Studying Home Range, Seasonal Movement and Habitat Use by the Endangered Forest Owlet and Sympatric Owls using Radiotelemetry in Melghat Tiger Reserve

Final Report

Wildlife Research and Conservation Society

Raptor Research & Conservation Foundation

WRCS

Melghat is transforming

Project Details

Project Title	**Studying Home Range, Seasonal Movement and Habitat Use by the Endangered Forest Owlet and Sympatric Owls using Radiotelemetry in Melghat Tiger Reserve**
Project Supported by	**Raptor Research and Conservation Foundation (RRCF), Mumbai**
Project Implemented by	**Wildlife Research and Conservation Society (WRCS), Pune**
Project Collaboration with	**Raptor Research and Conservation Foundation (RRCF), Mumbai** **Ministry of Environment and Forests and Climate Change (MoEFCC), New Delhi** **Maharashtra Forest Department** **Melghat Tiger Reserve**
Radio-telemetry Equipment Supported by	**Mrs. Kaku Nakhate, Mumbai** **Raptor Research and Conservation Foundation (RRCF), Mumbai**
Principal Scientists	**Dr. Prachi Mehta and Mr. Jayant Kulkarni**
Research Biologist	**Mr. Kamran Husain**
Project Assistants	**Mr. Ashik Bethekar and Mr. Ram Kasdekar**
Photo Credits	**WRCS, Kamran Husain, Prachi Mehta, Ashok and Ram**

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Confidentiality of the Report

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Acknowledgements

Our exciting research on the Forest Owlet and the co-existing owl species in Melghat Tiger Reserve represents the first-of-its-kind study on owls in the country, delving into the co-occurrence of an endangered and endemic Forest Owlet alongside seven other widely distributed owl species. The prospect of studying eight enigmatic owl species simultaneously in the same location is immensely thrilling and, at the same time, presents significant challenges.

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Prachi Mehta and Jayant Kulkarni

February 2024

WRCS team with Mr. Sunil Limaye (PCCF, Wildlife), DCF Sipna, DCF Gugamal and Field officers of Melghat Tiger Reserve

Chapter 1: Background

1.1 Introduction

Since 2005 Wildlife Research and Conservation Society (www.wrcsindia.org), has been working on the distribution, occupancy and ecology of Forests Owlet in Central India (www.wrcsindia.org/forest-owlet, Mehta et al. 2008, 2015, 2017a, 2017b, 2018).

WRCS has been carrying out long-term studies on the Forest Owlet and other owls in Melghat Tiger Reserve. A brief description of WRCS's earlier work is provided below:

2006-2008: Survey of Forest Owlet in Melghat Tiger Reserve. The survey was carried out to assess the presence of Forest Owlet inside MTR. Our survey was successful in reporting additional locations of Forest Owlet from Melghat Tiger Reserve.

2014-2015: Survey of Forest Owlet outside MTR in the buffer zone of East and West Melghat. Our survey reported very few locations of Forest Owlet from the buffer area.

2017-2021: In 2017, WRCS initiated a long-term study on the ecological co-variates of the Forest Owlet and other sympatric owls in Melghat Tiger Reserve in Maharashtra (Phase I). This was the first study in the country that examined the ecological co-variates of the Forest Owlet with co-existing owls. Along with the Forest Owlet, the other sympatric owls are the Spotted Owlet (*Athene brama)*, Jungle Owlet (*Glaucidium radiatum)*, Indian Scops Owl (*Otus bakkamoena)* and larger owls, namely the Barn owl (*Tyto alba)*, Brown Fish owl (*Ketupa zeyolensis),* Indian Eagle Owl (*Bubo bengalensis*) and the Mottled Wood Owl (*Strix ocellate)*. Through this study, we aimed to understand the mechanisms of co-existence among eight sympatric owl species in the study area. Since these eight species utilize the same resource pool for foraging, nesting, and roosting, their niches may likely have a spatial and/or temporal overlap, enabling different species to co-exist.

2021-2023: The next question in our study was to examine how far different owl species travel for foraging, nesting, and roosting and that is their extent of home range during the breeding season and outside the breeding season. To gain an accurate understanding of the habitat use and movement patterns of owls, it is essential to track their movements. For this purpose, we proposed to carry out a radio telemetry study on the Indian Eagle Owl, Brown Fish Owl, Mottled Wood Owl, Barn Owl, Spotted Owlet and Jungle Owlet in the study area.

Based on the outcome of our earlier studies, we proposed to understand the movement ecology of owls in the same study area and we initiated Radio-telemetry studies of sympatric owls in Melghat (Phase II). Ours is the first study in the country that examines the home range, habitat use and movement patterns of owls using radio-telemetry.

The ultimate goal of our ongoing studies is to establish long-term ecological monitoring of owls in the country and develop conservation strategies for the protection of owls and their habitat. Our endeavour in this direction has been supported by Raptor Research and Conservation Foundation (RRCF), Mumbai and the Ministry of Environment, Forests and Climate Change (MoEFCC), New Delhi. We are working in close collaboration with the Maharashtra Forest Department and Melghat Tiger Reserve Authorities.

1.2 Need for the Proposed Study

Radio telemetry is an immensely useful tool in studying spatial ecology, energetics, physiology and behaviour of free-ranging animals and can give accurate information on species distribution, mortality rates, habitat -use and home range that is most useful for determining the endangerment status of species at international, national and regional scale (Kenward 1985, Nicholls and Fuller 1987, Balksely et al. 1992, Sunde and Blostad 2004, Cooke 2008). Loss of habitat is one of the main threats faced by

most species today and in case of small and endemic populations, this can have serious implications ranging from local to global extinction.

Due to their nocturnal habits, owls are particularly challenging to research. Understanding their behaviour (Hafidzi et al. 2003), habitat use (Haug et al. 1990), and home range (White & Garrott 1990) is crucial for their effective conservation. Radio telemetry is a valuable technique for studying nocturnal species like owls (Nicholls and Fuller, 1987). Radio telemetry is a very useful tool to understand the type and extent of habitat required by the species for various ecological functions, the types of pressures existing in such areas and what actions are required for the conservation of the species and its habitat. This method is widely employed in owl research worldwide (Belthoff et al. 1993, Kenward 2001, Bennett & Bloom 2005, Kang et al. 2013, Eyes et al. 2017, Apolloni et al. 2018, Emin et al. 2018, Valdez-Gomez et al. 2018, Chang & Wiebe 2018, Denac et al. 2019, Blakey et al. 2019, Heggoy et al. 2021, Solheim et al. 2021). I

1.3 WRCS's Long-term Study on the Owls in Melghat Tiger Reserve (2015-2023)

From 2017 to 2021, WRCS studied the ecological covariates of the Forest Owlet and other sympatric owls in the Chourakund and Harisal range. After understanding the patterns of occupancy, diet and breeding of the eight sympatric owls, our objective was to study the home range, seasonal movements and habitat use by the owl species.

With the Owl Research Team in the field

With Mr. Kiran Srivastava, COO of RRCF in field and at theWorld Owl Conference

From October 2021 to mid-December 2022, the team surveyed the locations to monitor the owls.

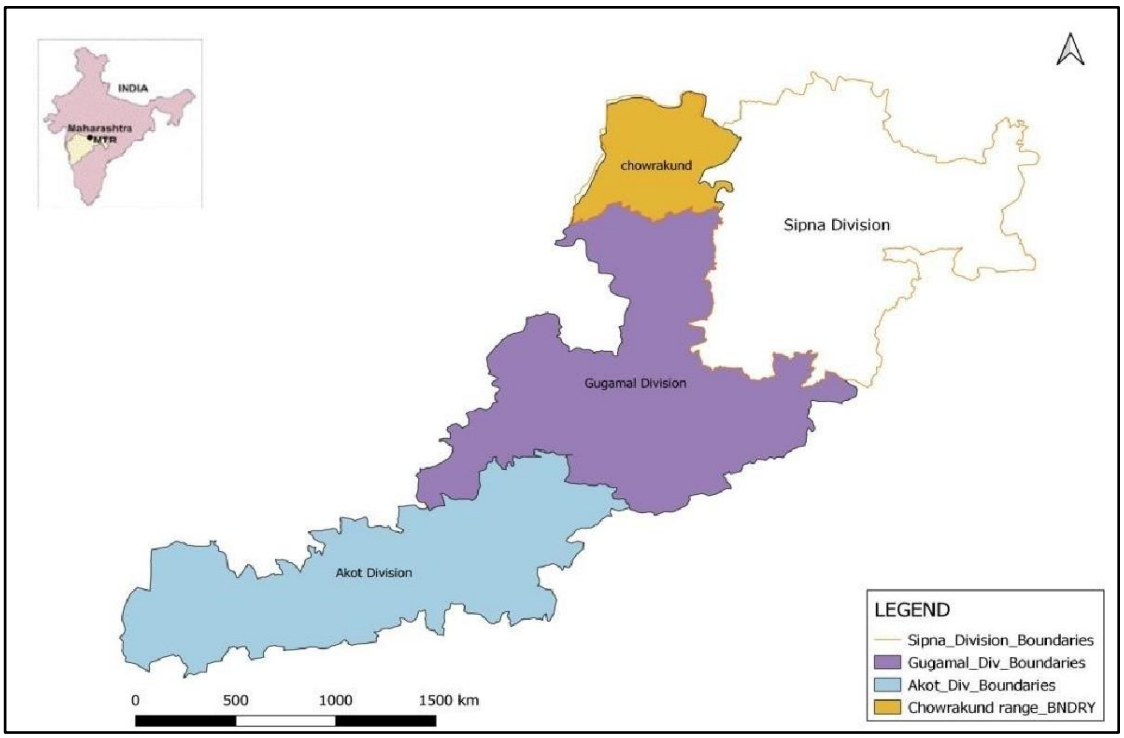
Owl Research team with the Forest Officers

Chapter 2: Study Area and Methods

2.1 Description of Study Area

The study was conducted in the buffer areas of Harisal and Chourakund ranges of Melghat Tiger Reserve (MTR), located (21°26'45"N and 77°11'50"E) in the Amravati District of Maharashtra, Central India.

Figure 1. Location of Melghat Tiger Reserve



MTR, established in 1973, covers an extensive area of 3000 km^2. The Gugamal National Park (361 km^2), the Melghat Wildlife Sanctuary (788.75 km^2), the Narnala Wildlife Sanctuary (12.35 km^2), the Ambabarwa Wildlife Sanctuary (127.11 km^2), and the Wan Wildlife Sanctuary (211 km^2) together, make up the Melghat Tiger Reserve (MTR). MTR was one of India's first Tiger Reserves established. The reserve plays a crucial role in connecting the forests of Maharashtra and Madhya Pradesh, featuring diverse topography with elevations ranging from 381 to 912 meters above sea level. Due to the variation in altitude and aspect, the climate in Melghat and distinct seasons are experienced throughout the year. The monsoon season lasts from the middle of June to the end of September. Except for the monsoon season, the air is generally dry. December is the coldest month, when night temperatures may go as high as 5°C, and May is the hottest month up to 47°C. The winter season is considered from October to February. MTR is home to a variety of floar and fauna. There are more than 760 different species of naturalized plants. They come from over 90 distinct plant families. There are 56 climbers, 23 sedges, 99 grass species, 90 tree species, 66 shrub species, 316 herb species, and 66 shrub species. There are about 80 species of mammals, 24 species of fish, 50 species of reptiles, 260 species of birds, 16 species of snakes, and 5 species of lizards. The local community consists mainly of tribal populations, such as Korku, Gond, and Nihal tribes, contributing to the unique cultural and ecological landscape of the region.

2.2 Methodology

We re-surveyed the areas in the Chourakund and Harisal ranges of MTR to better understand the locations of owl species and determine the individuals for trapping. Before starting the telemetry studies, we examined various types of radio tags available and used by the scientists in other studies. After several discussions and consultations with radio-tagging companies, we decided to use LOTEK radio tags (https://www.lotek.com). As all owls are nocturnal, we could not use solar-powered tags. Among the different types of tags available, we decided to use the Pinpoint VHF GPS tags. LOTEK tags are rechargeable so the tags can be charged repeatedly. The pinpoint VHF tags have several useful features: 1) The data from the tags can download information in case of unavailability of a cellular network, 2) We can communicate with the tag remotely and change the schedules to take GPS fixes as per our need, 3) We can also download the data and set-up tracking schedules by using the Pinpoint Commander unit from a distance of about 200 meters. Tagged owls can be found using the triangulation approach and the data can be downloaded because the owl species in the research region are resident.

Lotek Radio-tags, Receiver, PP Commander, Gang Charger used in the Project

Dr. Mehta and Mr. Kamran with the equipment

Mr. Kulkarni examining data downloading process with the team

WRCS team, with a Forest Guard, trapping experts and an Owl during tagging

2.3 Preparation of the Tag before deployment

We decided the individuals of each species to be tagged. The first step was to use a Gang Charger unit to fully charge the radio tags. The tag should be charged until the indicator light transitions from red to green. Subsequently, we proceed to upload three specific schedules to the fully charged tag:

- **Swift Fixes:** We make GPS schedules in Lotek software to take GPS fixes at our desired time, and upload the schedules on the tag.
- **RF Schedule and Beacon Schedule:** These schedules are specific for the tracking and downloading the data from the tag. We can fix the schedule as per the requirement.

2.4 Installation of Radio-tag

All procedures such as fixing the coloured bands, taking morphometry and installing radio tags are done by the lead scientists , Dr. Prachi Mehta and Mr. Jayant Kulkarni along with the help of research biologist Mr Kamran Husain assisted b trapping expers Mr Ali Husain and Mr Rustom. They handled the owl and completed the process. In each operation, one or two Forest Department personnel were always present. Our team was accompanied by a Forest Guard or a Forester on each occasion and many times the Range Forest Officer, Mr. Girish Jatkar also attended the tagging program.

- Body measurements are taken with the help of a vernier calliper and plastic scale as per the WRCS datasheet. The morphometry will include head-to-tail, wing-to-wing span, full-wing chord, half-wing chord, tarsus diameter and talon length.
- The radio tag is fitted with a backpack on the back of the owl. A backpack harness is prepared beforehand and is slipped down the head of the owl. It is made with high-quality wear-resistant Teflon tape. It is adjusted as per the body measurements of the owl. The ends are tied and stuck with a bit of Fewiquik to ensure that they do not become untied.
- After fixing the harness, the wings are checked for movement and snugness of the harness. After ensuring that the harness is comfortable, the owl is released close to its capture location.
-

With Range Forest Officer Mr. Girish Jatkar, Forest Guard Mr. Tekade and an Owl

Measuring the Brown Fish owl

Weighing the owl

With the Field Staff

Installing the Radio-tag

Releaseing the tagged owl

Tagged Barn Owl

2.5 Tracking and Monitoring of Radio-tagged Owls

Due to the nocturnal behaviour of owls, we scheduled data collection intervals to occur only at night from 6 pm to 6 am. We also scheduled daytime fixes to determine the roosting sites of the owls. We set specific times during the day for tracking and downloading data from the tagged owls, each with its own designated frequency. To track the owls, we used Beacon and Yagi Antennae in conjunction with the triangulation method. Once an owl was located, we attempted to retrieve its data using the Pinpoint Commander Unit attached to a Whip Antenna.

We preferred downloading data from a distance to avoid disturbing the owls, as they might leave their roosting sites, making it challenging to locate them again. Furthermore, disturbing the birds could make them vulnerable to diurnal raptors or expose them to harassment by other diurnal birds.

WRCS team with Forest Staff and an Owl

Team tracking the Owls

2.6 Data Processing

Lotek Software was used to process the downloaded data. KML and OBS files are created. The GPS coordinates and movement of the owl during the night are displayed in the KML files. To download and process data stable internet connection is essential. We had established a field station at Harisal and data from the Pune office was sent daily to the research officer at Chourakund to assist him in processing the information.

WRCS team with Ali Husain, Rustam Husain, Forest Guard and a Brown Fish Owl

Tagging the Mottled Wood Owl

Chapter 3: Owl Outreach and Knowledge Dissemination

3.1 Background

Programs to create awareness about owl conservation are essential to conserving India's owl species, which is characterized by the coexistence of diverse owl species in forested landscapes with local communities. By creating a sense of shared responsibility and acting as a link between these communities and initiatives to conserve the owls, these programs act as a bridge. Raising awareness is crucial to maintaining longevity and safeguarding of owls and their habitats in Melghat where interactions between humans and wildlife occur frequently.

The active participation of stakeholders and establishment of collaborations with local communities are essential components of successful conservation education initiatives. By involving the local communities, a commitment to the protection of owls and their habitat natural resources is embedded, along with a sense of sharing. This cooperative strategy is especially important when there is a direct correlation between human activity and the ecosystems that sustain different owl species.

Moreover, one of our important objectives of this project was to concentrate on enhancing the capabilities of frontline field staff working in MTR. Since they are the primary stakeholders in protecting the owls and their habitats, it is crucial to improve their knowledge and abilities for efficient conservation and management of owls and their habitat. Field staff needs to be trained and empowered to address challenges in owl protection, place best practices into practice in habitat conservation and make an important contribution to the protection of owls and their habitat in their area. We conducted several training programs with the Forest Department, awareness programs in schools and a poster presentation based on our telemetry project.

Melghat Field Staff being trained in Radio-Telemetry Techniques

3.2 Workshop on Techniques of Conducting Research on Owls Training the Field Staff in Radiotelemetry of Owls

We received a request to organize a technique training workshop for the frontline field staff from Senior officers. Accordingly, we planned a technique workshop on Owl Research Methods for the front-line Field staff of the Gugamal and Sipna divisions.

The workshop was organized on 12th April 2023 at Harisal Sankul. The participants were frontline staff of the Gugamal and Sipna divisions. The list of participants is included in Appendix 1.

Program Details

The workshop began at 11:15 am. We started with a welcome address to all the participants, followed by a round of self-introduction. The workshop was divided into the following sessions.

Session 1: An Overview of Owl Research Carried out by WRCS in Central India.

Dr Prachi Mehta, Senior Scientist, presented this session in which the following information was provided:

- Total number of Owl Species found in India and Central India
- History of discovery of the Forest Owlet in India, and its rediscovery after 113 years
- The reasons why the forest owlet got overlooked in India
- The similarities and differences between the Forest Owlet and the Spotted Owlet
- Number of owl species found in Melghat
- How to identify Owl Species from their appearance and calls
- Use of occupancy survey method in Detecting owls
- Information on pellets and how it is used in diet studies. The results of our diet research
- Breeding behaviour of owls accompanied by videos
- Nest monitoring with the help of camera traps accompanied by videos
- Color-banding of owls and its use for monitoring population
- Owl Capture techniques
- Radio-telemetry and its use in understanding habitat use
- Conservation of owls, awareness programs and management recommendations

Dr Prachi Mehta conducting the workshop on owl research methods


Session 2: Techniques in Owl Capture

Mr. Ali Hussein and Mr. Rustom Hussein, Bird trapping experts demonstrated owl capture techniques. The following aspects were demonstrated:

- Making of Chargodi Glue Trap
- Use of Glue Trap
- Bal chatri trap

Mr Ali Hussein and Mr Rustom demonstrating capture techniques



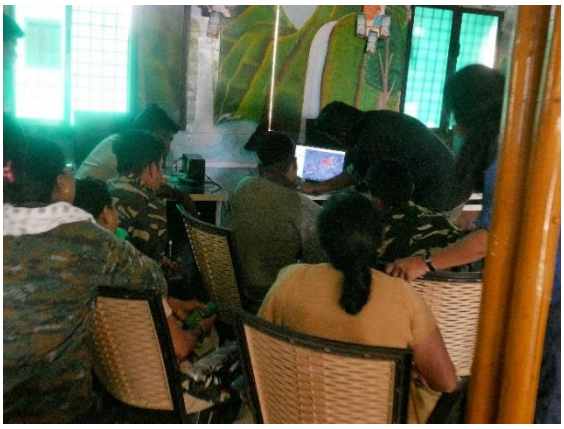

Session 3: Handling of Owls and Morphometric Measurement of Owls

Mr. Kamran Husain, a Research Biologist, demonstrated the technique in this session. We had got a live domestic chicken to demonstrate the morphometry techniques.

- How to handle the bird

- Names of different equipment used for radio-telemetry
- How to program and track the owls in the forest
- For this purpose, we activated one tag and asked one participant to walk away with the tag. The remaining participants used the antenna to locate the tag and download the data
- How to process the data
- How to interpret the downloaded data



Session 4: Use of Camera-traps in monitoring owl nests

Mr. Ashok Bethekar and Mr. Ram Kasdekar, Project Assistants, demonstrated the use of camera traps in monitoring owl nests. We got our Browning Defender Camera trap to demonstrate to the participants. Our team demonstrated the following:

- Fixing of camera trap of the tree
- How to switch on the live view to focus on the nest
- Downloading the images from the camera trap on the phone app
- Checking the battery status and memory of the card without disturbing the camera
- Downloading the images from the camera and sorting them according to the activity
- Showed the video of a Radio-tagged Brown Fish Owl in the nest

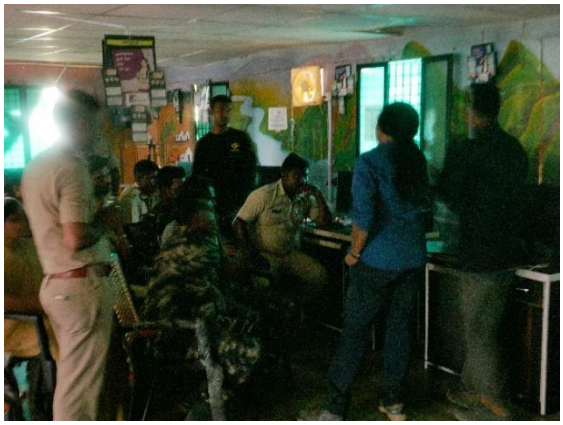
Session 5: Pellet Analysis to understand the diet of owls

Ashok and Ram also showed them how to collect the pellets of owls for diet analysis.

- How to collect the pellets
- To identify pellets of different owl species
- Storage and labelling of pellets
- Dissection of pellets
- Identification of prey remains from the pellets

Mr Ashok Bethekar and Mr Ram Kasdekar Demonstrating Camera-trapping and Pellet Analysis



Session 6: Screening of Video films

We screened the following video films for the participants

- WRCS short film on radio-tagging of owls with Ali Hussein and the WRCS team
- Gujarat Forest Department film on tagging of vultures, falcons, and harriers with Ali Hussein and GFD team
- Great Indian Bustard trapping and telemetry
- WRCS videos of owls showing prey exchange, pellet regurgitation, and feeding.

Session 7: Question and Answers and a Quick Quiz

All the participants asked questions throughout the sessions. We answered their questions and clarified their doubts. Ms. Sunanda Punekar, the Forest Guard, who accompanied us during the telemetry program provided her inputs and observations.

We conducted a quick quiz for the participants based on the information shared during the above sessions. It was heartening to know that the participants answered all the questions correctly, indicating that they were paying attention in all the sessions. That indicated the success of our workshop.

WRCS Owl Awarenss Poster at Harisal Sankul

3.3 Takeaways from the Workshop

Post this workshop, the participants were very keen to learn more about owls, their research methods and their application. Considering their interest, we have formed a WhatsApp group called “Friends of Owls_WRCS” with all the participants of the workshop. The objective of this group will be to share information on owls. We have already shared a pdf of a pictorial booklet on Owls of Melghat and calls of all the owls. The participants have also shared photos and videos of owls from their area. We hope to continue this interaction to generate awareness and interest among the field staff on owls and their research and conservation.

Understanding radio-telemetry equipment

3.4 Visit of the Management Effectiveness Evaluation (MEE) team, Melghat Tiger Reserve

Dr Prachi Mehta received a request to address the Management Effectiveness Evaluation (MEE) team on the work done in the Melghat Tiger Reserve by the Wildlife Research and Conservation Society (WRCS). The presentation addressed extensive detail about the ecology of owls and covered a lot of research on Project Tiger. After giving a brief presentation, the WRCS team performed a hands-on demonstration of owl-capturing methods and radiotelemetry study equipment.

A comprehensive overview of the significant achievements made by the WRCS in the conservation efforts within Melghat Tiger Reserve was given in Dr Prachi Mehta's presentation. The Project Tiger insights demonstrated the organization's dedication to protecting this iconic species, and the owl ecology research demonstrated a more general commitment to understanding and protecting a variety of wildlife. The following practical demonstration highlighted the WRCS's use of a hands-on approach in their research and conservation efforts while also bringing the concepts of theory to life.

WRCS team presenting work to MEE team in Chaurakund

3.5 Wildlife Week Programs

The Wildlife Research and Conservation Society (WRCS) team, including research biologist Kamran Husain and field assistants Ram Kasdekar and Ashok Bethekar, played a role in an awareness program organized by the Forest Department at Melghat Tiger Reserve during Wildlife Week. The Forest Department, recognizing the significance of educating the younger generation about wildlife conservation, extended an invitation to the WRCS team to deliver a presentation in schools at Chaurakund and Harisal.

The school children enthusiastically participated in the program, showing eagerness to learn through engaging activities. During the presentation, Kamran Husain discussed the importance of biodiversity conservation, emphasizing the significance of owl species and the intricate relationships between different species and their environments.

As part of the awareness initiative, the WRCS team selected and streamed short films about biodiversity conservation. These multimedia tools effectively conveyed the challenges faced by wildlife and the pressing need for conservation efforts. The visual storytelling not only captured the students' attention but also left a lasting impression, instilling in them a sense of responsibility and respect for the diverse flora and fauna that inhabit their surroundings. The collaboration between the Forest Department and the WRCS team showed a united effort to raise awareness among the youth and promote a greater understanding of wildlife conservation.

Wildlife Week Program conducted by the WRCS team




3.6 International Day for Biological Diversity (IDB) Celebration

The WRCS team was invited by Range Officer Mr. Girish Jatkar to deliver a talk on Global Biodiversity Day in Harisal Sankol. The program garnered participation from the frontline staff of the forest department, creating an engaging platform for discussions on biodiversity conservation. Mr. Girish Jatkar initiated the event with a talk, emphasizing the significance of biodiversity. Following his insightful introduction, Assistant Conservator of Forest (ACF) Mr. Machhindra Thigale took the stage to delve deeper into the crucial aspects of biodiversity conservation and management.

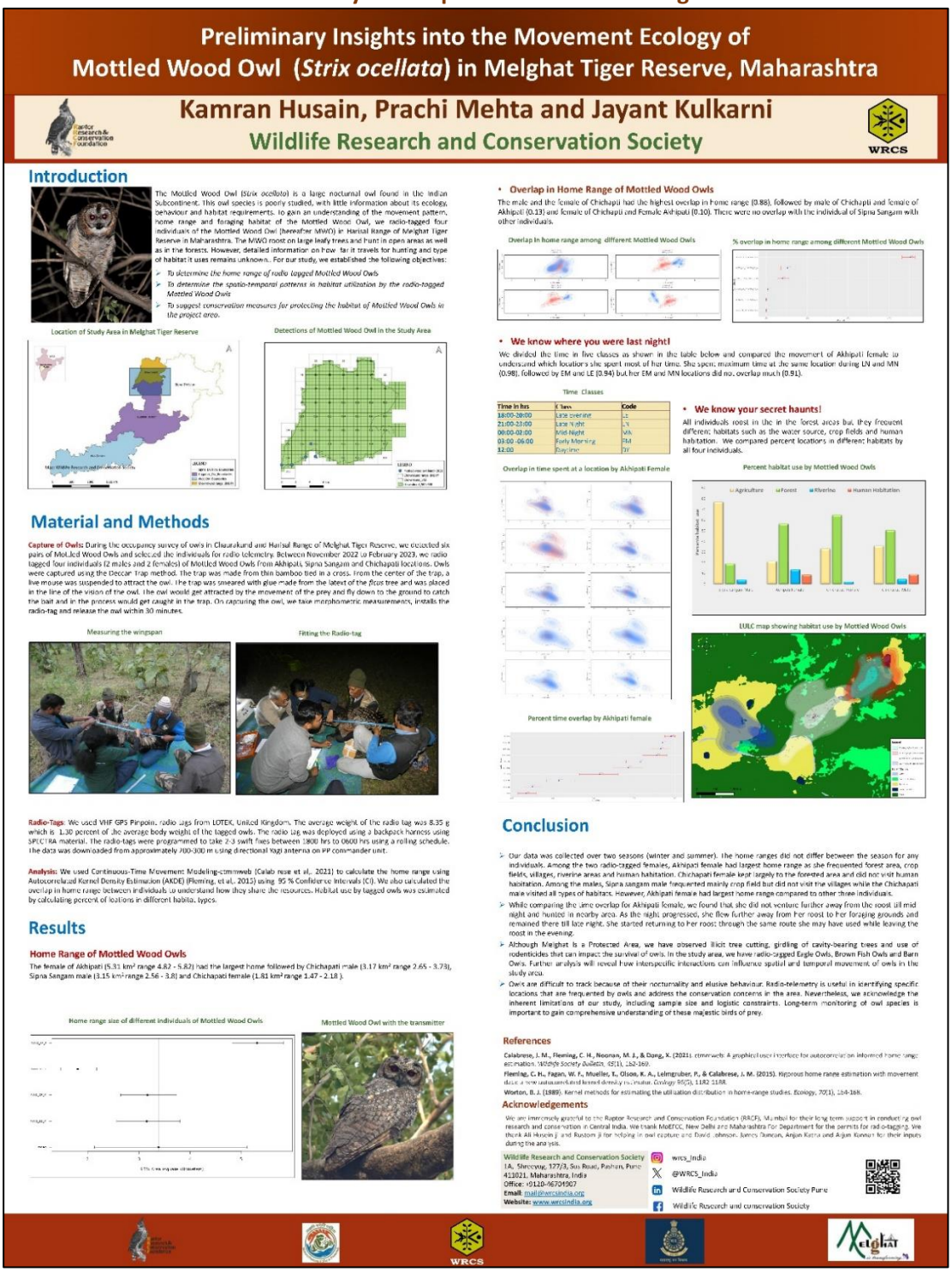
Continuing the enlightening session, research biologist Mr Kamran Husain presented a comprehensive overview of biodiversity and its importance. He shared valuable insights into the global diversity of owl species, shedding light on the unique roles these creatures play in ecosystems around the world. Mr. Husain emphasized the importance of conserving owl species, underlining their ecological significance. The event not only served as an educational platform but also fostered a sense of collective responsibility among the attendees towards the preservation of global biodiversity. Such collaborative efforts between the WRCS team and the forest department contribute to building awareness and promoting sustainable conservation practices in the region.

Celebrating Glabal Day for Biological Diversity

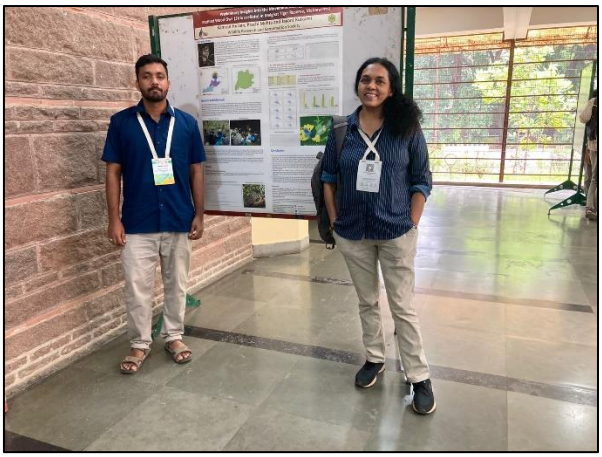
3.7 Participation in Student Conservation Conference (SCCS)- Bangalore

We presented our owl telemetry research at the SCCS 2023. Mr Kamran Husain presented the poster titled “Preliminary Insights into the Movement Ecology of Mottled Wood Owl (*Strix ocellata*) in Melghat Tiger Reserve, Maharashtra” . Our study invited good academic attention from conference participants.

Owl Telemetry Poster presented at SCCS-Bangalore



Participants at the WRCS Owl Telemetry Poster at SCCS



Chapter 4 : Conservation Implications

4. 1 Introduction

The study provided significant insights into owl movement ecology, revealing important factors such as territory size, seasonal differences in home ranges, habitat preferences, and roosting and nesting site selection.

The study not only revealed ecological processes of owl species in India in unprecedented detail but also promoted community-based, comprehensive conservation. The researchers engaged in workshops and activities with the local community and the forest department, fostering positive responses. Conservation measures were recommended, including identifying and conserving important sites, regulating pesticide use, and using artificial owl perches for eco-friendly pest control. The research underscores the crucial role of owls in preserving ecosystems and calls for prompt action to protect their habitats. The study's emphasis on continuous efforts to understand and conserve these essential components of the environment provides a foundation for future conservation initiatives.

4.2 Conservation Implications

Owls are important avian predators that occupy a prominent position in the food chain, making them vital to the maintenance of ecosystems. However, radio-telemetry studies have not been carried out on owls to understand their ranging behaviour in India. Ours is the first study that investigates sympatric coexisting owl species in India using radio-telemetry, exploring the temporal and spatial requirements of six different owl species. Our research provides important baseline data on owl territory sizes, seasonal differences in home ranges, habitat use, and roosting and nesting site selection.

Building upon the insights of earlier research by Bonebrake et al. (2010) and Le Viol et al. (2012), which highlight the profound impacts of anthropogenic activities on bird communities, our study contributes to the growing understanding of how such activities shape avian ecology. Moreover, Donázar et al. (2016) underscore the pivotal role of raptor species, shedding light on the ecosystem services they provide.

The identification and conservation of roosting and hunting sites emerge as crucial elements for effective owl management. These sites, offering vital cover from diurnal predators, represent key components of owl habitats. To translate our findings into actionable conservation measures, we advocate for the marking and protection of specific trees within these habitats. Urgent attention and concerted efforts are needed to ensure the continued well-being of these magnificent nocturnal hunters and, by extension, the ecosystems they inhabit.

The application of pesticides in and around forested areas demands careful regulation to prevent adverse effects on wildlife and ecosystems. Instead of resorting to rodenticides and pesticides, we advocate for an innovative program focused on educating and sensitizing farmers. A key component of this program involves encouraging the installation of artificial owl perches.

Certain owl species, notably the Barn Owl, exhibit a natural inclination to perch in agricultural settings, functioning as specialized hunters of rodents. By promoting the strategic placement of artificial owl perches, we can harness the inherent pest control capabilities of these magnificent birds. This approach not only provides an environmentally friendly alternative to pesticides but also contributes to the preservation of owls and the delicate ecological balance.

Through educational initiatives, farmers can gain insights into the ecological benefits of coexisting with owls and employing natural methods for pest management. By fostering a harmonious relationship between agriculture and wildlife, we can create sustainable practices that enhance biodiversity and support the long-term health of our ecosystems.

4.3 Conclusion

This study has unveiled critical ecological insights into the elusive nocturnal and diurnal owl species in the Melghat Tiger Reserve, focusing on the significance of their conservation and management. Serving as foundational data, our research lays the baseline for further investigations into the movement ecology of the commonly found owl species within the Indian Subcontinent. The challenges faced by owl species, including habitat loss, climate change, illegal hunting, and poaching, coupled with persisting superstitions surrounding their use, emphasize the urgent need for conservation efforts.

Our findings have wider implications for conservation strategies than just the immediate effects on owl populations. Our research highlights how owls and their habitats are interdependent, which highlights the need for a comprehensive strategy for wildlife conservation. Moreover, conservation efforts can be made more effective by involving local communities and raising awareness of the ecological contributions made by owls.

In conclusion, this study not only sheds light on the ecological dynamics of owl species but also advocates for a comprehensive conservation paradigm that integrates scientific insights with community involvement. The protection of these highly specialised owls and their habitats is not merely a wildlife concern but an essential step towards preserving the delicate balance of ecosystems in the face of evolving anthropogenic pressures.