Conservation leadership programme- Final report

Project title: Conservation of otters through community participation in river Moyar, Tamil Nadu.

CLP ID: 03228615
Host country: India
Site Location: Moyar River, Western Ghats, India
Dates in the field: 1st June 2015 to 30th October 2016
Participating Institutions: Care Earth Trust, Arulagam, ATREE and CICADA
Overall Aim: Enabling the conservation of river Moyar using otter as flagship species
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Date when report was completed: 25th September 2017

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Project partners & collaborators:

We acknowledge the support of Conservation Leadership Programme, Rufford Foundation and Idea Wild both financially and for their help in assisting us in many ways for the successful completion of field work of this project. Permissions to the study were provided by the Tamil Nadu Forest Department vide permit number WL5/20861/2015 and Ref. No. 6612/2015M to Narasimmarajan. K. Tamil Nadu Electricity, Arulagam and Atree provided rental accommodation in various places in the study site. Dr. Daniels RJR (Care Earth Trust) and Mr. Boominathan (WWF-India) welcomed this idea and gave an excellent appreciation. Mr, Sattainathan and his colleagues from Sattainathan & associates helped with auditing the expenditure. We are thanking the external referees for accepting this project. We are particularly grateful to Mr. Atul Borker and Ian Dickson for their critical review about the project before it get funded. Drs. Jack Tordoff., S.A. Hussain, Suthirta Dutta, J. A. Johnson and K. Ramesh provided valuable inputs for the completion of the project. Mr. Gopal .A and Palanivel G. helped during the entire field work. Vignesh, Mohan, Rahul Kumar, Soeripy Mungkumg and Ramesh volunteered during the work. Mr. Pramod Yadav helped for preparation of otter distribution maps. All the respective Forests Range Officers, DFOs, Field Directors helped us in various ways to finish the project successfully. Anti-poaching watchers and Forests Guards, and Watchers were helped us during the field work without them it would not be possible to do the field work. We sincerely thank all the visual media and print media for promoted our conservation efforts to conserve the threatened otters in river Moyar. Last but not least CLP provided a wonderful and knowledgeable training which helped me and my team to improve our leadership quality and developing new conservation ideas.

Section - I

Summary:

The project objectives as proposed have been successfully achieved. An intensive study has been carried out to map the distribution and conservation of otters in river Moyar. The project provided the first ever assessment of status and distribution of otters in Moyar river. The study also lead to description of a new record of Asian-small clawed otter from this region.

Information brochure and painting competition were disseminated to the local stakeholders and schools in and around the study site and forests officials. Periodical interaction were made with local fishermen to reduce the fishing activities in river Moyar. The study has so far, led two scientific article (at average stage of preparation and review), six popular newspaper article and one awareness video (filmed by CLP and Anirban team) and one international conference presentation (World otter congress held in Singapore from June 3rd to 8th 2016). The project was proposed to establish the distribution of the otters as well as to reduce the anthropogenic activities in river Moyar was fully achieved.

Many journalist and researchers are working towards otters in terms of locating them in new places within the Nilgiri Biosphere Region. We were achieved all the objective results and small consequences was happened about to approach the high elevation areas during the post-monsoon season.

The farmers are reduced their pesticides usage and the fishing activity were comparatively reduced after the project implementation. Mudumalai tiger reserve was initiated the otter watch using their staffs and drafted the river conservation action plan and annexure with the existing the 5 year management plan.

Introduction:

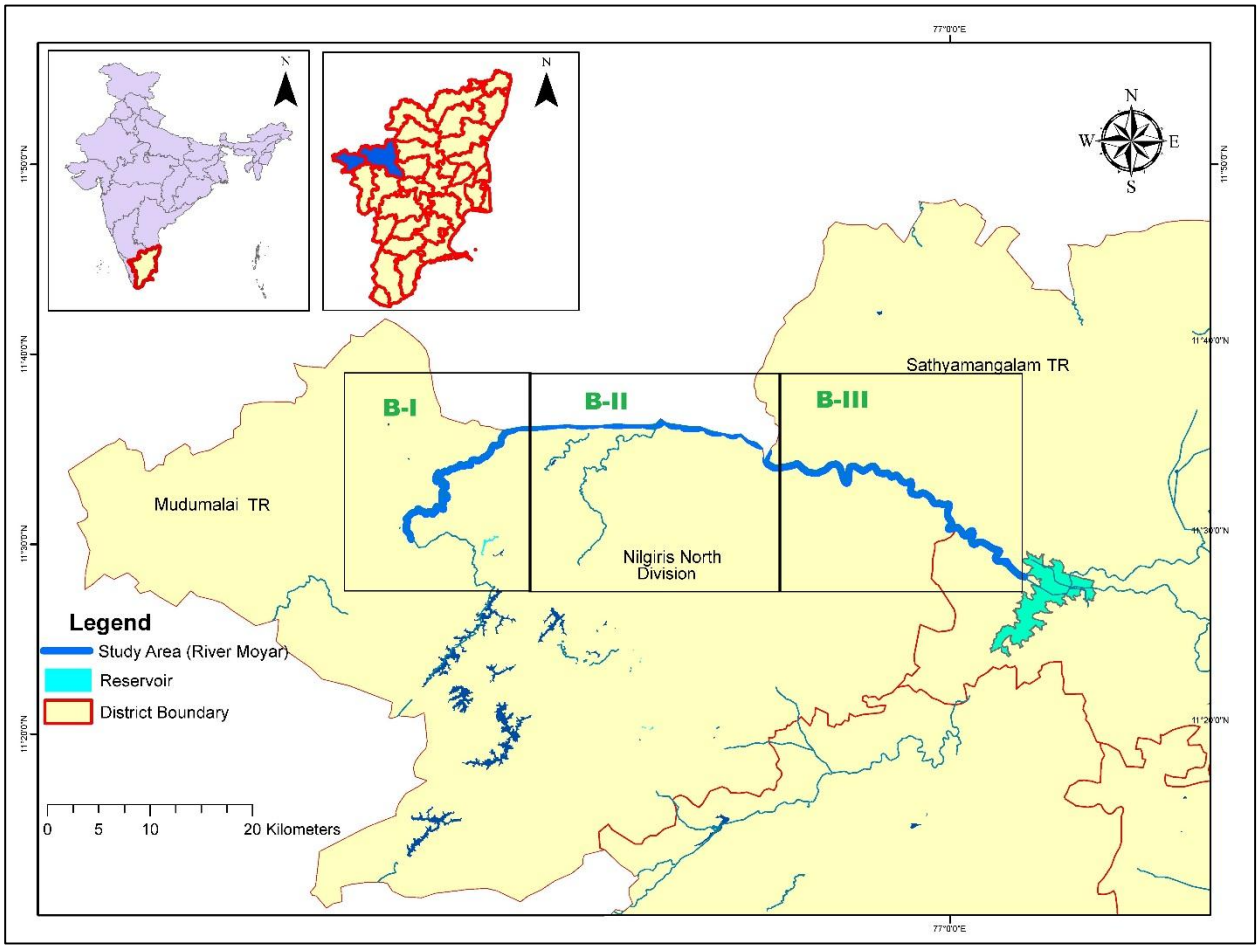
Otters are obligatory tied to aquatic environments and occupy littoral areas of both freshwater and marine habitats throughout much of the world. They are classified in the Lutrinae, one of the subfamilies that belong to the Mustelidae, which also includes the Mustelinae (weasels and minks), Melinae (badgers), Mellivorinae (honey-badger), Taxidiinae (American badger) and Mephitinae (skunks) (Hussain, 1996). Though otters are widely distributed and play a vital role in the wetland ecosystem as a top carnivore species, not much attention has been given to understand their ecology. They are suitable indicators of the health of a wetland ecosystem as they are sensitive to degradation along the food chain (Hussain & Choudhury, 1997). Of the 5 species found in Asia, three are found in India - Smooth coated otter *(Lutra perspicillata),* Eurasian otter *(Lutra lutra)* and Oriental small-clawed otter *(Aonyx cinereus)*. Major threats to otter survival are the loss of wetland habitats, reduction in prey biomass and pollution and poaching (Hussain, 1996). Developmental projects such as darns and barrages, and aquaculture activities have taken their toll on wetlands and consequently on the otters. Otters are hunted for their pelts, meat, fat and other body parts (Hussain & Choudhury, 1997).

Historically Tamil Nadu is water dearth state in India. Two perennial rivers flowing in the state namely Moyar and Thamirabarani. So, safeguarding very few perennial rivers and their ecosystems are fundamental for people and biodiversity. Rivers are open ecosystems vulnerable to degradation from terrestrial land uses (Ramesh et al. 2012). The potential of a wetland top predator such as the Smooth-coated otter (*Lutrogale perspcillata*) as a 'proxy' for conservation of riverine habitats has been least exploited in India. Being aquatic carnivore, the intactness of land water continuum is critical for survival of otters. They face various threats due to hydroproject, poaching, pestiside runoff mixing into the river, oil splling and over fishing activities in river Moyar (Puyravaud & Davidar, 2013). Increasing trend of global warming impacting the perennial river into seasonal in India. So, preserving our river ecosystem using otters as flagship species is advisable vendetta.

Moyar is one of the well-known perennial river in the Western Ghats that flows through many protected areas viz., Mudumalai Tiger Reserve (MTR), Sathyamangalam Tiger Reserve (STR) and Nilgiri North & South Divisions (NND; NSD) (11.5667 N' and 76.9333 E' ~431m asl) (**Figure 1**) (Kalle et al. 2013). Upper gorges of the river receives more than

5000 mm rainfall while the lower/down river area receives about 824 mm annually. Average temperature in this region varies from 14 ˚C - 30˚C in higher elevations and 25˚C to 38˚C in the lower elevations. Elevation of the river area varies from 2054m asl (in upstream areas) to 250m asl (in downstream areas) at Bavanisagar Dam (Ramesh et al., 2012) The landscape supports one of the largest Tiger (*Panthera tigiris*), Leopard (*Panthera pardus*), Elephant (*Elephas maximus*), Otters (*Lutagale perspicillata*) and *Gyps* Vultures populations. Moyar is a key livelihood source for more than a million people and thousands of hectares of agricultural lands (Kalle et al. 2013). However, this river ecosystem faces many threats such as agriculture runoff mixing, hydroelectric projects, fishing activities, pesticide and motor oil spilling in the river water. Inspite of these threats Mesquite (*Prosopis juliflora*) continue to invade the river gorges catastrophically impacting native biodiversity (Kumar & Mathur, 2014).

Figure: 1. Showing the location of the river Moyar, in the Western Ghats



The entire river Moyar and its tributaries were divided into 6 km segments (otter minimum home range) using Geographical Information System. Data on environmental parameters and otter signs as spraints, tracks, dens and grooming sites were recoded ever 400 m section. Searches were conducted in 100 m x 15 m strips along the edge of the river. A team of four researchers conducted the survey by walking along both river banks and searched otter signs. Along the river stretches the survey was carried out only by walking and few inaccessible places were left out. In each survey (three seasons), any site where spraints tracks, dens, grooming sites and other otter signs of otter presence were found was defined as a 'used/positive site'. A new site was registered only when spraints were separated by more than 5 m (Hussain, 1996).

At each survey site ecological parameters and human activities considered potentially important to otters were waterways of corded any opportunistic observations on otters during the course of the survey were also recorded and their position was noted on a handheld GPS receiver. On sightings the otters, their group size, structure, and activity were recorded. During the survey whenever Mugger crocodile (*Crocodylus palustris*) encountered its position was also noted and whereas in river Moyar otters were co-existed with Muggers (Hussain & Choudhury, 1997).

Electronic camera traps was placed at identified Otter sites within the study area which has maximum chance of recording otter activity. The camera traps was placed for a period of minimum 5 and maximum 30 days in 46 location. High end digital cameras was also be used to get photographic evidences of Otter. Direct sightings and photographic evidences (via camera trap or DSLR) was used for species identification and determine the temporal activity pattern of otters in river Moyar (Hussain, 1996; Hussain & Choudhury, 1997).

Project members:

Kannathasan Narasimmarajan is currently pursuing his PhD in University of Madras, Chennai. He received his M.Sc., Wildlife Biology degree from Barathidasan University, Trichy (2008). He has wast research experience and worked extensively on species consevation, ecology, work with policy makers and community. He worked on tiger estimation project throughout India and had handful knowledge about island ecology (Worked in Andaman and Nicobar Islands) arround two years. He worked on Gangetic river Dolphins conservation project in Bramaputra river ecosystem and wokred on conservation of endangered primates in the Western Ghats aswell as Nicobar Island.

K. Narasimmarajan is the team leader of the project and he was designed the methodology and arranged the research permission from the forests department. Introcated with the local community and various line department people to successfully implimented the project.

Abhishek Gopal is basically from the Computer Science Engineering bacgound but he has very much interested studing the wild otters ecology (especially small clawed otters). He is now persuing his masters wildife science degree in NCBS, Bangalore. He was a Member of Wild Otters (since Jan 2015); Volunteer at Madras Crocodile Bank (since 2013); Orientation Course in Insect Taxonomy by the Department of Entomology, University of Agricultural Sciences, (North) Bangalore (since 2014); Training on reptile management by Kalinga Centre for Rainforest Ecology (Dec-2014). He has extensively contributed to the success of this project and he learned organizing meetings with communiy, data collection and camera trapping and improved the leadership quality.

S. Palanivel is the Botonists at the same time he was also interested in small mammal conservation studies and community work. He recived his Masters degree in Plant biology and plant bio-technology from RKM Vivekananda college, Chennai (2013). He has vast experience for working woth different stakholders. He worked as a Junior Research Fellow and successfully completed socio economic assessment on natural resource dependent groups, Tamil Nadu (Sep- 2013 to April 2014). He has prepared a comprehensive report on water management strategies and action plan in Sathyamangalam Tiger Reserve (June- 2014 to Nov- 2014). He undertook all the community works and capacity building programmes with stakholders.

Section- 2

Aim and objectives of the project:

Aim: To study Otters and its Moyar river ecosystem. Notably the western and eastern parts of the river is a famous tourist destination (Tiger Reserves) where Otters occur in human use landscapes. So, the thriving Moyar otters survival should be secured.

- 1.Detailed data on Otters occupancy, distribution and habitat use will be established.
- 2.Identification of damaging threats to Otters and their habitats are documented.
- 3.Otter conservation initiatives through awareness campaign to local community and stakeholders, school children's and training to forest department personnel's.
- 4.Preparing regional Otter conservation plan and share to forest department, policy makers and relevant stakeholders (line departments) to generate greater awareness on otter distribution and threats.

Changes to original project plan:

- We don't change any project plan during the project period. We got proper research permission from the Tamil Nadu forests department in time (because the team leader have good reputation with the forests high officials).
- As I mentioned in my application earlier, few parts of the river could not be able to access so, those areas were leftout during the survey.

Methodology:

- *Investigating distribution and habitat use of Otters*:

The field survey was conducted along 120 km stretch of Moyar and its distributaries, using landmarks, the area were divided into three blocks ranging 30 km length of each (Hussain, 1996). Before initiating the intensive survey, a preliminary study was conducted in Block III (lower stream) to gain insight of Otters activity, Use of dens and spraint sites (Hussain & Choudhury, 1997). Only inaccessible area were left out.

Further all three Blocks were surveyed by foot consist of two to three observers to evaluate the status and their distribution pattern. However, Observations/Photography from the hide was done (Borker per.comm) to attain behaviour, habitat use of Otters. In addition to direct encounter of otters, indirect evidence in the form of spraints, pugmark, den character and scent marks were also noted in the data sheet.

Electronic passive camera traps were placed at potential Otter sites within the study site has the maximum chance of recording otter activity. The camera traps placed for a period of minimum 5 and maximum 30 days per location. High end digital cameras were used to get photographic evidences of Otter. Direct sightings and photographic evidences (via camera trap or DSLR) were used for species identification.

- *Assessing Habitat*:

1 km length stripe 25 m wide along both river side were laid to monitor otters and their habitat. Within each 1 km stripe 20 m X 20m circular plots were laid at the distance of every 400m to assess habitat parameters mentioned below (Hussain, 1997).

In each plot habitat parameters such as type of substrate (hard sand, loose sand, rock, stone and gravel), canopy cover, vegetation cover and leaf litter (measured as percentage cover of the plot) was assessed. 'Hard sand' was defined as fine-textured, tightly packed sand, while 'Loose sand' as coarse and loosely packed. Any boulder will be classified as rock, stones and gravels (small-sized stones roughly under 10mm in diameter).

- *Threat assessment*:

Anthropogenic disturbance were scored from 0, 1, 2 or 3 based on the perceived effect of the disturbance on the Otter habitats.

A score of '3' represent maximum disturbance caused by commercial fishing and sand mining; signs of picnickers such as trash, discarded food and fire scored 2; disturbance caused by local people and eco-tourists considered to have the least negative effect on otter site will be scored 1. The score 0 is no disturbunce.

We calculated disturbance levels for each 2 km transects of the river gorge using the following relation:

Disturbance level $\sum 3/i=1$ scorei *total no. of incidents of activity i/observer effort, where i was the type of activity.

To teaste out this habitat effect while comparing visit frequency with disturbance index, the visit frequency will be calculated by averaging the number of otter visits across all sites in the 2 km transect. Visit frequency = total number of visits by otters/number of otter sites/observer effort.

Outputs & Results:

Data analysis: occupancy data were analysised using R software, logistic regression model was used to estimate occupancy of otters and factors determining the otter occupancy in river moyar. Pearson's correlation analysis was perfomed to cross check the covariates influence.

Results: In river Moyar occupancy and habitat use by otters were studied for three seasons from June 2015 to June 2016. Of the 693 plots sampled in which 116 sites were positive/used sites were recorded. 27.3% (n= 33) positive/used sites being recorded in post-monsoon, 16.0% (n= 52) positive/used sites recorded during winter and 12.1% (n= 30) positive/used sites being recorded in summer. The river Moyar was unsuitable habitat for otters owing to rocky (-0.773) steep bank-slopes (-1.392) and elevation (-0.711) and river depth (-1.486) (**Figure 2 to 6**).

During the course of the study, 14 sightings were made (59 adults and 13 juveniles) with a mean group size of 5.14 ± 0.8. The relative abundance of the otter was 0.40 individuals/ km in river Moyar. During the winter season *Aonyx cinereus* relative abundance was high (0.71) this was happen due to the seasonal movement by *Aonyx cinereus*.

Seasonal observation on number and percentage of positive sites of Smooth-coated otter activity along 104.8 km stretch of the river Moyar between Pykara reservoir (km 0) and Bavanisagar reservoir (km 104.8)

Elevation and the disturbance shows negative influence for both the species. However, lose sand and the rock shows positive influence for both species in three seasons (see **Figure 2 – 6**).

Figure:2. Habistat use by Asian Small-clawed otter during summer season in moyar river, WesternGhats

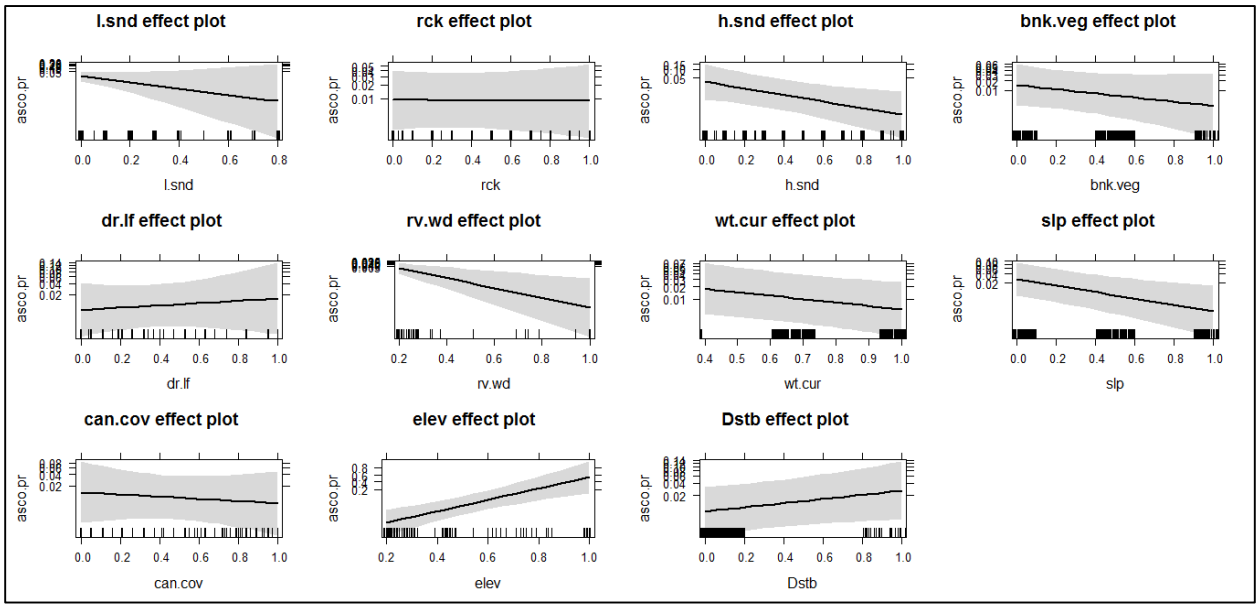


Figure:3. Habistat use by Asian Small-clawed otter during winter season in moyar river, WesternGhats

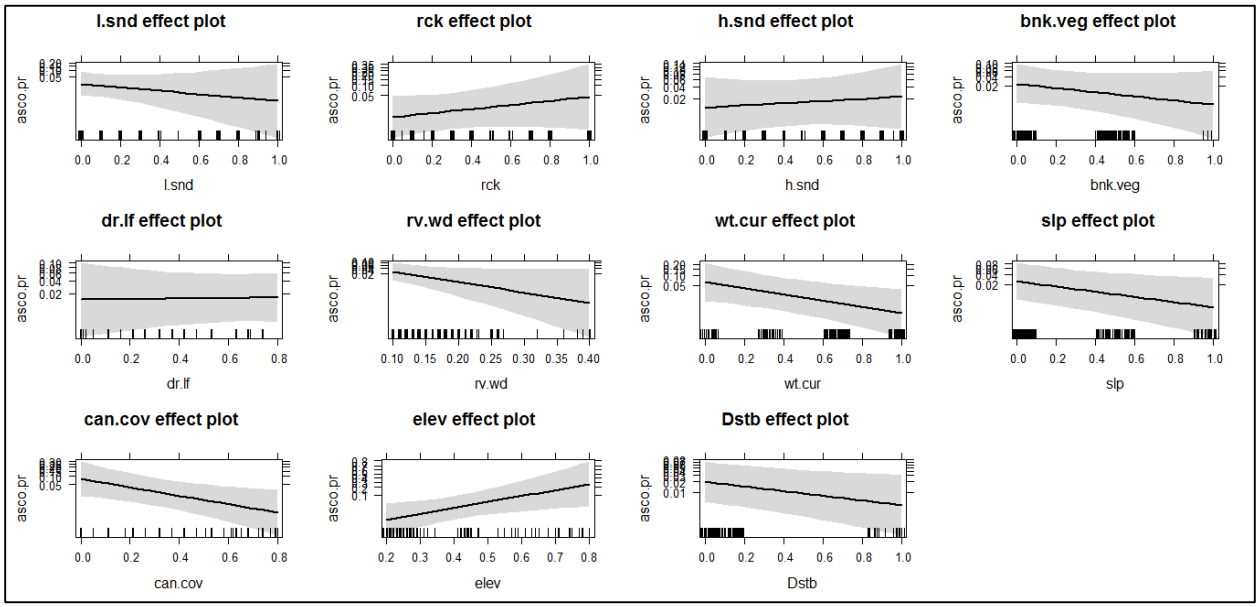


Figure:4. Habistat use by Smoth-coated otter during post monsoon season in moyar river, WesternGhats

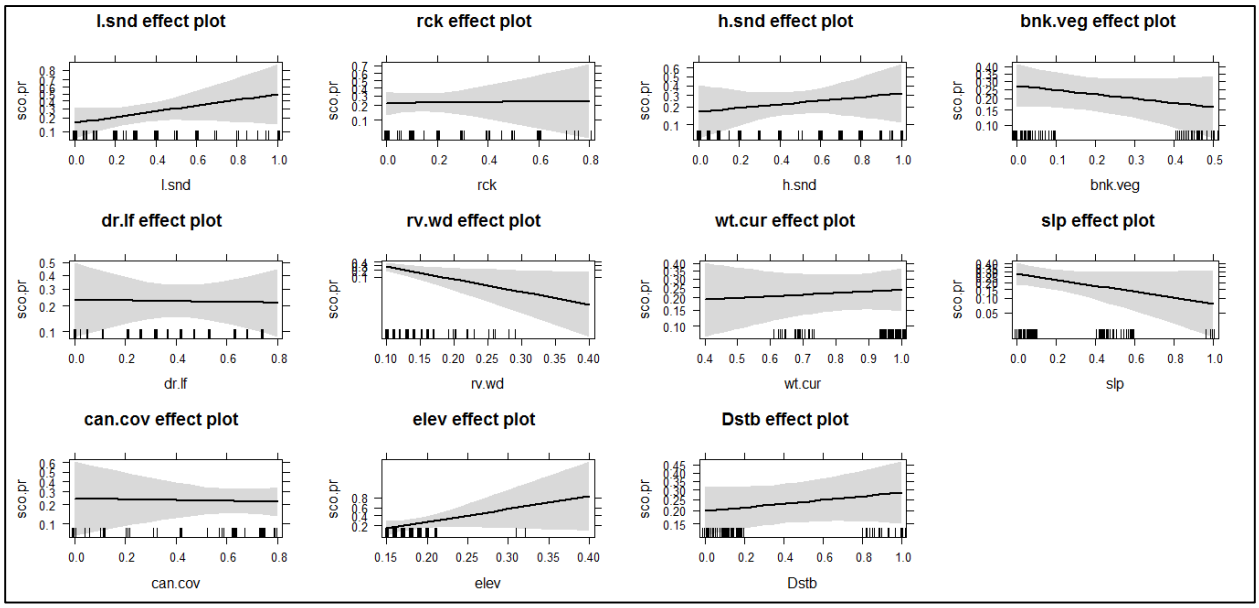


Figure:5. Habistat use by Smooth-coat otter during winter season in moyar river, WesternGhats

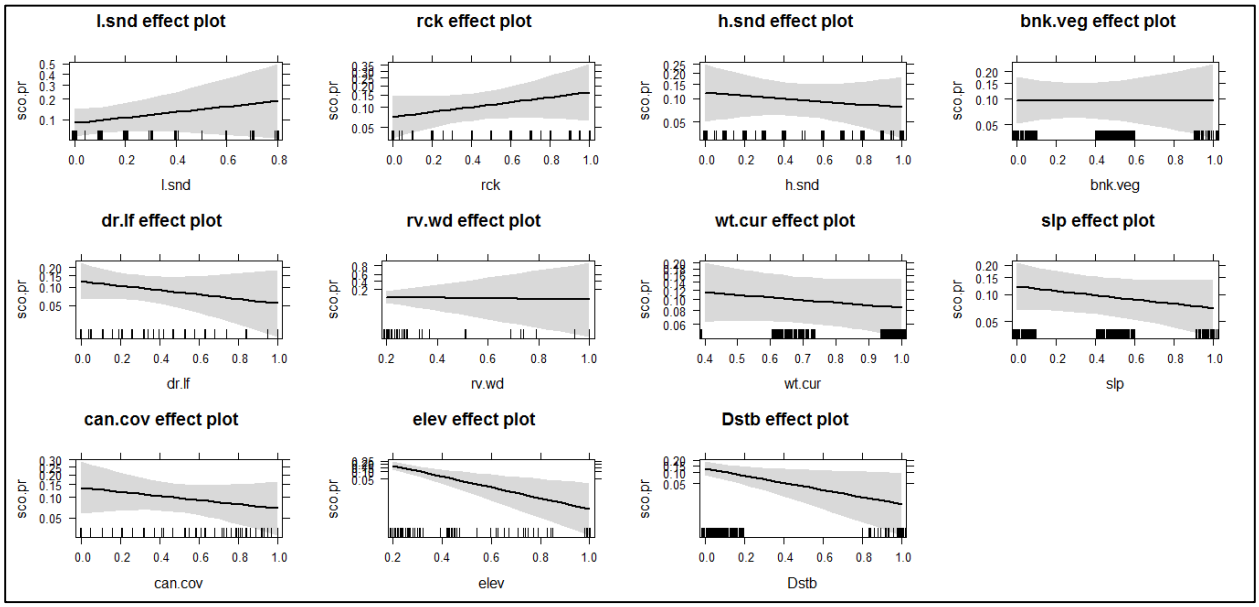


Figure:6. Habistat use by Smooth-coated otter during summer season in moyar river, WesternGhats

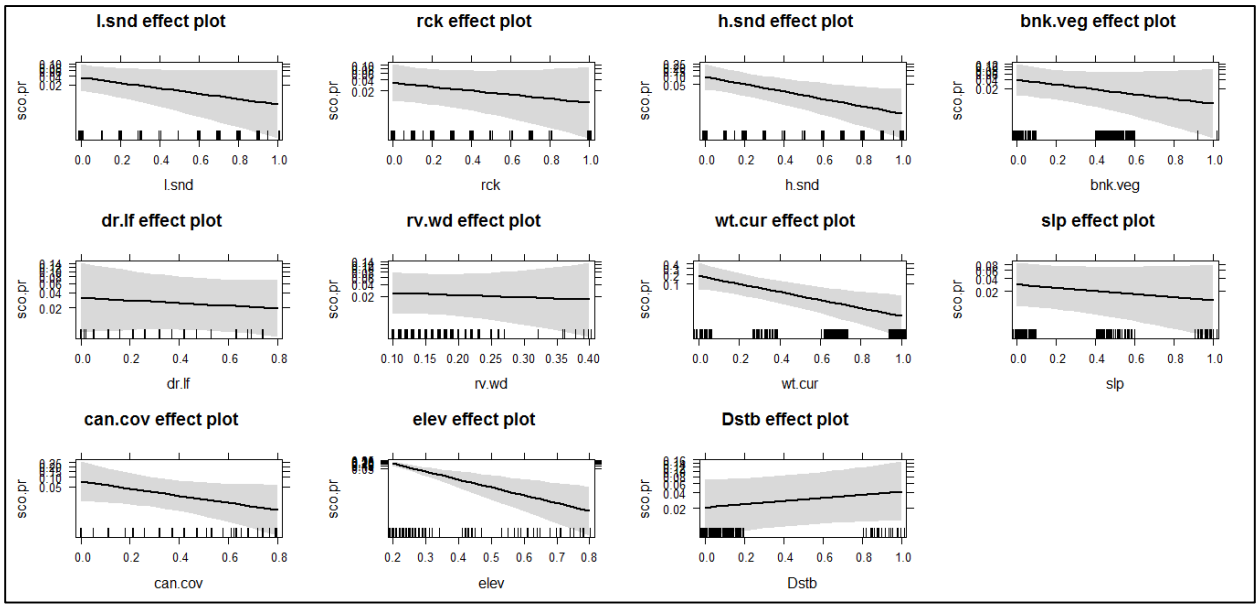


Figure: 7. showing the relative abundance of otters in river Moyar, Tami Nadu

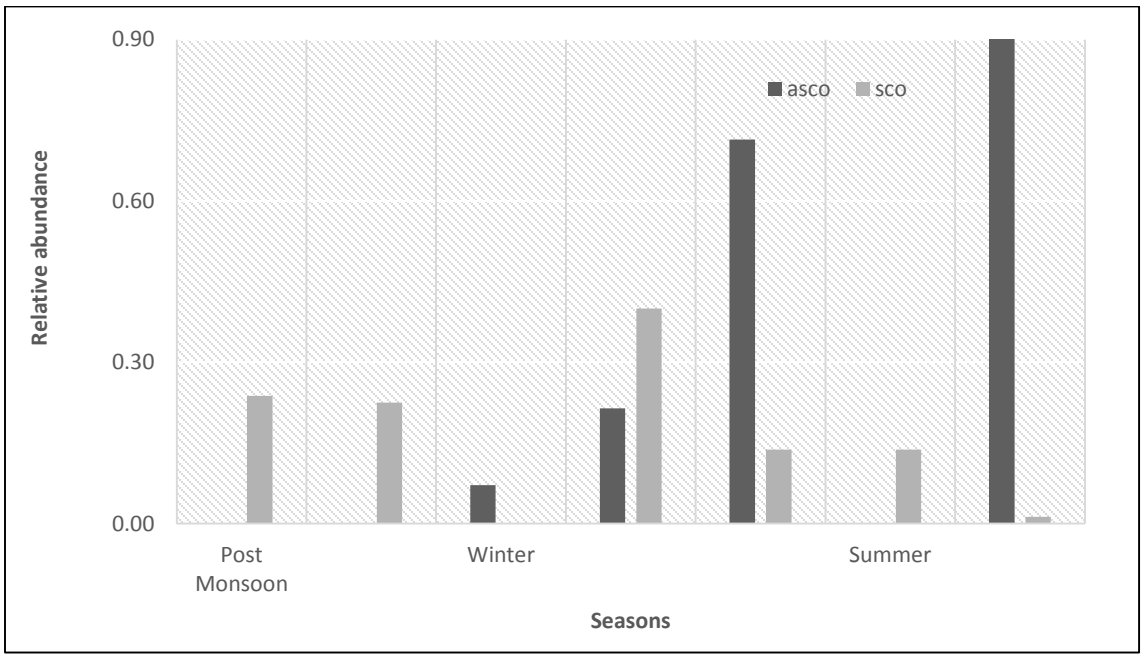
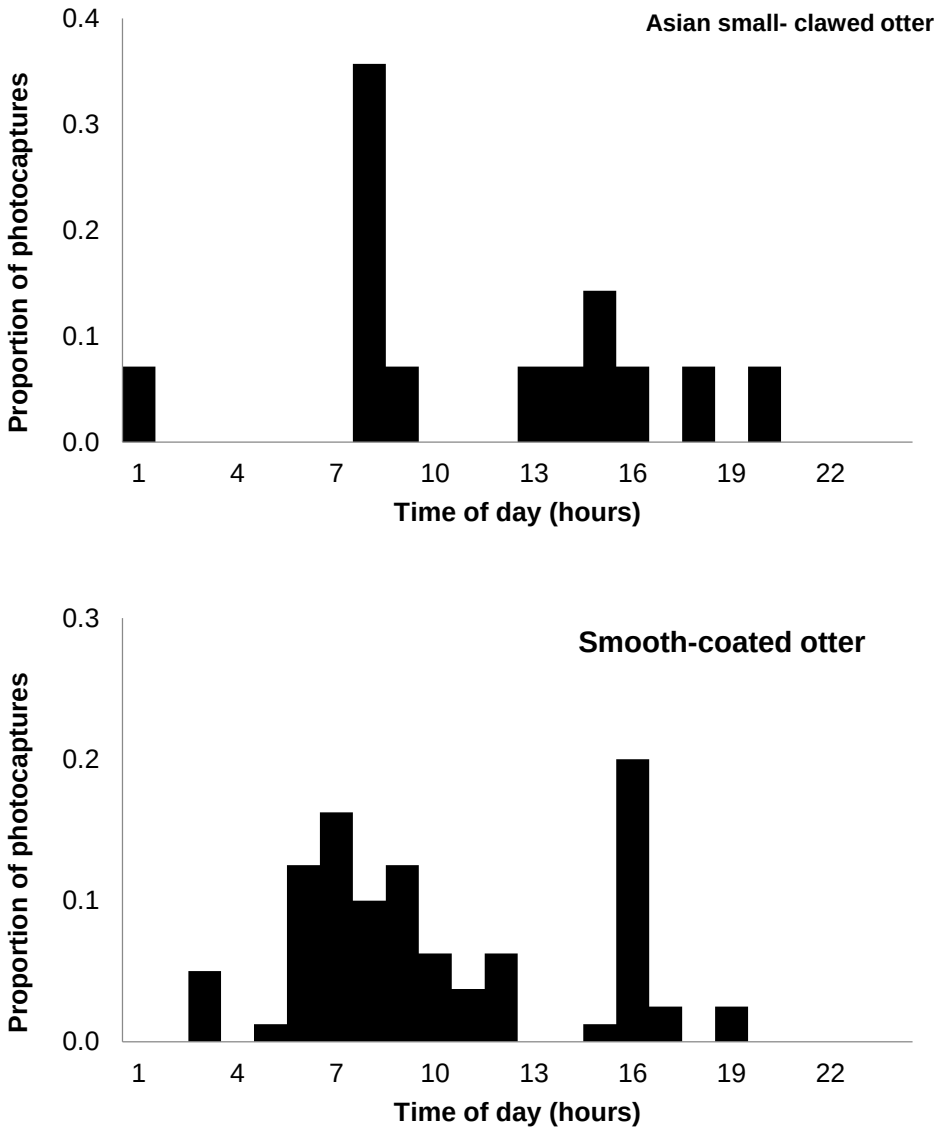
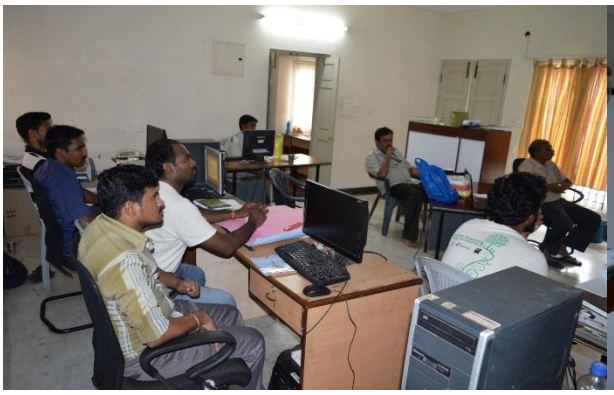


Figure 8 & 9. Showing the proportion of photo capture and temporal activity pattern of the otters in river Moyar, Tamil Nadu



The relative abundance of both otters quite similar but, during summer the Asian small-clawed otter's abundance was high due to seasonal migration from upstream to downstream of the river Moyar (**Figure .7**). The temporal activity pattern of the otter species were given in the **Figure 8 & 9**.

Team training conducted to the team members and awareness programme conducted in Thengumaragada high school (Teachers & Children's, Forest officials and villagers were participated)






Below picutures shows Field survey, awareness and outreach programme, T-Shirt relase (300 nos. was distributed to Frontline staffs and other stakeholders), poster release and prize winning students






Below photos showing the threats to the otters in river Moyar Western Ghats, Hydro-electric protects, over fishing, oil motor plumbing, grazing, sand mining and agricultural run-off mixing in the river water:






Weed (*Prosopis juliflora*) invasion in river moyar

Mesquite (*Prosopis juliflora*) is one such an invasive species that was introduced in the early 19th century in drier parts of the state of Tamil Nadu, to support poor people through firewood and charcoal industry. Now is spreading everywhere and began impacting our native biodiversity severely. The Moyar is a well-known perennial river that flows through many protected areas and supports a diversity of unique riparian flora and fauna

considered threatened such as Asian elephant (*Elephas maximus*), Tiger (*Panthera tigiris*), Leopard (*Panthera pardus*), Gaur (*Bos gaurus*), Otters (*Lutra perspicillata*), and Crocodile (*Crocodylus palustris*) in the Western Ghats. However, many parts of the river have been invaded by *Prosopis juliflora* and its effects is seen effectively. Such an invasion not only impacts animal movements but is also seen to replace our unique riparian forests. Findings revealed that mesquite invasion was negatively correlated with water flow but, positively correlated with canopy cover. River gorges within Sathyamangalam Tiger Reserve and Nilgiri North Division are completely invaded by mesquite. Which indicates significant threat to the indigenous riparian ecosystem. Concerned authorities could safeguard the riparian forests through urged management action and removal of already invaded mesquite is urgently needed. Prevention of further invasion of mesquite in other parts of the river could protect our unique riparian forests sustainably.

Impact of *Prosopis juliflora* in river Moyar (1A); partially invaded area (1B, 1C), completely invaded area (1D) *Prosopis Juliflora* invaded site with absence of understory growth.

Communication & Application of results

The project results have been communicated through a press release to local newspapers (English, Tamil). The T-shits were not only provided to the workshop participants and also to the Forest Department frontline staffs and local communities for greater dissemination. The results of the otter distribution was shared in the workshop and shared with forests department for further monitoring. The results of the surveys have been prepared for scientific journals and are at various stages of publication. Due to these project results, the profile of otters and its importance in river Moyar has increased among Forest Department officials. Social media (Facebook) page was created to increase the awareness among the urban people was reached more than 1000 like. Some of the publications were shared below.

The successful implementation of this study can be evaluated form the many quantitative outcomes of the project.

'நீர் நாய்களை காப்பாற்றினால் இயற்கையை பாதுகாக்க முடியும்'

நீலகிரி மாவட்டம், முதுமலை அருகே உள்ள சீகூர் பகுதி மாயர் ஆற்றில் காணப்படும் நீர்நாய் கூட்டம்.

தினமலர்

கோயம்புத்தூர் | வெள்ளி | 8.1.2016

The downpour was ac- ▶Miraculous escape, P 10 ⋮ ▶FULL REPORT: P 11

Researchers to track an elusive predator lurking in state's rivers

Oppili.P@timesgroup.com

Chennai: From the ancient Chinese to kingdoms in ancient Europe, Africa, and Britain, otters have for more than a thousand years helped humans fish and been a source of wonder for their industry and resilience.

They may not have been put to the same use in the country or the state but — hang on there — otters in Tamil Nadu? Few people are aware that the sleek amphibians thrive in some of the state's rivers, particularly in the upper reaches of the Cauvery, Bhavani and its tributary the Moyar in western Tamil Nadu.

A scholar is now leading a team that is researching otters in the state, a subject that a scientist last focused on more than two decades ago. The study by K Narasimmarajan, 28, of CareEarth, a Chennai-based biodiversity research organisation, and four other researchers will involve a head-count of what is one of nature's most efficient and elusive predators, collection of data that the team plans to use to create a map of their distribution and habitat and how it is faring in stretches of the state's rivers.

UNDERSTANDING NATURE: The study will begin with otters that inhabit the clear waters of the Moyar in Mudumalai Tiger Reserve

The study, which will have the collaboration of the forest department and financial support from London's Conservation Leadership Programme, will begin with otters that inhabit the clear waters of the Moyar in the Mudumalai Tiger Reserve.

"There are three species of otters in India: the Eurasian otter (Lutra lutra), the smooth-coated otter (Lutra perspicillata) and the Asian small-clawed otter (Aonyx cinereus)," Narasimmarajan said. "All three species are found in the Western Ghats."

"The species has not received any focused attention, particularly in Moyar river," he said. "As a result, no one has calculated their numbers or the threats they face."

▶ Planning campaigns, P 4

‘ஏசியன் ஸ்மால் ஆட்டர்’ வகை நீர் நாய் மாயார் ஆற்றில் காணப்பட்டதால் மகிழ்ச்சி

கூடலூர் ● ஜன. 11– முதுமலை அருகேயுள்ள மாயார் ஆற்றில், ‘ஏசியன் ஸ்மால் ஆட்டர்’ என்ற நீர் நாய், வசிப்பது தெரிய வந்துள்ளது.

முதுமலையில் உள்ள மாயார் ஆற்றில், சென்னை கிறிஸ்டியன் கல்லூரி மாணவர் நரசிம்ம ராஜன், விலங்கியல் துறையில் முனைவர் பட்டத்துக்காக, நீர் நாய்களின் வாழ்வியல் குறித்த, ஆய்வை மேற்கொண்டுள்ளார்.

இதில், கூடலூர் தொரப் பள்ளி அருகே, மாயார் ஆற்றில் அரியவகை, ‘ஏசியன் ஸ்மால் ஆட்டர்’ என்ற நீர் நாய் வசிப் பதை அவர் உறுதி செய்துள்ளார்.

நரசிம்மராஜன் கூறியதாவது:

நம் நாட்டில், மூன்று வகை நீர் நாய்கள் உள்ளன. இவைகள் அழிவின் பட்டியலில் உள் ளதால், வன உரிமை பாது காப்பு பட்டியல் ஒன்றில் உள் ளன. இதில், உருவத்தில் சிறிய ‘ஏசியன் ஸ்மால் ஆட்டர்’ என்ற நீர்நாய் தென்மாநிலத்தில், காவிரி ஆற்றிலும், வால்பாறை நீர் நிலையிலும் வசிப்பதை பதிவு செய்யப்பட்டுள்ளது.

தற்போது, முதுமலை தொரப் பள்ளி அருகே, மாயார் ஆற்றில், இந்தவகை நீர் நாய் வசிப்பது தெரிய வந்துள்ளது. இங்கு ‘சுமோத் சொட்டட் ஆட்டர்’ என்ற நீர்நாய் அதிகளவில் உள் ளன. ஆனால், இப்பகுதியில் ‘யுரேசியன் ஆட்டர்’ வகை நீர் நாய் மட்டும் இதுவரை தென்ப டவில்லை. அதனை தேடி வரு கிறோம்.

இமயமலை பகுதியில் மட் டுமே மூன்று வகை நீர் நாய் களும் உள்ளன. நீர் நிலைகள் அழிவு, நீர் மாசுபடுத்தல், உணவு பற்றாக்குறை, தோலுக்காக வேட்டையாடுதல் போன்ற கார ணங்களால், இவைகள் அழிந்து வருகின்றன. இவற்றை பாதுகாப்பது அவசியமாகும். இவ்வாறு நரசிம்மராஜன் கூறி னார்.

முதுமலை தொரப்பள்ளி அருகே, மாயார் ஆற்றில் வசிக்கும், அழிவின் பட்டியலில் இடம் பெற்றுள்ள ‘ஏசியன் ஸ்மால் ஆட்டர்’ வகை நீர் நாய்கள்.

நெருக்கடியில் தத்தளிக்கும் மாயாறு நீர்நாய்கள்

• மு முருகேஷ் •

சென்னையிலுள்ள இரண்டு குழந்தைகள் பூங்காவுக்குச் சென்றனர். ஒரு பெரிய குழிப் பகுதியின் நடுவிலிருக்கும் கண்ணாடித் தொட்டியின் உள்ளே நீந்துவது, சட்டென தலையைத் தூக்கி எட்டிப் பார்ப்பது, இரை போடக்கூடாதா என ஏங்கி ஏங்கி நிற்பது என ஒரு உயிரினத்தைப் பார்த்திருக்கலாம். விளையாட்டுத்தனம் நிரம்பிய உயிரினங்களில் ஒன்றான நீர்நாய்தான் அது.

அழிவின் விளிம்பில்

இந்த நீர்நாய் வகை மேற்குத் தொடர்ச்சி மலைத் தொடரில் வாழ்கின்றன. ஆனால், இன்றைக்கு அவற்றின் நிலை சொல்லிக்கொள்ளும்படி இல்லை. சுற்றுச்சூழல் சீரழிவு, கடத்தலுக்காக வேட்டை, வாழிட அழிப்பு, உணவுப் பற்றாக்குறை போன்ற நெருக்கடிகளால் அவை அழிந்து வருகின்றன.

உலகம் முழுவதுமே நீர்நிலைகள் மாசுபடுவதால் முதலில் பலியாகும் உயிரினங்கள் நீர்நாய்களே. சிங்கப்பூர், கம்போடியா, பூட்டான் ஆகிய நாடுகளில் நீர்நாய்கள் அழிந்துவிட்டன. மற்ற நாடுகளிலும் அருகிவரும் உயிரினமாக உள்ளன. இந்நிலையில், தமிழகத்தில் முக்கூர்த்தி தேசியப் பூங்காவில் தொடங்கி, பவானிசாகர் அணையை வந்தடையும் மாயாறு ஆற்றின் கரையில் நீர்நாய்கள் வசிக்கின்றன.

மாயாற்றில் ஆய்வு

"சிறுமத்தில் பிறந்து வளர்ந்ததால் இயல்பாகவே இயற்கையின்மீது எனக்கு ஈடுபாடு உண்டு. நீர்நாய்கள் பற்றி சிறிய படக்காட்சியை யூ-ட்யூப்பில் ஒருமுறை பார்த்தேன். அது எனக்குள் பெரும் தாக்கத்தை ஏற்படுத்தியது. நீர்நாய்களை அழிவிலிருந்து மீட்கும் வகையில் ஏதாவது செய்ய வேண்டுமென்கிற எண்ணத்தில்தான், ஆய்வு மேற்கொள்ள முடிவு செய்தேன். நீர்நாய்களைக் காப்பதற்கான முதல்கட்ட முயற்சியே எங்களுடைய ஆய்வு..." என்கிறார் கே. நரசிம்மராஜன்.

நீலகிரி மாவட்டம் வீரவாடி கிராமத்தைச் சேர்ந்த இவர் சென்னை லயோலா கல்லூரியில் முனைவர் பட்ட ஆய்வை மேற்கொண்டு வருகிறார். தனது நண்பர்கள் எஸ். பழனிவேல், எஸ். விக்னேஷ்வரன், அபிஷேக் கோபால் ஆகியோருடன் இணைந்து மாயாறு ஆற்று நீர்நாய்களின் வாழிடம் பற்றிய ஆய்வு மேற்கொண்டு வருகிறார்.

பேராசிரியர் மனோதாமஸ் மத்தாய் ஆய்வு முயற்சிக்குப் பெரிய தூண்டுதலாக இருந்திருக்கிறார். ஆய்வைச் சிறப்பாக மேற்கொள்வதற்கு, கடந்த ஆண்டு கனடாவின் கால்கரி நகரில் நடைபெற்ற 'இளம் ஆய்வாளர்களுக்கான தலைமைப் பண்பை வளர்க்கும் பயிலரங்கு' நரசிம்மராஜனுக்கு சிறந்த முறையில் வழிகாட்டியுள்ளது.

காட்டு நீர்நாய்

கேமரா பதிவு

மாயாற்றின் கரையோரப் பகுதிகளில் இரண்டு வகை நீர்நாய்கள் காணப்படுகின்றன. உருவத்தில் பெரியதாகவும் ஆற்று நீர்நாய் (smooth-coated otter), சிறியவை காட்டு நீர்நாய் (Oriental small-clawed otter) என்று அழைக்கப்படுகின்றன. நீர்நாய்கள் மிகுந்த கூச்ச சுபாவம் உடையவை. மனிதர்களைக் கண்டாலே ஒடி ஒளிந்துகொள்ளக் கூடியவை.

நேரடியாக இவற்றைப் பற்றிய ஆய்வு செய்வது கடினமானது என்பதால், அவை அதிகம் நடமாடும் இடங்களில் கேமராவை வைத்துப் பதிவுசெய்ய ஏற்பாடுகளைச் செய்தோம். தோற்றத்தில் ஒரே மாதிரி இருப்பதால், இவற்றைப் பிரித்து அடையாளப்படுத்துவது கடினம்.

ஆற்று நீர்நாய்

தப்பிப் பிழைக்குமா?

பாலூட்டி இனத்தைச் சேர்ந்த நீர்நாய்கள் ஒரே நேரத்தில் 2 முதல் 6 குட்டிகள்வரை ஈனும். 16 ஆண்டுகள்வரை உயிர் வாழும். நீரிலும் நிலத்திலும் வாழும் தகவமைப்பை கொண்டவை. இறால், நண்டு, நத்தை போன்றவற்றை உட்கொள்ளும்.

"உணவுப் பற்றாக்குறையும் வேட்டையாடுதலுமே நீர்நாய்கள் எண்ணிக்கை வெகுவாகக் குறைந்து வருவதற்கான முக்கியக் காரணம். நீர்நாய்கள், நீர்நிலைகளின் முதன்மை உயிரினங்கள். அவற்றை அழிவதைத் காப்பதற்கு, சீரழிந்துவரும் நீர்நிலைகளை பாதுகாப்பதுதான் முதல் படி" என்கிறார் நரசிம்மராஜன். கிரிப்வின்னை போலிருக்கும் இந்த நீர்நாய்களின் எதிர்காலம் தப்பிப் பிழைக்குமா என்பதை பொறுத்திருந்தே பார்க்க வேண்டும்.

The Times of India
Title : Researchers to track an elusive predator lurking in state's rivers
Author : Oppili P
Location :
Chennai:
Article Date : 09/07/2015

From the ancient Chinese to kingdoms in ancient Europe, Africa, and Britain, otters have for more than a thousand years helped humans fish and been a source of wonder for their industry and resilience.

They may not have been put to the same use in the country or the state -but hang on there -otters in Tamil Nadu? Few people are aware that the sleek amphibians thrive in some of the state's rivers, particularly in the upper reaches of the Cauvery , Bhavani and its tributary the Moyar in western Tamil Nadu.

A scholar is now leading a team that is researching otters in the state, a subject that a scientist last focused on more than two decades ago. The study by K Narasimmarajan, 28, of CareEarth, a Chennaibased biodiversity research organisation, and four other researchers will involve a headcount of what is one of nature's most efficient and elusive predators, collection of data that the team plans to use to create a map of their distribution and habitat and how it is faring in stretches of the state's rivers.

The study, which will have the collaboration of the forest department and financial support from London's Conservation Leadership Programme, will begin with otters that inhabit the clear waters of the Moyar in the Mudumalai Tiger Reserve.

"There are three species of otters in India: the Eurasian otter (Lutra lutra), the smoothcoated otter (Lutra perspicillata) and the Asian small-clawed otter (Aonyx cinereus)," Narasimmarajan said. " All three species are found in the Western Ghats."

"The species has not received any focused attention, particularly in Moyar river," he said. "As a result, no one has calculated their numbers or the threats they face." Narasimmarajan said they intend to identify immediate threats to otters and their habitat and hope to start a programme for the conservation of the species through awareness campaign and with the help of local communities who share the rivers' re sources with the friendly and charismatic creatures.

The team of researchers will by foot cover the entire course of the Moyar -more than 90km -for the otter headcount and to study the distribution of the animal.

"We will divide the river into 2km stretches and then survey each stretch on foot twice a week," Narasimmarajan said. "This will help us identify ideal sites for otter preservation areas along the banks of the river."

The team will in phases set up close to 1,000 camera traps to evaluate the otters' habitat and figure out their habits and movement along the river's course, he said. Narasimmarajan and his team have, since they started the study last month, sighted two groups of smooth-coated otters in the Masinagudi Range. One group had seven of members and the other had three.

"We've found smooth-coated otters in the Moyar river so far but we expect to sight the Asian small-clawed otter upstream of the river," Narasimmarajan said.

The researcher said infrastructure development along several stretches of the Cauvery , Bhavani and Moyar has destroyed the mammal's habitat, leaving them extremely vulnerable. "Once populations get smaller, inbreeding is more likely , and that can have disastrous effects on them," he said.

Conservation of Otters in River Moyar, Western Ghats

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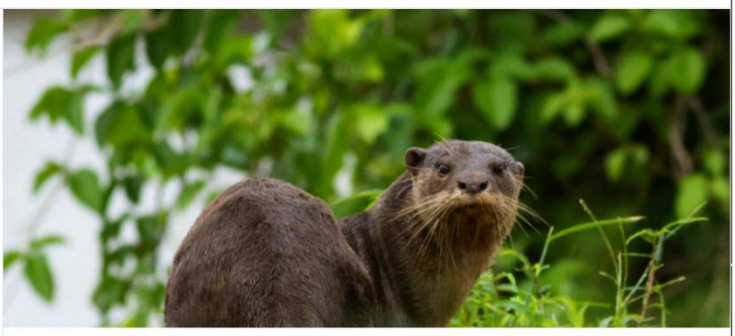

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The video link of the Moyar Waterdogs project

Otters: The waterdogs of Moyar

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UPCOMING EVENTS

Mac Mohan Economics Vs Environment (corruption vs truth) (Developement Means What) "#Demonetisation"

Pushpa Nathan likes Prabhakaran Natarajan's photo.

Sunny Deori likes 5-Minute Crafts's video: How to pack a suitcase.

Munaivarnarasai Sekar and Marudhanayagam Ramesh are now friends.

Otter Kwek
Ramanathan Vaidya...
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Abdul Lutfi 1h
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Irwansyah Reza Lubis
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Anumitra Phukon
Senthil Kumar
Mahardika Rizqi Him...

MORE CONTACTS (4)

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Certificate was issued the prize winners of the painting competition conducted in various schools along the river Moyar Villages

Conservation of otters through community participation in river Moyar, Tamil Nadu

மாயார் ஆற்றில் சமுதாயப் பங்களிப்புடன் கூடிய நீர்நாய் பாதுகாப்பும் ஆராய்ச்சியும்

Enabling the conservation of river Moyar ecosystem using Otter as flagship species

Poster and Tea cup model

Monitoring and Evaluation

The project was created great impact from the forests department officials and other stakeholders (https://www.youtube.com/watch?v=b3PAey-CjQc).

Before the project implementation the farmers who placed their oil motors on the edge of the river, around 60% of farmers were displaced their motors 10 meters away from the edge of the river after the project.

The forests department now included monitoring otters and their dens during their daily patrolling. Our survey confirm that on an average 77% of the front-line staff can identify two otter species and associate them with their habitats after 4 months of the workshop.

Achievements and Impacts

- First of all the research was confirmed the presence of the Asian small clawed otter in river Moyar.
- Before the project implementation many of the people as well as the forests department officials from this region were not aware about otters and its importance. But, after the project implementation the total forests department showing the interest to protect and conserve the otters and the people who like around the river Moyar were also happily involving the otter conservation efforts.
- No the Mudumalai tiger reserve authority was included the otter/river conservation action plan in their 5 years action plan.

Capacity Development and Leadership capabilities

- K. Nrasimmarajan skills in project management and communication improved due to the CLP Conservation Management and Leadership Training Course at Barrier Lake Field Station, Canada in 2015. KN then trained the other team members, which not only improved the team's capacity but also improved their working relationship. KN leadership skills improved as he led the otter conservation workshop component with the Forest Departments. His skills in scientific writing and QGIS usage was improved from the training at the Writing for Conservation Workshop organized by CLP & FFI at Bengaluru, India in 2017. He is currently leading the preparation of a scientific paper on otter occupancy. Abhishek and Palanivel has improved their capacity in designing questionnaires, undertaking social surveys and habitat characterization surveys, interacting with

multiple stakeholders, project management (especially finances) and scientific writing. At the end of the project, Ahishek felt he had gained the perspective of a conservation researcher as he perceived that he was more of a wildlife ecologist before the project.

- The team's improved skill base enabled them to undertake a research essential course (project planning, scientific writing, fund raising and social science survey techniques) for the MSc Wildlife Biology students of the A.V.C. College, Mayiladuthurai at Mudumalai tiger reserve.

Section 3

Conclusion

Our project has initiated on-ground conservation towards the Vulnerable otters in river Moyar. The project has been able to initiate the knowledge sharing and thereby helping to secure the thriving otter population. It has improved the capacity of the local Forest Department officials in identifying and monitoring otters that would not only increase their focus towards otters conservation but also improve the profile of the entire river ecosystem.

Problems encountered and lessons learnt

- *Which project activities and outcomes went well and why?*

The occupancy of otters, capacity building activity with both forests department and other stakeholders were really went well. The outreach programmes with local community, schools, local panchayat were really went well and the students, teachers and local villagers are happily participated for these activities. Local farmers are also helped us to implement the displacement of their oil motors from the edge of the river to 10 m away/ inside their respective lands. Finally the forests department implanted the otter conservation plan within the Mudumalai tiger reserve.

Which project activities and outcomes have been problematic and in what way, and how has this been overcome?

We don't face any problem for implanting the project activities, except few areas were left-out during the survey due to inaccessibility. We got permission in time and all the forests officials were cooperative and supportive to the team members. Without their support it would be possible to finish our work.

One small problem occurred during the survey that the Prosopis invasion along the river Moyar, the issue was highlighted and discussed with the Sathyamangalam tiger reserve authorities to eradicate them as possible to save the unique riparian habitat but, they were refused to do that due to their financial restriction.

- *Briefly assess the specific project methodologies and conservation tools used.*

The occupancy survey, camera trap, habitat assessment, threats assessment, social questionnaire surveys and capacity building were simple to undertake especially since team members have been working with similar tools in their previous projects. However, distinguishing the spraints of Asian small clawed otters was difficult by the team members, it took a month to understand by team members. Fish identification was helped by Dr. JA. Johnson (scientist, Wildlife Institute of India) and KN learned the short course from him to identify the fishes.

- *Please state important lessons which have been learnt through the course of the project and provide recommendations for future enhancement or modification to the project activities and outcomes.*

The lessons learnt from the project is that stakeholders are more supportive when we approach them in proper manner, which positively impact the project activities. The project can be well undertaken when team members of different strengths take on individual as well as joint activities that further improves their relationships and the project's success.

In the future

Otter monitoring activity will be continue by the local forests department. Ecological study will be required to understand more about both the otter species, their habitat requirement and tolerance towards the disturbance. The tribal students are studying well but, in terms of higher education they are not reaching due to financial constrain so, scholarship scheme might help them to reach up to higher education. While this will reduce the river resource dependency for the next generation tribal.

Financial Report

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)	% Difference	Details & Justification (Justification must be provided if figure in column D is +/- 25%)
PHASE I - PROJECT PREPARATION				
Communications (telephone/internet/postage)	450	450.00	0%	Internet charge, postage, phone bills
Field guide books, maps, journal articles and other printed materials	200	210.00	5%	Mammals of India, otter ecology studies hard copies, maps of the Nilgiri biosphere reserve,
Insurance	200	200.00	0%	Medical insurance for the team + first aid kid box
Visas and permits	160	220.00	38%	Entry fee and caution deposit to enter the protected areas (WL5/20861/2015 and Ref. No. 6612/2015M to Narasimmarajan. K)
Team training	255	255.00	0%	Workshops on Otters conservation and use of camera trap
Reconnaissance	0	0.00	#DIV/0!	
Other (Phase 1)	300	300.00	0%	Two Capacity building programme to the forest department personnel's and local stakeholders
EQUIPMENT				
Scientific/field equipment and supplies	2389	2400.00	0%	1 x Garmin GPS = $200, 1 x field compass = $140, 1 x Binocular = $145, 6 camera traps + batteries = $317 each
Photographic equipment	480	600.00	25%	SLR Camera + Tripod Mount and SD card
Camping equipment	400	400.00	0%	: 2-Tents, 5-sleeping bags, 1-torches, 2-headlights, 5-pairs shoes, 5-camouflage/field clothes, 3-bags, 2-rain covers
Boat/engine/truck (including car hire)	2800	2800.00	0%	1-Car/bike hire= 100 trips x $28 /trip
Other (Equipment)	10	10.00	0%	: stationeries
PHASE II - IMPLEMENTATION				
Accommodation for team members and local guides	720	600.00	-17%	160 days x 5 person x $4.5/day
Food for team members and local guides	800	740.00	-8%	5-person x 295 days x $3/day
Travel and local transportation (including fuel)	650	650.00	0%	1-Bike/Car fuel = $400, Local Transport= $250
Customs and/or port duties	0	0.00	#DIV/0!	
Workshops	563	565.00	0%	5 -workshops x $112.50/workshop
Outreach/Education activities and materials (brochures, posters, video, t-shirts, etc.)	600	600.00	0%	500-Brochures, posters, t-shits, caps, stickers will be distributed among the locals to spread awareness and build knowledge. Costs mentioned here are inclusive of the design costs.
Other (Phase 2)	900	880.00	-2%	5-Stipend to cover basic living expenses
PHASE III - POST-PROJECT EXPENSES				
Administration	0	0.00	#DIV/0!	

Report production and results dissemination	300	300.00	0%	The report and other documents disseminated to the forest department and other stakeholders. 5 year river conservation plan was prepared and send to approval from PCCF office by Mudumalai tiger reserve.
Other (Phase 3)	280	280.00	0%	otter conservation action plan preparation with Forests department was done and other stakeholders such as Electricity department and Public work department
Total	**12,457.00**	**12,460.00**		

Section 4: Appendices

CLP M&E measures table

Output	*Number*	*Additional Information*
Number of CLP Partner Staff involved in mentoring the Project	10	Stuart Patterson, Julie Lewis, Kiragu Mwangi, Christina Imrich, Laura Owens, Iain Dickson, Charlotte, Martin Fowlie, Martin Davies, Robyn Dalzen
Number of species assessments contributed to (E.g. IUCN assessments)	1	Conservation Needs Assessment for *Asian small clawed otter*
Number of site assessments contributed to (E.g. IBA assessments)	0	-
Number of NGOs established	1	Center for Integration of Conservation and Developmental Accountability" (CICADA) K. Narasimmarajan as one of the trustee
Amount of extra funding leveraged ($)	£5000	Rufford Small Grants Foundation (£5000); Idea Wild ($850 worth equipment); Care Earth Trust ($430)
Number of species discovered/rediscovered	1	*Hemibagrus punctatus* (first time from the river Moyar)*
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	0	-
Number of species/sites legally protected for biodiversity	0	-
Number of stakeholders actively engaged in species/site conservation management	1	Tamil Nadu State Forest Department; State Electricity board: Arulagam; ATREE & Local Panchayat
Number of species/site management plans/strategies developed	1	River Moyar management plan was developed by Mudumalai tiger reserve
Number of stakeholders reached	6	Forest Department officials, local communities, other NGOs, Local panchayat, line departments and managers
Examples of stakeholder behaviour change brought about by the project.	1	The capacity of Forest Department officials in identifying otters and differentiating both species was improved
Examples of policy change brought about by the project	0	-
Number of jobs created	0	-
Number of academic papers published	2	Two papers under review for publication (Tropical conservation science; JoTT)
Number of conferences where project results have been presented	1	Paper presented in '13th International Otter Congress' held in Singapore on 3rd to 8th July 2016

Annexure:

Annotated checklist of fish was observed in river Moyar, Western Ghats

S. no	Family name	Species name	Status	Remarks
1	Bagridae	*Hemibagrus punctatus**	Critically Endangered	Rare
2	Cyprinidae	*Tor khudree*	Endangered	Rare
3	Cyprinidae	*Hypselobarbus dubius*	Endangered	Rare
4	Cyprinidae	*Hypselobarbus micropogon*	Endangered	Rare
5	Cyprinidae	*Garra gotyla stenorhynchus*	Least concern	Rare
6	Channidae	*Channa marulius*	Least Concern	Rare
7	Belonidae	*Xenentodon cancila*	Least Concern	Common
8	Cyprinidae	*Pethia conchonius*	Least Concern	Common
9	Gobiidae	*Glossogobius giuris*	Least Concern	Common
10	Cyprinidae	*Cirrhinus reba*	Least Concern	Common
11	Bagridae	*Mystus keletius*	Least Concern	Common
12	Cyprinidae	*Barbodes carnaticus*	Least Concern	Common
13	Cyprinidae	*Osteochilichthys brevidorsalis*	Least Concern	Common
14	Cyprinidae	*Bangana dero*	Least Concern	Common
15	Cyprinidae	*Labeo pangusia*	Near Threatened	Rare
16	Cichlidae	*Oreochromis mossambicus*	Near Threatened	Common

*Based on IUCN Red List assessment the species is distributed in isolated populations and believed that it is extinct in many places/ heavy decline due to rapid habitat destruction and over fishing. The matured adult ratio was dwindling in the Cauvery basing.

Environmental variables code:

l.snd	Loss sand
h.snd	Hard sand
rck	Rocky
bnk.veg	Bank vegetation
dr.lf	Dry leaf litter cover
rv.wd	River width
wt.cur	Water current
slp	River bank slope
can.cov	Canopy cover
elev	Elevation
Dstb	Disturbance

Manuscripts proposed based on project data

1. Occupancy and resource use; vulnerable otters in the river Moyar, Western Ghats, India (Tropical conservation science) under review.

2. Impact of Mesquite invasion in river Moyar, Western Ghats, India (Journal of Threatened Taxa) under review.

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