not an option.

This project explored an alternative approach through which large plantation and estate owners could be encouraged to manage their land in a wildlife-friendly manner. The essence of the strategy lay in providing a certification for supporting conservation. This was tied to Corporate Social Responsibility and best management practices based on both social and ecological indicators. The latter fall in the realm of habitat restoration which is required to re-establish connectivity while safeguarding agricultural production and providing economic incentives.

This project explored such an approach to restore connectivity in the Shencottah gap. Here one of the two corridors identified for large mammals passes through large rubber estates. The Rainforest Alliance's "Sustainable Agriculture Network" standard and the SmartWood programme under the Forest Stewardship Council standards was introduced to the management at the Harrison Malayalam rubber estate. Certification under these standards would encourage the adoption of suggested conservation measures to ensure connectivity. In turn, the certification is expected to create new market linkages for products from the estate.

This project is being implemented in collaboration with The Rainforest Alliance who conducted the first diagnostic audit of the estate in early 2013. Meanwhile FERAL is trying to raise awareness about this certification process amongst other estates in the region and also smaller private players. A web site has been set up to this end as well and the team has been actively participating in numerous stakeholder workshops organised by The Rainforest Alliance.

Participatory resource mapping with farmers in Saptur, House hold interviews, collecting land details and willingness to participate in conservation auctions.

Bridging the Shencottah gap: How payments for ecosystem services can restore biodiversity outside protected areas in India.

Project period: *October 2009 - June 2014*
Budget: *$ 4,99,443*
Supporting Partner: *Critical Ecosystem Partnership Fund*
P.I.: *Srinivas Vaidyanathan*

Protected areas constitute only about 4% of the land area of India. Many ecologically rich and sensitive regions are outside this network, thus providing a potential for enlarging the protected area network through incorporation of additional land into the protected areas. While such inclusions are possible with Government owned land, incorporating privately owned land can be expensive and time consuming. Thus immediate steps required to maintain and enhance biodiversity in areas identified as corridors on both state owned forests and privately owned land.

This project seeks to establish protocols and build experience in using payments for ecosystem services to restore and conserve biodiversity in such areas and also to rationalize the existing PA network to incorporate areas within multiple use reserve forests critical to long term sustenance of wildlife and their habitat. The project targets the Shencottah gap, a mosaic of remnant moist and dry deciduous forests interspersed with rubber, tea, teak, and other farms.

The first phase of the project set out to identifying potential links in the Shenkottah gap at two scales. At a coarse scale, corridors were identified that need to be protected or legally designated and managed to ensure long term connectivity. At a finer scale, linkages were identified which need to be restored to ensure animal dispersal across the gap.

In its second phase the project established mechanisms and protocols for payments for ecosystem services - in this case, protecting and enhancing biodiversity and landscape connectivity. Three different mechanisms were established.

For forest dependent communities who regularly venture into the forest, a payment cum incentive based payment approach was adopted. The community monitored setting up and maintaining camera traps within one of the wildilfe corridors.

Two mechanisms were set up for private land owners to participate in conservation efforts. This inculdes a one to one negotiation with farmers where barren/ uncultivated blocks are restored with native agro-forestry tree species and also maintaining exixting native vegetation. In the second mechanism, the farmers were selected through a reverse auction which ensured that the farmer offering the most favourable combination of habitat quality and conservation action receiving payments.

The project is now establishing protocols for measuring improvements in habitat in the fields of the partner farmers and tying these to an incentive system. Challenges of scaling up these payments and sourcing resources for long term support for the initiative are the present focus of the project.

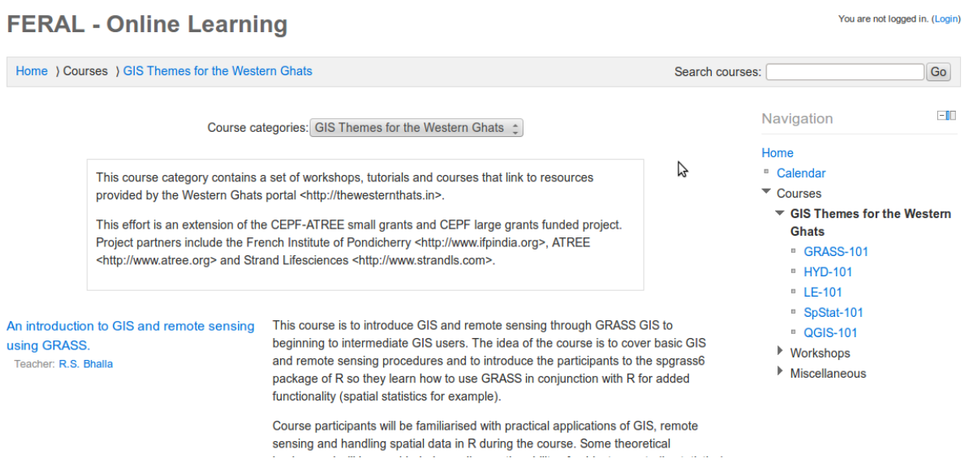
Networking and data support to the Western Ghats portal

Project period: *April 2012 - March 2013*
Budget: ₹ *4,65,340*
Supporting Partner: *French Institute of Pondicherry as a sub-grant of Western Ghats Biodiversity Open Collaborative Information System.*
P.I.: *R.S. Bhalla*

FERAL has conducted a large number of workshops in the application of open source GIS and remote sensing for conservation practitioners and wildlife biologists. The organisation has an 'open' approach to data and makes its baseline and published data layers available to researchers and practitioners on request. We have also demonstrated that such data sharing initiatives can be established and the modalities for the same have been worked out with other institutions which includes the French Institute of Pondicherry (IFP) and the Ashoka Trust for Research in Ecology and the Environment (ATREE).

This project is meant to facilitate an increased adoption of the Western Ghats Portal (WGP) <http://thewesternghats.indiabiodiversity.org> by the conservation and research community. It also seeks to enlarge the spatial datasets and capacity building offered by the portal to its members. The latter refers to improved access to expertise in open source GIS and remote sensing that will be made available via the WGP network.

In addition, gaps in baseline datasets will be identified and data will be made available to the portal over an extended period. This is linked to the geomatics work taken up by FERAL for a number of other projects as well, making this a long term contribution to the WGP. Members from four to six institutions who are directly engaged in GIS and remote sensing or conservation research will be met to seek their support to the WGP so they become active users and contributors. Topics of interest will be identified for each of these institutions and a lead person will be identified to manage the creation and updating of datasets and user community on that theme. Training in open source GIS and remote sensing technologies will be offered to students from interested institutes as an incentive to join the WGP community.



Screen shots of the Moodle course series created for the programme.

Building capacities for conservation planning using open source tools

Project period: *October 2011 - July 2012.*
Budget: *$ 18,888.75*
Supporting Partner: *CEPF-ATREE Western Ghats Small Grants*
P.I.: *R.S. Bhalla*

This project was a result of a gap identified by CEPF partners in the availability of training in quantitative and spatial techniques which have widespread application in conservation.

The project built capacities of researchers in the use of tools for managing spatial data and analysing spatial relationships. This could be a crucial ingredient in their professions.

Six five day workshops introducing GIS, remote sensing and spatial statistics were run in facilities hosted by partner institutions in Bangalore, Trivandrum, Coimbatore and Pondicherry. This helped in creating a network of institutions and resource persons interested in providing training in these tools.

The resource persons identifed from these institutes are expected to participate in the design of future theme specifc, workshops in their respective areas of expertise. An initial set of syllabi was formulated for teaching spatial analysis to ecologists based on discussions with experts in the feld. This may have long term impacts on the quality of research outputs from institutions involved in these felds.

The project has trained over a hundred researchers active in the field of conservation and ecology in the Western Ghats in the use of spatially explicit tools. The training has filled an important gap in the capacities of these researchers to use spatially explicit data from a variety of sources in conservation related research.

A field session on using GPS units at Pondicherry University.

Learning and study abroad programme

This programme hosts semester long and short term courses as well as workshops on a range of topics and techniques required by researchers. Its most important component is the study abroad through which undergraduate students have an opportunity to attend classes offered by FERAL and other partner institutions.

The two major changes on the programme this year was the addition of Phuket, Thailand as a location on the Islands and Reefs course and a new collaboration with Sacred Heart College, Thevara, Kerala for part of the Uplands and Estuaries course. Seven students signed up for the semester on marine sciences in India and Christopher J Smith, a former student joined us later in the semester in the capacity of a teaching assistant.

An additional focus on courses for post graduate and doctoral scholars and conservation researchers is being considered for the future. There are a number of workshops, such as those presently offered on spatial techniques, which could be converted into longer and more formal accredited courses. Such courses would help fill gaps in present curricula in postgraduate programmes in conservation and environmental sciences offered by universities and colleges in India.

Students taking salinity and depth measurements at Cheyyur

FERAL - KSAC Marine science in India, spring 2013

Project period: *2006 – ongoing*
Budget: *Depending on participants*
Supporting partner: *Keystone Study Away Consortium*
PIs: *Neil Pelkey & Tara N. Lawrence*

The students ushered in the New Year at Phuket, Thailand where subsequently two of them completed their PADI open water dive certification. The visit to Phuket was partially exploratory in nature as it was included for the first time on the programme. Potential for courses on the sustainable development for future programmes was also explored.

The GIS and Methods courses were conducted in Pondicherry where the entire group studied the "Effects of Groynes on beach erosion at Quiet Beach, Pondicherry". The Methods course trained the group in research methods and analysis that was necessary for them to be able to engage in independent and joint research projects at the various locations.

Four students required credits for a Natural resource management (NRM) course as a result of which they lived at Sadhana Forest for about a week and worked on a project entitled "Comparing three sustainable reforestation and agricultural practice projects in Auroville, Tamil Nadu." The project had them spend most of their time at Sadhana Forest, with a day each allocated to Evergreen forest and Pebble Garden in Auroville respectively. During this time, the remaining three students worked on a project related to the Upland and Estuaries course on "Effects of Salinity on wading birds within two estuarine systems: Cheyyur and Edayanthittu, Tamil Nadu, India".

ANET, as always, offered a fantastic environment for students to work in the intertidal walks, the mangrove forests and the beaches. The fish landing centres afforded an array of possibilities for students to work with. Students had a few days dedicated exclusively to design their study followed by data collection and were therefore able to execute individual reasearch projects rather successfully, bringing the Islands and Reefs course to a close. Some of the work produced this semester is as below:

1. Rocky tide pool diversity: Diurnal vs Nocturnal Organisms, North Wandoor Beach
2. Invertebrate Diversity and Habitat Preference for three species of mangrove trees in North Wandoor
3. Distribution of faunal abundance and diversity in the mudflat region off the ANET property.
4. Fauna diversity across rock and wood substrates, South Andaman Island.

The students had the opportunity to experience and learn about the varied aspects of zoo keeping at MCBT along with talks on reptile morphology and physiology. Their final projects were to design enclosures and present care schedules for animals of their choice and the three groups chose to work on burmese pythons, water dragons, tortoises and Cuvier's dwarf Caiman.

After spring break at Barefoot Scuba was a week at Sacred Heart College, Thevara, Kerala. This was in partial fulfillment of the Uplands and Estuaries course covering a wide range of topics from aquaculture to marine chemistry. The faculty were very enthusiastic resulting in the entire experience being positive for the students.

The Art as Sustainable Development course was run at Pyramids, the Art centre of Auroville. While classes on culture, class and gender were mainly held in Pondicherry. The course is highly observational in nature and therefore relevant at all travel locations on the programme. On the whole, students enjoyed the programme immensely and provided positive feedback which will be considered for future programmes.

Faculty members Rosalie and Celia getting blessed by Laxmi, the temple elephant.

FERAL – KSAC 13 – Faculty programme

Project period: *Jan 7th to Jan 12th 2013*
Budget: *Depending on participants*
Supporting partner: *Keystone Study Away Consortium*
PIs: *Neil Pelkey & Tara N. Lawrence*

A week long programme for seven KSAC faculty members was run in parallel with the student programme. The purpose of their visit was to explore potential for further collaborations particularly with Sacred Heart College, Thevara and Madras Christian College, Chennai. They also shared some of the students' experiences on the India programme. The group divided their time between Pondicherry and Sacred Heart College resulting in a very hectic schedule. They visited a few places ie., Sadhana forest and Discipline farm which students usually visit or intern with on the programme. Also part of this experience was a boat tour along the coast led by Aurofilio from PondyCAN. This was followed by field visits to two sites severely affected by beach erosion with a concluding lecture on Coastal Zone management. Interactions in Kerala with Fr. Prasant and faculty were positive with potential for student exhange programmes. The last day included a visit to Madras Christian College with a brief interaction with the BCA resident director, Ms.Anupama Pai. This was followed by a few hours at MCBT with subsequent visits to the temples in Mahabalipuram. The programme received positive feedback from the faculty members whose names and expertise is as below:

1. Leah Hamilton, Social Work
2. Susan E Prill, Religious Studies Sikhism
3. John Unger, Chemistry
4. Rosalie Rodriguez, Cultural Diversity
5. Robert M East, Environmental Studies
6. Celia Cook-Huffman, Peace Studies
7. Kati Csoman, International office

Natural resource management

This programme has a strong overlap with initiatives in FERAL dealing with community based resource and environment management. This includes the marine sciences programme, water, sanitation and health.

Management of water resources and the potential impact of climate change on ecosystem services is the major focus of the NRM programme. It presently has a project in the Western Ghats under its purview.

In the coming year, the programme seeks to expand research on ecosystem services to other areas in the southern Western Ghats. Proposals have been submitted to compare ecosystem services and vulnerabilities of communities against different climate scenarios, particularly extreme rainfall events.

Our work with coastal communities continues with proposals seeking to measure vulnerabilities of coastal communities in the Cauvery delta and to involve local stakeholders in the evolution of integrated coastal zone management plans.

The Upper Bhavani dam benefits from the natural Shola habitat of forests and grasslands which sustain flows and filter out sediments from runoff.

Downloading data from a tipping bucket rain guage.

View of the Avalanche reservoir from the rain guage installed at the valve house. Below: Installing a water level recorder at the "bunker"

Hydrologic and carbon services in the Western Ghats: Response of forests and agro-ecosystems to extreme rainfall events.

Project period: *January 2012 – December 2014*
Budget: ₹ *4,520,000*
Supporting partner: *Ministry of Earth Sciences*
Co-PIs: *R.S. Bhalla and Srinvas Vaidyanathan*

This collaborative project is led by Dr. Jagdish Krshnaswamy (ATREE) and Dr. Michael Bonell (University of Dundee) and involves four institutions and as many major components. The goal of the project is to unravel the linkages between carbon and water relationships in various ecosystems, both natural and human modified.

The project has four major objectives:

1. To understand the spatial and temporal dimensions of extreme rainfall events (ERE) in the western ghats in relation to spatial patterns of land-cover and land-use.

2. To determine the hydrologic and carbon dynamics consequences of existing land-cover and land-use including large scale forestation in the western ghats and adjacent Deccan plateau.

3. To assess the hydrologic and carbon vulnerability of ecosystems, natural, semi-natural and agro-ecosystems, to extreme rainfall events at various spatial scales.

4. To prioritise sites in the western ghats and adjacent Deccan plateau for restoration under the Green India Mission and other watershed management programmes.

On this project the FERAL team is handling much of the data organisation, its preliminary analysis and the remote sensing component. A field station was set up and is being maintained by FERAL at Emerald, about 20 kilometres from the hill station of Ooty. In due course we will be taking up the modelling of surface water flows along with sediment and nutrient transport.

Thus far, numerous scripts have been written to organise and calibrate data from loggers tracking rainfall, stream heights, temperature, relative humidity and a range of meterological parameters from automatic weather stations. This data is a crucial ingredient in the models to be set up under the project in the coming years.

Secondary data from sources on the web and literature have been collated and organised to provide a background for comparative analysis of rainfall events in the region. These are being used to link to meteorological observations from remote sensing to observed rainfall measurements on the ground. A manuscript which statistically analyses the relationship between the Indian monsoon and ocean-atmosphere phenomenon is also under preparation.

One of the many Gaur we try not to "run into" during field work.

Fisherman operating the GPS unit, recording each fishing location.

Marine science

This programme attempts to unravel the complex links between fishing capacities, management structures and their impacts on species composition and marine ecosystems. Projects in this programme look at both the social aspects of resource management as well as the ecological aspects of species composition, diversity and morphometry.

A series of projects on fisheries along the Coromandel coast of Tamil Nadu were the core of the programme. Surveys extended from only artisanal fisheries to include mechanised craft and greatly enhanced the spatial mapping of fishing efforts. A component on artificial reefs was added to our work which could become a crucial element in artisanal fisheries management. This would also allow a unique opportunity to study the colonisation of artificial structures through regular observations of the reef.

The programme is rapidly expanding in both scope and coverage with a number of new proposals from the West coast and one on exploring the genetic connectivity of commercially important fish species along the entire peninsular coast.

Field assistant Ezhumalai interviewing a fish vendor busy preparing her catch for sale.

Catch from a ring seine at Cuddalore.

Trawl catch landings.

Co-management of artisanal fisheries along the Coromandel Coast

Project period: *October 2011 – October 2013*
Budget: ₹ *22,66,110*
Supporting partner: *SEED Division, Department of Science and Technology*
P.I.: *Tara N. Lawrence*
Co.P.I. *R.S Bhalla*
Project Area: *Coastal areas of Villupuram and Cuddalore Dt. Tamil Nadu and Pondicherry*

This project seeks to contribute to sustainable management of marine fisheries by strengthening initiatives in fisheries co-management. It seeks to answer specific questions about resource utilisation among artisanal fishers and help build upon earlier work in organising meetings between representatives of artisanal fishers and the fisheries department. This research has direct relevance to the artisanal fishing communities located on the Coromandel coast. The project area comprises of 15 fishing settlements and three jetties along the largely sandy coast between Marakannam in Villupuram Dt. It extends to the deltaic areas of the Cauvery river in the region of Killai, at the South of the Cuddalore Dt. and encompasses the union territory of Pondicherry.

Major achievements of the project include household surveys across 45 households from each of the 62 villages surveyed in 2008 . This was part of an UNDP- FAO funded project. This was done to track changes within the sector in the intervening 4 years.

Three cycles of trawl fishing and catch composition data collection are completed. The harbors surveyed were Pondicherry, Cuddalore and Mudasaloodai.

Eight chartplotters were distributed to trawlers and vallams for a duration of 15 months. The fishermen logged the fishing location of each fishing trip and this data was periodically collected by the team along with details on catch composition, total catch weight and price. Additionally, one unit was used every three months to track fishing locations of all types of craft found along this part of the coast. This was done for 15 days every three months in order to capture the approximate daily fishing effort of the respective regions.

A total of 289 and 255 people were interviewed for the market and credit surveys respectively, comprising of the key stakeholders within the commmunity.

Finally, the designs for the artificial reef units have been completed.

Compilation and analysis of the data collected so far is currently underway. This will be presented to the fishing community prior to the comanagement meetings. Leading authorities from the community are expected to discuss potential ways of management at the local level using this data as one of the major factors in the decision making process. The final meetings will serve as a platform to discuss potential ways and means for the community to actively participate and enforce management at the local level. Their recommendations will subsequently be forwarded to the Government fisheries departments and key stakeholders for further support and action.

Water, sanitation and hygiene

With the first WASH project starting in 2009, WASH is growing steadily and is slowly expanding into other WASH-related areas. Within the last four years a total of four WASH projects were completed and a fifth one has just started. The geographical focus of these projects is the coastal and rural districts of Tamil Nadu because it is here where the lack of sanitation affects people, especially children the most. Most of the WASH projects conducted so far had a strong child focus and girls in particular were prioritised since children are considered 'change agents' for better hygiene and sanitation conditions within their respective communities.

The programme is evolving from a predominantly intervention based effort to include elements of epidemiological research. Proposals in the pipeline are exploring the relationship between helminth parasitic infections and open defecation. A proposal on epidemiological mapping of malaria is also under preparation.

Sanitation in school in Karuneelam prior to and after intervention.

The implementation of a sustainable system to provide safe drinking water and adequate sanitation facilities for girl child around Chennai.

Duration: *April 2012 - May 2013*
Budget: ₹ *12,75,439*
Supporting partner: *FORD MOTORS*
Collaborating Institution: *Technology and Action for Rural Advancement (TARA)*
P.I.: *Gaspard Appavou*
Consultant: *Elke Van Koert*

One of the strategies that has been adopted by FERAL in its approach to WASH is to target school children. This has a number of advantages over household sanitation interventions. For one, it targets the younger generation who are more likely to alter their behaviour with respect to open defecation. Further, by restoring and building infrastructure in schools, we can ensure the use of facilities created.

This project, implemented in partnership with the Technology and Action for Rural Advancement (TARA), involved a series of activities and interventions in six schools located near the FORD Motors factory close to Chennai. The activities included the restoration and construction of drinking water facilities and toilets and a number of awareness generation programmes. A total of 14 toilets were constructed in the selected schools and another two were refurbished.

The awareness programmes tried to sensitise school children on the need for clean water and sanitation, both at school and at home. Interactions with the students revealed that a very small proportion of students had toilet facilities at their homes. In an effort to sustain the activities initiated by the project, eco-committees were formed in the schools and members were trained in the maintenance of the toilet infrastructure created.

Sanitation in school in Karuneelam prior to and after intervention.

Sensitizing school children through awareness and providing access to water and facilities

Duration: *July 2012 - December 2012*
Budget: ₹ *11,60,000*
Supporting partner: *UNICEF*
P.I.: *Gaspard Appavou*
Consultant: *Elke Van Koert*

This project had a strong focus on changing children's behavioural towards WASH. This was to be done by sensitising school children through awareness training on WASH and to provide access to water and sanitation facilities within their schools. This project can be considered as an extension of an earlier project carried out in the schools of Krishnagiri district.

This WASH project consisted of a six-month intervention that started in July 2012 in the District of Krishnagiri, Tamil Nadu. During the project period FERAL made an effort in changing schools into so-called 'child-friendly model schools' which was achieved through (a) increasing awareness on water, sanitation and hygiene among students and by (b) complementing these activities by physical upgrading of water and sanitation facilities in the schools.

For ten schools that were selected for this project, FERAL engaged students in a variety of different awareness programmes such as Global Handwashing Day and World Toilet Day. Most of the students were already aware of WASH, so these awareness programmes were used to reinforce their ideas and understanding of WASH in order to make these children agents of change and to indirectly introduce their parents to the importance of WASH. Awareness programmes were carried out on topics such as menstrual hygiene management, footwear and diseases. Additionally FERAL carried out training programmes for teachers and parents on WASH an on the importance of forming so-called ECO committees in schools and communities.

Other than these awareness and training programmes, FERAL continued working on physical improvement of water and sanitation facilities. It primarily included the provision of child-friendly sanitation and hand wash facilities but it also included repairs to drainage systems and the provision of rain water harvesting systems.

Islands and reefs

This programme was initiated to encourage researchers to focus and collaborate on studies addressing the unique set of conservation needs and challenges of islands, particularly the Andaman & Nicobars.

The marine sciences component of the study abroad programme offers an opportunity for designing long term studies which students can participate in. It was felt that projects under the Islands & Reefs programme could help with a framework for such student based research.

The programme presently hosts the Coconut Oil initiative in the Nicobar islands with numerous new proposals to document fisheries resources and exotic invasive species, their impact and possible control.

Intertidal walk to Kanai dera, Wandoor, Andaman Islands.

From Tsunami to Virgin Coconut Oil

Duration: *July 2012 - December 2012*
Budget: ₹ *11,60,000*
Supporting Partner: *Runners up for the St.Andrews Prize for the Environment*
P.I.: *Rauf Ali*

This is a four year initiative first funded by the Dept. of Science and Technology, but since supported through independent funds and presently through an award from the St.Andrews Prize for the Environment. The project supports procurement of cold presses designed to improve the efficiency and reduce the drudgery in the extraction of coconut oil from copra. Copra, or dried coconut kernel, is the major produce of the Car Nicobar island.

Via this project, persons from the local Nicobari tribe are able to extract virgin oil from the copra thereby saving considerably on transport costs and adding value to the final product. Even after repeated visit, there was very little production. A consultant was appointed who spent two weeks in car Nicobar. After her visit, we decided to change the stewardship of the coconut presses to a local entrepeneur, and production is expected to start soon. A distributor has been identified in Pondicherry who will purchase, bottle and sell the oil, while ensuring a remunerative price is paid to the growers.

Coconut press

Workshops and conferences

Here is a brief summary of the workshops and conferences that were hosted or co-hosted by FERAL. Most of these were part of ongoing projects and not "independent" events. We had two broad categories of events; those related to policy advocacy in our projects and training workshops which were attended by students and researchers.

Building Capacities for Conservation Planning (2 workshops)
Dates: 12th to 16th June, 2012 and 27th October, 2012
Resource persons: R.S. Bhalla, Saravanan S. and Kumaran K.
Supported by: CEPF-ATREE Western Ghats Small Grants
Host institutes and venues: Salim Ali Centre for Ornithology and Natural History (SACON) - Coimbatore and NIIIT- Hyderabad as part of the the FOSS4G event respectively.

The first workshop, attended by doctoral students and faculty covered the basics of GIS using Quantum GIS software.

The second, a one day event, covered a brief introduction to GRASS. Materials and tutorials used for the course can be accessed from the online course management site below
<http://www.feralindia.org/moodle/course/category.php?id=3>.

Consultative workshop for site-specific recommendations for arboreal mammals conservation in the Periyar-Agsthyamalai landscape.
Date: 25-02-2013
Venue: Forest Head Quarters, Vazhuthacaud, Thiruvananthapuram
Supporting Partner: CEPF-ATREE Western Ghats Small Grants Programme
Project: Gap analysis of the Periyar - Agasthyamalai landscape for arboreal mammal conservation

A working draft of recommendations based on the findings of the project was presented and discussed with the participants. These included senior officials from the forest departments of Kerala and Tamil Nadu and other managers and scientists. Suggestions and recommendations made by the participants were incorporated into the final project report.

Final presentation at the SACON workshop attended by the Director and senior colleagues.

Publications

ARTICLES

Journal Articles

Bhalla, R. S., K. V. Devi Prasad, & N. W. Pelkey. 2013. "Impact of India's Watershed Development Programmes on Biomass Productivity." Water Resources Research 49 (3): 1568–1580.

Ali, R. & N. W. Pelkey. 2013. Satellite images indicate vegetation degradation due to invasive herbivores in the Andaman Islands. Current Science, 105:209-214.

Srinivasaiah, N. M., V. D. Anand, S. Vaidyanathan, & A. Sinha. 2012. Usual Populations, Unusual Individuals: Insights into the Behavior and Management of Asian Elephants in Fragmented Landscapes. PLoS ONE 7(8): e42571.

Popular articles

Ali, R. That Bird in the Bush. OPEN magazine, August 4, 2012
http://www.openthemagazine.com/article/books/that-bird-in-the-bush

Ali, R. More than you can Chew. The Hindu magazine, July 6, 2013
http://www.thehindu.com/features/magazine/more-than-you-can-chew/article4884162.ece

CONFERENCE PAPERS

Namboothri, N., R. Ali & A. Hiremath. 2012. Biological invasions of marine ecosystems: Concerns for tropical nations. Position Paper for CBD-COP 11. Dakshin Foundation, Bengaluru and Foundation for Ecological Security, Anand.

Vaidyanathan, S. H. S. Sushma & A. Gangadharan. 2012. Disentangling the effect of linear barriers from other landscape elements to identify potential movement pathways. The 2nd Asia Regional Conference of the Society for Conservation Biology – Asia Section, August 2012, Bangalore, India.

Gangadharan, A., S. Vaidyanathan & C. C St Clair. 2012. Habitat selection by elephants in a multiple-use corridor in the southern Western Ghats. The 2nd Asia Regional Conference of the Society for Conservation Biology – Asia Section, August 2012, Bangalore India.

THESIS

Bhalla, R S. 2012. "Application of Landscape Tools in Watershed Restoration - A Study of the Kalivelli Watershed". PhD Thesis, Pondicherry, India: Pondicherry University.

BOOKLETS AND MANUALS

Appavou, Gaspard, A. Varampath, & R. S. Bhalla. 2012. Setting up Community Based Water and Sanitation Facilities - a Protocol Manual Based on Field Experiences. 1st ed. Pondicherry, India: Foundation for Ecological Research, Advocacy and Learning.

REPORTS

Completion reports

Ram S., 2013. Study of the distribution of Primates of the Genus Semnopithecus and understanding factors that influence parapetry between the common langur (Semnopithecus priam) and Nilgiri langur (Semnopithecus johnii) in the southern Western Ghats. Final technical report, Foundation for Ecological Research Advocacy and Learning (FERAL).

Sushma H.S, S. Ram & S. Vaidyanathan (2013). Gap analysis of the Periyar Agasthyamalai landscape for arboreal mammal conservation. Final technical report, Foundation for Ecological Research Advocacy and Learning (FERAL).

Rajat R. Nayak, (2013). Effect of fire and grazing on vegetation dynamics in the Himalayan landscape. Final technical report, Foundation for Ecological Research Advocacy and Learning (FERAL).

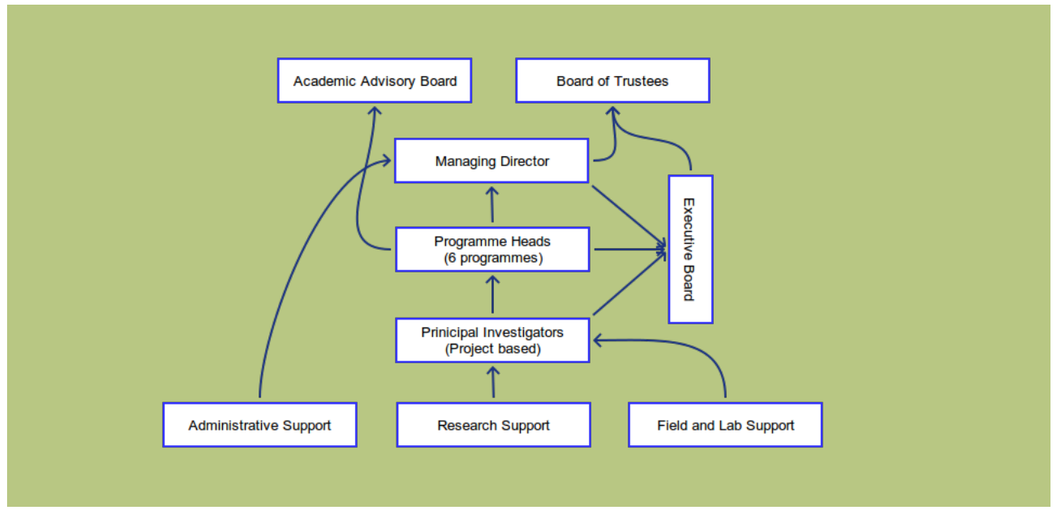
ONLINE MATERIALS

GIS Themes for the Western Ghats - five thematic courses prepared using the Moodle, on-line course management system. Many of these are improvements on existing course materials and most of them continue to evolve on the basis of inputs from users. A number of individuals and institutions have contributed to these courses in terms of data and content. The courses are available for download under the creative commons non-commercial share alike license. The titles and links to the courses are:

1) An introduction to GIS and remote sensing
   a) using GRASS <http://www.feralindia.org/moodle/course/view.php?id=10> and
   b) using Quantum GIS <http://www.feralindia.org/moodle/course/view.php?id=2>.
2) An introduction to spatial statistics using R <http://www.feralindia.org/moodle/course/view.php?id=6>.
3) An introduction to landscape ecology <http://www.feralindia.org/moodle/course/view.php?id=7>.
4) An introduction to collection and analysis of hydrological data for forest hydrology
   <http://www.feralindia.org/moodle/course/view.php?id=8>.

Administrative information

ORGANOGRAM



FERALIDAE

The people behind FERAL are a diverse group with specific interests in the wide field of ecology. This team is responsible for formulating and co-ordinating the organisations activities and comprises of a number of persons introduced alphabetically below:

SCIENTIFIC STAFF

Dr. Rauf Ali (Scientist): Founding and Managing Trustee of FERAL. Rauf is involved in various research efforts in the Andaman and Nicobar islands with a focus on assessments and impacts of exotic species. A primatologist by training, Rauf is active in policy advocacy for conservation efforts and is part of the researcher network across the country and worldwide.

Gaspard Appavou (JRF): Gaspard has been coordinating the field surveys and data collection for the FAO-UNTRS project. He holds a master's degree in human resources management and a bachelors degree in law. His ability to moderate during meetings and discussions and manage multiple field teams during surveys has been a boon to the organisation.

Ajith Ashokan (JRF): Ajith has a Master's degree in plant biotechnology. His interests lie in vegetation studies and specifically plant taxonomy.

Senthil Babu (SRF): Babu has an M.Phil. in History of Science. He is interested in issues affecting the coastal communities in general and the fishing community in particular. He has worked along the east coast on various issues for the last six years.

R.S. Bhalla (DRA): Founding Trustee, is an ecologist interested in the applications of quantitative techniques to community based natural resources management and ecosystem services and processes. He holds a Ph.D. in GIS and remote sensing based tools and models on water resources management, with a focus on watershed policy.

Rutuja Dhamale (JRF): Rutuja has a Master's degree in Environmental Sciences from Pune University. Other than her interest in studying carbon stocks, she has a keen interest in studying butterflies.

Aditya Gangadharan (JRF): Aditya is currently interested in evaluating connectivity for large mammals and is involved in our initiatives in the southern Western Ghats wildlife corridor programme. He is particularly intrested in measuring functional connectivity in human modified landscapes. He is currently pursuing his Ph.D. at University of Alberta, Edmonton.

Tara Lawrence (JRF) is a junior research fellow with a masters degree in Marine Biology. Her broad interests lie in the area of fisheries ecology and more recently ecophysiology (anything fish centric!). Her interest in the fisheries sector stems from the incredible dynamics the industry displays in the face of a rapidly changing resource base. She also coordinates the student programme, teaching topics largely related to fish, fisheries and marine ecophysiology.

Rajat Ramakant Nayak (JRF): Rajat completed his Masters in Wildlife Biology and Conservation from National Centre for Biological Sciences, Centre for Biological Sciences, WCS-India Programme, Bengaluru. His research focuses on the long-term changes in ecosystem components and processes due to anthropogenic factors in Indian forests. He has a special interest in grassland ecosystems, both low and high altitude, semi-arid and wet. He is currently working on understanding the role played by anthropogenic fire and grazing in different habitat types, ranging from tropical seasonal forests to savannah woodlands to sub-tropical sub-alpine and alpine woodlands and grasslands.

Ignatius Peliyas (JRF): Ignatius is interested in understanding human dimensions of conservation. He is currently working in the Agastyamalai complex assessing the role human settlements and community based organisations play in conserving wild habitats. Other than talking to people he is also interested in watching wild animals and accompanies us during our field surveys.

Dr. Neil Pelkey (Scientist): A Founding Member of FERAL and currently Senior Advisor, Neil is an Assistant Professor at the Juniata College, Pennsylvania, USA. He is an expert on GIS andremote sensing and environmental studies. He is an advisor on many of the projects and research proposals of FERAL. Neil is also responsible for developing the ongoing collaboration with the Juniata College for facilitating their undergraduate study aboard programme in India.

Sunita Ram (SRF): Sunita is a PhD scholar currently working on the behaviour and distribution of Langurs. Her interests lie in the identification of habitats of these shy primates so that conservation efforts may be improved.

Kumaran S. (JRF): Kumaran is part of our Marine Sciences team. He has a Master's in Ecology and Environmental Scienes from Pondicherry University. His interest lies in working on marine biodiversity and conservation related issues along the Coromandel Coast.

Nithya Satish (JRF): Nithya has a Master's degree in Environmental Sciences. She is currently assisting with data management and analysis.

Shweta Shivakumar (JRF): Shweta has a Master's degree in Environmental Sciences and she is interested in working on leopard ecology in fragmented landscapes.

Shruti Singh (JRF): Shruti has a Master's degree in Environmental Sciences from Mysore University and studied the distribution and densities of butterflies in urban areas of Mysore for her thesis. Her interests include wildlife conservation, Natural Resource Management, education, herpetology, ornithology and study of butterflies.

Dr. H. S Sushma (DRA): Has a post graduate degree in psychology and studied resource partitioning and inter-specific interactions of arboreal mammals in the rainforest's of Annamalai's for her doctoral dissertation. Her broad research interests are community ecology, restoration ecology, conservation of tropical evergreen forest patches in human altered landscapes and primate behaviour. Her primary academic interests lie in behavioural ecology of primates and the role primates play in forest ecosystem functioning.

Thammaiah C. K.: Thammaiah has a Masters degree in forestry. He is currently working on human wildlife conflict in the Shencotah gap.

Akshay Thiyagarajan: Akshay is a graduate in statistics from Mumbai University. He is currently assisting our camera trapping teams in the Periyar-Agastyamalai landscape.

Srinivas Vaidyanathan (SRF): Srinivas, is a trustee of FERAL. He is a wildlife biologist with particular interest in understanding changes in landscape level processes and structure and how the same affect large mammal populations and distributions, in particularly wide ranging mammals. Srini's expertise lies in monitoring animal populations using a variety of advanced sampling techniques and the use of GIS and remote sensing to develop decision support systems for conservation initiatives.

ADMINISTRATIVE STAFF

FERAL has a small administrative support system which comprises of an accounts manager and an office manager. Our administrative staff contribute to other projects by way of facilitating training programmes, workshops and reporting and include:

Rajendran K.: Raji is the Office Manager at FERAL and is engaged in keeping the campus at Morattandi operational and organises workshops and events for various projects. The former involves facilitating the entire range of projects operating out of the campus and Pondicherry office.

Shanthi R.: Shanthi is the Accounts Manager at FERAL handling the day to day accounting responsibilities of the organisation. She is a post-graduate and is versatile in the use of a range of financial software. She is ably assisted by Venkatesh Perumal, our junior accountant who is a B.Com. graduate.

Our support staff include Sumathi and Chitra who help with office maintanence and kitchen work on campus, Ramadoss our driver and Citru for campus security. At our field stations, a number of field assistants have been part of various projects helping with both field data collection and in maintanance of field stations.

RESEARCH SUPPORT

Kumaran K.: Kumaran has been working as part of our field teams in Pondicherry and in the Western Ghats. Although he has a Bachelors in Business Adminstration his interests lie in ecology related field work.

Selvaganesh: Ganesh is a post-graduate working as part of our WASH Programme implementation team.

Saravanan S. (F.C.): Saravanan is a self taught GIS expert and coordinates the field activities on various projects, particularly the NRDMS supported work on landscape assessments. He is presently completing his post graduate degree in environmental economics.

Partners

Supporting Partners

Sl. No.	Name of the Agency	Project
1	Critical Ecosystem Partnership Fund	1. Bridging the Shencottah Gap: How Payments for Ecosystem Services Can Restore Biodiversity Outside Protected Areas in India. 2. Exploring Sustainable Landuse Practices in Rubber Plantations in a Critical wildlife Corridor.
2	CEPF-ATREE Western Ghats Small Grants Programme	1. Gap analysis of the Periyar - Agasthyamalai landscape for arboreal mammal conservation. (CEPF Western Ghats Small grants Programme) 2. Building Capacities for Conservation Planning using open source tools. (CEPF Western Ghats Small grants Programme)
3	Keystone Study Away Consortium (KSAC)	1. FERAL – KSAC Spring 2013 – Marine Science in India Programme. 2. FERAL – KSAC 2013 – Faculty Programme.
4	Development Alternatives – New Delhi	The implementation of a sustainable system to provide safe drinking water and adequate sanitation facilities for girl child around Chennai.
5	French Institute of Pondicherry, Pondicherry.	Western Ghats Bio Diversity Open Collaborative Information System (Networking and data support to the Western Ghats Portal).
6	MOES INDIA - NERC UK Changing Water Cycles Awards India.	Hydrologic and carbon services in the Western Ghats: Response of forests and agro-ecosystems to extreme rainfall events.
7	Primate Conservation, Inc., 1411 Shannock Road, Charles town, BI 02813, U.S.A. 401-364-7140.	Gastrointestinal Parasites in Langur.
8	Ruffords small Grant Foundation, 6th Floor, 248 Tottenham Court road, London W1T7QZ.	Consumer control and vegetation response: the fire-vegetation-grazing dynamics in the Western Himalayan landscape.
9	Science & Society Division, Department of Science & Technology, New Delhi.	Study of the Distribution of the Primates the Genus Semnopithecus and understanding factors that influence parapetry between the Common langur (*Semnopithecus priam*) and Nilgiri langur (*Semnopithecus johinii*) in the Southern Western ghats, India.
10	U.S.Fish & Wild Life Service, Division of International consevation, 4401 N.Fairfax Drive, Suite 100, Arlington, Virginiya 2220.	Functional connectivity for large mammals in southern Western Ghats, India: Linking movement and distribution.
11	UNICEF , Chennai.	Sensitizing school children through Awareness and providing access to water and facilities.
12	University of St Andrews & Conoco Phillips, U.K.	St.Andrew's prize for the environment.
13	Wildlife conservation Society , U.S.A	Functional connectivity for large mammals in southern Western Ghats, India: Linking movement and distribution.
14	Science for Equity Empowerment and Development (SEED) Division, Deparment of Science & Technology, India.	Co Management of artisanal fisheries along the Coromandel Coast.

Collaborating Institutions

Sl. No.	Name of the Agency	Project
1	Ashoka Trust for Research in Ecology and Environment, Bangalore.	1. Building Capacities for Conservation Planning using open source tools. (CEPF Western Ghats Small Grants Programme.) 2.Hydrologic and carbon services in the Western Ghats: Response of forests and agro-ecosystems to extreme rainfall events.
2	National Centre for Biological Sciences, GKVK, Bellary Road, Bangalore – 560065.	Hydrologic and carbon services in the Western Ghats: Response of forests and agro-ecosystems to extreme rainfall events.
3	French Institute of Pondicherry, Pondicherry.	Building Capacities for Conservation Planning using open source tools

BALANCE SHEET

FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING
No .170/3, Morattandi Village, Avroiville Post, Tamilnadu - 605101
BALANCE SHEET AS AT 31.03.2013

(Amount in ₹)

Particulars	Sch.Ref	31.03.2013	31.03.2012
SOURCES			
Corpus	1	(29,231)	(3,85,315)
Project Asset Reserve	2	44,56,433	44,56,433
Projects Account (Cr)	3	39,78,339	74,61,115
SBI - Bolero Vehicle Loan		2,13,666	3,89,585
		86,19,207	**1,19,21,818**
APPLICATION			
Fixed Assets less Depreciation	4	37,41,590	43,13,573
CURRENT ASSETS, LOANS AND ADVANCES			
Cash and bank balances	5	48,15,627	76,20,578
Loans and advances	6	4,37,166	62,886
(i)		52,52,793	76,83,464
Less: Current liabilities	7	3,75,176	75,219
(ii)		3,75,176	75,219
Net Current Assets (i) - (ii)		48,77,617	76,08,245
		86,19,207	**1,19,21,818**
Notes on Accounts	9		

As per our report of even date attached

For FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING

R S BHALLA
Managing Trustee

Dr.RAUF SAAD ALI
Trustee

Place : Chennai
Date : 30.08.2013

FOR ASA & ASSOCIATES
Chartered Accountants

K.VENKATRAMAN
Partner
M.No:200/21914
Firm Reg No: 009571N


FERAL
www.feralindia.org