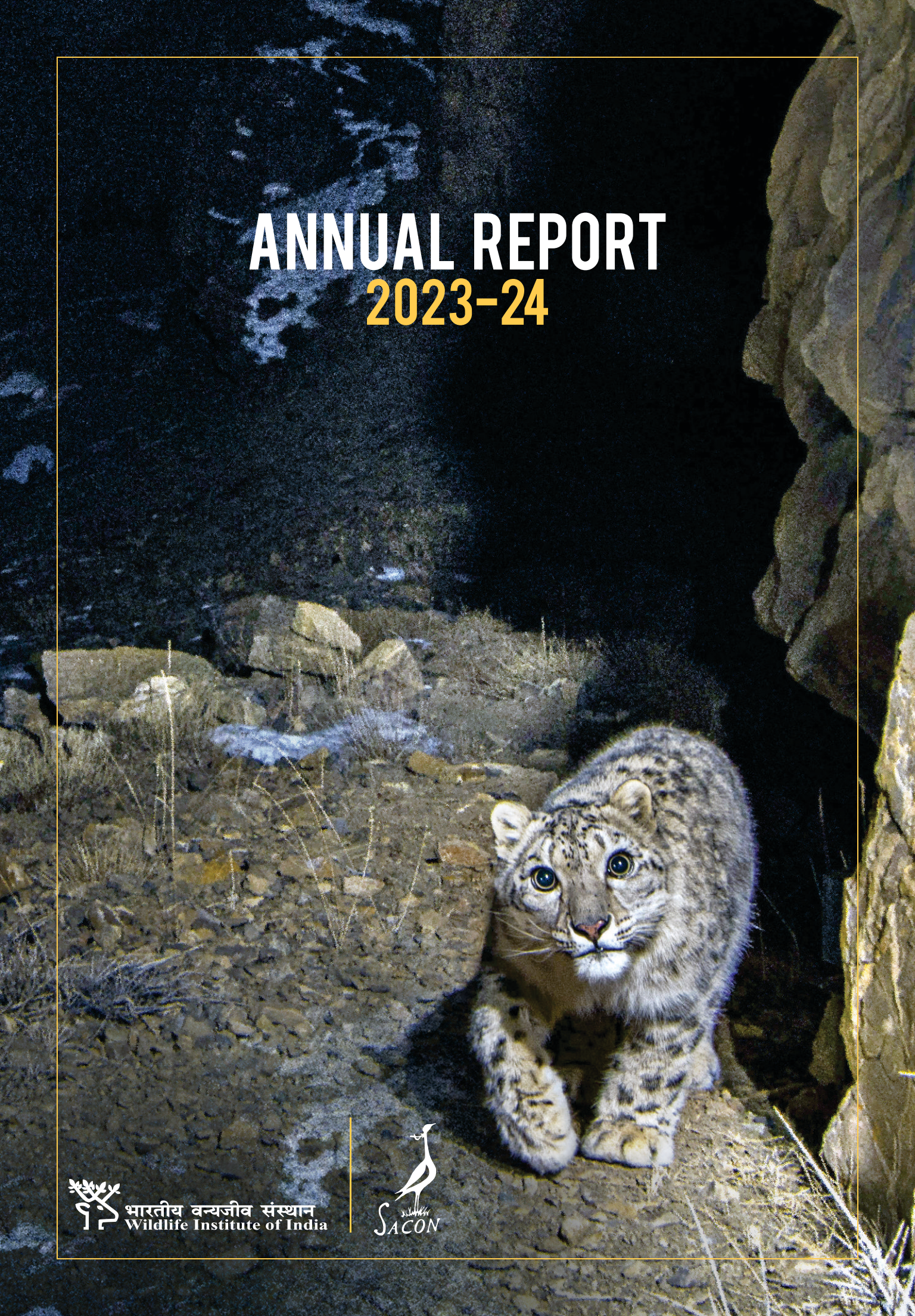
ANNUAL REPORT
2023-24



भारतीय वन्यजीव संस्थान
Wildlife Institute of India

SACON

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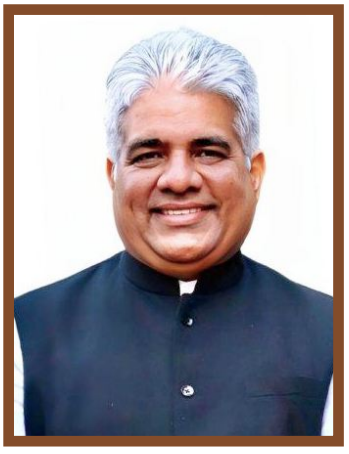


Sh. Bhupender Yadav

Hon'ble Union Minister
Ministry of Environment, Forest & Climate Change
Government of India

Sh. Kirti Vardhan Singh

Hon'ble Union Minister of State
Ministry of Environment, Forest & Climate Change
Government of India

FROM THE DIRECTOR'S DESK

It is with immense pride that I present the Annual Report of the Wildlife Institute of India (WII) for the year 2023-24. This year marked a significant milestone with the integration of the Salim Ali Centre for Ornithology and Natural History (SACON) as WII's southern regional centre, further solidifying our mission to lead in wildlife conservation, research, and capacity building.

The reporting year was distinguished by remarkable achievements across our core mandates of teaching, training, and research. WII undertook over 100 research projects, successfully concluding 40, initiating 20 new projects, and continuing 50 ongoing studies. Among these were landmark initiatives, including the PAN-India Assessment and Monitoring of Endangered Species under the Integrated Development of Wildlife Habitat (IDWH) Program funded by the Ministry of Environment, Forest and Climate Change (MoEFCC), and the National CAMPA and MoEFCC-funded Endangered Species Recovery Programme.

Notable accomplishments during the year included the first-ever GPS collaring of Himalayan Marmots in Ladakh, the successful captive hatching of Great Indian Bustard chicks in Jaisalmer, and the successful conclusion of the Gaur reintroduction program at Sanjay Tiger Reserve, Madhya Pradesh. Additionally, we developed innovative tools and action plans, such as the RhODIS Rhino DNA Indexing System, to enhance rhino conservation efforts in India. WII-SACON contributed significantly by preparing state-level action plans for avian diversity conservation in select Indian states, supported by MoEFCC. Furthermore, we provided expert inputs to select airfields under the Airports Authority of India to mitigate bird and wildlife hazards to aircraft.

Our academic endeavors flourished this year. The 18th MSc in Wildlife Science batch upheld the tradition of excellence, engaging in ecological research on diverse species and habitats across India. Their studies encompassed key species such as the Asiatic Elephant, Fishing Cat, Smooth-Coated Otter, Lion-Tailed Macaque, Nilgiri Tahr, Pallas's Fish Eagle, and Olive Ridley Turtles, spanning ecosystems from the Trans-Himalayas to the Western Ghats, the Thar Desert to mangrove ecosystems, and Northeast India. The 19th MSc batch commenced this year, welcoming 20 students, including eight sponsored by WII, ensuring a dynamic and talented cohort.

The flagship Post Graduate Diploma in Advanced Wildlife Management saw its 43rd batch of 10 trainees successfully graduate, while the 44th batch with 16 participants began their journey. The 38th Certificate Course in Wildlife Management trained 28 professionals, while the newly introduced Certificate Course in Heritage Management equipped seven officer trainees with specialized knowledge in biodiversity, heritage site management, and risk mitigation strategies.

The year was further distinguished by significant events that underscored WII's leadership in conservation. The Indian Conservation Conference (ICCON), commemorating 50 years of Project Tiger, was inaugurated by the Hon'ble Prime Minister Shri Narendra Modi, who announced India's minimum tiger population at 3,167 individuals. Another landmark event was the inauguration of the Pashmina Certification Centre, a joint venture between WII and the Export Promotion Council for Handicrafts (EPCH), by the Hon'ble Union Minister (MoEFCC), Shri Bhupender Yadav. The release of two critical reports—*the Status of Snow Leopards in India (2023)* and *the Status of Leopards in India (2022)*—alongside the unveiling of WII's Vision Plan by the Union Minister, further highlighted our commitment to driving global conservation efforts.

The Institute's 34th Annual Research Seminar showcased cutting-edge research through six lead talks, 26 oral presentations, 11 speed talks, and 31 poster presentations across eight thematic sessions. Six technical publications were launched during the seminar, contributing to the growing body of wildlife research. Our researchers made significant contributions to global scientific knowledge, publishing over 150 peer-reviewed papers during the year. To further enhance scientific discourse, we launched the *Journal of Wildlife Science*, a diamond open-access journal providing free access to high-quality research for a global audience.

As we look ahead, I extend my heartfelt gratitude to WII's faculty, staff, students, and collaborators for their unwavering dedication and excellence. Together, we remain committed to advancing the conservation and management of India's rich biodiversity.

(Virendra R. Tiwari)

Dated: 25 January 2025

YEAR AT A GLANCE

As we conclude 2023-24, we reflect with pride on a year of significant progress in wildlife conservation, education, and capacity building. A transformative achievement was the integration of the Salim Ali Centre for Ornithology and Natural History (SACON) as WII's southern regional centre on 25th April 2023. This strategic collaboration bolstered our leadership in wildlife research and holistic conservation efforts.

This year, the Institute achieved significant progress, undertaking over 100 research projects, showcasing our growing depth in scientific exploration. Of these, 40 projects were successfully completed, 20 were newly initiated, and 50 remain ongoing, collectively advancing the understanding of India's diverse ecosystems. The flagship initiative, the PAN-India Assessment and Monitoring of Endangered Species under the Integrated Development of Wildlife Habitat (IDWH) Program, funded by MoEFCC, was a monumental undertaking. This program assessed a wide range of species across the country, addressing critical knowledge gaps, especially for lesser-known species. Additionally, under the National CAMPA and MoEFCC-funded Endangered Species Recovery Programme, we prioritized efforts on some of India's most vulnerable species.

WII-SACON made noteworthy contributions by developing Integrated Management Plans for select wetlands and enhancing the National Park Management Plan. Among the year's scientific achievements was a genomic study of the Near-Threatened Rusty-spotted Cat in Maharashtra, culminating in the generation of a reference genome and an analysis of its genetic diversity. Other accomplishments included crafting a state-level action plan for bird conservation in Nagaland and providing expert guidance to select airfields under the Airport Authority of India, focusing on assessing bird strike hazards and proposing mitigation strategies.

WII's academic programs continued to thrive in 2023-24, cementing its reputation as a leader in wildlife education. The 18th MSc in Wildlife Science batch maintained our tradition of excellence, engaging in cutting-edge ecological research across diverse ecosystems—from the Trans-Himalayas to the Western Ghats, the Thar Desert, and the mangrove ecosystems of the East. The 19th MSc batch, initiated later in the year, added 20 bright minds to our community, including eight sponsored by WII, ensuring a diverse and talented cohort of future wildlife leaders.

Our Post Graduate Diploma in Advanced Wildlife Management graduated its 43rd batch of 10 trainees, while the 44th batch of 16 participants began their course. The 38th Certificate Course in Wildlife Management trained 28 professionals, and a newly introduced Certificate Course in Heritage Management prepared seven officer trainees to manage biodiversity and heritage sites. These programs are vital for equipping professionals with the knowledge and skills to address emerging challenges in conservation and management of natural and cultural heritage.

Beyond structured courses, the Institute hosted specialized trainings and workshops targeting critical conservation issues. Highlights included the Inception-cum-Training Workshop of the Gaur Reintroduction Project at Kanha Tiger Reserve in April 2023 and the 7th Technical Workshop of the Asia Protected Areas Partnership (APAP) in Dehradun. A significant milestone was the Global River Dolphin Declaration Meeting in October 2023, uniting representatives from all river dolphin range countries to foster collaborative conservation. Additional events included a December 2023 training program at Sundarbans National Park focused on monitoring the Outstanding Universal Value of Natural World Heritage Sites and a January 2024 workshop addressing wildlife safety and electrocution risks.

The Institute's role in global conservation was underscored by a series of landmark events in 2023-24. A major highlight was the inaugural Indian Conservation Conference (ICCON) on 9th April 2023, commemorating 50 years of Project Tiger. The Hon'ble Prime Minister, Shri Narendra Modi, graced the event, announcing India's minimum tiger population at 3,167 individuals with the release of the *Status of Tigers in India – 2022* Summary Report. This achievement reaffirmed India's global leadership in wildlife conservation.

On 19th May 2023, the Pashmina Certification Centre, a joint venture between WII and the Export Promotion Council for Handicrafts (EPCH), was inaugurated by the Hon'ble Union Minister (MoEFCC), Shri Bhupender Yadav. This was followed by the release of the Status of Snow Leopards in India (2023) report on 30th January 2024. Conducted under the Snow Leopard Population Assessment in India (SPAI) Program initiated by MoEFCC, the report provided the first comprehensive scientific assessment of snow leopard populations in India, estimating a total of 718 individuals. On the same day, the Hon'ble Union Minister also unveiled WII's Vision Plan, propelling the Institute towards becoming a global leader in conservation. Subsequently, on 29th February 2024, *the Status of Leopards in India (2022)* report was launched,

revealing an estimated population of 13,874 leopards across 70% of their known distribution area.

Scientific discourse reached new heights at the 34th Annual Research Seminar, which featured six lead talks and over 60 presentations across eight thematic sessions. During this event, six key technical publications were launched, significantly advancing wildlife research. WII researchers contributed over 150 peer-reviewed publications to global scientific literature, underscoring their impact on the field. To further enhance access to high-quality research, WII launched the *Journal of Wildlife Science*, a diamond open-access journal, facilitating global dissemination of pioneering research.

Looking ahead, WII remains steadfast in its mission to advance wildlife conservation and management in India and beyond. The accomplishments of 2023-24 have laid a strong foundation for the future, amplifying our responsibility to excel in research, training, and education. Together, we aim to build on these achievements, forging new pathways to protect and preserve India's rich wildlife.

ROLE & MANDATE

Introduction

Wildlife Institute of India is a premier training and research institution in the field of wildlife science and protected area management in South Asia. In 1986, the Institute was granted the status of an autonomous institution by the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India. Since its inception, WII has had the benefit of collaboration with international organisations such as UNDP, FAO, USFWS, IUCN and UNESCO. These partnerships have helped the Institute build qualified faculty and staff through rigorous training and exposure to modern research and analytical techniques.

The Institute's vast array of capacity-building programmes provides a practical and realistic direction to the concept and practice of wildlife conservation. By learning from its own and others' experiences, WII is traversing a path of hope and aspiration, which will help strengthen finding answers in addressing wildlife conservation issues and challenges in the country and the South Asian region.

Our Mission

The mission of WII is to nurture the development of wildlife science and promote its application in the field in a manner that accords with our economic and socio-cultural milieu.

Aims and Objectives

- Build scientific knowledge about wildlife, their habitat and conservation.
- Train forest personnel at various levels in the conservation and management of wildlife and its habitats.
- Carry out research relevant to management, including the development of techniques appropriate to Indian conditions.
- Provide information and advice on specific wildlife management problems.
- Collaborate with international organisations on wildlife research, management and training.
- Develop as a regional centre of international importance for the conservation of wildlife and natural resources.

Research

RESEARCH COMPLETED

SNOW LEOPARD POPULATION ASSESSMENT IN INDIA

Funding Source
Ministry of Environment, Forest, and Climate Change, Government of India and Forest/Wildlife Departments of Snow Leopard Range States/UTs

Collaborators
All Forest/Wildlife Departments of Snow Leopard Range States/UTs, NCF (JK & Himachal Pradesh), and WWF-India (Sikkim & Arunachal Pradesh)

Researchers
All researchers of NMSHE, UWPE projects

Date of Initiation
January 2019

Date of Completion
January 2023

Coordinator
WII (National, Ladakh and Uttarakhand)

Investigators
Dr S. Sathyakumar and Collaborators

WII

Objectives: The Snow Leopard Population Assessment in India (SPAI) was anticipated to lead to scientifically robust national and state-wise population estimates of the snow leopard across high-altitude habitats inside and outside protected areas. Its overarching goal was to gather reliable data to guide effective conservation efforts and policy decisions.

Progress: The SPAI systematically covered over 70% of the potential snow leopard range in the country, involving forest & wildlife staff, researchers, volunteers, and contributions from knowledge partners. Covering approximately 120,000km2 of crucial Snow leopard habitat across the trans-Himalayan region, including UTs of Ladakh and J&K, and states such as Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh, the SPAI exercise was conducted from 2019 to 2023 using a meticulous two-step framework.

The first step involved (i) evaluating Snow leopard spatial distribution, (ii) incorporating habitat covariates into the analysis, and (iii) aligning with the guidelines of the National population assessment of snow leopards in India by the MoEFCC in 2019. This systematic approach included assessing the spatial distribution through an occupancy-based sampling approach in the potential distribution range. In the second step, Snow leopard abundance was estimated using camera traps in each identified stratified region.

Outputs and Outcomes: During the SPAI exercise, total effort included 13,450 km of trails surveyed for recording Snow leopard signs, and camera traps deployed at 1,971 locations for 180,000 trap nights.

The Snow leopard occupancy was recorded at 93,392 km2, with an estimated presence at 100,841 km2. A total of 241 unique Snow leopards were photographed.

Based on data analysis, the estimated population in different states were estimated as follows: Ladakh - 477, Uttarakhand - 124, Himachal Pradesh - 51, Arunachal Pradesh - 36, Sikkim (21), and Jammu and Kashmir (9).

Milestone: The Snow Leopard Population Assessment in India (SPAI) Program is the first-ever scientific exercise that reports the Snow leopard population of 718 individuals in India. The report also highlights the need for establishing a dedicated Snow Leopard Cell at WII under the MoEFCC, with a primary focus on long-term population monitoring, supported by well-structured study designs and consistent field surveys.

RESEARCH COMPLETED

UTTARAKHAND STATE WILDLIFE POPULATION ESTIMATION (UWPE) FOR THE MID HIMALAYAN ZONE (1,000M TO 3,500M)

Funding Source
Uttarakhand Forest Department

Investigator
Dr S. Sathyakumar

Researchers
Dr Ranjana Pal, Shagun Thakur, Shiv Narayan Yadav, Gaurav Sonker, Sayli Sawant, Pooja Chaudhary, Manisha Mathela, Pooja Pant, Raagini Muddaiah, Shivangi Bendre, Tuheina Thakur, Ayushi Khanduri, Himangshu Bora, Syed Mohammad Muzammil, Ankita Das, Janamjai Sehgal, Subhechha Tapaswini and Amritesh Ranjan Dubey

Date of Initiation
April 2021

Date of Completion
July 2023

WII

Objectives: This state-wide study aimed to produce a spatially explicit abundance estimation of key animals in the mid-Himalayan zone (1000-3500m) of Uttarakhand. Such information will be valuable in understanding the status of several endangered fauna in the state, the species-habitat relationship, and the impacts of humans on their natural environment.

Progress: The project was designed to generate spatially explicit abundance estimates of large mammals in the mid-Himalayan zone. The project comprises two phases: Phase I involves collecting baseline information on species presence through sign surveys within an occupancy framework, while Phase II focuses on estimating the density of target species by subsampling areas identified in Phase I.

The combined efforts of Phase I sign surveys and Phase II camera trap sampling produced data on large mammal populations in the mid-Himalayan zone of Uttarakhand. The report has been completed and submitted to the forest department.

Outputs and Outcomes: The Phase-I survey team walked a total of 5,285.47 km in 909 beats of 20 divisions to record the signs of species. The information on the relative abundance of large mammals in the mid-Himalayan zone of Uttarakhand was collected in the form of 4,051 sign records. In Phase II, the camera trapping efforts of 31,582 trap nights resulted in 22,873 images of wild species, of which 694 were Common leopards.

The estimated Common leopard population in the mid-Himalayan zone of Uttarakhand was 2,276 (SE range 2,018 to 2,534) at a density of 17 ± 2 individuals/100 km2. The SE range indicated that the population could range between 2,018 and 2,534 adults.

The estimated Barking deer population in the mid-Himalayan zone of Uttarakhand was recorded at 10,212 (SE 9,063 - 11,361), density 0.64±0.17 individuals/km2; Himalayan goral: 3,314 (SE 2,753 – 3,875), density 0.14± 0.06 individuals/km2; Sambar: 3,915 (SE 9,256 - 9,352), density 0.14±0.07 individuals/km2; Indian Wild pig: 1,005 (SE 563 - 1,447), density 0.02 ±0.01 individuals/km2; Asiatic black bear: 352 (SE 250 – 454), density 0.002 ± 0.001 individuals/km2.

Since the data obtained through camera traps were not sufficient to perform camera trap-based distance sampling analysis for Himalayan serow, Himalayan tahr, and Himalayan Musk deer, MaxEnt (Maximum Entropy) modelling was carried out to estimate the distribution of species based on presence-only data and environmental variables to model the potential distribution of these species across Uttarakhand State.

Milestone: This study is a pioneering effort for population estimation in the entire state of Uttarakhand and is the first such study conducted under the Uttarakhand Forest Department. The baseline estimates for the Common leopard and other prey species will aid in planning future research, conservation, and management strategies.

RESEARCH COMPLETED

THE FIFTH CYCLE OF MANAGEMENT EFFECTIVENESS EVALUATION (MEE) FOR 51 TIGER RESERVES IN INDIA DURING 2022-23

Funding Source
National Tiger Conservation Authority

Researchers
Dr Nasim Ahmad Ansari and Aqsa Rehman

Date of Initiation
August 2022

Date of Completion
July 2023

Investigator
Dr Gautam Talukdar

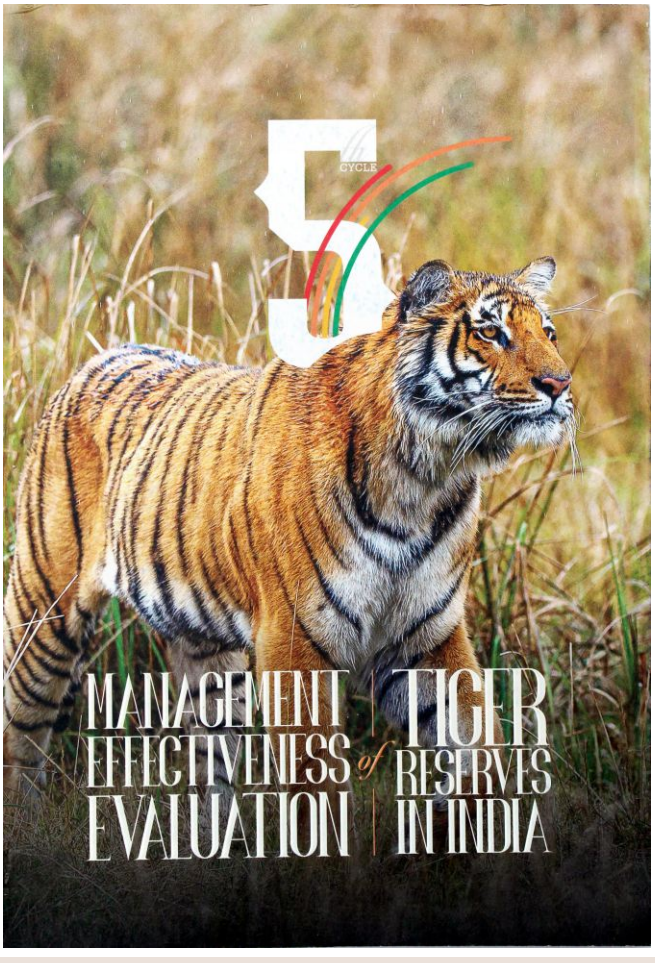
WII

Objectives: The objective of the project was to assess the management efficacy of 51 Tiger Reserves of the country and to provide valuable insights into their management systems and practices.

Progress: Prior to the commencement of the exercise, an expert committee constituted by the NTCA deliberated upon the past MEE exercises in the Tiger Reserves, and a technical manual was developed. A briefing session (Inception Workshop) for the evaluators was conducted in New Delhi in June 2022. Ten Independent Regional Expert Committees (REC) were constituted and deputed in 5 different clusters of five tiger landscapes to evaluate the 51 Tiger Reserves of the country.

As a part of the exercise, the Field Directors submitted a self-assessment form with all relevant supporting documents by July 2022. The Independent Expert MEE teams visited all 51 Tiger Reserves to conduct MEE as per the prescribed assessment criteria and completed the MEE Score Card after cross-checking the supportive documents submitted by the Field Directors between July 2022 and February 2023. The reports submitted by the MEE team were also reviewed internally by in-house experts on Tiger Reserve Management in the country.

Outputs and Outcomes: An interaction meeting was organized by NTCA on March 15, 2023, to finalise the report in which the Field Directors of Tiger Reserves and MEE teams participated along with the NTCA officers. Following this meeting, on April 9, 2023, in Mysuru, Bengaluru, the Honourable Prime Minister Shri Narendra Modi released a 40-page summary report of the fifth cycle of MEE for Tiger Reserves. The WII team then worked on compiling the management strengths, management weaknesses, and immediate actionable points of all Tiger Reserves from the chairmen's reports, scoring, data analysis, and report writing to produce the full report.



Milestones: The MEE TR summary report was released by the Hon'ble Prime Minister, Shri Narendra Modi, on 9 April 2023 at the Indian Conservation Conference 2023, Mysuru. A detailed report was released by the Hon'ble Union Minister of State, Shri Ashwini Kumar Choubey, in a programme organised at the Corbett Tiger Reserve to celebrate Global Tiger Day on 29 July 2023.

RESEARCH COMPLETED

WII

PREPARATION OF COMPREHENSIVE WILDLIFE/ ELEPHANT MANAGEMENT PLAN FOR NON-FORESTRY USE OF 783.275 – HECTARE FOREST LAND CONSISTING OF 643.095 – HECTARE OF RESERVE FOREST IN CHHENDIPADA & KANKURUPAL RESERVE FOREST AND 140.180–HECTARE OF VILLAGE FOREST LAND IN ANGUL FOREST DIVISION OF DISTRICT ANGUL, ODISHA

Funding Source
Singareni Collieries Company Limited

Investigator
Dr G.V. Gopi

Researchers
Dr D Frank Sadrack Jabaraj, Dr Justus Joshua, Dr Wesley Sunderraj, S. Karthy, Aruna Kumar Rath and Nonita Rana

Date of Initiation
February 2023

Date of Completion
September 2023

Objectives: The project had the following objectives (i) Assessment of biodiversity of the major fauna and flora groups in the study area; and (ii) Preparation of a comprehensive wildlife cum elephant management plan for the study area.

Progress: The fieldwork for the assessment of plants, mammals, birds and reptiles in the study area was initiated on 22nd February 2023. Between March and June, a vegetation survey, bird survey, mammal sign survey, herpetofauna survey, conflict data from the forest department and socio-economic survey were completed within the study area.

Outputs and Outcomes: The study gave insights into the Human–Elephant Conflict (HEC) in the Angul division, Odisha, where the proposed coal mine is expected to come up. There was an increasing trend in HEC in the study area and nearby divisions, the plausible reasons were hypothesized to be due to the increase in coal mines in the

district. The elephant's movement ecology was studied using the existing elephant movement data from the forest department. The findings were presented in the Annual Research Seminar 2023. The elephant management plan comprising all these findings and respective mitigation measures was submitted to the Forest Department of Odisha on January 2024 after a series of revisions.

Milestone: The findings give insights into the important biodiversity present in the area, and the results are being collated for a peer-reviwed scientific manuscript incorporating ecological and remote sensed data.

RESEARCH COMPLETED

INFLUENCE OF TECTONIC SHIFT (UPLIFT AND SUBSIDENCE) ON CARBON STOCK DYNAMICS OF MANGROVE FORESTS OF ANDAMAN ISLANDS

Funding Source Centre for International Forestry Research

Researchers
Dr Utchimahali M and Shamna KT

Date of Initiation
January 2023

Investigator
Dr Nehru Prabakaran

Date of Completion
September 2023

WII

Objectives: The project had the following objectives: (i) Installation of Rod Surface Elevation Tables (RSETs) across Andaman Island to allow long-term monitoring of sedimentation dynamics in mangroves across the subsidence and uplift gradient created by the geomorphological changes following the 2004 Sumatra-Andaman earthquake; (ii) Installation of data loggers across monitoring sites for measuring environmental parameters (e.g. Salinity, temperature, and water depth) at high temporal resolution; (iii) Capacity building and networking with forest managers and researchers to foster better management practices for mangroves through improved scientific research and monitoring.

Progress: The project attempted to establish long-term monitoring of sedimentation rates and environmental parameters in mangroves across the Andaman Islands using state-of-the-art equipment. Seventeen RSETs were installed at seven sites across the North, Middle and Southern Andaman Islands. Five sites were equipped with data loggers to monitor salinity, temperature, and fluctuations in water depth along the tidal cycles. Sediment accretion and erosion measurements were carried out during February, June, and September (Summer, Early monsoon, late monsoon). Data loggers were also retrieved during the field measurements, and the data were downloaded.

Outputs and Outcomes: The project has generated the first such data on sedimentation rates in Indian mangroves. The results suggested that local conditions have influenced the accretion and erosion of sediments. The sediment erosion was especially acute in North Andaman, where the mangroves were degraded due to the coastal uplift. The workshop on mangrove restoration and management has built the capacity of the forest department frontline staff.

Milestone: Monitoring sedimentation rates was a first-of-its-kind study on Indian Mangroves. The established RSETs will continue to provide long-term data on the sedimentation rates in Andaman mangroves. It will give finer details on the future vulnerability of these mangroves to sea level rise. The 40 frontline staff trained through the project will continue to assist the mangrove management and restoration in the Andaman Islands.

RESEARCH COMPLETED

HERPETOLOGICAL EXPLORATION IN KAMLANG NAMDAPHA LANDSCAPE, INDIA

Funding Source:
National Geographic Society

Researchers
Bitupan Boruah, Naitik G. Patel, Deepak Veerappan

Date of Initiation
March 2021

Investigator
Dr. Abhijit Das

Date of Completion
October 2023

WII

Objectives: The objectives of the project were to (i) survey Kamlang-Namdapha Landscape for herpetofauna and provide an updated checklist and collect genetic samples for target taxa; (ii) revise taxonomy and describe new species using morphological, molecular and behavioural data; (iii) rediscover species which were not reported since its description; (iv) transfer knowledge and skills to junior researchers, conservation managers and general public; and (v) collect baseline data on reproductive behaviour, microhabitat use, diet and acoustics.

Progress: The field studies were conducted in Namdapha Tiger Reserve and Kamlang Tiger Reserve during May-June and August-September 2022 and April-July 2023. The final report was submitted to the National Geographic Society, and Forest Department of Arunachal Pradesh. The findings of the project were published in a peer-reviewed international journal. The identity of anuran larvae collected from the Kamlang-Namdapha landscape is determined based on molecular data and morphological characters.

Outputs and Outcomes: A total of 93 species of herpetofauna, including 48 species of amphibians belonging to 28 genera and 10 families, and 45 species of

reptiles belonging to 29 genera and 10 families, were recorded. Three new species of anurans belonging to the family Rhacophoridae, Ceratobatrachidae and Ranidae were described. The discovery of a few more species is awaiting. Two poorly known species of Bush frogs and a flying lizard were rediscovered. Phylogenetic status and taxonomic revision of poorly known species of amphibians described from Namdapha Tiger Reserve have been assessed. The bioacoustics of anuran species and newly generated DNA sequences of reptiles and amphibians were deposited in the global database. A photographic booklet of amphibians and reptiles of the two tiger reserves has been released.

Milestone: First-ever systematic study on amphibian and reptilian fauna of Kamlang-Namdapha landscape with extensive sampling of 60 localities involving ~200 visual encounter surveys. The integrative taxonomic approach involving molecular, bioacoustics, osteological and morphological studies so far has led to the discovery of three new species of frogs from the Kamlang-Namdapha landscape, namely Patkai Green Tree Frog, *Gracixalus patkaiensis*, Brook Dwarf Mountain Frog, Alcalus fontinalis and Noa-dihing Music Frog, *Nidirana noadihing*.

RESEARCH COMPLETED

ECOLOGICAL IMPACTS OF MAJOR INVASIVE ALIEN PLANTS ON NATIVE FLORA IN RAJAJI TIGER RESERVE, UTTARAKHAND

Funding Source
DST-Science and Engineering Research Board

Researcher
Sipu Kumar

Date of Initiation
July 2020

Date of Completion
November 2023

Investigators
Dr Amit Kumar,
Dr Navendu Page,
Shri Qamar Qureshi and
Dr GS Rawat

WII

Objectives: The objectives of the project were to (i) study the invasion patterns of alien plants in Rajaji Tiger Reserve (RTR); (ii) assess the ecological impacts of invasive alien plant species on native flora; (iii) suggest ecological restoration measures; and (iv) assess the efficacy of various management practices in controlling the invasion of alien species.

Outputs and Outcomes: Based on the 127 quadrat plots (10×10m) laid during the years 2021 and 2022 across different forest ranges in western Rajaji TR, the density of *Lantana camara* was recorded at 5,268.08 stems/ha (1,756.02 individual/ha), while *Parthenium hysterophorus* had 1,257.44 individuals/ha, *Ageratum conyzoides* had 1,148.93 individuals/ha and *Senna tora* had 468.08 individuals/ha. This spatial clustering suggests that *Lantana camara*, *Ageratum conyzoides* and *Senna tora* might respond to similar ecological conditions, such as soil types or other environmental factors that favour their establishment and growth. The distribution patterns of invasive species are further explored on a range-by-range basis, revealing *Ageratina adenophora* substantial coverage in Chillawali (19.2 km^2), *Lantana camara* dominance in Haridwar (23.5 km2), and *Parthenium hysterophorus* prevalence in Dholkhand (28.5 km^2) showcasing distinct range wise distribution patterns. Lantana-invaded sites (L1) had lower organic matter (1.91±0.93%) and phosphorus content (1.106±0.57ppm) as compared to Uninvaded (UI) sites (2.209±2.09% and 2.23±2.01ppm, respectively). In contrast, LI areas had higher sodium (37.57±11.81kg/ha) and nitrogen content (0.09±0.013%) as compared to UI sites (36.63±9.54kg/ha and 0.1±0.05%, respectively), indicating that Lantana has a negative impact on soil nutrient composition.

Milestone: In pursuit of ecological restoration within the Rajaji Tiger Reserve, it is recommended that an Invasive Species Management Plan (ISMP), specific to Rajaji, incorporating the specific recommendations of the project needs to be taken up. There is a need to strengthen the ecological restoration activities involving the enrichment of *Lantana*-invaded areas with native plant species, emphasizing leguminous plants such as *Atylosia*, *Phaseolus*, and *Cajanus*.

RESEARCH COMPLETED

WII

METAPOPULATION DYNAMICS OF TIGERS ACROSS THE TERAI-ARC LANDSCAPE, INDIA

Funding Source
Wildlife Conservation Trust-Panthera Global Cat Alliance

Researcher
Supriya Bhatt

Date of Initiation
December 2014

Date of Completion
December 2023

Investigator
Dr Samrat Mondol

Objectives: The aim was to investigate the dynamics of the tiger metapopulation across Terai-arc landscape by determining: (i) Spatial distribution of tigers in each of the eight protected areas, managed forests and the corridors connecting them in this landscape, and assessing the source-sink dynamics among these habitats by estimating abundance, population density, sex ratio, and dispersal directions among tiger populations. (ii) Connectivity and dispersal rates among different tiger populations across the corridors, and what landscape features facilitate/hinder such movements. (iii) Estimate genetic relatedness and population structure among the tiger populations and their relationship to the habitat connectivity. (iv) Conduct tiger population viability analysis at the metapopulation level integrating ecological, genetic, and landscape level information collected over the study period. (v)(a) Assess the food habits of tigers in different habitat types i.e., Shivalik-Bhabar and Terai of the Terai-Arc Landscape of India using non-invasive sampling. (b) Evaluate ecological variables that influence such patterns; and (c) Explore the patterns of livestock depredation by tigers across Terai-Arc Landscape, India. (vi) (a) To understand the genetic variation in the mitochondrial DNA of Indian leopard; (b) Assess population structure and demographic analysis of Indian leopard, Panthera pardus fusca; and (vii) To understand the genetic relatedness among leopard across different tiger density gradient.

Progress: Mitochondrial data (mtDNA) was generated for partial fragments of NADH5, NADH4 and Cytochrome b

for 112 individual leopards and concatenated the data. The number of haplotypes, haplotype diversity (h), nucleotide diversity (p), number of polymorphic sites (s), population structure, and demographic history were analysed. The data was generated for 722 field-collected carnivore scat samples from Rajaji Tiger Reserve (RTR) and identified 398 leopards and 242 tiger-positive samples. Thirteen microsatellite data was generated for 398 leopards for identification of unique individuals.

Outputs and Outcomes: We identified 46 haplotypes in Indian leopards, with high haplotype diversity (0.913 ± 0.019) and low nucleotide diversity (0.00343 ± 0.01). We got four genetically intermixed clusters suggesting no genetic structure in leopard mtDNA across India. The network analyses indicate no strong phylogeographic structure among different leopard haplotypes across India. The qualitative and quantitative approaches showed contrasting patterns of population demographic patterns. We identified 158 individual leopards with the cumulative probability of identity values for 185 sindividual leopards was 1.09*10-13 (PIDunbiased) and 1.5*10-5 (PIDsibs) and further analysis are going on to understand the genetic basis of social dynamics. The quantitative BSP approach showed an increase in female effective population size ~3000-4000 years ago (during mid-Holocene period). The above findings have been compiled. The manuscript will be submitted in next six months. This work was presented in the XVI Internal Annual Research Seminar at the Wildlife Institute of India.

Milestone: This study is the first of its kind that looked into the mitochondrial diversity of the Indian leopard. This study suggested a high genetic variation in the extant subspecies of the Indian leopard. This study also provides a declining trend in leopard maternal effective population size during the Last glacial maxima.

RESEARCH COMPLETED

UNDERSTANDING THE IMPACTS OF MINING AREAS OF WESTERN COALFIELDS LIMITED (WCL) AND CHANDRAPUR THERMAL POWER PLANT (CSTPP), CHANDRAPUR FOR EFFECTIVE MANAGEMENT OF WILDLIFE

Funding Source
Western Coalfields Ltd. (WCL)
Maharashtra State Power Generation Company Ltd. (MAHAGENCO)

Researchers
Ankita Sharma, Neha Yadav and Nidhi Goyal

Date of Initiation
March 2021

Date of Completion
December 2023

Investigator
Dr Bilal Habib

WII

Objectives: The objectives of the project were to (i) evaluate the pattern in the land use and land cover change in and around mining areas of Western Coalfields Limited and Chandrapur Thermal Power Plant (ii) assess faunal diversity in and around the mining areas of Western Coalfields Limited and Chandrapur Thermal Power Plant (iii) explore the issues related to habitat fragmentation, loss of structural and functional corridors due to ongoing and proposed mining areas of the Western Coalfields Limited and Chandrapur Thermal Power Plant (iv) evaluate the issues of human-wildlife conflict concerning mining areas of Western Coalfields Limited and Chandrapur Thermal Power Plant; (v) evaluate the effects of dust deposits on plants concerning mining areas of Western Coalfields Limited and Chandrapur Thermal Power Plant (vi) Soundscape ecology- Study of the acoustics relationship between living organisms, humans, and their environment (vii) evaluate the effects of mining (Vibrations and Noise) on different wildlife species (viii) evaluate changes in forest sound concerning mining areas (ix) Identify areas of connectivity concerning power transmission lines and suggest mitigation measures to reduce the electrocution of animals (x) develop a management plan for the conservation of wildlife around mining areas and coalfields

of Western Coalfields Limited and Chandrapur Thermal Power Plant.

Progress: The pattern of land use and land cover change in and around mining areas of Western Coalfields Limited and Chandrapur Thermal Power Plant was evaluated. Multiple field exercises were planned to assess the faunal diversity in and around WCL and CSTPP mining areas. Considering the maximum extent of impact of mines and power plants around the sites, the effect of mining and power plant activities was studied up to a distance of 3 km from the site. The data was collected from the field to assess bird diversity around study sites. To assess the diversity of birds in and around mining areas and CSTPP, point counts in the distance sampling framework were carried out on one randomly selected point in each of the 300 x 300 m grids laid around each mining site and CSTPP, extending up to 3 km on all sides. GPS location of point, bird species observed, number of individuals, and other site covariates would be noted down.

Camera trapping was carried out in 1 x 1 km grids around each mining site to study mammalian assemblages around mining sites and CSTPP, extending up to 3 km on all sides. Single-sided camera traps in each grid were deployed for 20-25 days each. Cameras were only deployed on forested portions of the grids.

To characterise vegetation around mining areas and CSTPP, the sampling on circular plots of 10 m radius was carried out in each of the 300 x 300 m grids laid around each mining site and CSTPP.

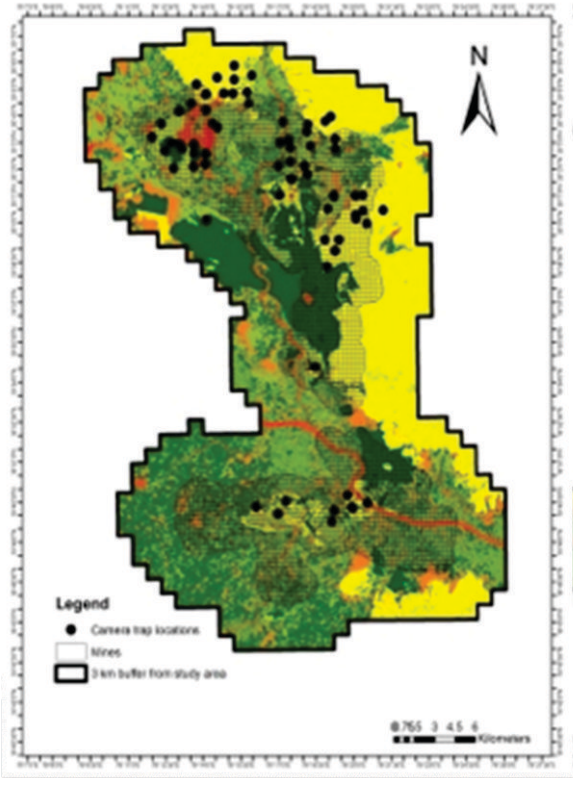


Figure 1: Camera trap placement points in and around the mining areas and CSTPP of Chandrapur district, Maharashtra.

Outputs and Outcomes: A total of 11 mines are present in the Chandrapur region, where eight are active and three are closed. The camera trapping exercise was conducted in and around mining areas of Chandrapur district from January to March 2023. In total, 90 camera traps were placed around three mining regions and CSTPP. In the Chandrapur region, 43 camera traps were placed around four mines, i.e. Bhatadi OC (19), Durgapur Rayatwari Colliery UG (9), Durgapur Rayatwari Colliery OC (7) and Padmapur OC (8). In the Ballarshah region, ten camera traps were placed around six mines, i.e. Sasti UG (1), Sasti OC (3), Ballarpur OC (1), Gauri deep OC (3), Pauni OC (1) and Hindustan Lalpeth Colliery UG (1). In the Umred region, there was only one mine, Murpar UG, where we placed 18 camera traps. In CSTPP, two camera traps were placed in Urja Nagar, and 17 camera traps were placed in the ash bund area of CSTPP. The camera traps were active for 25 days in all sites, yielding a total effort of 2250 camera days.

Density estimates of Tiger and Leopard based on the camera trap captures in Chandrapur: The analysis revealed a tiger density estimate of 5.8 (±1.6) per 100 sq. km under the null model in the sampled areas (forested areas in and around mines and CSTPP in Chandrapur). In contrast, the heterogeneity model yielded identical female and male tiger densities, measuring 5.9 (±1.7) in the study area.

The study has reported the presence of 14 active tiger individuals, of which eight tiger individuals are active in the Chandrapur mining region. Four active tiger individuals were reported in the ash bund area of CSTPP. We found two active tiger individuals from Murpar UG mines of the Umred mining region falling within the Brahmapuri forest division.

Likewise, the leopard density in the study area in Chandrapur stood at 6.3 (±1.9) per 100 sq. km. We found the presence of 13 active leopard individuals, out of which most individuals were reported from the Chandrapur mining region, i.e. six from Bhatadi (OC) and four from Durgapur (UG). The presence of two leopard individuals was reported from the Umred mining region, i.e. Murpar (UG), and one from the Urja Nagar area of CSTPP.

Relative Abundance Index of Mammals: We recorded 20 species of wild mammals due to the camera trapping exercise in and around the mining areas and CSTPP of Chandrapur district. The highest RAI was found to be of livestock. Among wild mammals, the highest RAI was that of wild pig (28.15) followed by small Indian civet (18.47) and chital (17.75). The lowest RAI was found to be of feral cats (0.12). Among the wild species, the lowest RAI was (0.68) that of Ratel and Indian fox.

Assessment of bird diversity: A total of 128 species of birds belonging to 53 families were observed. The present study in and around mines revealed that the Muscicapidae family

dominated the avifaunal diversity with 11 species, followed by Accipitridae (10 species) and Estrildidae (6 species). We found 22 families. The average Shannon-Weiner diversity index for bird species in and around the mining areas of Chandrapur and CSTPP was H'= 4.125. We found that the bird diversity around OC mines (3.909) was greater than that around UG mines.

Assessment of vegetation (tree) diversity and abundance: A total of 43 tree species representing 17 families were recorded in and around the mining areas of Chandrapur. Among these families, the major contributors included Fabaceae (13 species), Moraceae (4 species), Apocynaceae, Malvaceae, Rubiaceae and Combretaceae (3 species each). Two species and eight families represented three families were represented by single species. The average Shannon diversity of tree species in the study area calculated was 2.91.

Milestone: Pattern in the land use and land cover change in and around mining areas of Western Coalfields Limited and Chandrapur Thermal Power Plant was evaluated. The fieldwork has been completed to assess faunal diversity in and around the mining areas of Western Coalfields Limited and Chandrapur Thermal Power Plant.

RESEARCH COMPLETED

WII

HOLISTIC PLAN FOR A 10 KM RADIUS LANDSCAPE AREA AROUND RAJAJI TIGER RESERVE TOWARDS IDENTIFYING CRITICAL ZONES FOR WILDLIFE & ENSURING SUSTAINABLE RIVERBED MATERIAL (RBM) MINING PRACTICES IN UTTARAKHAND

Funding Source
National Board for Wildlife and Wildlife Institute of India

Investigator
Dr G.V. Gopi

Researchers
Rohit R.S. Jha, P. Manikandan, Manisha Bishnoi and Stanzin Zangmo

Date of Initiation
May 2022

Date of Completion
January 2024

Objectives: The project had the following objectives: (i) Identify critical zones where sand and boulder (or RBM) mining should not be allowed in a ten km-radius area around Rajaji TR in Uttarakhand towards protecting the tiger and elephant corridors from west to east between Rajaji and Corbett Tiger Reserves; (ii) Critically analyse RBM proposals awaiting appraisals around RTR within the Holistic Plan Area to either permit/ allow with mitigation/ prohibit; and (iii) Provide recommendations and facilitate SC-NBWL's informed decision-making towards effectively regulating RBM mining activities around Uttarakhand's PAs.

Progress: A comprehensive technical report ('Holistic Plan') concerning areas around Rajaji TR's ten km-radius in Uttarakhand (c. 2,250 sq. km) and covering the abovementioned objectives was submitted to the SC-NBWL in November 2022. However, when the report was discussed during subsequent meetings of the SC-NBWL and following the Uttarakhand CWLW's comments on the submitted Plan (in April 2023), the same exercise was requested to be carried out in a relatively small area within Rajaji TR's ten km-radius in Uttar Pradesh (c. 446 sq. km, in Saharanpur and Bijnor districts) as well. Accordingly, necessary forest and wildlife-related data were requested

by WII in June 2023, which was subsequently supplied by the PCCF (WL), UP in December 2023. Meanwhile, a detailed response to UK CWLW was also submitted in October 2023. Upon receiving the necessary data, a two-day rapid field survey was carried out in UP in January 2024, and an 'Addendum Report' – in continuation with the main Holistic Plan submitted earlier – was submitted in the same month to the SC-NBWL, bringing the project to a close.

Outputs and Outcomes: A detailed, scientific and comprehensive point-by-point response to observations made by the Uttarakhand CWLW on WII's submitted 'Holistic Plan' was compiled and submitted to the SC-NBWL in October 2023.

A well-referenced 'Addendum Report' submitted to the SC-NBWL with detailed recommendations for managing and/ or delineating critical zones for wildlife in areas adjacent to Rajaji TR (within ten km-radius) – for protecting wildlife corridors and important habitats from riverbed material (RBM) mining – in the biodiversity-rich Shiwalik and Najibabad Forest Divisions was submitted to the SC-NBWL.

Milestones: WII submitted a detailed response to Uttarakhand CWLW observations on the Rajaji TR 'Holistic Plan' Report to SC-NBWL in October 2023. Uttar Pradesh PCCF (WL) provided necessary relevant data to WII to facilitate compiling the 'Addendum Report' in December 2023, after a data request was sent by WII in June 2023. WII submitted the required 'Addendum Report' to the SC-NBWL within the timeline provided by the Ministry (02 months, triggered from receiving necessary data) in January 2024.

RESEARCH COMPLETED

INFLUENCE OF TECTONIC SHIFT (UPLIFT AND SUBSIDENCE) ON CARBON STOCK DYNAMICS OF MANGROVE FORESTS OF ANDAMAN ISLANDS

Funding Source
Department of Science and Technology

Researchers
Shri Thirumurugan V and Anoop Raj Singh

Date of Initiation
August 2018

Date of Completion
January 2024

WII

Investigator
Dr Nehru Prabakaran

Objectives: The project had the following objectives: (i) to study the variation in mangrove species composition along the subduction gradient; (ii) to understand the mangrove vegetation cover change across Andaman and Nicobar Islands after the tectonic subduction using satellite remote sensing data; and (iii) Simulation modelling of mangrove succession at different sea level change scenarios.

Progress: The replicate sampling of mangrove vegetation across the Andaman and Nicobar Islands was carried out. About 40 sites from the uplifted coastal areas, 30 from the subsided coastal areas, and ten from the control sites were covered. Analysis of the data was carried out, and the project's final report was compiled.

Outputs and Outcomes: The project has generated the baseline data on the mangrove colonization across the new intertidal zones created by uplifted reef beds and sea floors in the Andaman Islands and subsided terrestrial zones in the Nicobar Islands. A number of new distribution records for mangrove species in Andaman and Nicobar Islands were reported (*e.g. Avicennia alba*). Various factors, such as seed source availability, and herbivory by faunal species, including the invasive Spotted deer, influenced the colonization of mangroves. Species like *Rhizophor*a spp., *Avicennia marina*, and *Sonneratia alba* showed high resilience and colonization potential in the new intertidal zones.

Milestone: The generated baseline data formed the basis for long-term monitoring of mangrove succession in the Andaman and Nicobar Islands following the 2004 tsunami and coastal line changes. A number of new distribution records for mangrove species in Andaman and Nicobar Islands were reported (*e.g. Avicennia alba*). The results have established Spotted Deer's negative influence on the Andaman Islands' mangrove vegetation.

RESEARCH COMPLETED

RAPID ASSESSMENT FOR FACILITATING ELEPHANT, ELEPHAS MAXIMUS MOVEMENT BETWEEN THE PANIR RESERVED FOREST AND DULUNG RESERVED FOREST ALONG THE LOWER SUBANSIRI HYDROELECTRIC PROJECT

Funding Source
National Hydroelectric Power Corporation Private Limited

Investigators
Dr Gopi GV, Dr Parag Nigam, Dr Abhijit Das, Dr Anukul Nath and Dr Lakshminarayanan Natarajan

Researchers
Karthy, S, Swati Nawani, Sirumai Khusiali Kri, Balaji V (WII), Dr Santanu Dey (Nagaland University)

Date of Initiation
May 2023

Date of Completion
January 2024

WII

Objectives: The project's objective was to conduct a study to prepare a plan ensuring the free passage of elephants across Panir Reserved Forest and Dulung Reserved Forest.

Progress: WII was tasked with conducting a rapid assessment in the Lower Subansiri district of Arunachal Pradesh in the 72nd Standing Committee of the National Board of Wildlife held on 25.04.2023. Consequently, the research team from WII conducted a rapid assessment to find the use of habitat by elephants in the Hydroelectric project site in October 2023.

Outputs and Outcomes: The study recorded more than 127 species of birds, 44 species of amphibians and reptiles, and 272 species of plants. The researchers were able to observe elephants directly using the corridor that was thought to be defunct. The findings of the study were submitted to the Standing Committee of NBWL in January 2024. The recommendations by WII were acknowledged and accepted by the members of the committee.

Milestone: Based on the recommendation, the Standing Committee of NBWL suggested a reassessment of the Dulung - Subansiri Elephant Corridor to avoid hydro-peaking activities in the hydroelectric dam.

RESEARCH COMPLETED

EVALUATION OF EFFICACY OF VARIOUS POPULATION ESTIMATION METHODS FOR ELEPHANTS TO DEVELOP POPULATION MONITORING PROTOCOL

Funding Source
Uttarakhand Forest Department

Investigators
Dr Bilal Habib and Dr Parag Nigam

Subject Matter Specialist
Dr S. P. Goyal

Researchers
Charanjot Kaur and Rima Sadhukhan

Date of Initiation
February 2022

Date of Completion
March 2024

WII

Objectives: The project had the objective of evaluating the efficacy of various population estimation methods for elephant population to develop a population monitoring protocol.

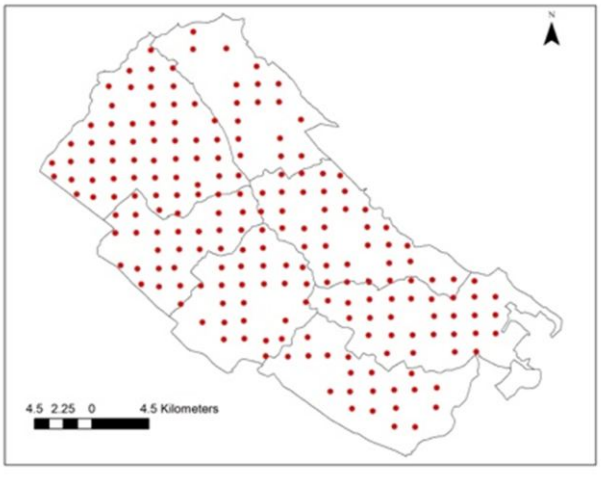
Progress: Fieldwork was carried out and completed for the following methods:

Distance Sampling using Line transect — 41 transects, ranging from 1 to 2 km, were walked seven times in the western part of the Rajaji National Park.

Dung Density Estimation: The dung decay rates were estimated in Phase 1 of the project and field data on the dung pile densities was collected on the line transacts to estimate the elephant population size based on dung deposits.

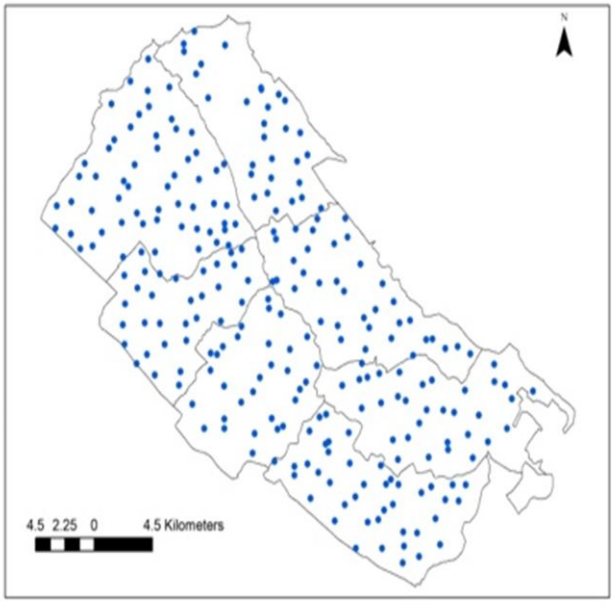
Linear SECR: Road segments of about 370 km were surveyed with seven repeats using motorable vehicles to record the elephant's presence through direct sightings and additional information about the herd, sighting location, time, etc, were noted down. The survey duration was from 1 December 2023 to 15 December 2023.

Grid-based SECR: We deployed pairs of camera traps in a two sq. km. grid at 262 locations across the western Rajaji National Park to estimate the elephant population using SECR analyses framework requiring individually identified elephants based on their morphological characteristics. The survey was carried out from 1st February 2024 to 31st March 2024.



Location of camera traps for camera-trap-based distance sampling to estimate elephant population in Rajaji National Park.

Camera-trap-based Distance Sampling: Camera traps can be used as point detectors for the distance sampling method. We deployed a single camera trap in a two sq. km. grid at the centre of the grid. Two hundred ten locations were covered across the western Rajaji National Park. The survey was carried out from 1st February 2024 to 31st March 2024 and extended further.



Location of camera traps for SECR-based population estimation of elephants in Rajaji National Park.

Outputs and Outcomes: Our surveys yielded a total of 275 sightings of the ungulates in line transect surveys, a total of 246 observations of dung piles for dung density estimates and a total of 159 sightings of elephants on road segments for linear SECR analyses. The Camera-trap SECR survey resulted in a dataset of 11,23,705 photographs, of which about 9500 photographs belong to the elephant. For camera-trap-based distance sampling, a total of 485307 photographs were obtained. Further segregation of the data for elephant images is ongoing. The analyses of these datasets are underway, the results of which shall be used to carry out comparative analyses of the pros and cons of different methods and draw appropriate recommendations for future monitoring of the elephants. Testing of another modified approach of using camera traps for waterhole census is underway.

RESEARCH COMPLETED

RESPONSE TO ANTHROPOCENE AND CLIMATE CHANGE: MOVEMENT ECOLOGY OF SELECTED MAMMALIAN SPECIES ACROSS THE INDIAN HIMALAYAN REGION

WII

Funding Source
National Mission on Himalayan Studies (NMHS)

Researchers
Shaheer Khan and Prasad Tonde

Date of Initiation
June 2020

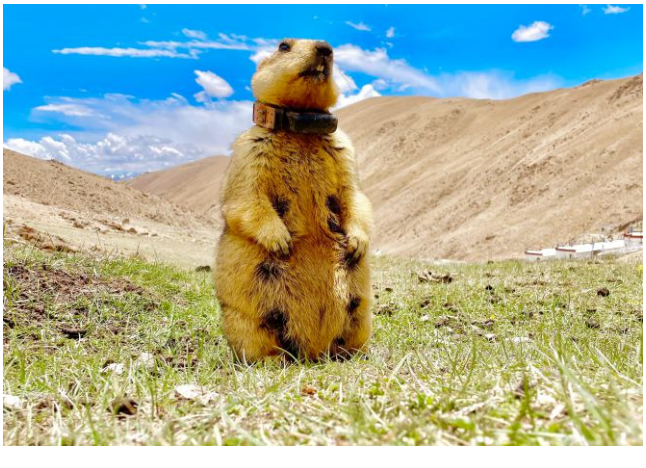
Date of Completion
March 2024

Investigator
Dr Bilal Habib

Objectives: The objectives of the study were to a) To study the movement patterns of Pallas's Cat, Himalayan Wolf and Himalayan Marmot with respect to Anthropocene and climate change in the IHR b) To study the spatio-temporal habitat utilization, feeding ecology and life history traits of the selected mammal species in the IHR. c) To predict fine-scale distribution pattern of the selected mammal species in the IHR based on telemetry data for predicting change under anthropogenic and climate scenarios.

Progress: a) *Wolf Distribution Modelling:* Three thousand seven hundred seventy-six woolly wolf locations were compiled from various sources across Afghanistan, Pakistan, Kyrgyzstan, India, Nepal, Bhutan, China, and Mongolia. GIS mapping was used to assess spatial autocorrelation. The study area was divided into grids (1km x 1km to 10km x 10km) to prevent clustering, resulting in 774 to 162 presence locations for further analysis. Elevation, temperature, precipitation, and land use/land cover were key factors influencing woolly wolf distribution. Woolly wolves preferred lower to moderately warm temperatures and higher precipitation, avoiding forests and farmlands in favor of open barren areas. Only about 20% of the study area was highly suitable for woolly wolf habitat. Future climate change scenarios predict an expansion of suitable habitat for the Woolly Wolf, particularly in the southern and southwestern parts of the study area b) *Pallas's Cat:* Sites were finalized for the collaring of Pallas's Cat, and scats were collected for diet analysis, which is ongoing c) *Himalayan Marmot:* The telemetry study of Himalayan marmots is the first in India to provide baseline data for conservation efforts. Telemetry data was collected using on-ground receivers due to the weight constraints of collars. Equipment included Lotek Litetrack 140 RF collars, Pinpoint commander (Receiver for data download), Garmin GPS, binoculars, and a weighing machine. Custom Sherman traps were constructed to trap Himalayan marmots. Dan-inject tranquillizer gun and darts, as well as chemicals for immobilization, were provided by the Department of Wildlife Protection, Leh, Ladakh. Trapping was carried out during specific seasons (summer), with scat collection for dietary analysis. Home range and movement metrics were calculated; Species distribution modelling will help influence conservation measures and safeguarding protocols for this species. The home range varied on an average between 3 to 7 hectares indicating a concentrated distribution. The step length was 20 to 60 metres and the average distance they travelled from their burrow was 10 to 15 metres. The net-sqaured displacement showed that they are central foragers which coincides with the small home ranges. Activity pattern showed that they are mostly diurnal with one or two instances of emerging from burrow at night. Habitat utilization displayed preference for moss and lichens type habitat followed by grassland type. Sparse vegetaion, although available in plenty, was not selected for. Growing tourism is leading to increased interactions between tourists and Himalayan marmots, resulting in the transfer of diseases such as scabies. Collar data will be used to analyze the intensity of interactions between tourists and marmots, providing insights for conservation efforts.

Outputs and Outcomes: The study sheds light on the intricate relationships between key environmental factors and the distribution patterns of the woolly wolf in the IHR. Through meticulous modelling efforts, we delineated the significance of elevation, temperature, precipitation, and land use/land cover in shaping the habitat preferences of this elusive species. Moreover, the findings underscore the potential impact of climate change on future habitat suitability, with projections indicating a notable expansion of suitable habitat for the woolly wolf, particularly in



specific regions of the study area. Additionally, our pioneering telemetry research on Himalayan marmots provides invaluable baseline data for formulating effective conservation strategies. The telemetry data and insights into human-wildlife interactions elucidate the multifaceted challenges facing species conservation amidst escalating tourism activities in the region. By integrating cutting-edge methodologies and interdisciplinary approaches, our study advances scientific understanding and informs evidence-based conservation interventions aimed at preserving the biodiversity of the Indian Himalayan ecosystem.

RESEARCH COMPLETED

WII

CUMULATIVE ENVIRONMENT IMPACT ASSESSMENT ON WILDLIFE HABITAT AND ECOLOGICAL VALUES DUE TO PROPOSED DOUBLING OF RAILWAY TRACK FROM TINAIGHAT TO KULEM IN THE NORTHERN WESTERN GHATS

Funding Source
Rail Vikas Nigam Limited (RVNL)

Investigators
Dr Bilal Habib, Dr Parag Nigam, Dr Gopi G.V., Dr Abhijit Das and Dr Navendu Page

Project personnel
Dr S. P. Goyal, Dr Indranil Mondal, Dr Jins, VJ., Dr Nikhil Modak, Dr Mayur Nandikar, Dr Sudip Banerjee, Dr Sharfaa Hussain, Dr Pooja Thathola, Vijay Babu Nandwanshi, Niket Nilesh Alashi, Sonia K.B, Ranjit Satrusallya, Ankit Singh Dinesh and Swati Saha Sonia KB

Date of Initiation
October 2022

Date of Completion
March 2024

Observed rail kill during a survey

Objectives: The primary objective of the project was to conduct a Cumulative Impact Assessment through; a) Fine-scale composition and configuration of habitat characteristics, b) Distribution and abundance status of terrestrial and arboreal mammal species and *herpetofauna* with particular emphasis on Western Ghat endemics, c) Examine the spatial profile and extent of railway noise and vibration, d) Assess train transport-related soil contamination and determine the impact on vegetation, e) Determine the hotspot of wildlife-train collision, f)Suggest relevant mitigation measures along the railway track from Castlerock to Kulem for retaining ecological processes within the northern Western Ghats.

Progress: We collected information on bird diversity, monitored rail kill, and population estimation of genus Indosylviarana of family Ranidae using visible implant elastomer tagging. Besides, we also assessed the impact of railway track related to vibration, micro temperature, noise pollution, and artificial light on wildlife species. The methods used during the period are as follows:

Avifaunal survey: The point-count method was used in this

study. A total of 75 points were sampled with three replicate surveys.

Rail kill: Rail-kill survey was conducted from September 2023 to November 2023. Throughout the survey period, we recorded data on various species affected by rail traffic.

Visible Implant Elastomer (VIE) tagging and Capture-Mark-Recapture (CMR): Over 98 individuals of Indosylviarana were initially captured at and near Tinaighat (chainage 15300), marked, and subsequently released back into their habitat in a CMR framework.

Light and temperature: We deployed 44 Hobo MX data loggers across 16 locations between Kulem and Tinaighat. Two units were deployed in each location, one on the track and the other at 10m from the track inside forest. Each unit was configured to record data at 1-second intervals.

Assessment of noise pollution using Audiomoth: We deployed 45 Audiomoth devices near the railway track and within the forest canopy (at 10m, 50m, 100m, 250m, 500m and 700m). The devices were configured with a recording duration of 55 seconds and five-second sleep duration for 4-5 days.

Vibration data collection: Extent of vibration by train was assessed using Vibration Level Meter deployed at 5m, 10m, 20m, 50m, 100m, 150m, 200m, 250m from the track in different terrains. Vibration Data Management software was used for data configuration and export.

Outputs and Outcomes: Avifaunal survey: The survey documented 4,480 observations along the rail track, with a total of 135 avian species representing 17 orders and 47 families. Simpson's diversity index (D) of 0.052 and Shannon's diversity index (H) of 3.64 indicates moderate to high avian diversity. Species richness was 4.94. An evenness index of 0.73 suggested a relatively balanced distribution of species abundance.. Rail kill: A total of 341 kills were documented. Amphibians constituted the majority (76%), followed by reptiles (16%), mammals (7.8%), and birds (0.2%). Amphibian mortality hotspots were primarily in the Dudhsagar-Kulem and Tinaighat-Castlerock during the dry season, whereas during the wet season, mortality was widespread throughout the ghat section. VIE tagging and mark re-capture: Of the 98 individuals, 20 marked Indosylviarana were re-captured during the study time. Preliminary findings of VIE tagging revealed large displacement (up to 35m) in the stream-dependent amphibians, which could be threatened by barriers such as railway tracks. Light and temperature: The highest mean lux value for light intensity at 0m (open area) was 35.67 and the highest mean lux value at 10m (partially covered area) was 2.99. Close to the track, light intensity varied from 24 to 36 lux whereas the values were < 3 lux at 10m away from the ballast. We found an inverse relationship between canopy cover and ambient temperature. Maximum temperature on the track was 37.36°C where canopy cover was almost nil, while at 10m, the maximum temperature was 29.21°C where canopy cover was 60%.

Assessment of noise pollution using Audiomoth: Maximum dB recorded decreased from 106 dB at 10m to 54.3 dB at 300m towards forest cover suggesting highest impact close to the track. Vibration data collection: In different terrain and surface categories, we observed almost 50% decrease in vibration level from 5m to 250m distance from the track.

RESEARCH COMPLETED

WILDLIFE STUDY AND MITIGATION PLAN FOR DEVELOPMENT OF 4 LANE HARIDWAR BYPASS ROAD (PACKAGE-2) PASSING THROUGH RAJAJI TIGER RESERVE AND NATIONAL PARK, UTTARAKHAND

Funding Source
National Highway Authority of India

Researchers
Dr Shivam Shrotriya, Zehidul Hussain and Aman Bhatia

Date of Initiation
April 2023

Investigator
Dr Bilal Habib

Date of Completion
March 2024

WII

Objectives: The project had the following objectives: (i) Study the wildlife use of the area selected for the proposed tunnel for the developing 4 Lane Haridwar Bypass Road (Package – 2); (ii) Map the land use, land cover, and terrain along the proposed tunnel for developing 4 Lane Haridwar Bypass Road (Package – 2); and (iii) Suggest mitigation measures and recommendations based on the available best practice.

Progress: Haridwar city holds significant religious importance for the Hindu community and experiences a

substantial influx of pilgrims and vehicles, particularly during events such as Kawad Yatra. In July 2023, the city witnessed an influx of 4.07 crore people and 46 lakh vehicles (Mishra, 2023), leading to severe traffic congestion in and around the urban areas. In response to these challenges, the Ministry of Road Transport and Highways, along with the National Highway Authority of India, has proposed the development of a bypass road for Haridwar. This bypass road, part of Package – 2 of the larger projects, spans a length of 9.5 km and connects to the existing NH74 (Haridwar – Haldwani road). The proposed alignment traverses through the Rajaji Tiger Reserve and adjacent forested landscapes before joining NH-58. Therefore, this study was conducted to evaluate the impact of the proposed alignment on wildlife in the Rajaji Tiger Reserve (Figure 1) and to suggest appropriate mitigation measures.

Wildlife presence and habitat utilisation were assessed using trail-based sign surveys and camera trapping. Intensive sign-based surveys (direct/indirect records) and camera-trapping exercises were conducted between May 2023 and July 2023. The survey was conducted in a buffer of 2 km on either side of the proposed alignment, covering an area of 50 km2. The study area was systematically divided into two grid systems: 2 × 2 km for the sign-based survey and 1 × 1 km for the intensive camera trapping. Each 2 x 2 km grid was walked thrice to document direct and indirect signs of wildlife, including mammalian signs such as scats, pellets, pug marks, hoof marks, and scratch marks. A total of 71.42 km was walked to collect the signs of wild animals. Additionally, camera traps were deployed at 41 locations within 1 × 1 km grids for 2,353 trap nights. The collected data were then analysed to assess species presence and movement patterns and to identify hotspots of animal activity and habitat use along the proposed alignment.

Outputs and outcomes: 26 wildlife species were recorded during the survey. Chital was the most frequently captured species, with 5049 sightings, followed by sambar with 2455 sightings. Moreover, wild boar (n= 715) and Asiatic elephants (n= 667) were consistently captured across multiple camera trap locations. Asiatic black bear, Indian pangolin and Goral, were captured infrequently, each with one capture event. Among carnivores, the striped hyena was the most frequently captured species (n= 183), followed by 107 sightings of 13 unique leopards and 69 sightings of 7 unique tigers using the proposed alignment area.

Species use areas were generated for multiple wildlife species using sign surveys and camera trap data (Figures 2-4). Species such as tigers, leopards, elephants, and various ungulates, including sambar, chital, and barking deer, exhibited concentrated activity hotspots around the North Portal. Tigers were observed to prefer undisturbed habitats and areas with less disturbance. However, leopards, elephants, and ungulates were found to occupy a wider range of habitats, including both the North and South Portals, as well as the Haridwar-Chilla-Rishikesh Road. The density of animal usage shows potential sites where animals may encounter roads, with NH-74 between package-1 and the South Portal serving as a critical crossing point for leopards, elephants, and ungulates accessing forested areas along the Ganga River. Elephants in the area frequently crossed roads to access the river and its islands, whereas ungulates were observed crossing the road to access areas along the riverbank.

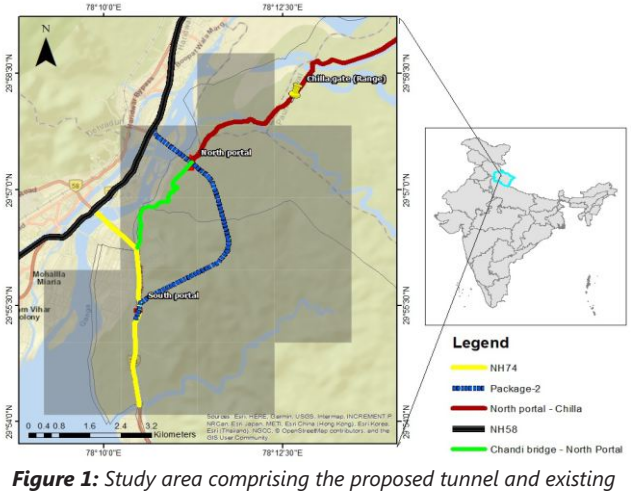


Figure 1: *Study area comprising the proposed tunnel and existing roads passing through the Chilla range of Rajaji Tiger Reserve, Uttarakhand*

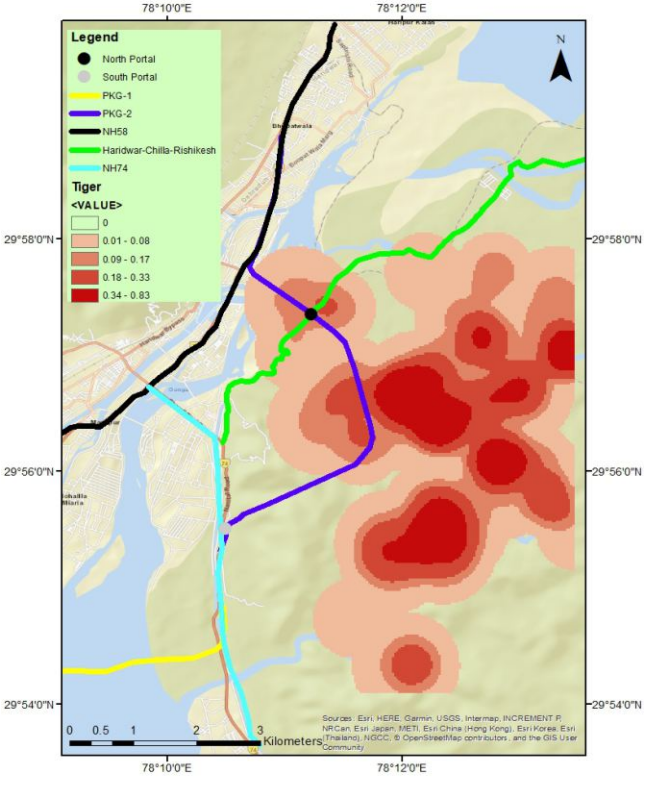


Figure 2: *Density map of tiger based on sign survey and camera trap data along the proposed tunnel within a 2 km buffer*

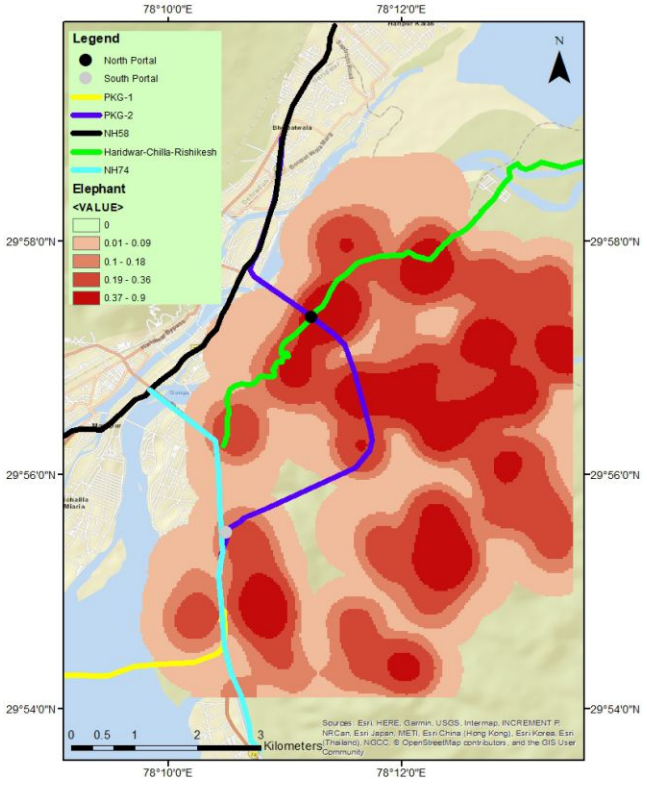


Figure 3: Density map of elephant based on sign survey and camera trap data along the proposed tunnel within a 2 km buffer

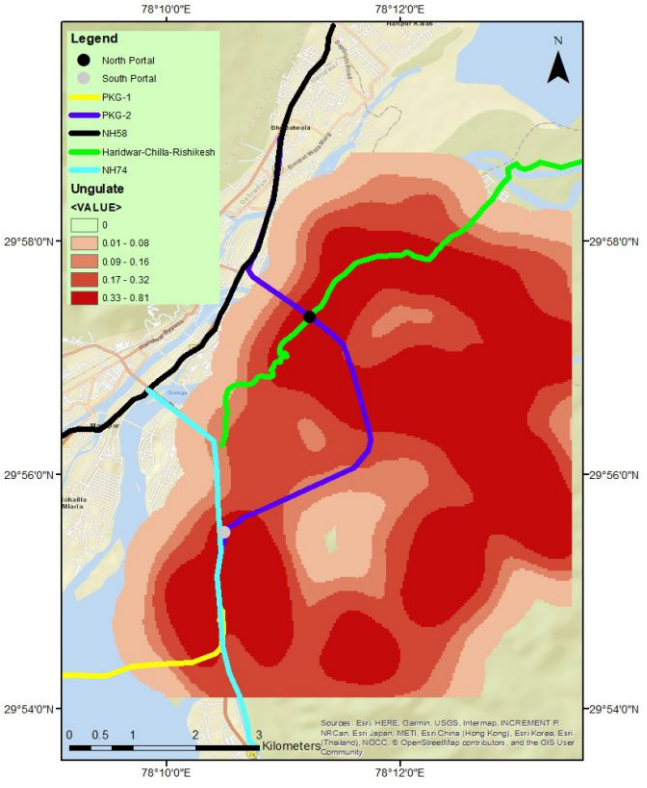


Figure 4: Density map of ungulates (sambar, chital and barking deer) based on sign survey and camera trap data along the proposed tunnel within a 2 km buffer

Recommendations: (i) The north portal and surrounding area, falling within the Rajaji Tiger Reserve, are critical sites for the movement of elephants, tigers, leopards and all major ungulate species. Preserving wildlife connectivity and wildlife use of the habitat at this junction is of utmost importance.

(ii) A double-staggered full circulation loop is suggested to connect the North portal exit with the Chilla-Rishikesh road and NH – 58. The recommended minimum height for such a structure is 9 meters to allow elephants to pass. This structure should be extended over Sukha sot on the Chilla-Rishikesh road, which is a prominent elephant crossing zone. This further enhances the utility of the mitigation structure for elephants.

(iii) All road alignments on the North portal should have an appropriate sound and light barrier to minimise disturbance to animals as much as possible. The opening of the North portal should have a preventive structure to minimise the risk of wildlife entry from the top.

(iv) The area between the Chandi barrier and the North portal is a prime wildlife habitat, which is currently disturbed by the road towards Rishikesh and public movement. The existing 2-lane road between the Chandi barrier to the North portal (approx. 2 km.) should be closed for public use, and this section should be opened as a passage for wildlife. Only the forest department would continue to use the existing road for patrolling activities.

(v) In package 1, there is an approximately 900–meter–wide forest patch between the Ganga River and NH-74. An elevated bridge is planned over the Ganga River, which later joins NH-74. It is suggested that this bridge should continue to be elevated, providing a minimum height of 6 m for elephant movement, and should be lowered to join NH-74 only within 300 m from NH-74.

(vi) Sufficient sound and light barriers cordoning the bridge over the Ganga River and the remaining road in package-1 and two until the South portal are suggested to make the resulting underpass animal movement-friendly. This will further make the bypass road inaccessible to wildlife animals, reducing collision and conflict risks in this section of the road running along the Rajaji Tiger Reserve.

Milestones: The field survey and literature review for the wildlife use of the affected area were completed. Specific recommendations to mitigate the impacts of the 4-lane bypass road on wildlife were prepared and communicated. A tunnel passing through the Chilla range of Rajaji Tiger Reserve and wildlife-friendly crossing structures at both tunnel openings were recommended.

RESEARCH COMPLETED

ASSESSMENT OF FINE-SCALE SPATIAL AND TEMPORAL USE OF KEY WILDLIFE SPECIES IN RELATION TO ECOLOGICAL RESOURCES AND SUGGEST MITIGATION PLAN TO AMELIORATE IMPACTS DUE TO UPGRADATION OF HARRAWALA RAILWAY STATION

Funding Source
Northern Railway

Date of Initiation
February 2023

Investigators
Dr Bilal Habib and Dr Parag Nigam

Date of Completion
March 2024

Researchers
Dr Amit Kumar, Rajat Singh Rana, Upasana Kandpal, Sonam, Aparna Sunil and Adil Khan

WII

Objectives: The objectives of the project were to (i) Determine the spatial and temporal use of the landscape by key wildlife species along railway track (ii) evaluate the pattern of wildlife–train collision based on existing information and monitoring to identify the hotspot of the wildlife train collision in the landscape (iii) Use 3D terrain and forest resources profile to identify the ecological factors determining occupancy, abundance, and landscape use by key species along the railway track (iv) identify a critical area for implementing mitigation measures to enhance permeability across the landscape (v) Prepare a 'Mitigation Plan'(MP) to ameliorate the impacts from (a) upgradation of Harrawala railway station, (b) extension/additional loop line at en route stations for handling 24 coaches, and (c) increase of train speed to 100km along Dehradun-Haridwar railway line passing through Dehradun Forest Division and Rajaji Tiger Reserve, Uttarakhand.

Progress: Wildlife spatial and temporal use was assessed through a sign survey and camera trapping conducted within the study area spanning from Harrawala railway station to Motichur railway station (in between chainage 72/13 to chainage 30/13) from May 2023 to July 2023. The camera trapping was done within a 2 km buffer on both sites along the railway track in the forest of Dehradun Forest Division and Rajaji Tiger Reserve, and the data was collected for 768 cumulative trap nights with 190 camera traps. Vegetation surveys were conducted using circular plots with diameters of 10m, 5m, and 1m for tree, shrub, and grass cover, respectively, at all sampling points along

the line transect. The entire railway track within the study area was surveyed to identify crossing hotspots through tail counts and garbage hotspots that attract animals to the railway track. The viability of existing bridges and culverts was checked for potential as functional wildlife crossing structures. Noise disturbance assessment was done with an HTC Noise level meter till 400m across the railway track.

Outputs and Outcomes: A total of 21 wild species, excluding birds and reptiles, were captured, with sambar being widely captured species (RAI - 119.3±21.98) and rusty spotted cat being captured only once (RAI - 0.02±0.04). The core hotspot zones of key species like sambar and elephant were observed in between Kansrao railway station to Raiwala railway station, and Raiwala railway station to Motichur railway station.

The vegetation survey revealed that within the study area, Mallotus philippensis had the highest species richness among trees (0.23), while Ziziphus mauritiana had the lowest (0.0011). Among shrubs, Murraya koenigii had the highest species richness (0.19), followed by Lantana camara. The highest tree density was found between Kansrao and Raiwala, while the highest shrub density was between Raiwala and Motichur railway stations. On surveying the existing crossing structure on the railway track, only two river bridges (bridge numbers 166 and 138) were found favourable for the potential crossing of large body-sized mammals, i.e., elephants and sambars. In contrast, most of the bridges and culverts were clogged with debris and vegetation. A total of 94 animal trails were documented. The greatest abundance of animal trails was observed between the Kansrao and Raiwala railway stations. Elevated levels of garbage accumulation are notably concentrated between the Kansrao and Raiwala railway stations. Elevated noise levels (110-80db) were also observed in close proximity (50m) to the railway track.

Crucial mounds were identified at two places between chainages 64/17 to 64/15 and 63/11 to 63/8 in Lacchiwala. On the basis of the above findings, suitable mitigation measures are proposed.

RESEARCH COMPLETED

DEVELOPMENT OF A GENETIC DATABASE OF CAPTIVE ELEPHANTS ACROSS INDIA FOR WELFARE AND MANAGEMENT

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Researchers
Ankit Shankar Pacha, Ayushman Singh Naruka and Abhiruchi Uniyal

Date of Initiation
January 2022

Date of Completion
March 2024

WII

Investigator
Dr Samrat Mondol

Objectives: The objectives of the project were to (i) establish a set methodology for undertaking captive elephant genetic studies and generate a DNA data archive on Indian elephants. This was planned to be achieved through a set of critical goals: (a) Develop standard operating protocols (SOP) for the collection of DNA samples from various sources from elephants; (b) Develop a tamper-proof sampling kit for biological sampling for the database; (c) development and maintenance of 'Chain of Custody (CoC)' for legal procedures; (e) Develop a manual for directing the collection of blood samples from captive elephants; (f) Standardize and test a set of microsatellite markers for elephant individual identification and forensic use pan India. (ii) conduct a training program for veterinarians under the Forest Department in sample collection and data collection and other necessary procedures to achieve EGDB goals; and (iii) The EGDB aimed to (a) collate the genetic and physiological database under one dataset; (b) understand the genetic status of the present population to facilitate population management of captive elephants.

Progress: The project team collected 282 samples in the first phase, whereas 412 samples were received by the end of May 2024. This year, the EGDB project received 27 requests from Arunachal Pradesh for elephant translocations to other states. The project provided necessary training and communication to respective division officers. All elephant (n=27) genetic data have been generated, and reports were provided to the Arunachal Forest Department to facilitate the smooth translocation process. To date, sampling has been completed in eight states, and partial sampling has been conducted in eleven states. The Institute conducted several training programs chaired by Dr Samrat Mondol (Scientist-

E) in this session (2023-2024) to initiate the sampling process in various states (West Bengal, Assam, and Kerala). These programs introduced forest department personnel to the project's rationale, goals, and detailed sampling procedures.

Outputs and Outcomes: A substantial increase has been seen in the number of biological samples received, with 694 samples collected from 19 states. This expansion contributed significantly to the captive elephant genetic database. Using a multivariate approach implemented in Discriminant Analysis of Principal Components (DAPC), we identified three major genetic lineages/clusters of captive elephant populations (K=3). Broadly, elephant samples from the states formed one northern cluster, one southern cluster, and one north-eastern cluster. A few individuals exhibited admixed genetic signatures, likely due to historical interstate translocations.

Genetic profiling of individual elephants assists authorities in ensuring the welfare and monitoring of captive elephants during and after translocation across states. The project was also useful for the welfare of the elephants, which are to be translocated. All the kits have been distributed across India to states with captive elephants for uniform sampling.

Milestone: This initiative, aimed at incorporating the details of these elephants into a national database, signifies a pioneering effort in the conservation sector. Having comprehensive data regarding the captive elephant population, including origin, size, gender, owner, and even genetic identity, brings a novel concept to captive elephant population management.

RESEARCH COMPLETED

ASSESSMENT OF DISEASE PREVALENCE IN UNGULATES IN PROTECTED AREAS OF MIZORAM

Funding Source
Ministry of Environment Forest and Climate Change, Government of India

Investigators
Dr Lallianpuii Kawlni, Dr S. Sathyakumar, Dr Vishnupriya Kolipakam and Shri Qamar Qureshi

Researchers
Akangkshya Priya Gogoi, Roopali Singh, Harshita Halemani, Prachi Mishra, Pooja Latwal, Preeti Semwal, Joonu Chakma, F. Malsawmdangliana Lalngaihawmi

Date of Initiation
December 2020

Date of Completion
March 2024

WII

Objectives: The objectives of the project were to (i) assess the prevalence of infectious diseases in selected areas of Mizoram with special reference to pathogens that caused mortality of wild ungulates in the recent past; and (ii) assess the prevalence of transmissible diseases in domestic counterparts in and around the PAs.

Progress: All objectives have been achieved. Ungulate diseases of importance have been investigated, along with information on population assessment and a study of people's perspectives in and around the study areas - Dampa Tiger Reserve, Murlen National Park and Ngenpui Wildlife Sanctuary.

Outputs and Outcomes: The prevalence of transmissible diseases in domestic counterparts in and around the PAs has been assessed. The prevalence of infectious diseases in selected areas of Mizoram, with special reference to pathogens that caused mortality of wild ungulates in the recent past, has also been assessed. The project also gave us additional information on the population assessment of ungulates in the study area.

Milestone: Metagenomic data of bacterial zoonotic pathogens in the study area were assessed. The study has also given us important insights into disturbance and parasite prevalence.

RESEARCH COMPLETED

PLANNING CONSERVATION IN ELEPHANT RESERVES – FRAMEWORK FOR THE PREPARATION OF THE ELEPHANT CONSERVATION PLAN (ECP)

Funding Source
Project Elephant Division, MoEFCC

Researcher
Maitryee Bhave

Date of Initiation
June 2023

Date of Completion
March 2024

Investigator
Dr Parag Nigam
Wildlife Planning Experts:
Shri P.C. Tyagi and
Dr Sanjay Srivastava

WII

Objective: The project's objective is to prepare guidelines/frameworks for the Elephant Conservation Plan (ECP) for the Elephant Reserves.

Progress: Elephant reserves have been constituted to achieve the goals and objectives of the 'Project Elephant'. The main focus of the elephant reserve management is to protect the elephants across the entire range, including their habitat and corridors, address issues of human-elephant conflict, and ensure long-term conservation of viable populations of the Asian elephant. Considering the elephant not only as a keystone species but also an umbrella and flagship species, the plan, besides necessitating landscape-level approach, has to be overarching in the implementation areas under different management regimes viz. guidelines of the Tiger Conservation Plan (TCP); management plans for the Protected Areas (PA); traditional forestry management as per Working Plan (WP) prescriptions guided by the National Working Plan Code; and Zonal Master Plan (ZMP) in the fringe areas governed by the Eco-sensitive Zone (ESZ) guidelines. The challenge is to integrate the different planning processes to achieve the common goal of sustainable forest management and wildlife conservation with a focus on the elephants. Thus, planning for ECP in the landscape would be a complex exercise as it integrates ecological, socio-economic and cultural variables relevant to the landscape.

Outputs and Outcomes: The ECP project had a well-structured work plan and objectives. The activities constituted field visits, collation of documents and two major consultation workshops involving experts from diverse fields, such as experienced wildlife managers and wildlife scientists.

Milestone: During the project tenure, two workshops have been successfully completed to finalise the ECP report. Workshop 1- Inception/ stakeholder consultation workshop on the 'framework for the preparation of elephant conservation plan (ECP) for the elephant reserves" workshop was held on 13 October 2023 to discuss the framework for elephant conservation plan. Workshop 2- "Consultative workshop on finalization of the framework for the preparation of elephant conservation plan (ECP)" took place on February 6, 2024, to review the document and finalize it for further implementation. The complete report was submitted to Project Elephant in March 2024.

RESEARCH COMPLETED

MONITORING THREATENED BIRDS OF THE THAR DESERT: HOW DOES HABITAT RESTORATION FOR THE GREAT INDIAN BUSTARD IMPACT ASSOCIATED AVIFAUNA?

Funding Source
Rufford Foundation, UK

Investigators
Shri Varun Kher

Advisors:
Dr Anand Krishnan, JNCASR, Bengaluru and
Dr Sutirtha Dutta

Researchers
Devendra Dutta Pandey and
Mihir Jadhav

Date of Initiation
April 2023

Date of Completion
March 2024

WII

Objectives: The project had the following objectives (i) Comparing bird assemblages between restored and unrestored areas of Desert National Park; (ii) Understanding the effects of Great Indian Bustard (GIB) focused restoration on population and distribution parameters of co-occurring bird species; (iii) Ascertaining status of resident threatened species of the Thar desert - White-browed Bushchat, Laggar Falcon, Egyptian Vulture, Red-headed Vulture, White-rumped Vulture, Indian Spotted Eagle, Tawny Eagle; and (iv) Acquainting relevant stakeholders with avifauna of the region through in-person meetings and distribution of outreach materials.

Progress: The project was envisioned as a foundational short-term study and aimed at generating baseline information that can help in the conceptualization of other long-term research and conservation projects. The entire study was conducted in the one-year period between 01st April 2023 and 31st March 2024. The following activities were undertaken: (i) Fieldwork: Vehicle transects (c.650km) were surveyed to enumerate the distribution, density and habitat response of raptors and other large birds. Similarly, line transects (c.150km) were walked to estimate ecological parameters for smaller birds. Ad-libitum surveys were conducted to find raptor nests. These nests were then monitored to understand breeding ecology and demographic vital rates. (ii) Analysis and reporting: The data was analysed using analysis tools such as distance sampling, occupancy estimation, etc. Most analyses were done using a Bayesian approach. The results were compiled as a technical report and submitted to the Wildlife Institute of India on 31st March 2024. (iii) Outreach: As part of the project, outreach activities were conducted to sensitise forest department ground staff and school children about the presence of threatened bird species in their neighbourhood. (iv) Training / Mentorship: One M.Sc. dissertation student was trained as part of the project

Outputs and Outcomes: The study provided baseline information on the threatened bird species of the Thar desert and their response to contemporary GIB-focused habitat restoration activities. The key results were as follows: (i) It was found that the occupancy of most raptors was not affected by the presence of vegetation recovery enclosures in a grid. The exception to this pattern was the Laggar Falcon (Falco jugger), which had much higher predicted occupancy in areas with enclosures. As for smaller birds, the total richness and occupancy of most birds were very similar between restored and unrestored areas. (ii) It was also found that a total of 22 raptor nests, which included threatened species such as White-rumped Vulture (Gyps bengalensis), Egyptian Vulture (Neophron percnopterus), Tawny Eagle (Aquila rapax) and Laggar Falcon. (iii) The research team ascertained the status of four threatened species in the Thar Desert and found that the

Laggar Falcon and the White-browed Bushchat are heavily associated with grassland habitats and benefit from GIB conservation activities. On the other hand, Egyptian Vultures seemed to prefer unrestored cropland habitats and had a marginally lower occupancy and density in restored areas. The Tawny Eagle seemed to be indifferent to the restoration of habitats. The status of Red-headed Vulture, White-rumped Vulture and Indian Spotted Eagle could not be determined due to the very low encounter rate for these species. (iv) Three local youth were employed as field assistants during the project and were trained in bird identification, ecology and survey techniques. Ground staff of the local forest department (mostly from the local communities) were informed about the presence of different threatened bird species in their area, and flyers were distributed to help them identify them. Our team also facilitated a visit of school children to the Desert National Park in collaboration with the Bustard Recovery Program and the Rajasthan Forest Department.

Certain knowledge gaps were identified based on the results of this study, and the following activities are suggested for upcoming projects: (i) Monitoring of birds in restored areas over the long term to understand the temporal effects of vegetation recovery and protection; (ii) Monitoring of nests identified during this exercise to understand breeding ecology and identify threats and/ or demographic bottlenecks; (iii) Telemetry of a few birds to understand the spatial ecology of threatened species and their interaction with potential threats; and (iv) Expansion of restoration programs for mitigating other threats such as invasive species and renewable energy infrastructure, and subsequent monitoring.

Milestones: The effects of GIB focused restoration on co-occurring birds were assessed in a scientifically robust manner. The status of four threatened species of the Thar desert was determined based on collected data. The topics for future research and conservation action were identified and prioritized.

RESEARCH COMPLETED PROJECTS

SACON

PREPARATION OF INTEGRATED MANAGEMENT PLANS FOR TEN WETLANDS FROM EASTERN UTTAR PRADESH

Funding Source
Wildlife Trust of India, New Delhi

Investigator
Dr Goldin Quadros

Researcher
Dr Bibhu Prasad Panda

Date of Initiation
December 2022

Date of Completion
May 2023

Objectives: The project's objective was to prepare an Integrated Management Plan (IMP) for wetlands, with a focus on the utilisation of the habitat by Sarus Cranes.

Progress: The project has been successfully completed, and Integrated Management Plan has been formulated for ten wetlands in Eastern Uttar Pradesh. The selected wetlands include Baidauli, Dhanha Nayak, Hariharpur, Hertodwa, Ledi, Matiaria, Paragpur, Puraina, Salamatgarh, and Baisaar. Following the National Plan for Conservation of Aquatic Ecosystems (NPCA) guidelines, concise documentation and health cards were prepared for each wetland. Stakeholder consultations were subsequently conducted to identify key concerns and strategies for improved wetland management. The final report provides individual Integrated Management Plans for each wetland while emphasizing sustainable development priorities.

Outputs and Outcomes: The IMP represents one of the first comprehensive wetland management plans in Uttar Pradesh, covering more than ten wetlands. It prioritizes both the conservation of Sarus Crane habitats and the livelihoods of local communities. Key highlights include the Sustainable utilization of wetland resources. And the Community and stakeholder integration in wetland landscape management. Facilitated by the Wildlife Trust of India (WTI), the IMP serves as a foundational document for various line departments, including the Forest Department, to guide long-term conservation and management efforts.

Milestone: The IMP is being executed by the funding agency, Wildlife Trust of India, along with the forest department in Maharajganj district of eastern Uttar Pradesh.

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Birds around the Hertodwa wetland, Maharajganj district

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Puraina wetland landscape, Maharajganj district

RESEARCH COMPLETED PROJECTS

SACON

ASSESSING THE POPULATION STATUS AND TEMPORAL PATTERNS OF MIGRATORY BIRDS IN VADUVOOR BIRD SANCTUARY, TAMIL NADU

Funding Source
Tamil Nadu State Land Use Research Board

Researcher
Dr V. Kirubanandhini

Date of Initiation
March 2022

Date of Completion
May 2023

Investigators
Dr S. Babu and Dr R. Jayapal

Objectives: The objectives of the project were to (i) assess the spatial and temporal pattens of migratory and resident waterbirds in Vaduvoor Bird Sanctuary and adjacent foraging area; (ii) study the physicochemical properties of water and flora and fauna in and around the Vaduvoor Bird Sanctuary; (iii) evaluate the poaching pressure on the migrant and resident bird species and conduct the capacity building programme to the frontline staff involved in the protection and conservation of the Vaduvoor Bird Sanctuary; and (iv) assess the land use and land cover change pattern in and around the Vaduvoor Bird Sanctuary.

Progress: The project was initiated to document the flora and fauna of the sanctuary and to assess the population status of both migratory and resident bird species. Standardized sampling and survey methodologies were employed to document the lake's biodiversity, with the total count method utilized specifically for wetland bird enumeration. The survey recorded 312 plant species, 6 damselfly species, 12 dragonfly species, 28 butterfly species, 15 fish species, 9 amphibian species, 24 reptile species, 127 bird species, and 10 mammal species, using rigorous survey protocols and with technical support from subject matter experts.

We also analyzed the physico-chemical properties of water using standard analytical methods. Among the 127 recorded bird species, 44 were wetland and wetland-associated species, comprising 16 species of diving and open-water foraging birds, 11 species of large wading birds, eight species of small wading birds, and six species of floating vegetation and grassland-foraging birds. The Black-headed Ibis, Asian Openbill, Little Egret, Indian Cormorant, and Cattle Egret were the dominant and most frequently observed species throughout the year.

Although the sanctuary is renowned for its heronries of large wading birds, these species were less frequently observed foraging within the lake, likely due to the absence of suitable foraging substrates, such as shallow water areas. Small wading birds were primarily observed during the return migration period when the lake's water levels were low. Based on the monthly composition of waterbird species, we identified four distinct bird seasons at Vaduvoor Lake:a)Arrival of large wading birds for breeding (June–July), b)Breeding season (August–November), c)Post-breeding and arrival of small wading birds (December–March), and d) Departure season/dry season (April–May).

Surveys of major nearby wetlands (satellite wetlands) within a 5 km radius revealed that the bird species richness in these lakes was a subset of those recorded at Vaduvoor Lake. This indicates that Vaduvoor Lake likely serves as a source population for many waterbird species. Therefore, the protection of satellite wetlands is equally critical for the long-term conservation of waterbirds within this landscape.

Outputs and Outcomes: The flora and fauna of the bird sanctuary, including butterflies, damselflies, dragonflies, fishes, amphibians, reptiles, birds, and mammals, have been documented comprehensively for the first time.

As part of the educational outreach, bilingual posters were developed focusing on fishes, amphibians, reptiles, and wetland birds, along with a pamphlet dedicated to the wetland birds of Vaduvoor Bird Sanctuary. Additionally, a book documenting the flowering plants of the sanctuary was published. The study elucidated the structural composition and breeding seasonality of wetland bird

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Open bill stork in Vaduvoor Bird Sanctuary

species. Furthermore, it emphasized the importance of protecting satellite wetlands as a critical strategy for ensuring the long-term conservation of waterbirds within this landscape.

Milestone: Management recommendations suggested as part of this project are being implemented at Vaduvoor Bird Sanctuary with the financial support of the CKIDP mitigative measure project.

RESEARCH
SACON COMPLETED PROJECTS

SPATIAL MAPPING OF MATHIKETTAN SHOLA NATIONAL PARK (MSNP)

Funding Source
Ananmudi Forest Development Agency (AFDA), Munnar, Kerala

Researcher
Nandu VS

Date of Initiation
December 2022

Date of Completion
June 2023

Investigator
Dr P.V. Karunakaran

Objectives: The objectives of the project were to prepare a fine-scale (high resolution) land use/landcover map with level V/VI classification: this activity explores the different ecosystems and habitats like various kinds of natural forests, degraded areas, plantations, and other ecological attributes. The mapping also includes social, economic, livelihood and utility services such as firebreaks, trekking trails, waterfalls, etc.

Progress: During the reporting period, we prepared the administrative and basic thematic layers of the PA using topo sheets and online resources. The management authorities provided the administrative boundary of the PA. IRS LISS IV data procured (from the National Remote Sensing Centre) under another project (India High Range Mountain Landscape Project) was used for mapping the land- use/ land-cover attributes of the PA. A draft of the Land Use Land Cover classification was carried out through object-based image analysis and the support vector machine learning process.

Outputs and Outcomes: A total of 10 land use/landcover classes, both natural and artificial, were identified in the PA. This includes dense and disturbed types of subtropical hill forests, southern montane wet temperate forests, tropical wet evergreen forests, west coast tropical wet evergreen forests, reed thickets, montane wet grassland, eucalyptus and rocky outcrops. Among these, 9 are natural landcover, contributing almost 100% of the area, and only 0.35% of the area is occupied by eucalyptus plantations along the border. Among the natural landcover, primary landcover contributes 12 km2 (90.1%) and secondary forests and other landcover constitute 0.68 km2 (5.12%). Subtropical hill forests and southern montane wet temperate forests are the dominant vegetation types.

The patch metric analysis identified over 200 patches in MSNP, with the majority (149) consisting of rocky outcrops. Although the protected area's canopy appears uniform, past human disturbances have resulted in the formation of patches. Notably, these patches are well-connected and spatially adjacent, facilitating the movement of both small

Canopy Views of Mathikettan Shola National Park

and large wildlife. Among the various vegetation types, subtropical hill forests and montane grasslands exhibit a higher number of patches compared to other land cover classes.

Milestone: The project completion report highlighted the biological importance of the PA and management implications were focus on the distribution of invasive species, Ageratina Adenophora, that needs to be controlled. The management recommendations were incorporated into the PA's management plan.

RESEARCH SACON COMPLETED PROJECTS

GENOMIC STUDIES ON RUSTY-SPOTTED CAT

Funding Source
Maharashtra Forest Department

Date of Initiation
August 2022

Investigators
Dr Shomita Mukherjee,
Dr Nandini Rajamani, IISER Tirupati,
Mr Nayan Khanolkar

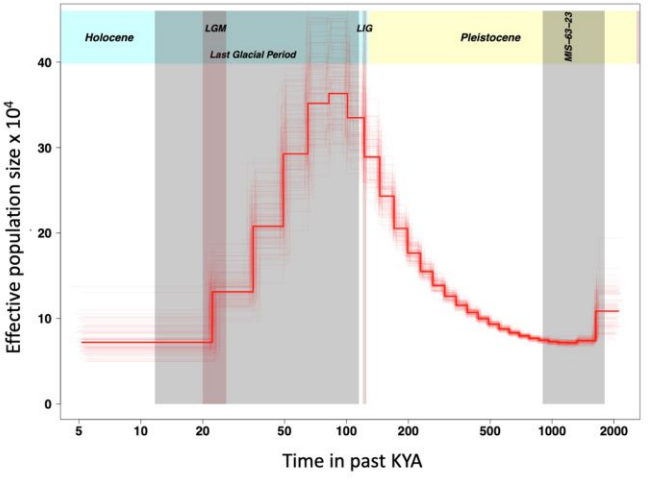
Date of Completion
July 2023

Objectives: The objectives of the project were to (i) prepare the first reference genome for the Rusty-spotted Cat; (ii) study the genetic variation of the Rusty- spotted Cat population in captivity at SGNP; (iii) explore the long-term demographic history of the Rusty-spotted Cat in India and understand how climate change could have impacted it; and (iv) create a database of prey DNA sequences from dentition in scats, which can be used as a barcode for quick reference for small carnivore diet studies in SGNP.

Progress: Samples taken from two female siblings were sequenced through Illumina Novaseq 6000 sequencer (150 bp paired-end) for 50x and 30x coverage. Standardised web-based pipelines and bioinformatic tools for genomic analyses were used to assemble the genome. Demographic change for the Rusty-spotted Cat over 500,000 years (Late Quaternary) was performed through Pairwise Sequentially Markovian Coalescent (PSMC) analysis. Among the caveats of the project was the inability to determine genetic diversity in the captive Population due to the death of several individuals before sampling was initiated (Objective 2). Prey remains in scats did not yield adequate DNA to fulfil Objective 4.

Outputs and Outcomes: The size of the Rusty-spotted Cat genome was estimated at 2.350 Gbp, similar to its congeners, the Asian Leopard Cat and Fishing Cat. The preliminary PSMC analysis of the demographic history of the species suggests that there were dips in the effective population size during the glaciation times, which corresponds with the results of an earlier study of their past climatic niches. However, further analyses need to address the shorter scaffolds and poor contiguity.

Milestone: This is among the very few small cat whole genomes to be sequenced in India and the first Rusty-spotted Cat genome to be assembled. The project and final report have been completed.



PSMC plot depicting the demographic history of Rusty-spotted Cat

RESEARCH SACON COMPLETED PROJECTS

REJUVENATION OF HOLDING PONDS AND STORM WATER DRAINS IN NAVI MUMBAI MUNICIPAL CORPORATION

Funding Source
Navi Mumbai Municipal Corporation

Investigator
Dr Goldin Quadros

Researchers
Prathamesh Gurjarpadhye, Sunil Kumar Gupta, Siddhesh D. Bhave and Pratik Dey

Date of Initiation
April 2022

Date of Completion
August 2023

Objectives: The project's objective was to assess the impact of the de-siltation process on the mangroves in the open area of the holding pond.

Progress: The biodiversity of the holding pond was systematically documented, and the pressures arising from anthropogenic activities were thoroughly assessed. Key mangrove species, along with associated flora and fauna, were identified and recorded. Additionally, the factors contributing to the reduction in the pond's water-holding capacity were evaluated to assess its potential for rejuvenation.

Outputs and Outcomes: Several evidence-based recommendations were presented to the funding agency, including the regular maintenance and monitoring of flap gates regulating water flow into the holding pond. Acting on these recommendations, the Navi Mumbai Municipal Corporation (NMMC) replaced the flap gates and carried out dredging operations in the open mudflat area, ensuring minimal disturbance to the mangroves.

A notable outcome of these interventions was the absence of flooding incidents in Navi Mumbai during the past year.

Milestone: The NMMC has expressed plans to replicate these recommendations across other holding ponds under its jurisdiction, demonstrating the scalability and impact of the proposed management strategies.

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Holding Pond at CBD Belapur

©Sunil Kumar Gupta

Holding Pond at CBD Belapur

RESEARCH COMPLETED PROJECTS
SACON

ASSESSING HUMAN – PEAFOWL CONFLICT AND DEVELOPING AN ACTION PLAN TO REDUCE THE CONFLICTS IN SELECT ZONES OF TAMIL NADU

Funding Source
Forest Department, Tamil Nadu

Researchers
B.K. Aravindan and R. Kishore

Date of initiation
September 2022

Investigators
Dr H. N. Kumara and Dr S. Babu

Date of completion
December 2023

Objectives: The project had the following objectives (i) Identification of high human-peafowl conflict zones in Tamil Nadu and assess the Population of peafowl in identified conflict zones; (ii) Evaluation of the crop damages and economic loss of agricultural produce due to peafowls in select conflict zones; (iii) Assess the effectiveness of scaring devices used by farmers to protect the crops; and (iv) Prepare an action plan for a high conflict zone and propose appropriate management interventions.

Progress and Outcomes: The data collection and analysis were successfully completed. Of the 38 districts in Tamil Nadu, peafowls were sighted in 32 districts. Data from eBird and field detections confirmed the occurrence of peafowls across all districts in the state. A total of 348 detections comprising 1,025 individual peafowls were recorded during the survey. Based on the mean detection distance, the estimated population density was 40.45 peafowls/km^2, while the minimum population density, calculated using the maximum detection distance, was 25.20 peafowls/km^2. The estimated mean population size of peafowls in the state was approximately 6.1 million, with a minimum estimate of 3.8 million.

Interviews were conducted with 1,136 respondents across 35 districts in Tamil Nadu. The most commonly observed meso-carnivore, as reported by respondents, was the grey mongoose (70.98%), followed by the jungle cat, jackal/fox, and small Indian civet. Crop depredation was reported by 78.70% of farmers, with the majority attributing damage to the post-harvest period (31.26%) and the entire cropping period (30.66%). Farmers noted that crop raiding by peafowls occurred daily (82.88%) and at all daylight hours (80.89%). The crops least affected by peafowl depredation included coconut, plantain, and cotton.

Farmers employed a variety of mitigation methods based on economic viability, efficiency, and durability. The most common strategies were chasing peafowls with dogs and changing crop types due to their cost-effectiveness and ease of implementation. While various scaring devices, including decoys, were tested, none proved significantly effective in deterring peafowls.

Peafowls demonstrate a high degree of adaptability to environmental changes, allowing them to thrive across diverse habitats and expand their range. This adaptability suggests that managing peafowls in agricultural landscapes will become increasingly challenging. Drawing on findings from this study and existing literature, we have proposed specific management actions and identified research directions to develop effective mitigation strategies and interventions for peafowl management.

Peafowls feeding in the cropfield

RESEARCH COMPLETED PROJECTS

SACON

DEVELOPING STATE LEVEL ACTION PLANS FOR IMPLEMENTING A VISIONARY PERSPECTIVE PLAN FOR CONSERVATION OF AVIAN DIVERSITY, THEIR ECOSYSTEMS, HABITATS AND LANDSCAPES IN THE COUNTRY – NAGALAND

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Researcher
Durgesh D. Patil

Investigator
Dr. Goldin Quadros

Date of Initiation
December 2021

Date of Completion
September 2023

Objectives : The project aimed to develop a visionary roadmap for the conservation of birds in Nagaland for the next decade, grounded in the principles of sustainability, community engagement and evidence based scientific research.

Progress : The State level Action Plan (SAP) is the primary step in the execution of the Visionary Perspective Plan. Nagaland is a biodiversity hotspot, land rich in natural resources and vibrant cultures.

The methods followed while preparing the SAP included collection, compilation and collation of secondary literature that covered the scientific, biogeographic, socio-cultural and economic aspects of Nagaland. Subsequently the priority features that required attention and were of different levels of concern were identified. These concerns were discussed with the stakeholders during the meetings and probable solutions were chalked out.

The SAP report is a compilation of the secondary literature survey and the field interactions with stakeholders and forest officials while attempting to address the threats that require immediate and sustained attention.

Outputs:

a) Habitat Conservation:Prioritizing the protection and restoration of critical bird habitats.

b) Community Involvement: Promoting sustainable livelihoods through bird conservation and raising awareness about the importance of avian biodiversity.

Outcomes:

a) Preservation of Nagaland's Avifauna:Conservation efforts that help protect bird species.

b) Ecological Balance:Protecting bird habitats contributes to maintaining the state's ecological balance.

c) Sustainable Development: Community involvement in bird conservation fosters sustainable development practices.

d) Cultural Significance:Celebrating and acknowledging the cultural importance of birds in Nagaland.

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Amur Falcon in the Doyang Valley of Nagaland

RESEARCH
COMPLETED PROJECTS

SACON

UTTARAKHAND STATE LEVEL ACTION PLAN FOR IMPLEMENTING SACON'S VISIONARY PERSPECTIVE PLAN FOR CONSERVATION OF AVIAN DIVERSITY, THEIR ECOSYSTEMS, HABITATS & LANDSCAPES IN THE COUNTRY

Funding Source
Ministry of Environment, Forest and Climate Change, Govt. of India

Investigator
Vidyadhar Atkore

Researchers
Dr Ankita Bhattacharya and Harshita Prakash

Date of Initiation
November 2022

Date of Completion
November 2023

Objectives: The objectives of the project were to (i) collate published and unpublished information on the conservation of avian diversity of Uttarakhand under each of the thematic areas as outlined in the Visionary Perspective Plan (VPP), and (ii) To develop state-level action plans for conserving birds, their habitats, ecosystems, and landscapes in Uttarakhand through widespread consultations with various stakeholders.

Progress: A comprehensive literature survey was completed. A stakeholder consultation with the staff of the Uttarakhand Forest Department and local NGOs and experts was held in the first year. Various suggestions for developing a State Level Action Plan were considered. Brainstorming over tackling the rising problem of Urbanization, the spread of invasives and plastic pollution was done.

Outputs and Outcomes: The avifauna of Uttarakhand was reported as more than 700, which is the second highest (Arunachal Pradesh has 867) in any Himalayan State of India. The report identified critical strategies for conserving threatened birds of the state. These include habitat preservation, restoration, sustainable land use and the promotion of responsible tourism.

Outputs of the project are as follows:
(a) Uttarakhand State Level Action Plan for Implementing SACON's Visionary

Perspective Plan for Conservation of Avian Diversity, their Ecosystems, Habitats & Landscapes in the Country. Salim Ali Centre for Ornithology and Natural History (SACON), South India Centre of Wildlife Institute of India, Anaikatty (Post), Coimbatore – 641108, Tamil Nadu, India. pp. 226. PR-247.

(b) Prakash H, V. Atkore, A. Bhattacharya, M. Mahendiran and D. Prakash (2022). Identifying conservation threats to birds and their habitats in the state of Uttarakhand through SACON's Visionary Perspective Plan. A poster was presented at the Bird Monitoring Symposium. 29-30 April 2022. (Online).

(c) Prakash D, M. Mahendiran, A. Bhattacharya, V. Atkore and H. Prakash (2022). Pollution or Population: A concern for Urban Avifauna of Delhi. A poster was presented at the Bird Monitoring Symposium. 29-30 April 2022. (Online).

Outcomes: A comprehensive report on the state action plan on avifauna was prepared.

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Western Tragopan

RESEARCH
COMPLETED PROJECTS

SACON

STATE-LEVEL ACTION PLAN FOR IMPLEMENTING SACON'S VISIONARY PERSPECTIVE PLAN (VPP) FOR CONSERVATION OF AVIAN DIVERSITY, THEIR ECOSYSTEMS, HABITATS & LANDSCAPES IN THE COUNTRY; DELHI- NCR

Funding Source
Ministry of Environment, Forest and Climate Change, Govt. of India

Researchers
Divya Prakash and
Dr Ankita Bhattacharya

Investigator
Dr Mahendiran Mylswamy

Date of Initiation
September 2021

Date of Completion
December 2023

Objectives: The objectives of the project were to (i) identify the conservation issues and management priorities for avifaunal diversity and the important bird habitats for the respective states; and (ii) identify specific aspects for selected bird species or habitats for immediate actions based on the VPP, and chalking out a roadmap to plan bird conservation initiatives.

Progress: A comprehensive literature survey on the birds and their habitats was completed per the guidelines for developing the state-level action Plan for Delhi-NCR. Earlier, more than three stakeholder consultations were held at different times, including online sessions with the Delhi Forest Department and local NGOs and experts in the first year. Various suggestions for developing a State Level Action Plan were considered after a thorough brainstorming session over the rising problem of urbanization and the spread of invasives and plastic pollution in the Delhi NCR. The final report and recommendations were submitted to the Funding agency and the Delhi Forest Department.

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A pair of Sarus Cranes saunter in marshy wetlands on a foggy winter evening

Outputs and Outcomes: The policy document enumerates the conservation issues and management priorities for the avifaunal diversity across the NCR Delhi covered in 14 thematic areas. It was prepared after several consultations with stakeholders, including policymakers, academicians, forest officials, local communities, NCGs, and birdwatchers.

Milestone: The plan will aid policymakers in conserving avifauna and their habitats as they align with the principles and policies enunciated in the September 2023 G20 summit in New Delhi.

RESEARCH COMPLETED PROJECTS

SACON

POPULATION STATUS, ECOLOGY, AND CONSERVATION OF THE INDIAN SWIFTLET IN THE WESTERN GHATS, WEST COAST, AND OFFSHORE ISLANDS OF MAHARASHTRA

Funding Source
Ministry of Environment, Forest and Climate Change, Govt. of India

Researcher
Dhanusha Kawalkar

Date of Initiation
January 2020

Date of Completion
March 2024

Investigators
Dr Manchi Shirish S. and
Dr Goldin Quadros

Objectives: The objectives of the project were to (i) estimate the Population and evaluate the distribution pattern of the Indian Swiftlet in the coastal districts, including the offshore islands of Maharashtra; (ii) understand the breeding ecology (breeding biology and nesting and foraging habitat) of the Indian Swiftlet in the coastal districts, including the offshore islands of Maharashtra; and (iii) identify threats and formulate the conservation plan for the Indian Swiftlet in the coastal districts, including the offshore islands of Maharashtra.

Progress: Since the project was in its last phase, along with continuing the population survey, breeding biology, foraging habitat and threat identification studies, most efforts were put into the social survey, awareness and outreach programs. Collaborating with MahaMTB and RoundGlass Sustain, multilingual documentaries were prepared and released to spread awareness among people, especially locals, about the species, its significance. The documentaries were also showcased at different forums for local people (including fishermen, students, academicians, print and digital media, farmers, and local policy/decision makers), naturalists, researchers, and others. The stakeholder meeting was successfully held in Vengurla to discuss the conservation of the Indian Swiftlet in the region. Based on the findings, the writing of the Indian Swiftlet Conservation Plan and Final Technical Report continues.

Outputs and Outcomes:

1. The threats to the species and its habitats are identified.
2. Scientific information related to the Population, distribution, breeding biology, habitat ecology, and threats to the species are added to the existing knowledge.
3. Educated people about the species, its habitat, ecological significance and the ongoing conservation efforts by disseminating work in various ways.
4. Laid the foundation of knowledge for the global conservation of species.
5. The action-oriented roadmap through the Indian Swiftlet Conservation Plan is prepared.

Milestone: The species' breeding range in Maharashtra is confined to the Vengurla Rocks Archipelago, and the foraging range is restricted to Ratnagiri and Sindhudurg. The absence of illegal trade from the Population was confirmed in Maharashtra. The scrub, dry-deciduous, and evergreen forest in the coastal Sindhudurg region is a critical foraging habitat for the Indian Swiftlet. Work is disseminated through various means to make people in the region aware of the species, its habitat, ecological significance, and ongoing conservation efforts. Initiated preparation of the Indian Swiftlet Conservation Plan for Maharashtra with a sustainable approach based on the ecological and social knowledge concerning the species.

The stakeholder's meeting was held in Vengurla to discuss the conservation of the Indian Swiftlet in the region

RESEARCH COMPLETED PROJECTS

SACON

BIRD WILDLIFE HAZARDS TO AIRCRAFTS IN SELECT INDIAN CIVIL AIRFIELDS OF AIRPORTS AUTHORITY OF INDIA- PHASE I

(Maharaja Bir Bikram Airport, Agartala, Raja Bhoj International Airport, Bhopal, Devi Ahaliya Bhai Holkar Airport, Indore, Jayprakash Narayan International Airport, Patna and Surat International Airport)

Funding Source
Airports Authority of India

Researchers
Dr PN Anoop Raj, Dr S. Jeevith, PP Ashiq, Angel Joy, Sri Sowmiya

Date of Initiation
November 2020

Investigators
Dr P. Pramod and Dr P.V Karunakaran

Date of Completion
March 2024

Objectives: The objectives of the project were to (i) study the community structure of birds and animals in the airfield and neighbouring areas and identify the prominent species involved in the conflict, (ii) evaluate the land use and land cover in the neighbourhood of the airfield (10 km radius) and the community structure of the plants in the airfield, the habitat of the birds of the area, (iii) study the factors affecting bird/animal movements and other behavioural aspects to identify the factors responsible for strikes, and (iv) develop comprehensive and integrated strategies to mitigate bird strikes at the airfield.

Grass cutting activity at Bhopal airport

Progress: Project fieldwork has been completed during the reporting period. One annual report with recommendations for actions was submitted. Two monitoring reports were also submitted. The final report is being prepared for each airport.

Outputs and Outcomes: All the airports started implementing the recommendations in the third year of the study with constant support from the SACON research team. Airport operators are officials sensitised about the seriousness of wildlife hazard management. The concerned authorities give priority to waste management around the airport.

Milestone: The project has been completed. The final dissemination workshop is planned for August 2024.

RESEARCH COMPLETED PROJECTS

SACON

AVIFAUNA STUDY FOR THE PROPOSED REPLACEMENT TRANSMISSION LINES OF 110 KV KHOPOLI-MANKHURD AND KHOPOLI-CHEMBUR WITH REFERENCE TO THE THANE CREEK FLAMINGO SANCTUARY TO SUGGEST APPROPRIATE BIRD DIVERTERS

Funding Source
Tata Power, Mumbai

Researcher
Baburao, G.

Date of Initiation
March 2023

Investigators
Dr Arun P.R. and Dr Babu S.

Date of Completion
September 2023

Objectives: Salim Ali Centre for Ornithology and Natural History (SACON) conducted the study with the following objectives: (i) Document the baseline data on avifauna along the route of the proposed transmission lines, and (ii) Suggest appropriate bird diverters for the transmission lines and towers.

Progress: Bird monitoring was conducted in and around the Thane and Panvel Creeks from March 2023 to September 2023. Total count and vantage point count methods were employed to assess bird abundance and flight activity, while carcass searches were carried out using a mechanized boat to examine both sides of the transmission lines within the creek area. Additionally, questionnaire surveys were conducted to gather secondary information on bird collisions with power lines. A comprehensive list of bird species was compiled using data from published and online sources. Among the recorded species, Passeriformes and Charadriiformes exhibited the highest diversity, followed by Accipitriformes and Pelecaniformes.

The most abundant species observed during the study included Lesser Flamingos, Lesser Sand Plover, Greater Flamingo, Brown-headed Gull, and Indian Cormorants. Maximum flight activity was recorded for the House Crow and Black Kite. Notably, bird flight activity in the risk zone was lower, suggesting that some species may have adapted to the presence of long-established power lines. No bird mortality was observed during the carcass surveys.

The transmission lines crossing the Thane creek

Outputs and Outcomes: The flight activity of birds in different zones at power lines indicates their susceptibility to collisions. We did not observe any bird species directly hitting power lines during the study. However, some species, such as Whiskered Tern, Brown-headed Gull, Flamingos and Painted Stork, were seen flying in the risk zone, suggesting possible collision with power lines. Thane Creek is highly dynamic and influenced by tides. Though our intensive carcass surveys failed to record dead birds around the power lines during the short-term study, interviews with local fishermen in the area confirm that there is a frequent collision of flamingos with power lines in certain seasons and weather conditions, indicating the need for management actions to protect the birds.

Avian collisions with power lines are subjected to multiple factors, and line marking with a single type of device will not solve the problem. Hence, we recommended installing two types of diverters, viz., spiral-SWAN-FLIGHTTM diverter in combination with either Reflective Rotamarka 3D diverter or reflective FireFly diverter. The reflective diverters are expected to work most efficiently to reduce avian collisions during low-light conditions in the area.

Milestone: The project was completed, and the final report with recommendations for appropriate bird diverters to minimise collision risk for birds was submitted to the funding agency for implementation.

RESEARCH ONGOING

WII

AN INTEGRATED APPROACH FOR CONSERVATION OF MISHMI TAKIN, *BUDORCAS TAXICOLOR TAXICOLOR* IN NORTH-EAST INDIA: LINKING SPECIES ECOLOGY WITH TRADITIONAL ECOLOGICAL KNOWLEDGE

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Investigators
Dr. Gopi G.V., Dr Parag Nigam, Dr Bilal Habib and Dr S. Sathyakumar

Researchers
Gaurav PJ and Sirumai Khusiali Kri

Date of Initiation
July 2019

Proposed Date of Completion
May 2024

Objectives: The project has the following objectives (i) Assessment of Distribution status and Occupancy of Mishmi Takin in Arunachal Pradesh; (ii) To forecast potential changes in its distribution under plausible climate change projections using an ensemble species distribution modelling approach to relate the occurrence records of Takin to environmental conditions; (iii) To understand the local and transboundary movement pattern of Mishmi Takin in the landscape; and (iv) Identify threats/ local Attitudes, including evaluation of traditional ecological on Mishmi Takin

Progress: Data collection for objectives I and II involved camera traps, sign surveys, and literature reviews, helping predict Mishmi Takin distribution and habitat suitability. Ensemble modelling showcased climate change impacts, predicting substantial habitat loss under high emissions scenarios. For objective IV, we have conducted Key informative surveys to document traditional ecological knowledge on Takin ecology and cultural significance. The foraging behaviour of Takin was investigated through interviews with residents, documenting traditional Ecological knowledge. Despite these, we have attempted and faced challenges in collaring Takin due to terrain ruggedness, habitat remoteness, limited resources, and species sensitivity, leading to failed attempts during three expeditions under Objective III.

Outputs and Outcomes: This project attempted to integrate traditional ecological knowledge with scientific research to understand the ecology and habitat use of Mishmi Takin. With this, we were able to identify six congregation sites and gained insights into the Mishmi Takin's ecology, behaviour, activity patterns, hearing structure, and preferred plant species.

The extensive surveys have not only shown crucial insights into Mishmi Takin's ecology but also provided information on habitat suitability and climate change's impacts on the species. For Objectives I and II, primary field surveys and literature reviews identified Mishmi Takin's presence. These presence locations were used to model species distribution with Maxent, revealing 24,697 sq. km as potential habitat for Mishmi Takin further we are also able to understand the habitat losses of 15.6% and 40.4%, respectively, under different climate change projections at RCP2.6 and RCP8.5, With overall range changes of -6.1% and -38.1%. The project's findings indicate that approximately 24,000 sq. km of suitable habitat exists for Mishmi Takin in India, demonstrating how climate variations affect habitat and distribution patterns within the species' range.

Key informative surveys documented Traditional Ecological Knowledge (TEK) on Takin behaviour and cultural significance along with this our expedition surveys led to the identification of six congregation sites and provided comprehensive insights into Mishmi Takin's ecology, behaviour, activity patterns, herd structure, and preferred plant species Despite these, Objective III faced challenges in collaring Takin due to rugged terrain and limited resources, resulting in unsuccessful attempts during expeditions. These difficulties highlight the logistical constraints in conducting research in remote areas. The initiative aimed to conserve Mishmi Takin while respecting its cultural significance in Arunachal Pradesh and emphasizes the importance of collaboration between scientific and traditional perspectives for effective conservation efforts.

Milestone: This report summarized an overview of the project's milestones from each objective. Our Species distribution modelling utilizing data from 184 presence locations identified 24,697 sq. km of potential habitat for Mishmi Takin. These findings are crucial for conservation planning, as they delineate areas of high importance for habitat preservation and species protection. Climate

change projections indicated that Mishmi Takin's habitat could be substantially reduced, emphasizing the species' vulnerability to environmental changes further showed habitat losses under Ensemble modelling for climate change impacts revealed significant habitat loss under emissions scenarios RCP2.6 and RCP8.5.

The project highlighted the importance of incorporating TEK, and scientific knowledge, for the effective conservation of the species.

RESEARCH ONGOING

WII

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITAT PROGRAM (IDWH), MALABAR CIVET

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Researcher
Saeed Anvar Ali M V

Date of Initiation
February 2023

Proposed Date of Completion
December 2024

Investigators
Dr Vishnupriya Kolipakam and Dr Samrat Mondal

Objectives: The project has the following objectives (i) Analyse the severely endangered Malabar civet species current status; (ii) Identifying potential field sites for long term ecological study of Malabar civets; and (iii) Develop protocols for long-term population and habitat monitoring.

Progress: This year, the process of identifying the Malabar Civet in the Western Ghats region was initiated. The putative skins of the Malabar Civet in various Indian institutes were discovered. The permission letters to four institutes to collect samples were sent. The Zoological Survey of India (ZSI) in Calicut and the Bombay Natural History Society (BNHS) permitted to collect samples. The University of Calicut permitted us to investigate the putative skin samples of the Malabar Civet but denied permission to collect them. The samples were collected from ZSI, Calicut, and subsequently the University of Calicut was visited to check and investigate the samples.

Outputs and Outcomes: Field work data from All India Tiger estimation, in potential distribution areas of Malabar civet yielded no positive images from camera trapping. The museum specimens require genetic analysis to determine if they belong to the Malabar Civet, and to confirm their distinctiveness from other Viverrid species is on-going.

Milestone: Current field work data showcases the lack of presence of this species in wild currently. The on-going genetic analysis work will provide a clearer understanding of the status of this species.

RESEARCH ONGOING

WII

ECOLOGY AND CONSERVATION PERSPECTIVES OF FISHING CAT, *PRIONAILURUS VIVERRINUS* IN EGREE, ANDHRA PRADESH

Funding Source
East Godavari River Estuarine Ecosystem (EGREE)

Researcher
Kunal Gokhale

Date of Initiation
June 2021

Proposed Date of Completion
January 2026

Investigator
Dr Bilal Habib

Objectives: The objectives of the project are to (i) estimate the population density of Fishing cats and relative abundance of other mammalian species in Coringa Wildlife Sanctuary, Andhra Pradesh; (ii) study the Space use, home range and activity patterns of Fishing cats using Radio-telemetry; and (iii) understand resource utilisation by understanding feeding patterns of Fishing cats.

Progress: In the initial phase, Reconnaissance survey was done in the Coringa Wildlife sanctuary to understand the ecological challenges related to tidal conditions and accessibility in the deltas of Tulyhaga, Coringa and Gaderu rivers. Systematic Grid based (1×1 sq.km) camera trapping was carried out inside the sanctuary. At each station, 2 CuddebackTM C1 infrared trail cameras were tied to suitable trees at a height of 30-45 cm above the ground depending on the likelihood of tidewater inundation. Camera traps were set to record photos both during the day and night.

The Camera trap data will be used to estimate the population density of Fishing cats after the retrieval of camera traps. Travel to all camera trap stations was carried out by boat. Locations of camera traps are selected based on the vegetation characteristics facilitating the installation of camera traps and the presence of signs of the fishing cat. Process of Scat sampling is undergoing for the dietary analysis. Customized iron Cage traps are constructed for capturing and collaring Fishing cats. Questionnaire survey with local Fish farmers is under process to understand the conflict of Fishing cats with Fish farmers.

Outputs and Outcomes: The study throws light upon the species community structure inside mangrove habitats.

Images of 6 species of mammals were obtained during the camera trapping programme. These were the Fishing cat, *Prionailurus viverrinus*, Golden jackal, *Canis aureus*, Indian gray mongoose, *Herpestes edwardsii*, *Rhesus macaque, Macaca mulatta,* Smooth coated otter, *Lutrogale perspicillata* and the domestic water buffalo, *Bubalus bubalis*. Birds were commonly camera trapped, owing to the placement of most trap locations alongside mangrove creeks and mudflats. The bird species most commonly camera trapped were the Whimbrel, White-breasted waterhen, various species of egrets and the Greater coucal. Questionnaire survey is revealing that there is only negligible amount of conflict of Fishing cat with Fish farmers since Fishing cats are not causing any loss to the farmers. In coming months our study will emphasize on understanding feeding patterns of Fishing cats. Also, we are aiming to study their space use and home ranges by the use of radio telemetry.

RESEARCH ONGOING

INTEGRATED WILDLIFE ACTION PLAN COMPRISING OF MITIGATION AND COMPENSATING MEASURES WITH A LANDSCAPE APPROACH FOR THE ENTIRE FOREST AREA IN HAZARIBAGH WILDLIFE DIVISION, HAZARIBAGH WEST FOREST DIVISION AND KODERMA FOREST DIVISION IN THE IMPACT ZONE OF KODERMA DETOUR

Funding Source
Dedicated Freight Corridor of India Limited (DFCCIL)

Investigators
Dr G.V Gopi, Dr J. A. Johnson, Dr Abhijit Das, Dr Navendu Page and Dr Lallianpuii Kawlni

Researchers
Dipak Anand, Rohit R.S. Jha, Priyanka Das, Er. P. Manikandan, Avinash Yadav, Arun K. Rath, Ajit Sahu, Swastik Pritam, Abhin N., Chirag Vassa, Abhishek K. Singh, Akash Sai and Suvam Kanungo

Date of Initiation
March 2022

Proposed Date of Completion
May 2024

WII

Objectives: *The project has the following objectives:* (i) Conducting a comprehensive assessment of wildlife, encompassing both floral and faunal components, along the proposed railway track and throughout the entire Immediate Impact Zone (IIZ); (ii) Socio-economic assessment of the villages, situated in the IIZ; (iii) Identification and delineation of hot spot area along the proposed railway corridor, based on species distribution and assemblage; (iv) Planning appropriate mitigation measures to ensure the safe passage of animals and promote long-term sustainability in the protected area; and (v) Formulation of a comprehensive management plan for the Immediate Impact Zone (IIZ) that considers ecological, geographical, and social factors.

Outputs and Outcomes: A comprehensive study was conducted within a 596.70 sq.km area known as the Immediate Impact Zone, encompassing all three Forest Divisions, to assess the biodiversity values of the protected area. The study revealed the presence of diverse wildlife, including 28 mammalian species, 143 avian species, ten amphibian species, and 23 reptile species. Furthermore, it identified 81 tree species, 24 shrub species, 16 herb species, and 13 grass species, representing various families. Additionally, a socioeconomic study surveyed 601 families across 48 villages within the Immediate Impact Zone. Surveys were conducted on both sides of the alignment to evaluate the potential impact of a proposed railway alignment on adjacent biodiversity. These surveys revealed the presence of 18 mammalian species, 121 avian species, six amphibian species, 11 reptile species, and 69 tree species. Hot spots along the proposed alignment (36.32 km) were identified. Subsequently, a total of 331 mitigation structures were proposed, comprising RCC box culverts (15 Nos.), animal underpasses (23 Nos.), animal overpasses with light and sound barriers (25 Nos.), viaducts (234 Nos.), cut-and-cover tunnels (4 Nos.), significant bridges (2 Nos.), minor bridges (22 Nos.), and RUB (6 Nos.). These mitigation structures are designed to ensure species' contiguity and unrestricted movement across the landscape. This study also delineated the fire, soil, and moisture conservation zones from the management perspective.

Milestone: In a pioneering move for this landscape, a camera trapping exercise was implemented to gauge the population of wild animals, yielding notable results. For the first time, the elusive Rusty Spotted Cat and the Indian Grey Wolf were captured on camera within the study area. Furthermore, an exhaustive sign survey in the area unveiled the presence of certain amphibian species, marking the first documented records of their occurrence in the region.

RESEARCH ONGOING

NICHE SELECTION AND MESOPREDATOR RELEASE IN HIGH ALTITUDE ECOSYSTEMS

Funding Source
Science and Engineering Research Board (SERB), Department of Science Technology (DST)

Researcher
Priyanka Justa

Date of Initiation
February 2021

Proposed Date of Completion
May 2024

WII

Investigator
Dr Salvador Lyngdoh

Objectives: The project's objectives are (i) to determine resource utilization by high-altitude carnivores; (ii) resource use of snow leopards, Himalayan wolves, foxes and free-ranging dogs in the trans-Himalayan region, and (iii) to investigate levels of overlap and influence by high altitude carnivores in terms of mesopredator release or suppression, (a) how do interactions amongst intra-guild predators influence top-down effects in terms of mesopredator relative abundance and distribution? And (b) how do bottom-up processes such as resource availability influence mesopredator release among the carnivore guild?

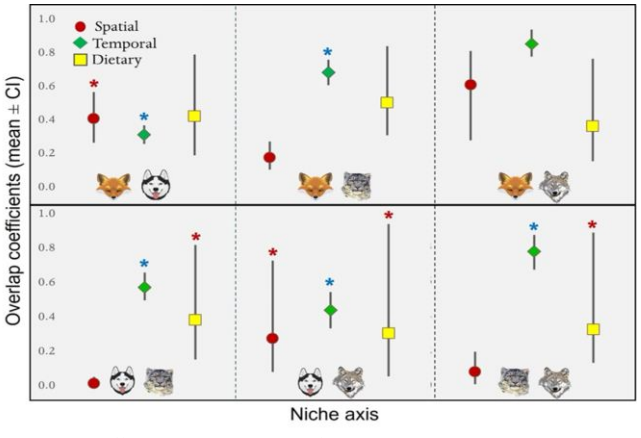
Progress: The data was analyzed from 205 camera traps placed across five study sites in two sessions to study carnivore spatio-temporal interactions. In Session I, 113 cameras, 15 in Chandratal, 39 in Kibber, 43 in Pin Valley, and 16 in Mane and Session II, 92 cameras, 49 in Kibber, 21 in Mane, and 22 in Gue, were deployed. The data was used to find multi-species occupancy, spatio-temporal overlap, and red fox density estimates.

The carnivores' scat samples were collected during trail transects and opportunistically to study food habits and dietary overlap while deploying camera traps from August 2021 to December 2023. A total of 1,065 carnivore scats were collected and analyzed for this study, including 279 for dogs, 583 for red foxes, 159 for snow leopards and 44 for Himalayan wolves.

The data was collected and analyzed for dog population estimation using the polygon search method in the villages falling in our intensive study sites. Three red foxes were collared in Mane village of Spiti Valley. Project Closure Report was submitted to DST-SERB.

Outputs and Outcomes: The study highlights the need to integrate human activities and associated species into carnivore ecology research in human-altered landscapes. It emphasizes the importance of considering spatial, temporal, and dietary niche axes to understand carnivore community dynamics.

Positive spatial associations were found between red fox occupancy and other predators, indicating potential mesopredator facilitation due to their opportunistic behaviour. Additionally, dogs' associations with snow leopards and wolves raise concerns about disease transmission and hybridization risks for Himalayan wolves.



Overlap coefficients (mean ± CI) of spatial, temporal and dietary niche overlaps between carnivores in Spiti Valley, H.P., India. The red asterisk shows significant positive spatial association and significant diet overlaps, while the blue asterisk shows significant dissimilarity between their temporal activity pattern (significance: p-value < 0.05).

The high dietary overlap among carnivores, primarily due to reliance on domestic animals, implies competition for limited resources. The carnivores partition their niche along different space, time and diet axes to reduce this overlap. Effective livestock and habitat management, while maintaining a healthy prey base, is essential to minimise conflicts and support the coexistence of high-altitude carnivores.

A notable increase in dog populations across sampled villages intensifies competition and poses threats to native carnivores. Red fox density estimates established a baseline and can be useful for monitoring changes in fox abundance in the future. Telemetry data from the collared red fox revealed a smaller home range near human settlements, indicating reliance on anthropogenic subsidies. Utilizing relative abundance indices, the negative correlations between top predators and mesopredators indicated top-down suppression. For instance, in Kibber, there was a high abundance of snow leopards and a low abundance of red foxes.

Juno: First GPS-Collared Female in Mane Village, Spiti Valley, Himachal Pradesh

Milestone: Extensive data has been collected on three key niche dimensions, *i.e.*, diet, space, and time—simultaneously for the four predators in Spiti Valley. The study fills data gaps in directed research on the effects of an introduced predator, i.e., dogs on sympatric carnivores. This is the first study in Spiti to collar red foxes.

RESEARCH ONGOING

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITATS SCHEME OF MOEFCC – *CARACAL, CARACAL CARACAL*

WII

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Investigators
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Dr Vishnupriya Kolipakam

Researchers
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Christina Grace T,
Shriya Auradkar,
Gausiya Kelawala, Srishti Joshi and Sourav Das

Date of Initiation
January 2023

Proposed Date of Completion
December 2024

Objectives: The objectives of the project are to (i) assess the population status of Caracals in the potential Caracal habitats in Rajasthan; and (ii) develop a long-term monitoring protocol for populations and habitats of Caracal.

Progress: An extensive literature review was conducted to understand the biology and distribution of Caracals in India. For the study of the status and distribution of Caracals in Rajasthan, sign surveys and systematic camera trapping were decided upon for potential Caracal habitats within the Ranthambore Tiger Reserve, Rajasthan. The study area was divided into 4 km^2 grids, and a systematic survey of 3-4 km within each grid using the M-STrIPES polygon search application was planned.

Based on the information derived from camera trap captures of the All-India Tiger Estimation 2018 & 2022, intensive study areas were chosen for Ranthambore Tiger Reserve Division-I. Subsequently, an initial survey was conducted in the intensive study areas of Ranthambhore TR Division-I in June-July 2023, which was further expanded into thorough systematic sampling during October-December 2023 in RTR Division-I and during January-March 2024 in RTR Division-II.

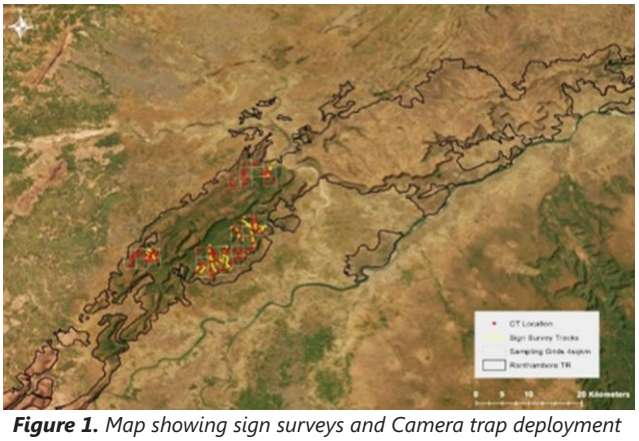


Figure 1. *Map showing sign surveys and Camera trap deployment carried out in Ranthambore Tiger Reserve Division -I during June-July 2023.*

During the June-July 2023 fieldwork in RTR Division I, 69 camera traps were deployed, and 14 trails (approximately 30 km) were covered (Fig 1), resulting in the collection of a total of 18 potential Caracal/small cat scats (since Caracal scats cannot be visually distinguished from those of other small cat species). From October 2023 to March 2024, 92 camera traps were deployed in RTR Division I and II. In RTR Division I, 72 trails (approximately 228 km) were covered, collecting 122 potential scat samples, while in RTR Division II, 93 trails (approximately 351 km) were covered, resulting in the collection of 456 potential scat samples (Fig 2).

The camera trap images were geotagged, coded, and segregated to individual species folders. The collected scats underwent Genomic DNA extractions using the GUSCN-based wash method, followed by PCR amplification using the 218 bp mammalian Cyt-b mitochondrial marker (CytBBF & H15149) and finally, Sanger sequencing for species identification.

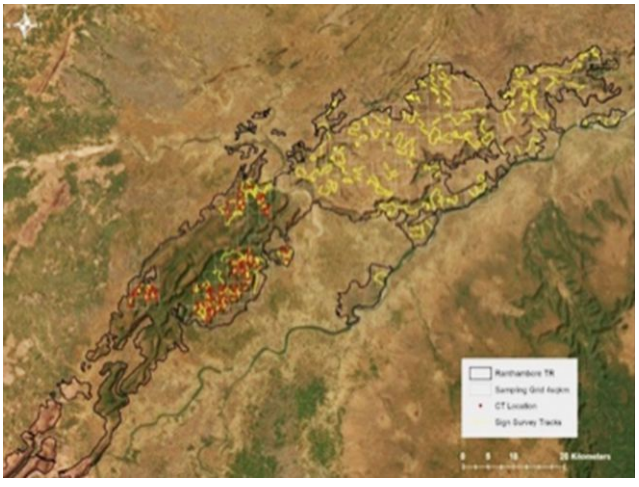
Outputs and Outcomes: During the June-July 2023 fieldwork, 37,241 images (1,186 trap nights) were captured, including 6,819 blanks. Although no caracals were photo-captured, 23 other species were recorded, with 47 images of small cats (jungle cat and rusty-spotted cat). The camera trap data of the October 2023-March 2024 fieldwork is currently undergoing the data segregation process. However, preliminary data analysis has revealed 10 captures of caracals from the study area.

Among the 18 samples collected during June-July 2023, 6 species were identified by Sanger sequencing. Notably, one sample was identified as Caracal, Caracal caracal, while the other species identified were the Golden jackal, Canis aureus, Ruddy mongoose, Herpestes smithii, and the

Indian crested porcupine, Hystrix indica. DNA extractions of 578 samples of October 2023-March 2024 sessin have been completed, PCR amplification of 252 samples. A preliminary batch of 48 samples has been sequenced, resulting in the identification of 24 samples. These include the Rusty-spotted cat, *Prionailurus rubiginosus*, Golden jackal, *Canis aureus*, Indian wolf, *Canis lupus pallipes*, Striped hyena, *Hyaena hyaena*, Ruddy mongoose, *Herpestes smithii*, Indian grey mongoose, *Urva edwardsii*, Fox, *Vulpes vulpes*, and Nilgai, *Boselaphus tragocamelus*.

For the remaining samples, subsequent PCR amplification and species identification through Sanger sequencing, as well as individual identification by genotyping, will be carried out.

Milestone: The findings obtained so far from the study confirm the presence of Caracals within the study area. Valuable insights into the habitat preferences of the species were also derived.



Map showing sign surveys and Camera trap deployment carried out in Ranthambore Tiger Reserve Division -I & Division -II during October 2023 - March 2024.

RESEARCH ONGOING

WII

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITATS SCHEME OF MOEFCC – *BATAGUR BASKA* (NORTHERN RIVER TERRAPIN)

Funding Source
Ministry of Environment, Forest & Climate Change, Government of India

Investigators
Dr Abhijit Das & Dr Samrat Mondol

Researchers
Amirtha Balan R, Swati Nawani and Asim Bashir

Date of Initiation
December 2022

Proposed Date of Completion
June 2024

Objectives: The project has the following objectives: (i) Access the current status of Critically endangered Batagur baska; (ii) Develop a long-term monitoring protocol for the population and their habitat; and (iii) Establishment of molecular detection method for *Batagur baska* in Sundarbans using eDNA.

Progress: The project was designed to assess the current status of *Batagur baska* in the wild using systematic modern methods. The project comprises three steps: In step I, a visual encounter survey was carried out in Sundarbans Tiger Reserve (STR) in West Bengal from 28 Jan 2023 to 26 Feb 2023. In step II, a questionnaire survey was carried out among the seven villages buffering the STR. Water samples were collected from different ponds for eDNA analysis from 5 June 2023 to 30 August 2023. In step III, biological samples were collected from the captive individuals of STR to understand the population genetics.

Outputs and Outcomes: A 2,625 km boat survey yielded no direct evidence of *Batagur baska* from our boat-based visual encounter survey. The sea-facing beaches of Sundarban Tiger Reserve also did not show any direct evidence of tracks, crawling marks or nesting spots. Three of five sea-facing beaches suit turtles (Chaimari, Bagmara, Gurangati) inside the STR. The questionnaire survey revealed that less than 1% of respondents were aware of *Batagur baska* in the wild, out of the 422 people interviewed. Species distribution modelling revealed more suitable habitats inside STR and Bhitarkanika in Odisha.

Observations from captive individuals showed symptoms of bronchitis and metabolic bone diseases, suggesting health challenges possibly linked to a lack of basking sites and captivity conditions. The whole mitochondrial DNA analysis highlighted low genetic variation within the species, potentially increasing susceptibility to inbreeding depression.

Milestone: This study is the first systematic survey conducted to assess the current population of *Batagur baska* in the wild. From the current study, *Batagur baska* will aid future research in movement ecology, nesting beach sampling, and the health of captive individuals. The study has generated the first-ever whole mitochondrial DNA of B. baska, which can be used to emphasize the importance of maintaining genetic diversity in captive breeding programs and potential future reintroduction efforts. The health issues (bronchitis, metabolic bone disease) were identified in captive *Batagur baska* populations, highlighting the need for improved captive care practices and potential reintroduction challenges.

RESEARCH ONGOING

HABITAT IMPROVEMENT AND CONSERVATION BREEDING OF GREAT INDIAN BUSTARD

Funding Source
National CAMPA and Ministry of Environment, Forest & Climate Change, Government of India

Investigators
Dr Sutirtha Dutta, Shri Qamar Qureshi, Dr Vishnupriya Kolipakam and Dr Lallianpui Kawlni

Researchers
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Date of Initiation
April 2016

Proposed Date of Completion
June 2024

WII

Objectives: The project has the following objectives (i) Conservation Breeding: Securing ex-situ populations of GIB and LF; (ii) Applied Research: Prioritising conservation areas, characterizing threats, monitoring populations and habitats, understanding livelihood issues and population genetics; (iii) Capacity Building, Awareness, and Advocacy: Enhancing protection measures, sensitising stakeholders and decision-makers, raising public awareness, and promoting bustard-friendly land uses; and (iv) Pilot Habitat Management: Demonstrating effective interventions for habitat restoration and management, replicable by range State Forest Departments and conservation agencies.

Progress: Conservation breeding of Great Indian Bustard and Lesser Florican: (i) Routine conservation breeding activities in fully functional & operational facilities at Sam & Ramdevra (Jaisalmer) for GIB and a temporary facility at Bijainagar (Ajmer) for LF; (ii) Successful captive breeding of GIB with the rearing of 2 chicks from captive-laid eggs and an additional 7 chicks from wild-laid eggs; (iii) Construction

of Arwar facility (Ajmer) and Sorsan facility (Baran) construction is ongoing.

Applied Research: (i) Regular seasonal GIB population surveys in Western Thar (2022-ongoing). (ii) Telemetry of GIB (6 functional tags) and LF (2 functional tags) in Rajasthan. (iii) Demographic monitoring of wild GIB population in Jaisalmer. (iv) Habitat and arthropod population assessments in GIB habitats. (v) Genetic analysis and finalisation of markers.

Capacity Building & Outreach: (i) Nature education programs in schools and conservation outreach in villages of Jaisalmer and Ajmer. (ii) Development of video-documentary of GIB and Project activities through technical agency. (iii) Wildlife day and week celebrations; Desert Festival; wall paintings; interactions with dignitaries in Conservation Breeding Centers. (iv) Meeting and conferences including exhibition of project activities to global delegates at UNFF country-led initiative.

Pilot Habitat Management: (i) Translocation of nest predators from GIB breeding habitats; (ii) Powerline mortality surveys and diverter effectiveness experiments.

Outputs and Outcomes: Conservation breeding of Great Indian Bustard and Lesser Florican: (i) Establishment of conservation breeding facilities in Sam, Ramdevra and Bijainagar. (ii) Founder populations of GIB and LF partially secured. (iii) Current number of captive birds are 29 (>1 year age) GIB and 10 LF.

Applied Research: (i) Information obtained on population status of GIB and LF. Estimated GIB population in DNP is 37 (SE 14) birds. (ii) Better understanding on movement ecology of GIB and LF through telemetry. (iii) Gained information on bustard demographics and habitat preferences and use. (iv) Prioritisation of threats and assessments of their impacts on GIB.

Capacity Building & Outreach: (i) Disseminating knowledge of bustard population assessments among forest frontline staff. (ii) Technical understanding of power line mitigation measures among concerned stakeholders. (iii) Awareness among school children and local people on GIB, LF and ongoing conservation efforts.

Pilot Habitat Management: (i) The Project research and advocacy influenced the ongoing power line mitigation by concerned agencies in GIB habitats that will reduce adult mortality once the powerline threat is effectively mitigated. (ii) Ongoing efforts of predator control & jump-start strategy in breeding areas showed potential in improving in-situ recruitment. (iii) The Project successfully translocated 38 predators, including fox, mongoose, monitor lizards from key GIB breeding enclosures. Some were tagged for monitoring post-release movement. (iv) About 30 free-ranging dogs were also translocated from key GIB breeding enclosures.

Milestone: Commencement of captive breeding of GIB through natural mating. Successful transfers of GIB chicks from Sam to Ramdevra centers. Migration route of Lesser Florican revealed. Successful translocation of GIB nest predators from key breeding enclosures, to boost in-situ recruitment. Successful execution of pilot jump-start strategy to improve in-situ recruitment.

RESEARCH ONGOING

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITATS SCHEME OF MOEFCC –NILGIRI TAHR

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Researchers
Joel Correa and B.K. Aravindan

Date of Initiation
December 2023

Proposed Date of Completion
July 2024

Investigator
Dr S. Sathyakumar

WII

Objectives: The goal of this study is to assess the population status of the endangered Nilgiri tahr in Tamil Nadu and Kerala. Additionally, the study aims to develop long-term monitoring protocols for accurate population estimation and habitat assessment. By implementing these protocols, the study seeks to ensure the effective conservation and long-term management of Nilgiri tahr populations and their habitats.

Progress: The project was designed to estimate the population of Nilgiri tahr in Tamil Nadu and Kerala. It aims to address the issues of the bounded count method and standardize the methodology by implementing the double observer method in larger continuous landscapes and isolated patches of tahr habitats. Additionally, the project explores alternative methods, such as camera trap-based distance sampling for population estimation in larger landscapes.

A synchronized survey was conducted for population estimation of Nilgiri tahr in Tamil Nadu and Kerala.

Outputs and Outcomes: In Kerala, Camera Trap-Based Distance Sampling (CTDS) was implemented by deploying 20 camera traps in Eravikulam National Park (ENP). The Nilgiri tahr was photo-captured by 6 out of the 20 camera traps, resulting in 247 photos and videos recorded. The estimated Nilgiri tahr population in ENP is 6.58 SE ± 3.94 individuals/km^2 (CV = 0.37). In Tamil Nadu, we conducted the study in Grass Hills National Park (GHNP), where we deployed 12 camera traps. Of these, 4 captured Nilgiri tahr, resulting in 194 photos and videos. Additionally, in Mukurthi National Park (MNP), we deployed 5 camera traps, and 3 of them captured Nilgiri tahr, resulting in 15 photos and videos.

This study represents a significant effort in estimating the Nilgiri tahr population across Kerala and Tamil Nadu. It is the first ever synchronized survey conducted between these two states. The baseline estimates obtained will be valuable for future research, monitoring the population trends, conservation efforts, and management strategies for the Nilgiri tahr.

RESEARCH ONGOING

ECOLOGY AND CONSERVATION OF MAJOR CARNIVORES & UNGULATES OF SEMI-ARID GRASSLAND-SCRUB-AGRO-SYSTEMS OF KARNATAKA

Funding Source
Karnataka Forest Department

Researchers
Dr Manjari Roy, Basavaraj Mulage, Chethan CM and Meghana Srivathsa

Date of Initiation
December 2020

Investigators
Shri Qamar Qureshi, Dr Vishnupriya Kolipakam and Dr Lallianpuii Kawlni

Proposed Date of Completion
December 2024

WII

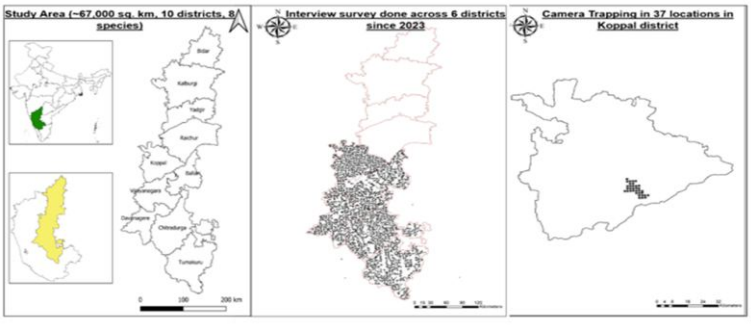
Objectives: The objectives of the project are to (i) develop a monitoring System with modern technology to assist effective patrolling, assess ecological status and mitigate human-wildlife conflict in semi-arid grassland-scrub-agro-systems of Karnataka; (ii) determine the status and distribution of major fauna of semi-arid grassland-scrub-agro-systems of Karnataka; (iii) determine the home range, dispersal, denning behaviour and feeding ecology of the major carnivores & ungulates of semi-arid grassland-scrub-agro-systems of Karnataka at select study site(s); (iv) determine the prevalence of certain infectious diseases in major carnivores at select study sites and compare the circulating strains/lineages of these pathogens to understand the transmission pathways; and (v) build capacity of forest staff in species identification and monitoring, modern tools and technology (MSTrIPES, Telemetry) and capture & restraint.

Progress: Data was collected from an interview-based occupancy survey to determine species distribution in the districts of Koppal, Bellari, Vijayanagara, Davangere, Chitradurga, and Tumkur, Karnataka. Camera trapping in selected blocks of Koppal for abundance estimation of various species completed. New project fellows were recruited to continue the fieldwork further.

Outputs and Outcomes: The interview-based occupancy survey allowed us to determine individual species, viz. wolf, leopard, hyena, sloth bear, fox, jackal and blackbuck occupancies and distributions across the aforementioned districts. The map of the extent of interview surveys, along with the camera trapping location, is shown in image:

Interview-based sampling data is currently being analysed in a single-season occupancy framework. Analysis of the camera trap data is ongoing.

Milestone: 34,000 sq km of the study area (approx. 67,000 sq km) has been covered using an interview-based occupancy survey to understand the distribution of the study species.



Extent of interview surveys and camera trapping in the study area

RESEARCH ONGOING

WII

CONSERVATION ECOLOGY OF THE RETICULATED PYTHON *MALAYOPYTHON RETICULATUS* (SCHNEIDER 1801) IN THE NICOBAR ARCHIPELAGO

Funding Source
DST-SERB CRG/2021/005095

Investigators
Dr Ramesh Chinnasamy, Dr Nehru Prabakaran and Dr Sandeep Kumar Gupta

Researchers
Dhanesh P, Jyoti Nagarkoti, Tannu and Kodeeswaran V.

Date of Initiation
January 2022

Proposed Date of Completion
January 2025

Objectives: The objectives of the project are to (i) study the distribution and population ecology of pythons across the Nicobar archipelago; (ii) generate information on pythons occupied in various forest types, microhabitats and trophic ecology in the Nicobar archipelago; (iii) generate molecular genetic data for its phylogeography, phylogenetics, and population genetics inferences; and (iv) document information on Human-python conflict and people perception towards snakes and outline potential conservation strategies to the pythons.

Progress: The sampling of the area is done through grid survey in which 1x1 grids were sampled in day and night in Car Nicobar Island and Bompoka Islands, while 3x3 grids were sampled in Tarassa island. These surveys were carried out to understand the population status and distribution of the pythons. Moreover, instances of the python presence from the past encounter has also been documented. Awareness programs have also been conducted in schools of Car Nicobar in collaboration with Andaman and Nicobar Forest Department (ANFD) on the topic "Knowing our Neighbors: Understanding and Appreciating snakes" to sensitize the school children about the snakes and snake bites.

Outputs and Outcomes: Genetic samples were collected from three different islands in the North and Central Group of the Nicobar Islands, specifically Car Nicobar, Kamorta, and Katchal. These samples were obtained from two

primary sources: roadkill and conflict sites where pythons were killed in retaliation by local residents. Roadkill samples were gathered through random surveys conducted on roads, while additional samples were acquired from residents who provided information about conflicts with pythons. This collection process highlights the interaction between local communities and wildlife, offering valuable genetic data for further study.

An intensive survey was conducted on the island of Car Nicobar, utilizing a grid system of 145 (1x1 km^2) grids to ensure comprehensive coverage. During this survey, a total of eight reticulated pythons were found. Most of these discoveries were either opportunistic or based on information provided by local informants, with only one exception. The survey's sole live find was a juvenile python, discovered at night within one of the grids.

RESEARCH ONGOING

WII

DEVELOPMENT OF LANDSCAPE MANAGEMENT PLAN AND MONITORING WITH REFERENCE TO KEN–BETWA RIVER LINK PROJECT IN PANNA TIGER RESERVE (PTR), MADHYA PRADESH

Funding Source
National Water Development Agency (NWDA)

Investigators
Dr K Ramesh and Dr JA Johnson

Researchers
Dr Sankarshan Chaudhuri, Supratim Dutta, Dibyendu Biswas, Kamna Pokhariya, Vandana Tomar, Rahul Gandhi, Priyanka Kumari and Ashish Kumar

Date of Initiation
April 2018

Proposed Date of Completion
March 2025

Objectives: The objectives of the project are to (i) enable the betterment of habitat, protection, and management for flagship species viz. tigers, vultures, and gharials in the landscape; (ii) consolidate the landscape for overall biodiversity conservation through spatial prioritization and the well-being of forest-dependent communities; and (iii) provide species-specific and site-specific monitoring strategies under the integrated landscape management context with a feedback loop and adaptive management options.

Progress: During the period, field data collection, analyses, and writing were completed for the plan. The density estimation of co-predators, such as leopards and hyenas, was carried out from the 2018-2021 camera trap data of PTR. The occupancy estimation of three large carnivores, *i.e.*, tiger, leopard, and striped hyena, was carried out in a multi-season framework. In addition, the density of mesocarnivores (five species) and their space use patterns were carried out from the camera trap data, as mentioned before, using spatial presence-absence models and a single-season occupancy framework. The camera trap data obtained from the Greater Panna Landscape (GPL) during 2018-2019 was analyzed in a spatial and latent factor multispecies occupancy framework to estimate mammalian species richness and occupancy. The telemetry data of the migratory vultures (Eurasian Griffon and Himalayan Griffon) was analyzed to understand the migratory pathways, stop-over sites, breeding and wintering home ranges. Additionally, the seasonal changes in the home ranges of resident vultures (Indian vulture, red-headed vulture) were assessed.

The first Greater Panna Landscape Council Meeting was conducted on 5th September 2023, under the chairmanship of the Chief Secretary, Madhya Pradesh, to discuss the implementation of the Integrated Landscape Management Plan (ILMP), the establishment of the Integrated Research and Learning Center (IRLC), approval of budget allocation, and release of the implementation toolkits (tiger conservation, vulture conservation, crocodilian conservation, biodiversity conservation, community engagement) and the One-health management plan. The establishment of IRLC required a strategically suitable revenue land of ~9 hectares, which was identified in between the Panna Tiger Reserve and Panna City.

Outputs and Outcomes: The density of leopards varied between 23 individuals/100km2 ± 2 and 30 individuals/100km2 ± 2 from 2018 to 2021. During the same period, the density of striped hyenas varied between 14 individuals/100km2 ± 2 and 17 individuals/100km2 ± 2. The multi-season occupancy of tigers, leopards and striped hyenas ranged from 0.48 ± 0.03 to 0.74 ± 0.02, 0.74 ± 0.02 to 0.86 ± 0.02, and 0.70 ± 0.02 to 0.95 ± 0.03, respectively during 2018-2021. In PTR, density estimates (from 2018 to 2021) revealed that golden jackals occurred in the highest densities (ranging between 19 to 30 individuals/100 km2), followed by jungle cats (10-16 individuals/100 km2), Indian foxes (5-11 individuals/100 km2), Asiatic wildcats (4-6 individuals/100 km2), and ratels (4-6 individuals/100 km2). The occupancy estimates indicated golden jackal has the highest occupancy (#±SE) (0.64 ± 0.03), followed by jungle cat (0.52 ± 0.03), ratel (0.32 ± 0.06), Indian fox (0.19 ± 0.02), and Asiatic wildcat (0.19 ± 0.02). The occupancy of these species was found to be primarily influenced by forest cover, NDVI, distance to the village and water sources. In the GPL, it was found that overall mammalian species richness was moderately sensitive to human alteration to the landscape; however, further exploration revealed a varying magnitude of the effects of different anthropogenic covariates on species richness. Several species strongly avoided areas of high human population density and preferred forested landscapes, but many species did not show any pattern of habitat specificity, thus indicating an overall ubiquity in their occurrence. The implementation toolkit of tiger conservation strategies was finalized.

From the telemetry data, three stop-over sites of migratory vultures, one situated in the Tibetan plateau and one near Afghanistan, were identified. The Eurasian griffons travelled around 2,300km, covering the central Asian regions (Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan), whereas the Himalayan Griffon travelled 2500km, traversing parts of Mongolia, Tien Shan region, Tibetan plateau and central China. The resident vultures were found to be ranging near PTR and adjacent areas, as well as beyond the GPL.

The implementation toolkits for tiger conservation, vulture conservation, crocodilian conservation, biodiversity conservation, and community engagement, as well as the One-Health management plan, were finalized after complying with comments and suggestions received from the experts. Upon identification of the land for the establishment of IRLC, the land was verified for possession, measured (nine hectares), marked, and allotted to the Field Director, PTR, by the district administration.

Milestone: The ILMP was approved and recommended for implementation by the GPLC during its 1st meeting in Bhopal, Madhya Pradesh. The budget outlay (total of 3186 crore) was approved by the GPLC for the implementation of ILMP. The establishment of IRLC was approved by GPLC and recommended necessary actions for the concerned departments (WII, Forest Department, District Administration). Identification and subsequent land allotment for establishing the IRLC were carried out. First-hand knowledge was gained regarding the movement patterns (migration path, stop-over sites) of migratory vultures.

RESEARCH ONGOING

WII

ASSESSMENT OF WILDLIFE VALUES AND LAND TENURE FOR PLANNING RATIONALIZATION OF BOUNDARIES FOR CHANGTHANG AND KARAKORAM WILDLIFE SANCTUARIES, LADAKH

Funding Source
Department of Wildlife Protection, Union Territory of Ladakh

Investigators
Dr S Sathyakumar, Dr Bilal Habib and Dr Salvador Lyngdoh

Researchers
Dr Upma Manral, Dr Ajaz Hussain, Ankit Singh, Abhipsha Ghosh, Apoorva Thapa, Arif Ahmad, Himanshi Sharma, Prateek Savita, Priyadarshan Pandey, Priyadarshini Mitra, Prativa Bomzon, Rameshwar Ghade, Shivani Parmar and Tribhuwan Singh

Date of Initiation
January 2021

Proposed Date of Completion
March 2025

Objectives: The project has the following objectives (i) Identify areas within Changthang and Karakoram Wildlife Sanctuaries in High Conservation Value (HCV) categories; (ii) Delineate and map HCV areas in Changthang and Karakoram Wildlife Sanctuaries; (iii) Conduct stakeholder analysis through local consultations and ascertain wildlife values and natural resource dependencies; and (iv) Devise strategies and actions for future conservation of HCV areas in the Karakoram and Changthang Wildlife Sanctuaries.

Progress: The large landscapes of Changthang and Karakoram Wildlife Sanctuaries host diverse habitats that support unique flora and fauna and provide essential ecosystem services. However, these areas face conflicting interests from various stakeholders. To address these issues, WII has been tasked with identifying High Conservation Value Areas (HCVA) within these landscapes for the rationalization of these protected areas.

The project adopts a comprehensive approach to understanding and managing these protected areas. Initially, the task involved gathering detailed background information on Changthang and Karakoram Wildlife Sanctuaries, with a particular focus on wildlife and habitats of conservation significance.

Outputs and Outcomes: In Changthang, and Karakoram based on the priorities given to HCVAs in each category (1-6), the project identified and demarcated High Priority HCVAs (HPHCVAs). Each of these areas are significant for one or a combination of the HCVs and protection measures should be taken for sustaining local wildlife.

Utilizing Remote Sensing (RS) and Geographic Information Systems (GIS) techniques, maps were generated for Changthang Wildlife Sanctuary (WLS) and Karakoram WLS, highlighting critical wildlife habitats and delineating zones based on High Conservation Value Area (HCVA) categories.

RESEARCH ONGOING

COMPREHENSIVE STUDY AND DOCUMENTATION OF THE ENDANGERED FLORA AND FAUNA IN MEGHALAYA

Funding Source
Meghalaya Biodiversity Board

Researcher
Bitupan Boruah

Date of Initiation
May 2022

Investigators
Dr. Abhijit Das and Dr. Navendu Page

Proposed Date of Completion
March 2025

WII

Objectives: The project has the following objectives (i) to study the floristic and herpetofaunal diversity in Garo, Khasi and Jaintia Hills; and (ii) the distribution and abundance of flora and herpetofauna across the selected sites.

Progress: The field studies were conducted in Nokrek Biosphere Reserve, Tura Peak Reserve Forest, Malki Forest (Shillong), Mawsynram, Cherrapunji and Norpuh Wildlife Sanctuary. Natural history data and acoustics of poorly known amphibians were collected. The phylogenetic status of endemic poorly known species has been assessed. The description of new species and redescription of lost species are in progress. The type specimens of amphibian species present at the Zoological Survey of India, Kolkata were examined for the taxonomic study. The identification and morphological descriptions of larval stages of anurans are underway. The work on a photographic field guide is also underway.

Outputs and Outcomes: A total of 63 species of herpetofauna, including 34 species of Amphibians belonging to 23 genera and seven families, 29 species of reptiles belonging to 20 genera and seven families, were recorded. Two species of Bush frogs from their type locality were rediscovered in Meghalaya. Three amphibian species, *Philautus kempiae*, *Raorchestes shillongensis* and *Bufoides meghalayanus*, were also recorded as Critically Endangered (CR) in IUCN Red List. During the study period, five species of amphibians, *Bufoides kempi, Xenophrys oropedion, Leptobrachella nokrekensis, Philautus kempiae, Ichthyophis daribokensi*s and two species of geckos, *Cyrtodactylus bapme* and *Cyrtodactylus jaintiaensis* endemic to the state Meghalaya were recorded. Type localities of amphibians and reptiles described from Meghalaya were revisited, and collected samples were deposited at the Reptile and Amphibian Repository of the Wildlife Institute of India.

The study also recorded six species of flowering plants endemic to the state such as *Polyalthia meghalayensis*, *Adinandra griffithii, Salacia khasiana, Impatiens khasiana, Leptodermis griffithii, Ilex khasiana*. During the floristic survey, a total of about 350 species of flowering plants belonging to 110 families and 250 genera were recorded.

Milestone: Rediscovery and assessment of phylogenetic status of amphibian and reptilian species originally described from Meghalaya. First ever systematic survey on herpetofauna and flowering plants of protected areas such as Nokrek Biosphere Reserve, Norpuh Wildlife Sanctuary, Tura Peak Reserve Forest.

RESEARCH ONGOING

UNDERSTANDING POPULATION DYNAMICS, SPACE USE, MOVEMENT AND DIET OF LEOPARDS IN JUNNAR TALUKA, MAHARASHTRA FOR HUMAN LEOPARD CONFLICT MITIGATION

Funding Source
Maharashtra Forest Department

Researcher
Kumar Ankit

Date of Initiation
March 2019

Investigators
Dr Bilal Habib, Dr Parag Nigam, and Dr Samrat Mondal

Proposed Date of Completion
March 2025

WII

Objectives: The objectives of the project were a) To estimate the density, abundance and demographic structure of leopards in Junnar Forest Division.

b) To assess the food habits of the leopard through Scat analysis.

c) To identify their family lineage of the serial offenders in the conflict cases; and to identify the population dynamics and sex ratio d) To estimate the home-range, space use, and territorial behaviour of individuals; and to study the dispersal pattern and habitat use of leopards dwelling in the human-dominated landscape of Junnar Forest Division e) To characterize the conflict sites based on the conflict scenario f) To evaluate the dependency of local people on forest resources; and to evaluate the magnitude of the conflict.

Progress: Camera trapping exercise for population estimation of leopards: Camera trap exercise was replicated second time in Otur Range in February 2024 to understand the persistence of the carnivore in the landscape. All the data is being in process of sorting and analysis. Till date we have completed Six blocks of camera trapping and three replicate of two camera trap blocks. We did opportunistic camera trap exercise (n=9) to track leopards amidst human death because of leopard in different part of forest division. Additionally, we did opportunistic camera trapping exercise (n=6) for forest department to fulfil their objective such as cub reunion and conflict scenarios. Total of 11 Leopards (Five male and Six Female) were radio collared, in which seven collars have been dropped-off. A detailed report has been submitted to forest department Opportunistic scats collections are done across talukas and ranges under Junnar Forest Division for diet analysis and genetic component.

Periodic training (n=8) of forest officer/field staff members across ranges about camera trap exercise, scat collection, ground level observations, and leopard-rescue data collection. More than 150 staffs of different ranges were trained in these training the targeted Officer/staffs were Ranger, Forester, Forest Guard and Beat Guards. More than 900 hundred students attended awareness program regarding mitigating human-leopard negative interaction in Junnar Forest Division (awareness program, n=6).

Output and outcomes: A conference paper titled "Spotting the spots" - Understanding ecology of Leopards in Human-dominating landscape of Maharashtra, India for mitigating human-leopard negative interactions, was presented in ICCON April, 2023, Mysuru. Another presentation on the work was done in the 34th Annual Research Seminar of Wildlife Institute of India titled "The Gully Boy of Junnar": Ecology of leopards in the human-dominated landscape of western Maharashtra.

Milestone: First time 11 leopards were radio-collared to understand leopard space-use and movement pattern in human-dominating landscape additionally 4 more radio collared will be done in which two collars will be camera installed-collars. First kind of study with intensive camera trapping exercise and replication of the exercise in human-dominating landscape in India.

Images (Credit Junnar Research Team)

RESEARCH ONGOING

ECOLOGY AND RECOVERY OF CRITICALLY ENDANGERED VULTURE SPECIES IN PONG DAM PROTECTED AREA (PA) AND ITS ECO SENSITIVE ZONE (ESZ) IN DISTRICT KANGRA, HIMACHAL PRADESH

Funding Source
Ministry of Environment Forest and Climate Change, Research and Development Division

Researchers
Malyasri Bhattacharya and Ankit Zode

Date of Initiation
November 2020

Proposed Date of Completion
March 2025

Investigators
Dr Gautam Talukdar and Dr R Suresh Kumar

WII

Objectives: The project has the following objectives (i) To study movement ecology using satellite telemetry; (ii) Niche modelling of selected species of vulture to study their distribution pattern; (iii) Prevalence of Diclofenac and their effects in the study area; and (iv) Capacity building of Himachal Pradesh State Forest Department.

Progress: Five wild White-rumped Vultures, *Gyps bengalensis* were tagged with E-Obs Solar GPS-GSM tags. The questionnaire surveys have been carried out in the multiple household and veterinary clinics for Diclofenac prevalence in part of the study area. Two capacity-building workshops have been arranged with the Himachal Forest department to sensitize the importance of vultures and their nesting and feeding sites in the study area.

Outputs and Outcomes: The present climatic niche of nine species of vultures has been modelled using GBIF (2000-2020) dataset and bioclimatic variables. Taking SSP scenarios from 2041-2060 and 2061-80, modelled potential distribution for the future. More than 400 White-Rumped vulture nests were located. Threats to the vulture population have been identified in the study area. Collision due to the powerline near the feeding station and loss of nesting trees due to forest fire is of significant concern.

Milestone: More than 60 Forest Guards and Rangers of each beat from Kangra district were trained for future vulture surveys in the area. The climatic niche modelling of nine species of vulture shown most of the climatic niche of vultures are reducing in 2041-60 and 2061-80. Fourteen nesting colonies identified from the study area. From undercover pharmacy searches, it is found that the use of similar kinds of drugs which are equally toxic to vultures like Aceclofenac, Nimesulide, and Ketoprofen, are sometimes used in the area (probably due to ignorance).

RESEARCH ONGOING

ASSESSING THE ECOSYSTEM SERVICES PROVIDED BY COLONIAL NESTING WATERBIRDS IN AND AROUND SELECT WETLANDS OF TAMIL NADU

Funding Source
DST-SERB

Researcher
Alex Jacob S.S.

Date of Initiation
March 2022

Investigator
Dr G.V. Gopi

Proposed Date of Completion
September 2025

WII

Objectives: The objectives of the project are to (i) establish ecological baselines on identified wetlands with and without heronries; (ii) ascertain the influence of nutrient inputs in water and sediment quality of the wetlands; (iii) determine the fertilizer usage and productivity in agriculture fields drawing water from wetlands with and

Figure 1. *A snapshot of waterbirds at Koonthakulam bird sanctuary in Tirunelveli district of Tamil Nadu. Here the adult painted stork was observed collecting water in its beak possibly to take it to its nest for thirsty chicks.*

Figure 2. *Nesting Painted Storks with their chicks at Vedanthangal bird sanctuary in Chengalpattu district of Tamil Nadu*

without heronries; and (iv) assess the attitude and perception of farmers on colonial nesting waterbirds.

Progress: Data for establishing ecological baselines on avian fauna across wetlands was collected over two field seasons (2022-23 and 2023-24) and is currently under analysis for comparison. Preliminary findings indicate variations in the presence of colonial waterbirds between the two seasons. At Vetangudi bird sanctuary, nesting was observed in 2022-23, but a complete absence of birds was recorded in 2023-24 due to low water levels caused by a dry season. Conversely, at Koonthakulam and Theerthangal bird sanctuaries, no nesting was recorded in 2022-23, but nesting was observed in 2023-24. To ascertain the influence of nutrient inputs on water and sediment quality, intensive data was collected across test and control sites using a ProDSS multiparameter water quality testing device. Measurements included dissolved oxygen, temperature, conductivity, total chlorophyll, cyano-chlorophyll, turbidity, pH, nitrate, nitrite, chloride, and ammonium. Water samples were collected from the surface and from three different regions (inlet, outlet, and near nest site) of each wetland. Similarly, sediment samples were collected. The sampling process is ongoing, and the data is under analysis.

Outputs and Outcomes: The study has provided critical insights into the influence of rainfall patterns on colonial waterbirds' nesting-site selection across Tamil Nadu's wetlands. During the 2023-24 breeding season, heavy rainfall in southern Tamil Nadu resulted in higher water levels and an increased number of nesting waterbirds, while low rainfall in the central region led to the absence of birds. This underscores the significant role of rainfall in ensuring sufficient food supply and predator protection for nesting waterbirds. Preliminary analysis revealed significant differences in nutrient levels between wetlands with and without heronries, indicating the ecological impact of nesting waterbirds. Furthermore, nutrient levels varied at inlet and outlet points in study sites with heronries, unlike at control sites.

The results have important implications for wetland and waterbird conservation, particularly for Ramsar sites. They can inform effective management strategies, fostering sustainable and equitable conservation practices. Additionally, the cultural ecosystem services provided by these birds can be incorporated into management plans, recognizing their connection with local communities. This study fills a critical knowledge gap, providing new insights into local perceptions and attitudes toward wetlands and bird species. Data collected will enhance understanding of nesting season timing across 11 wetlands in Tamil Nadu and enrich knowledge of water and soil parameter variations between wetlands with and without heronries.

Milestone: Poster titled "Agrarian Avian Assemblages: Exploring the Relationship Between Heronries and Agricultural Lands in Tamil Nadu", presented by Alex Jacob and G.V. Gopi at the 34th Annual Research Seminar at Wildlife Institute of India, Dehradun on 21-22 September 2023.

RESEARCH ONGOING

IMPLEMENTING RHINO DNA INDEXING SYSTEM (RHODIS) TO COUNTER RHINO POACHING THREAT AND AID RHINO POPULATION MANAGEMENT IN INDIA- PHASE II

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Researcher
Shrewshree Kumar

Date of Initiation
April 2021

Proposed Date of Completion
April 2025

WII

Investigator
Dr Samrat Mondol

Objectives: The project has the following objectives (i) Expansion of RhoDIS-India database; (ii) Assessment of mitogenome variations to understand the evolutionary history of Indian rhino populations; (iii) Development of molecular sexing approach for one-horned rhinoceros; (iv) Development of crime investigation kit for rhino crime scene investigations; and (v) Whole genome sequencing of Indian rhinos to develop a panel of global rhino markers for forensic use.

Progress: After the first phase of the project, re-sampling in Dudhwa National Park (n=88) of Uttar Pradesh was done to expand the RhoDIS-India database. Additionally, re-sampling at Pobitora Wildlife Sanctuary, Kaziranga National Park and Orang National Park was done during 11-29 March 2024 to strengthen the database of this project. New rhino bearing parks of Assam, i.e. Biswanath Wildlife Division and Laokhowa-Burhachapori Wildlife Sanctuary were also targeted. Total samples collected were 591 from Assam.

The whole mitogenome data was generated for all Indian rhino populations followed by identification of polymorphic sites to assess the mitochondrial genetic variation in Indian rhinos. A concatenated sequence of 2531bp covering all the polymorphic sites was generated using the eight primers for 111 samples to investigate the phylogeography patterns. Further we estimated the divergence time among the clades to understand the evolutionary history of Indian rhinos.

A robust molecular sexing approach was developed for non-invasive samples, which can be a valuable tool in the studies of the one-horned rhinoceroses as the knowledge of individuals' sex provides vital data for management and conservation programs.At the initiation of the RhoDIS-India program it was envisioned that significant effort is required in terms of training and building infrastructure towards wildlife crime scene investigation (particularly focusing on rhinos). In this regard, we have provided first five crime investigation kits to the Assam Forest Department as it harbors the largest Indian rhino population. A kit was also provided to the Dudhwa forest department.

To achieve expansion of RhoDIS program to a global scale this phase of the project had planned to conduct genome sequencing of Indian rhinos for designing more robust primers that can be tested in other labs. In this regard, multiple samples from each park have been selected and sent for genome sequencing to our collaborating agency Nucleome Informatics, Hyderabad. The data generation for genome sequencing is completed and analysis is going on.

Outputs and Outcomes: Out of the 88 samples collected from Dudhwa NP, 43 unique individuals were identified. The data generation and analyses from the samples collected from Assam is ongoing.

The whole mitogenome data screening resulted in identification of 21 polymorphic sites across Indian rhino populations. Further the phylogeography analysis shows that Indian rhinos are genetically structured into three maternal clades corresponding to Assam, West Bengal and Uttar Pradesh. Among the three, Assam is the most diverse one consisting of 28 haplotypes whereas the other two clades are monomorphic. By comparing our data with the existing literature, it was confirmed that the reintroduced population of Uttar Pradesh showed maternal signatures of Chitwan National Park, Nepal. Further the divergence date estimation analysis suggests that one-horned rhino diverged from its recent common ancestors ~950 Kya (thousand years ago) and different populations (Assam, West Bengal and Uttar Pradesh/Nepal) coalesce at ~190-50 Kya, corroborating with the paleobiogeography history of the Indian subcontinent.

Training programs on the use of RhoDIS-India forensic kits and rhino dung sampling techniques was also conducted for the respective forest department staffs for this project.

In this year, we have received 11 rhino forensic case samples and provided the report to the respective forest departments.

Milestone: This is the first report of wild Indian one-horned rhino mitogenome from all the extant populations. The phylogeography and phylogenomic outcomes suggest recognition of three 'Evolutionary Significant Units (ESUs)' in Indian rhino. Given that multiple reintroduction programs are planned as per the 'National Conservation Strategy for the Indian One horned rhinoceros, Rhinoceros unicornis, Government of India, Ministry of Environment Forest and Climate Change, 2021' objectives (in the states of Uttar Pradesh, Bihar, West Bengal and Assam) in near future, the genetic signatures described in this study would be very helpful in selecting appropriate areas to identify founder animals. The findings of mitochondrial DNA work were published in a peer reviewed journal. The work was also presented in Annual Research Seminar in WII.

RESEARCH ONGOING

WII

ARABIAN SEA HUMPBACK WHALE, *MEGAPTERA NOVAEANGLIAE* UNDER PAN INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES

(COVERED UNDER THE DEVELOPMENT OF WILDLIFE HABITATS SCHEME OF MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE, GOVERNMENT OF INDIA)

Funding Source
National Compensatory Afforestation Fund Management and Planning Advisory Council (CAMPA), Ministry of Environment, Forest and Climate Change, Government of India

Investigators
Dr J.A. Johnson,
Dr Nehru Prabakaran,
Ms Chinmaya Ghanekar, (WII)
and Dr K. Sivakumar,
Pondicherry University

Researchers
Joshua Dharmaraj and
Abhishek Bettaswamy

Date of Initiation
January 2023

Proposed Date of Completion
June 2025

Objectives: The objectives of the project are to (i) identify Arabian Sea humpback whale hotspots along the West Coast of India based on the fishers' local knowledge, and (ii) document different Arabian Sea humpback whale populations residing in the West Coast of India using acoustic devices.

Progress: In order to understand the whale distribution status along the West Coast, the questionnaire survey was conducted among the fisher folks between January 2023 and June 2023. A total of 35 major fish landing areas were selected on the west and east coasts of India, and so far, 27 sites were successfully completed at the end of June 2023, which includes 4 locations from Gujarat, six from Maharashtra, two from Goa, six from Karnataka, seven from Kerala and two from Tamil Nadu. All these sites are major fish landing centres that were targeted due to the high activity of deep-sea fishing vessels. A total of 2407 interviews (Gujarat- 601; Maharashtra- 408; Goa-165; Karnataka- 745; Kerala- 381; Tamil Nadu- 107) were conducted out of 23,114 vessels from 6 states. The survey of 2407 fishers along the west coast of India compared ASHW sightings in four seasons: winter, summer, monsoon and post-monsoon. In winter, ASHW sightings were high in Gujarat, Maharashtra, and Karnataka. In summer, dominant sightings were observed in Karnataka. During the post-monsoon period, ASHW distribution was minimized in Karnataka and Tamil Nadu. In the monsoon season, Tamil Nadu and Kerala were the only states where ASHW distribution was observed, possibly due to modifying boat engines to enable deep fishing during the ban period. Based on our analysis, the best possible hotspots along the west coast of India are Porbandar in Gujarat, Harnai in Maharashtra, Tenginagundi in Karnataka, Beypore in Kerala and Chinnamuttom in Tamil Nadu.

Outputs and Outcomes: One of the significant outputs of this study is the establishment of spatio-temporal distribution patterns of the Arabian Sea Humpback Whale population along the west coasts of India.

Milestone: Hotspots of the Arabian Sea Humpback Whale population congregation sites along the west coast of India have been established. Hydrophones have been deployed in essential congregation sites to understand the movement and migration of Arabian Sea Humpback whales.

RESEARCH ONGOING

INTEGRATED DEVELOPMENT OF WILDLIFE HABITATS (IDWH) – HABITAT MONITORING OF SELECT CRITICAL (IDWH) SPECIES

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Researchers
Dr Vivek Sarkar, Sneha Pandey and Himani Singh Khati

Date of Initiation
December 2022

Proposed Date of Completion
July 2025

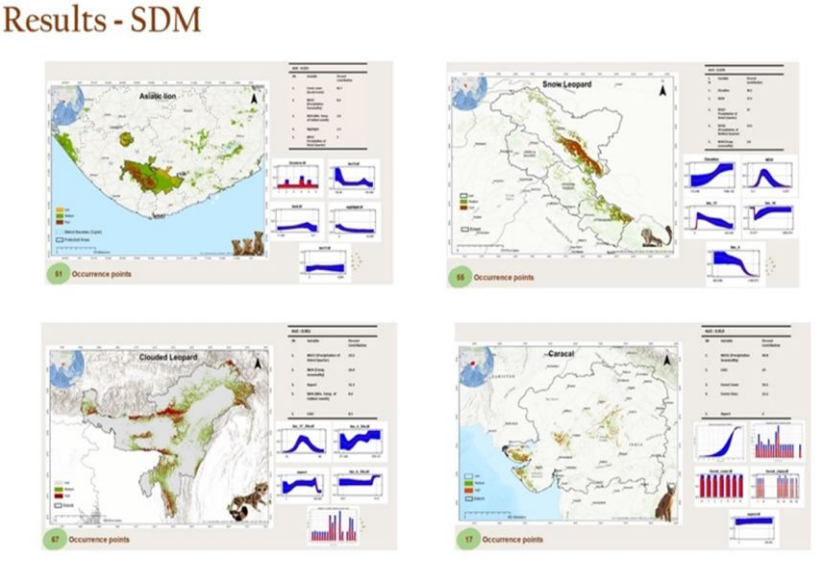
WII

Investigator
Dr Gautam Talukdar

Objectives: Following are the objectives of the IDWH-select habitat: (i) Distribution modeling of select IDWH species; (ii) Assessing the habitat information of select species covered under the IDWH project; and (iii) Field validation.

Progress: Preparation of documents/ outputs/maps: (i) Detailed factsheets for 30 IDWH species; (ii) Detailed habitat requirements write-up for 30 species; and (iii) Species Distribution Modelling for the selected species.

Outputs and Outcomes: Following are the outputs of the project: (i) Maps prepared for 12 species (9 mammals and 3 birds); (ii) Following are the outcomes of the project; (iii) Habitat Monitoring protocols for Olive Ridley Sea Turtle; and (iv) Posters for all IDWH species.



RESEARCH ONGOING

LANDSCAPE SCALE ASSESSMENT OF HABITAT, POPULATION AND GENETIC STRUCTURE OF HISPID HARE, *CAPROLAGUS HISPIDUS* IN THE HIGHLY FRAGMENTED TERAI GRASSLAND OF INDIA

Funding Source
DST-SERB, Duleep Matthai Nature Conservation Fellowship Programme, Prakrirti Research Fellowship

Investigators
Dr Sutirtha Dutta, Dr Vishnupriya Kolipakam and Dr Anukul Nath

Date of Initiation
May 2020

Proposed Date of Completion
August 2025

WII

Objectives: The project has the following objectives (i) Understanding the site occupancy and habitat relationships of hispid hare across its distribution range in India; (ii) Implementation of a refined population assessment method by integrating sign based and individual identification-based approaches to estimate hispid hare abundance; and (iii) Understanding the population genetic structure of hispid hare within the distribution range in India.

Progress: Data collection on distribution, habitat occupancy, and density of hispid hare was completed for Manas National Park, Manas Reserve Forest, Barnadi Wildlife Sanctuary (Assam), D'Ering Memorial Wildlife Sanctuary (Arunachal Pradesh), Jaldapara National Park (West Bengal), Dudhwa National Park and Katarniaghat Wildlife Sanctuary (Uttar Pradesh). The dataset was collected using an occupancy framework in a systematic grid (2×2 km) design in the grassland areas. Species' detection/non-detection data was generated by recording pellet groups along segments of trails (spatial surveys) to achieve adequate spatial coverage. The pellets of Hispid hare were distinguished on the basis of their size and shape. In each grid, 0.5-2.5 km area was surveyed for the pellets of hispid hare with the help of two independent persons following MRDS (Mark-recapture distance sampling approach). Subsequently, fresh pellets were marked on the site of observation and two-four weeks' interval and status of the rate of decay was recorded. DNA was extracted from the fresh pellets collected from different study sites and analysis on progress. Furthermore, we have selected a (1.5 × 1.5) km grassland plot in the Bansbari range of Manas National Park and carried out intensive pellet sampling, and to systematically distribute the sampling effort and to avoid "spatial holes", and further divided this plot into 50 × 50 m (0.5 ha) sampling units. Fresh pellet samples were collected from each of these 0.5 ha plots, and genetic analysis is currently underway.

Outputs and Outcomes: The presence of the hispid hare was confirmed in four out of the eight sampled sites: Manas National Park (NP), Manas Reserved Forest (RF), Jaldapara National Park (NP), and Dudhwa National Park (NP). Among these sites, the highest number of hispid hare pellet groups was found in the Manas landscape (5,830), followed by Jaldapara (255) and Dudhwa NP (224). DNA analysis conducted on fresh pellets further confirmed the presence of the hispid hare in these sites. No sign of hispid hare was found in Barnadi WLS, D'Ering Memorial WLS and Katarniaghat WLS. The grassland of Barnadi has been highly degraded in recent years and is dominated by the invasive Chromolaena odorata. It was also observed that the small patches of riverine grasslands of Barnadi southern boundary area of D'Ering and grassland patches of Katarniaghat Wildlife Sanctuary were highly threatened by cattle grazing. The landscape-scale analysis showed that the percentage of grassland cover followed by fire density, distance from the protected area, and annual mean temperature was vital in determining hispid hare occurrence. At the micro-scale, hare prefers tall grass species assemblages dominated by *Saccharum narenga*. The predicted habitat area available for the species is roughly less than (295. 56) 300 sq km. Manas landscape holds more than 50% of the suitable area within the species distribution range. In natural conditions, the mean pellet decay rate was estimated (136.52 ± 17.43 days; CV=12.77%). The density of hispid hares in the Manas landscape varies from 0.10-0.20 individuals/ha at 95% CI (0.14 ± 0.019 individuals/ha; CV: 13.8%). The Bhuyanpara range has the highest density, followed by the Bansbari and Kahitema range. The Panbari range of Manas NP and adjacent Manas RF has the lowest density. Almost all known surviving populations of hispid hare are restricted to small areas of riverine grassland in the flood plains. However, the habitat of the species is susceptible to minor changes in the course of these rivers, which can destroy habitat. Besides, human population pressure in the surrounding areas makes alternate habitats unlikely. The metagenomics analysis on food preference of Hispid hare preferred Saccharum spp.

Milestone: We present a robust and consensus habitat selection by including the most important climate, landscape, and anthropogenic variables. A scientifically credible system for monitoring the elusive endangered Hispid hare has been developed using a non-invasive and sign-based survey. The continued implementation of educational and outreach programs has contributed to the dissemination of knowledge among local communities regarding managing natural resources in the region. The analysis of diet and food preferences will aid in prioritizing and managing the conservation of site-specific grassland assemblages.

RESEARCH ONGOING

WII

A COMPREHENSIVE STUDY ON THE ECOLOGY AND POPULATION STATUS OF A HUMAN COMMENSAL – THE HOUSE SPARROW *PASSER DOMESTICUS* IN THE UTTARAKHAND STATE

Funding Source
Uttarakhand State Forest Department

Researchers
Renu Bala and Shaafay Khalid

Investigators
Dr R Suresh Kumar and
Dr Dhananjai Mohan

Date of Initiation
April 2021

Proposed Date of Completion
September 2025

Objectives: The objectives of the project are to (i) understand the population and nesting ecology of house sparrows at select sites along an elevational gradient across the State; (ii) study the genetic structure of house sparrow populations so as to identify presence of subpopulations if any and their evolutionary history in the Uttarakhand Himalaya; and (iii) investigate the presence of pesticides in house sparrows and possible correlation on the decline of house sparrow populations in the Uttarakhand State.

Progress: Throughout both breeding and non-breeding seasons, we conducted comprehensive point count surveys spanning various elevations across the state. To understand the breeding biology, we strategically placed additional nest boxes for nest monitoring in Purola, Rudrapur, and Haridwar. Furthermore, we recorded nesting data from each of the previously deployed nest boxes from the preceding year, ensuring continuous monitoring. For population genetic assessment, morphometric measurements and blood samples were collected from more than 20 sites across different elevations of the State. In addition to this, feather samples were also taken during the previous year were analyzed to study the variations in insulation capacity at different elevations. Further, to understand physiological adaptation of the species to higher altitude, an assessment of haemoglobin concentration and haematocrit levels from blood samples is underway.

Outputs and Outcomes: Field surveys in Uttarakhand revealed the distribution, abundance, and habitat preferences of House Sparrows. The relative count was 3.82/point in the breeding season and 4.64/point in the non-breeding season, with rural habitats supporting higher numbers due to abundant nesting spaces and food resources. Our point count surveys showed that rural areas consistently had more House Sparrows than urban areas across all elevations and seasons, highlighting the influence of habitat characteristics on their populations. The variance in nest box occupancy between sites, such as Peeli Padav and Maikoti, highlights the influence of habitat features on nest selection preferences. Traditional housing and village size affect occupancy, with natural nesting sites often preferred over artificial boxes, as seen in Malari village. Contrasting trends in nest box occupancy between urban and rural sites indicate that while urban areas face challenges, nest box programs can gradually enhance sparrow populations with sustained efforts. Across a 3200-meter elevational gradient in the Himalayas, we found that House Sparrows show significant intraspecific variation in both morphology and feather structure that indicate adaptations to increasing colder temperatures.

House Sparrows were significantly larger at higher elevations and had more downy dorsal feathers, likely due to the thermal advantages it provides at higher-elevation to cope with low temperatures. The haematological assessment showed that both haemoglobin and haematocrit levels exhibited an increase at higher elevations, suggesting a pronounced physiological adjustment aimed at enhancing oxygen-carrying capacity to cope with the oxygen-deficient conditions prevalent at higher altitudes. These findings highlight the crucial role of increased erythropoietic activity in facilitating oxygen transport in house sparrows inhabiting hypoxic environments.

Milestone: This study, conducted across various parts of Uttarakhand, has created significant mass awareness among locals about the importance of House Sparrow conservation. Residents are actively engaged in the effort, monitoring nest boxes installed at their homes and contributing to data collection. This initiative has highlighted the crucial need for providing adequate nesting spaces and has offered valuable insights into the population status and nesting ecology of House Sparrows. By involving the community, the project has fostered a sense of responsibility and connection to local wildlife.

RESEARCH ONGOING

BRINGING BACK THE CHEETAH TO INDIA

Funding Source
Ministry of Environment, Forest & Climate Change through the National Tiger Conservation Authority

Investigators
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Researchers
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Date of Initiation
November 2020

Proposed Date of Completion
November 2025 (Phase I)

WII

Objectives: The objectives of the project are to (1) establish breeding cheetah populations in safe habitats across its historical range and manage them as a metapopulation; (2) use the cheetah as a charismatic flagship and umbrella species to garner resources for restoring open forest and savanna systems that will benefit biodiversity and ecosystem services from these ecosystems; (3) enhance India's capacity to sequester carbon through ecosystem restoration activities in cheetah conservation areas and thereby contributing towards the global climate change mitigation goals, (4) use the ensuing opportunity for eco-development and eco-tourism to enhance local community livelihoods; and (5) manage any conflict by cheetah or other wildlife with local communities within cheetah conservation areas expediently through compensation, awareness, and management actions to win community support.

Progress: From the batch of 20 cheetahs that were brought to Kuno National Park from Namibia and South Africa during 2021-22, currently, two individuals are ranging, and 11 animals are in soft release with 12 cubs, whereas seven cheetahs died due to various natural reasons. One cub from last year is being hand-reared. All the cheetahs are being monitored regularly by tracking teams with the help of satellite collars, which enable the collection of additional ecological information. Monitoring of prey, co-predators and habitat is being carried out. Assessment of Gandhisagar Wildlife Sanctuary as the next site for cheetah release was conducted, and preparations are underway. Five leopards were captured and radio-collared in Gandhisagar. Additionally, in Kuno, three leopards, three jungle cats, two jackals, and five chitals were captured, and radio-collared and are being monitored to understand ecosystem response. Multiple trainings on survey methods and equipment were conducted for the forest staff of these two sites.

Outputs and Outcomes: An action plan for the introduction of cheetah in Gandhisagar Wildlife Sanctuary was prepared based on the assessment conducted. From the camera trap sampling conducted in Kuno, the density of leopards and hyenas was estimated as 27.05 (2.9 SE) per 100 km^2 and 13.35 (1.6 SE) per 100 km2, respectively. The density of leopards in Gandhisagar was estimated as 27.6 (3.3SE) individuals per 100 km^2 and 16.4 (2.3SE) individuals per 100 km^2 in the West and East Ranges, respectively.

Milestone: As the world's first wild-to-wire intercontinental translocation of cheetah progresses towards establishing viable metapopulation in India, 14 cubs were born during 2023-24 out of which 12 are in soft release enclosures accompanied by their mothers. After more than one and a half years since their release in Kuno, a total of 26 cheetahs (13 adults and 13 cubs) are currently in Kuno.

RESEARCH ONGOING

RECOVERY OF DUGONGS AND THEIR HABITATS IN INDIA–AN INTEGRATED PARTICIPATORY APPROACH

WII

Funding Source
National Compensatory Afforestation Fund Management and Planning Advisory Council (CAMPA), Ministry of Environment, Forest and Climate Change, Govt of India

Investigators
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Researchers
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Date of Initiation
April 2016

Proposed Date of Completion
December 2025

Objectives: The project has the following objectives: (i) Species conservation and management: Assess dugong population status through advanced census techniques, identify critical habitats, classify threats and develop site-specific monitoring plan; (ii) Habitat conservation and management: Characterize the critical dugong habitats, reduce and indirect threats through participatory approaches; (iii) Participatory management of dugong and their habitats: Raise awareness on the species and encourage the participation of local communities, include other stakeholders in conservation efforts and enhance dugong conservation program by spreading awareness on a national scale; and (iv) Capacity-building of state forests department & local communities: Enhance the capacity of the State Forests Department staff; train staff and local communities in the underwater survey for long-term habitat monitoring

Progress: *Dugong sightings:* Fishers in Gujarat reported three dugong sightings near Chank and Paga reefs, with one rescue near Man Marudi and Paga. Most fishers, active in areas like Dhani-Gandhiyo Bet and Pirotan Island, had never seen dugongs. Records (n=51) helped identify vulnerable areas for boat strikes and net entanglement. Further, there were continuous sighting records from the Dugong Volunteer Network across the three sites.

Aerial surveys: In Andaman and Nicobar Islands, 167 aerial sorties recorded 27 dugongs across North, Middle, and South Andamans. Analysis of videos aims to estimate encounter rates and behaviour. The Mahatma Gandhi Marine National Park had a dugong encounter rate of 1 detection per 1.85 sq. km.

Seagrass-associated benthic macrofauna: Surveys in Gujarat revealed seagrass meadows have higher densities and diversity of infaunal macrobenthos. Critical dugong foraging sites like Bhaidar Island showed high abundance. Seasonal variation was observed in Halophila species, with 149 species recorded, dominated by molluscs.

Nutrients in seagrasses: Seagrass meadows in the Dugong Conservation Reserve act as nutrient pumps. Among eight seagrass species, Cymodocea serrulata had the highest nutrient content. In the Andaman and Nicobar Islands, nutrient analysis indicated varying levels of organic carbon, sodium, potassium, nitrogen, and phosphorus across regions.

Outreach and awareness programs: In Gujarat, 26 outreach events and 12 stakeholder meetings educated 2103 people. Tamil Nadu and Andaman and Nicobar Islands had 36 and 43 outreach programs, respectively, involving over 2500 individuals.

Capacity building programs: 31 events trained 727 people in marine biodiversity monitoring and alternative livelihoods across three field sites, using methods like stakeholder consultations, workshops, and field visits.

Rescue and release: A total of 3 live dugongs were rescued and released by the fishermen in Tami Nadu.

Outputs and Outcomes: A total of 6 research publications were made during the year 2023-2024.

Hatkar P, Patel S, Pathan S, Sivakumar K, Vachhrajani K, Prabakaran N, Johnson JA (2023). Review of stranding records of megaherbivore the Dugong, Dugong dugon, Müller, 1776 in the Gulf of Kutch, India- an implication to the conservation of marine mammals in Gujarat. Journal of Survey in Fisheries Sciences, 10(2): 62-77.

Gole S, Gaidhani P, Bose S, Pande A, Johnson JA, Kuppusamy S (2022). New distribution record of globally threatened Ocean Turf Grass, Halophila beccarii Ascherson, 1871 from the North Andaman Islands highlights the importance of seagrass exploratory surveys. Journal of Threatened Taxa, 14(1): 20406-20412.

Gole S, Prajapati S, Prabakaran N, Johnson JA, Sivakumar K (2023). Herd Size Dynamics and Observations on the Natural History of Dugongs, Dugong dugon in the Andaman Islands, India. Aquatic Mammals, 49(1).

Gole S, Kuppusamy S, Das H, Johnson JA (2023). Flowering and fruiting of Tape Seagrass Enhalus acoroides (Lf) Royle from the Andaman Islands: observations from inflorescence buds to dehiscent fruits. Journal of Threatened Taxa, 15(1): 22494-22500.

Gole S, Prajapati S, Prabakaran N, Das H, Kuppusamy S, Johnson JA (2023). Spatial diversity and habitat characteristics of seagrass meadows with management recommendations in the Andaman and Nicobar Islands, India. Frontiers in Marine Science, 10:

Gole S, Prabakaran N, Prajapati S, Dudhat S, Das H, Kuppusamy S, Johnson JA (2024). Latitudinal variation in seagrass communities with special emphasis on post-tsunami status in the Andaman and Nicobar archipelago, India. Plos one, 19(3): e0300654.

A total of 21 dugongs have been rescued and released as direct/indirect efforts of the outreach and awareness campaigns in Tamil Nadu. Since 2017, more than 700 school kids of fishermen have been awarded the title of Dugong Ambassadors and provided with scholarships of Rs. 500 per month for two years as part of the Dugong Scholarship Program.

A total of 6 frontline forest staff were trained in SCUBA diving and underwater monitoring techniques during the SCUBA training program. During the World Dugong Day celebrations, eminent experts on Dugongs and their conservation participated in discussions pertaining to "Enhancing dugong conservation measures in South and southeast Asia".

Dugong Scholarship Program: The Dugong Scholarship Program expanded, and since 2017, the scholarship has been awarded to 757 students from fishing backgrounds to encourage community participation in dugong conservation.

SCUBA workshop: The SCUBA training program conducted as part of the CAMPA Dugong Recovery Program was held from February 22 to 28, 2024, on Shaheed Dweep Island. It aimed to certify frontline forest staff in SCUBA diving as well as monitoring and management of marine biodiversity through practical training on underwater surveys. The training also included visits to Mahatma Gandhi Marine National Park, enabling firsthand learning from successful SCUBA-based monitoring initiatives by the Andaman and Nicobar Forest Department.

Milestone: World Dugong Day on May 28, 2023, featured a month-long social media campaign, educational talks, and hands-on activities to raise awareness about dugong conservation, engaging over 1,000 participants.

Marine Mammal Consortium of India (MMCOI): CAMPA Dugong team attended the MMCOI workshop held on November 5-6, 2023, in Bengaluru, organized by WCS India, Mangrove Foundation, and WWF India. The team participated in discussions relating to recent research, conservation challenges, and innovative approaches to marine mammal conservation in India. Various members of the team presented talks on seagrass management, the role of outreach-awareness in dugong conservation and the use of advanced technology to monitor dugongs.

RESEARCH ONGOING

CONSERVATION ACTION PLAN FOR MANIPUR'S BROW-ANTLERED DEER OR SANGAI: AN INTEGRATED APPROACH

Funding Source
National Compensatory Afforestation Fund Management and Planning Authority (CAMPA), Ministry of Environment, Forest and Climate Change, Government of India

Investigators
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Dr Syed Ainul Hussain

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Akoijam Santikumar,
Roshani Bisht and Alok Manna

Date of Initiation
March 2016

Proposed Date of Completion
December 2025

WII

Objectives: The project has the following objectives: (i) Strengthening the existing population in Keibul Lamjao National Park (KLNP); (ii) Establishment of a second population in the wild; (iii) Improving habitat conditions and protection measures; (iv) Involving the local community in conservation efforts; and (v) Conducting applied research on the ecology of the species.

Progress: The Wildlife Institute of India, in collaboration with the Manipur Forest Department, conducted a population estimation of Sangai and associated species in KLNP during March 2023. Participants from various Non-governmental Organisations from Manipur and eminent scientists joined the estimation effort. The mean density of Sangai was estimated at 3.20 ± 1.09 individuals/km^2 with a minimum of 1.64 and maximum of 6.24 individuals/km^2 at 95% confidence level. Population trends derived between 2006 and 2023 showed a positive trend with 5.9% growth (R^2=0.9641) per annum in the Hog deer population, which continues to grow significantly.

Collaborative implementation of the Integrated Management Plan prepared by WII is in progress at KLNP, including habitat restoration and management by consolidating the masses of phumdis, cutting fire lines, and patrolling activities in vulnerable areas. WII has provided two boats to the Manipur Forest Department to support the patrolling infrastructure and enhance the protection measures.

Given the rapidly dwindling population of Sangai at KLNP, efforts to develop the Conservation Breeding Centre at KLNP have been accelerated by the Manipur Forest Department. The construction of enclosures is being expedited in collaboration with the Deputy Conservator of Forests (Park & Sanctuary), and the process is progressing at a slow pace due to the present turmoil in the state. Further exploration of suitable sites and willingness surveys of local communities are being carried out to establish a second home for Sangai.

Rescue and rehabilitation operations of wildlife have been conducted with the Forest Department. Rescued animals were given the required treatments before being released

into the wild. A female hog deer was rescued from Yawa Lamjao in the Bishnupur district in April 2023 and released into the Park after first aid. Another rescued individual Hog deer and one Hume's pheasant were handed over to Manipur Zoological Garden for rehabilitation.

We employed land use detection using temporal satellite data to understand the change in the wetland landscape dynamics. We investigated the land use and change in the Eco-sensitive zone of Keibul Lamjao National Park. The major change in the land use pattern observed between 1980 and 2022 is the massive increase in fish farms, which went from 25.66 sq km in 1994 to 56.19 sq km in 2022. With the establishment of the Ithai barrage, agricultural fields comprised 121.65 sq km in 1980 decreased to 24.93 sq km in 2022. This severe reduction in the agricultural area indicates the massive inundation caused by the establishment of the Ithai barrage and the change in the land use pattern in the eco-sensitive area of the National Park.

The scope of Uncrewed Aerial Vehicles (UAVs) to non-invasively access the habitat and detect the ungulate individuals of interest was also studied. A quadcopter, mounted with an optical (RGB) and a thermal camera, was tested in these landscape conditions for its durability, failsafe range, flexibility, camera capabilities for visualization and detection, and resolution. The results of the drone survey based on three different time frames suggest that it is feasible to soar through the floating meadows to detect deer, which is best during dawn and dusk. Detection yielded the best results without creating a disturbance in animal behaviour, with thermal infrared (TIR) imaging at night and both TIR and optical during the early morning. The results have paved a safe and practical way for acquiring accurate ground information that can

assist in population estimation, habitat assessment, and burnt area estimation due to wildfire to aid the conservation of an invaluable natural asset.

Five awareness programs were held at schools and colleges to raise conservation awareness among the local public between January and March 2024 to educate around 450 individuals, including students and teachers, on Sangai conservation and environmental issues in Manipur. As part of the ongoing livelihood intervention programmes, five Village Level Federations (VLFs) were established in collaboration with the Manipur State Rural Livelihoods Mission (MSRLM) to support women Self-Help Groups (SHGs) around KLNP between September 2023 and January 2024 in Keibul, Chandpur, Ithai Wapokpi, Sagram, and Chingmei village. Moreover, from April 2023 to March 2024, 86 local women members of SHGs underwent training on advanced bookkeeping and immersion training for active women cadres in partnership with the MSRLM.

Outputs and Outcomes: Estimates of Sangai and hog deer population size and trends based on long-term data have been made available for conservation planning and species recovery. Efforts for developing the Conservation Breeding Centre have been intensified based on the critically low abundance estimated by WII in 2023. The State Forest Department is actively expediting surveys for finding sites for the establishment of a second home. Information on habitat conditions and distribution patterns of Sangai and Hog deer has been generated based on long-term research monitoring in the National Park.

A total of 450 individuals, including students and teachers, were educated on Sangai conservation through five awareness programs between January and March 2024. In addition, an awareness stall was also set up at ICFRE-FRI in Dehradun in October 2023.

Milestone: The development of the Conservation Breeding Centre at KLNP has been prioritized by the State Forest Department owing to the rapidly declining population estimates derived in 2023.

Following the Integrated Management Plan, firefighting stations and patrolling infrastructure have been deployed at KLNP. Five Village Level Federations were established to support women's Self-Help Groups around the KLNP, and 86 women underwent training on advanced bookkeeping and immersion training for active women cadres.

RESEARCH ONGOING

WII

RANGE-WIDE ESTIMATION OF RIVER DOLPHINS

Funding Source
CAMPA, Ministry of Environment, Forest and Climate Change, Government of India

Investigators
Dr Vishnupriya Kolipakam and Shri Qamar Qureshi

Researchers
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Date of Initiation
September 2021

Proposed Date of Completion
December 2025

Objectives: The project has the following objectives: (i) Range-wide estimation of the River dolphin population in its ranges; (ii) Estimation of the associated fauna in the river dolphin ranges; (iii) Assessment of Water quality and pollution in the river dolphin habitat; and (iv) Involve stakeholders to develop a network which will assist in Dolphin Conservation.

Progress: Report writing on a range-wide estimation of the Ganges dolphin population and associated fauna is ongoing.

Procurement of instruments for distribution in the range-wide states: The procurement process of Global Positioning System (GPS) devices, Laser Range Finders, Binoculars, Cameras, Floating Passive Acoustic Monitoring Systems (F-POD), and YSI water monitoring instrument is completed and has been distributed in Uttar Pradesh, Madhya Pradesh, Rajasthan, and Punjab.

Capacity building and training: In parallel with instrument procurement, WII has initiated capacity-building programs to train local stakeholders in proficiently using these instruments. Training workshops conducted by WII experts equip conservation practitioners, researchers, and local community members with the necessary skills to effectively utilize the monitoring instruments in their respective regions. This collaborative approach ensures the sustainable management of dolphin populations and

Capacity-building training and workshops to the forest staff on river and river dolphin *monitoring*

their habitats by fostering local ownership and participation in conservation efforts.

Comprehensive Sampling Initiative for Monitoring Pollutants in Dolphin-Inhabited River System: Water samples were collected from strategic locations covering the entire range of Ganges dolphin distribution, which includes both Ganges and Brahmaputra River systems and Beas River for Indus dolphin. Sediment samples are obtained from riverbeds and banks to assess pollutant accumulation and sedimentation rates. Additionally, fish samples are collected from various aquatic habitats to evaluate the bioaccumulation of pollutants in fish populations, which are important indicators of ecosystem health.

The analysis to monitor the pollutant levels in the states inhabited by dolphins is currently underway, and we are diligently working on compiling the data. We anticipate completing this analysis soon and will submit the comprehensive findings promptly.

Outputs and Outcomes: The procurement and utilization of advanced monitoring instruments by the Wildlife Institute of India represent a significant stride towards enhancing the conservation of Ganges and Indus River dolphins and their habitats. WII aims to generate robust scientific data for evidence-based conservation management by strategically deploying GPS devices, Laser Range Finders, Binoculars, Cameras, F-POD, and YSI water

Equipment handover to the various forest department

monitoring instruments. By fostering collaboration and building local capacity, WII endeavours to safeguard these iconic riverine species for future generations and promote the sustainable coexistence of humans and wildlife in river ecosystems.

Milestone: The range-wide dolphin survey of mainstream Ganga, Brahmaputra and their tributaries, and Beas River, covering more than 8,000 km, was completed. Identification of critical sites for dolphin monitoring – and setting up monitoring stations with capacity building of the Forest department, with appropriate technology to monitor aquatic habitats marks a significant step in monitoring our fresh water habitats.

RESEARCH ONGOING

DEVELOPMENT OF CONSERVATION ACTION PLAN FOR RIVER DOLPHINS

Funding Source
CAMPA, Ministry of Environment, Forest and Climate Change, Government of India

Researchers
Dr Abdul Wakid, Dr Shovana Ray, Dr Vineet Singh, Dr Sunny Deori, Merin Jacob, Gargi Roychowdhury, Kanad Roy, Gautam, Bhavna Pant, Sneha Mane, Vijay Pratap Singh, Shantam Ojha and Athul

Date of Initiation
April 2016

Proposed Date of Completion
December 2025

Investigators
Shri Qamar Qureshi and Dr Vishnupriya Kolipakam

WII

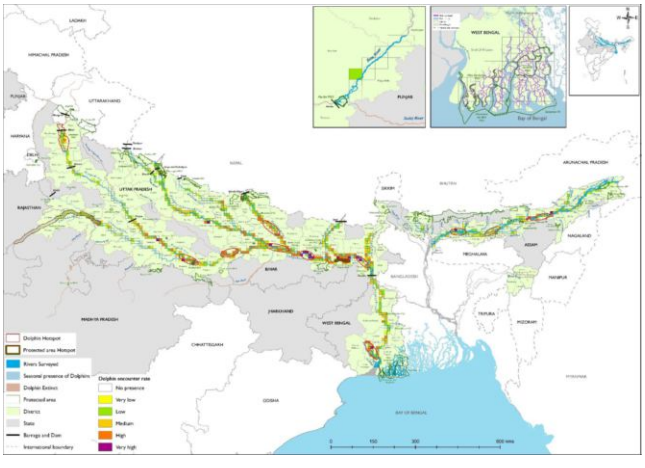
Objectives: The project has the following objectives: (i) develop monitoring protocol for dolphins; (ii) status of associated river fauna like Gharial, Otter, Turtles and Fishes; (iii) quality assessment of river habitat in terms of water quality, anthropogenic pressure and landscape surrounding riverscape; (iv) evaluate the current status of invasive species in riverscape; and (v) involve stakeholders to develop a network which will assist in dolphin conservation.

Progress: The objective for this year was to conduct intensive investigations in the critical sites of the Ganges River dolphin in India. Intensive site studies will play a crucial role in comprehensively understanding the ecology of the Ganges River dolphin. This survey utilized the critical sites identified in the Ganga and Brahmaputra River systems during the Range-wide survey of Ganges River dolphins to select study sites in Uttar Pradesh, Bihar, West Bengal, and Assam.

The activities carried out during the session were:

Repeated Ganges River Dolphin Population Survey: Two repeated surveys were carried out in a 90km stretch in Uttar Pradesh (from Prayagraj to Semradnath ghat, including 30km of Turtle wildlife sanctuary) with the least count estimation of 147 and 119 dolphins, respectively. Three repeated surveys were carried out on a 30-km stretch from Kirakata to Saraighat bridge in Brahmaputra River, Assam.

Point Count Estimation Method: Using hydrophones, point count estimation metod was carried out in 9 segments in a 90km stretch of Uttar Pradesh (from Prayagraj to Semradnath ghat), two segments of 16km in Bihar (from Barh to Munger) and three segments of 32km in Roopnarayan river of West Bengal (from Ghatal to Mankur). Both visual and acoustic data and camera-trap data to collect the anthropogenic variables were collected from the points to understand the abundance and interaction of Ganges dolphins and their habitat.



Critical site of the Ganges River dolphin population in the Ganga and Brahmaputra River system, Indian Sundarbans and Beas.

Associated Fauna Survey: 9 segments of banking boat survey (178km), sign surveys (34 trails), two repeated boat-based associated fauna surveys and 94 point count transect for avifauna were done in Uttar Pradesh. Many different migratory and non-migratory bird species were seen using the various habitats offered by the Ganga River. However, the most substantial observation was the endangered Indian skimmer, *Rynchops albicollis*. Apart from the Avifaunal diversity, Mammalian species observed during the survey only include the Nilgai, *Boselaphus tragocamelus* as well as the Indian Golden Jackal (*Canis aureus indicus*), while the herpetofauna diversity only consists of the dead specimens of Snakes; Checkered Keelback, *Fowlea piscator* and Indian Rat Snake, *Ptyas mucosa*. Dead specimens and trail marks of turtles, including Indian softshell turtle *Nilssonia gangetica*, were observed during the survey. In Bihar, a 37km boat-based survey was conducted for associated fauna, and 44km of sign surveys were conducted (22 trails). In West Bengal, a

boat-based bank assessment spanning three segments and 59.52 km uncovered 44 species, featuring three mammals (Indian Grey Mongoose, Flying Fox, Northern Plains Langur), one herpetofauna (Water Monitor), and 40 bird species. No threatened species were reported during these comprehensive assessments. The foot transect-based sign survey encompassed six transects covering 18.2 km, identifying 52 species, including six herpetofauna (Water Monitor, Bengal Monitor, Rat Snake, Skittering Frog, Cricket Frog and an unidentified Agamid), five mammals (Bengal Fox, Jackal, Jungle Cat, Mongoose), and 42 bird species. None of the mammals were sighted directly. All assumptions are based on their passive signs.

Fish Sampling and Fish Market Surveys: Fish sampling in the 90km stretch is completed, and small and big fish markets were covered along the same stretch in Uttar Pradesh and a total of 36 species were identified from the sampling. The fish sampling study identified 42 fish species using cast and gill nets, with *Salmostoma bacaila, Puntius sophore*, and *Apocryptes bato* being the most abundant. Notably, no invasive species were detected among the total catch. The sampling efforts totalled approximately 107 hours, 1508 cast net throws and 418 gill net deployments. A market survey conducted across 14 local markets from Ghatal to Bakshi documented 67 fish species, categorized into fisheries, marine, river, pond, and river/marine types. Among these, six were non-native, while 57 were native species.

Plankton Sampling: Plankton samples were collected by towing plankton nets in segments of 2.5km in a 90km stretch completed in Uttar Pradesh. Samples were also collected from the major sand mining areas and the up and downstream of those sites. Temporal plankton sampling was done four times a day in a 60km stretch. In Bihar, plankton samples were collected from 70km of the Ganga River (from Barh to Chakour Ghat). In West Bengal,

Fishermen socio-economic surveys and community outreach and awareness programs for stakeholders.

Bird species recorded during avifauna survey

plankton sampling was carried out over 32 km in the Roonarayan area and 20 km in the Katwa area. Analysis of all the stretches is yet to be started.

Vegetation Survey: Riparian vegetation sampling in Uttar Pradesh was conducted in nine segments totalling 90 km, along with a sign survey transect (trail walk). One hundred seventy-eight circular plots have been completed for herbs, shrubs, and trees (Appendix 10). However, there are still some species that have yet to be identified. In West Bengal, the sampling was carried out at 17 points along both the Rupnarayan and Mundeswari rivers. It revealed a rich biodiversity with 79 riparian vegetation species, including 21 trees, eight shrubs, and 50 herbs. The study 38 recorded 58 herb species, 22 tree species, and six shrub species, focusing on distinguishing between endemic, native, invasive, and non-native categories.

Efficacy of Pingers on Ganges River dolphins: The experiments were carried out to understand pinger efficiency in West Bengal for 35 days, including seven days of pre-treatment, 18 days of treatment, and ten days of post-treatment. The analysis is ongoing. Similarly, it was also carried out in the Kulsi river of Assam. The total experiment days consist of 40 Days with acoustic data collection of ~960 Hrs. Starting on December 17th and ending on January 25th. Data analysis is ongoing.

Pinger-fish Experiment: Three sets of experiments were carried out between 28 December 2023 - 6 January 2024, 10-18 January 2024, and 25 February - 4 March 2024; each consists of 8 days with two set-ups in Guwahati and one set-up in Goalpara in Brahmaputra River, Assam. A total of 32 fishermen, 19 boats, and 43 participated in this experiment, with ~562 nettings being done on field, the total with an effort of ~3005 hrs.

Experiment on Depth Preference of Ganges River Dolphins: In Assam and Bihar, based on river depth profiling in a 2 km segment, four F-Pods were deployed in four different depths with their hydrophones placed in depth (2, 4, 8, and

12m) respectively under the water, with a minimum inter-FPOD distance of 600 meters established to minimize data overlap. All four depths were categorised as low, medium, deep and very deep for analysis purposes. In all, 700 hours of acoustic data were collected at varying depths. The depth profile ranged from 2 m to 23 m.

Community-Based Surveys: Socio-economic surveys among Asam and West Bengal fishing communities were conducted. Fishery scheme awareness programmes were conducted in West Bengal. Awareness programs on river conservation were carried out among stakeholders, including school and college students, forest departments and fishery departments in West Bengal and Assam. Sensitization programs were organized for the BSF battalions in Murshidabad districts of West Bengal. Wildlife Week and Environment Day were celebrated in Bihar, West Bengal, and Assam.

Outputs and Outcomes: The work on the impact of the Baghjan Oil Well blowout incident in Assam was communicated to the scientific community. (Singh et al. 2023, Polycyclic Aromatic Hydrocarbons (PAHs) in aquatic ecosystem exposed to the 2020 Baghjan oil spill in Upper Assam, India: Short-term toxicity and ecological risk, https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0293601)

Intensive site monitoring has yielded important information, such as the minimum depth required for Ganges River dolphins. The acceptability of technological interventions like pingers, provide a way forward to reduce dolphin mortality.

RESEARCH ONGOING

STUDY THE VARIOUS IMPACTS THAT MAY OCCUR DUE TO THE DE-SILTING OF HARIKE WETLAND

Funding Source
Rajasthan Feeder Canal and Ground Water Division, WRD Ferozepur, Punjab

Investigators
Dr Gopi G.V. and Dr Amit Kumar

Researchers
Vivek Ranjan, Sipu Kumar, Priyanka Das, Arnab Chattopadhyay, Aruna Kumar Rath, Stanzin Zangmo, Sorinchon Vashi and Vijay Joshi

Date of Initiation
February 2024

Proposed Date of Completion
February 2026

WII

Objectives: The project has the following objectives: (i) Biodiversity assessment of Harike Wildlife Sanctuary pre-, peri and post-desilting; (ii) Assess the potential impacts of de-silting on Harike Wetland; and (iii) Prepare a conservation and mitigation plan to minimize the impacts of de-silting on Harike Wildlife Sanctuary.

Progress: A detailed study design was finalized to assess the biodiversity in the Harike Wildlife Sanctuary. The pre-desilting survey planning and designing has been completed. Field data collection has been done across taxa groups, including mammals, birds, vegetation, herpetofauna, fish, and socioeconomic components. The

data analysis and preliminary pre-desilting report preparation is in progress and shall be submitted by September 2024.

Outputs and Outcomes: Detailed field data collection with spatial replicates was carried out. Detailed checklists of mammals, birds, vegetation, herpetofauna and fishes have been collated. Mapping and delineation of the wetland has been carried out.

RESEARCH ONGOING

WII

PLANNING AND MANAGEMENT FOR AQUATIC SPECIES CONSERVATION AND MAINTENANCE OF ECOSYSTEM SERVICES IN THE GANGA RIVER BASIN FOR A CLEAN GANGA

Funding Source
National Mission for Clean Ganga, Ministry of Jal Shakti

Researchers
113 Project Personnel

Date of Initiation
January 2020

Proposed Date of Completion
March 2026

Investigators
Dr Ruchi Badola and Dr Syed Ainul Hussain

Objectives: The project has the following objectives (i) Strengthen the aquatic biodiversity conservation measures at six identified biodiversity hotspots along the Ganga River and monitor status of other areas; (ii) Explore the natural and assisted colonization of species of conservation significance to other stretches of mainstream Ganga River; (iii) Determine the current state of aquatic environment and biodiversity of the major tributaries and wetlands in Ganga basin; (iv) Identify direct and indirect drivers affecting the integrity of the aquatic environment and biodiversity in the Ganga basin; (v) Pinpoint problematic areas and identify conservation priority zones; (vi) Strengthen/establish rescue and rehabilitation centres at strategic locations for aquatic species in distress; (vii) Involve communities and other stakeholders in the conservation process through capacity building, innovation and strengthening existing institutions; (viii) Garner support for aquatic biodiversity and Ganga conservation through education and outreach programs; (ix) Identify and analyse the hydro-socio-ecological relations in the river basin for efficient and targeted conservation action; (x) Prepare an action plan to minimize the negative impacts of the direct and indirect drivers on the aquatic environment and biodiversity of the select tributaries of the Ganga basin; and (xi) Develop a centralized facility of laboratories and resource centre for aiding in science based management of the Ganga River and its tributaries.

Progress: The Ganga Aqualife Conservation Monitoring Centre/National Centre for River Research (GACMC/NCRR) has been established in the Wildlife Institute of India, Dehradun campus. The Centre has three state-of-the-art labs: the Ecotoxicology Laboratory, the Aquatic Ecology Laboratory, and the GIS Laboratory for spatial analysis.

Extensive surveys were conducted along a total of 5,725 km of rivers within the Ganga basin, encompassing the mainstem of the Ganga River, its major tributaries such as the Yamuna, Ghaghra, Gandak, Son, Kosi, Rupnarayan, and Chambal and smaller tributaries including the Girwa, Kauriyala, Babai, Sharda, Rapti, Bagmati, Mahananda, Ken, Betwa, and Sind rivers to determine the population of Gangetic dolphin. About 3936 ± 763 (mean ± SE) Gangetic dolphins inhabit the 14 rivers in the Ganga basin, including the Ganga River.

During the nesting survey of the river islands in the Ganga, Yamuna, Ghaghra and Gandak rivers, a total of 11 species of birds were found to be nesting, including Indian skimmer, *Rynchops albicollis*, river tern, *Sterna aurantia*, river lapwing, *Vanellus duvaucelii*, little ringed plover, *Charadrius dubius*, little tern, *Sternula albifrons*, red-wattled lapwing, *Vanellus indicus*, Indian thick-knee, *Burhinus indicus*, pheasant-tailed jacana, *Hydrophasianus chirurgus*, small pratincole, *Glareola lactea*, blue-tailed bee-eater, *Merops philippinus* and black-winged stilt, *Himantopus himantopus*.

The vegetation survey was undertaken along the Ganga, Gomti and Ghaghra rivers (covering about 3,653 km) between May to December 2023. The pre-monsoon survey (Haridwar to Farraka) indicated the presence of 456 plant species along the mainstem of the Ganga River. The major dominating families were Asteraceae, Fabaceae, Poaceae, Amaranthaceae, Moraceae, Acanthaceae, Lamiaceae, and Convolvulaceae.

Three national and one state-level spearhead training

workshops were conducted from April 2023 to March 2024. A total of 309 participants, comprising police personnel, forest officials, engineers, NSS volunteers and Ganga Praharis, were trained on River conservation and the role of enforcement agencies in biodiversity. Three onsite training workshops were conducted for NSS volunteers at Jaipur, Roorkee and Maldevta. A total of 298 National Service Scheme (NSS) Volunteers and Programme Officers were trained in Ganga Biodiversity Conservation.

Twelve Ganga Aqualife Knowledge Centres were established in government schools across various states of the Ganga basin. 95 Sensitization programmes were carried out in which 15,012 students and 300 teachers were sensitized about the importance of Ganga biodiversity and its conservation.

Capacity development workshops were conducted for the Ganga Praharis from 19 significant tributaries, sub-tributaries, and newly identified Ganga Praharis from the Ganga mainstem.

The Ganga Prahari Conclave, spanning three days, was convened at Parmarth Niketan Ashram in Rishikesh, Uttarakhand, from 19-21 March 2024. The event gathered Ganga Praharis from across 11 Ganga basin states, with the primary objective of facilitating the exchange of knowledge, experiences, and visionary insights pertaining to Ganga Basin Conservation.

Established 39 small-scale interpretative corners, Jalmala Samvaad in 17 districts of Uttarakhand, Uttar Pradesh and Bihar, along the Ramganga, Yamuna, Gomti and Gandak rivers.

Outputs and Outcomes: For effective conservation planning, the flagship species approach was adopted, for which the Gangetic dolphin, *Platanista gangetica* was chosen as a flagship species. About 46.3% of the river stretches were delineated as conservation priority stretches.

Two new species, *Lindernia tamilnadensis* and *Lindernia dubiaand* (the first records from North India), were documented from Bhagalpur, Bihar, during the vegetation

Eight Monitoring Committee Meeting

survey. Published fifteen scientific papers in high-impact factor journals of international repute. Information brochures on small tributaries were published in English. Published reports and storybooks for children as the output of the project. The Ganga Prahari cadre has increased to 4,808 individuals in the Ganga River Basin, of which 3,067 are female and 1,741 are male.

A series of 204 LiFE events were conducted in 42 districts of the seven Ganga River Basin states, namely Himachal Pradesh, Uttarakhand, Uttar Pradesh, Haryana, Bihar, Jharkhand, and West Bengal, from April to June 2023, in which more than 23,000 people participated. During these events, a total of 265 activities were conducted under 15 categories. Important days like Earth Day, World Environment Day, Turtle Day, Independence Day, National Bird Day and Wildlife week were celebrated in Varanasi,

Kaushambi, Prayagraj and Kanpur districts of Uttar Pradesh. About 2,120 participants of local communities, student and teachers were sensitized and made aware about the importance of aquatic biodiversity and their conservation. Ganga Darpan Blog released 54 posts, with 1,866 visitors and 3,335 views during the reporting period.

Milestone: WII-NMCG resource persons delivered 14 Radio talks on various aspects of conservation and career options for youths through 90.0 FM Radio Rishikesh. Dr Ruchi Badola, Dean, Wildlife Institute of India, gave a TEDx talk at the Welham Boys School, Dehradun, on 10 March 2024. She gave examples from NMCG-WII Ganga Project's work on Ganga Praharis for the conservation and ecological restoration of the Ganga River by bringing positive behavioural changes and nurturing leadership among common people, particularly children. She illustrated how the Ganga River is a symbol of leadership and an inspiration for many.

Successfully conducted the 8th meeting of the Monitoring Committee of the Project was held on 29th January 2024.

The proposal for initiating a Master's course in Freshwater Ecology and Conservation was approved by NMCG and the TRAC of the WII. Admission to the first batch of the MSc in Freshwater Ecology and Conservation has been initiated.

RESEARCH ONGOING

WII

INTEGRATED CONSERVATION & MANAGEMENT STRATEGIES FOR RIPU-CHIRANG ELEPHANT RESERVE: A MULTIFACETED APPROACH

Funding Source
Ministry of Environment Forest and Climate Change, Govt of India

Researchers
Richard S Sangma and Arun Kumar Gorati

Date of Initiation
March 2024

Proposed Date of Completion
March 2026

Investigators
Dr Anukul Nath, Dr Bilal Habib and Dr Parag Nigam

Objectives: The objectives of the project are to (i) investigate forest cover loss and prioritize areas for habitat restoration in the buffer zone (Udalguri) of the Ripu-Chirang Elephant Reserve; (ii) study the demography of the Asian Elephant in the core (Manas NP) and buffer zone (Udalguri) of the Ripu-Chirang Elephant Reserve; and (iii) investigate the influence of Asian elephant demography and anthropogenic factors (such as changing land-use patterns and other human activities) on conflict patterns in Udalguri district.

Progress: We have obtained secondary data on elephant mortality and its causes from the Udalguri District within the Chirang-Ripu Elephant Reserve. The analysis involves examining mortality rates across different age and sex categories to gain insights into the demographics most affected by human-elephant conflicts. Additionally, we have performed a comprehensive Land Use and Land Cover (LULC) change analysis for the Ripu-Chirang Elephant Reserve over the past 40 years. This analysis aims to understand habitat changes over time and their impact on elephant movements and mortality.

Outputs and Outcomes: The project aims to address human-elephant conflicts through conservation strategies in Ripu-Chirang Elephant Reserve. By studying forest cover loss, Asian elephant demography, and conflict patterns, we seek to prioritize areas for habitat restoration and understand the impact of anthropogenic factors on conflict intensity. The project aims to mitigate conflicts and promote coexistence through detailed demographic data analysis and targeted strategies focusing on young dispersing males. The outcomes include generating LULC change maps, identifying critical conservation areas, and supporting evidence-based decision-making for local authorities. Additionally, the project will provide insights into the behaviour of conflict elephants, guide future conservation efforts, and contribute to preparing a comprehensive conservation plan for the Ripu-Chirang Elephant Reserve.

RESEARCH ONGOING

AUGMENTATION AND LONG-TERM MONITORING OF TIGER IN BUXA TIGER RESERVE, WEST BENGAL

Funding Source
West Bengal Forest Department & National Tiger Conservation Authority, Government of India

Investigators
Dr K. Ramesh and Dr Sandeep Gupta

Researchers
Shekhar Sarkar and Ankit Thakur

Date of Initiation
April 2018

Proposed Date of Completion
March 2026

WII

Objectives: The objectives of the project are to (i) strengthen field protection and intelligence-based enforcement for overall habitat revival; (ii) improve habitat quality and prey population status to enable suitable conditions for tiger augmentation in Buxa Tiger Reserve and the landscape complex; (iii) augment tiger population from other source areas involving soft-release, and hard-release strategies towards ensuring a demographically, genetically, and physically (health-wise) viable population of tiger and its offspring; (iv) institutionalize monitoring of habitat conditions, prey populations and tiger population to enable 24x7 security of released animals and for feedback mechanism for effective management and capacity building of staff regularly; and (v) develop a landscape management plan in the context of tiger movement between Buxa and Jaldapara National Park, Buxa and Manas as well as Buxa and neighbouring/mm forests of Bhutan.

Progress: During the timeframe, we undertook a multifaceted approach to contribute to the conservation efforts within Buxa Tiger Reserve (BTR). Camera trap data obtained from 239 camera trap grids (2 sq km each) in the previous year (November 2022 - April 2023) was analysed, and in the current year (November 2023- April 2024), camera traps were deployed in 175 camera trap grids to understand the species dynamics in the reserve. Phase-I monitoring initiatives aimed at estimating prey density and distribution were conducted in March 2024, utilizing advanced sampling techniques and spatial analysis to assess the ecological balance within the reserve. A questionnaire survey was carried out in July 2023 within target villages (comprising 21 households of Bhutiabasti, 63 households of Gangutia, and 234 households of Jainti) to understand the socio-economic condition, willingness for relocation and tiger reintroduction.

To enhance the prey population distribution and to facilitate the natural colonization of tigers from nearby areas (Assam & Bhutan), a series of habitat improvement measures were suggested (e.g. identification areas for grassland preparation, removal of weeds and assisted regeneration). Focus was given on the habitat connectivity to the eastern part of BTR towards removing the bottleneck.

Furthermore, multiple training cum workshops were organized for frontline staff, enhancing their capacity in wildlife monitoring, advanced technologies in wildlife, conflict resolution, and community engagement.

Outputs and Outcomes: The project has made significant progress and achieved various outputs and outcomes through its implemented activities. The systematic and strategic camera trapping resulted in a successful photo capture of a male tiger from multiple reserve areas between December 2023 and February 2024. Co-predators such as leopard, clouded leopard, wild dog, leopard cat, jungle cat and golden cat were also detected during this period.

A hybrid approach for prey augmentation was suggested and implemented in the reserve. Recent herbivore estimation revealed an increase in the estimated ungulate density of 14.87/Km^2 from 12.17/Km^2 in the reserve. The questionnaire survey conducted in the two forest villages inside the core suggested the willingness of forest villagers to relocate voluntarily and a positive approach towards tiger augmentation in the reserve. Consequently, 247 people were relocated by the forest department.

As a result of habitat improvement in the eastern part of the reserve, sign survey and camera trapping data revealed that this area is playing as an active corridor for tigers. The source area of the recent tiger has been identified as the Manas Tiger Reserve of Assam, which supports the transboundary movement of tigers in the landscape.

Throughout the year, 203 forest staff were trained on

various survey techniques such as distance sampling, camera trapping, sign survey and radiotelemetry.

Milestone: Throughout the project, preparatory works, which include habitat assessment, prey base assessment, sign survey, camera trapping exercise for tiger and co-predator, capacity building of staff and awareness campaign with the stakeholders, have been carried out. These efforts culminated in preparing and submitting a comprehensive 'Phase - I Final Report', documenting findings, methodologies, and recommendations to inform future conservation planning and management decisions within the reserve. Consequently, Buxa Tiger Reserve is experiencing frequent tiger movement from the adjacent protected areas of Bhutan and Assam, suggesting the presence of an active corridor between these areas. This corridor holds promise for facilitating natural tiger movement into BTR soon, potentially enhancing tigers' population and genetic diversity in the landscape.

RESEARCH ONGOING

WII

CONSERVING VITAL CONNECTIONS ACROSS EXPANDING LINEAR INFRASTRUCTURE IN A TRANSBOUNDARY TERAI ARC LANDSCAPE (TAL)

Funding Source
Rhinoceros and Tiger Conservation Fund, U.S. Fish & Wildlife Services (USFWS)

Researchers
Dr Akanksha Saxena and Manisha

Date of Initiation
September 2022

Proposed Date of Completion
August 2026

Investigator
Dr Bilal Habib

Objectives: The objectives of the project are to (i) Identify movement corridors for tiger and rhino populations in the Indo-Nepal Terai Arc Landscape; (ii) Create transportation infrastructure data layers (Current and Future Road Networks); (iii) Identify conflict sections of transportation infrastructure projects that limit tiger and rhino movements for mitigation prioritization; and (iv) Strengthen transboundary connectivity coordination, science implementation and capacity building.

Progress: During the reporting period, the transboundary habitat suitability and connectivity were modelled for the two species (tiger and rhinoceros) in the Terai Arc Landscape. We then used the resulting habitat suitability layers to model the transboundary connectivity for both species using Linkage Mapper. The exercise helped delineate the least cost movement pathways, important linkages, and bottleneck areas in the landscape. We also identified conflict sections of transportation infrastructure projects that limit tiger and rhino movement in the landscape. The results are expected to help delineate important habitat linkages and critical bottleneck areas that require intervention in view of the rapidly developing linear infrastructure in the landscape.

The following work is currently underway: (i) prioritisation of corridors important for keeping the landscape connected, (ii) identification of critical linear infrastructure stretches intersecting these corridors, (iii) rationalisation of resulting corridors as a practically usable outcome for field managers, and (iv) planning a training workshop for different stakeholders with regard to linear infrastructure development and mitigation planning in TAL, India and Nepal.

Outputs and Outcomes: The results of the exercise were published in a technical report "Modelling Transboundary Habitat Suitability and Movement Corridors for Tigers and Rhinoceros in Terai Arc Landscape", and submitted to the funding agency. The study was presented in the Internal Annual Research Seminar 2023 as a complete presentation titled "Modelling habitat suitability and movement corridors for Tigers and Rhinoceros in the Transboundary Terai Arc Landscape".

RESEARCH ONGOING

WII

ASSESSMENT AND MONITORING OF CLIMATE CHANGE EFFECTS ON WILDLIFE SPECIES AND ECOSYSTEMS FOR DEVELOPING ADAPTATION STRATEGIES IN THE INDIAN HIMALAYAN REGION – PHASE II

Funding Source
Department of Science and Technology (DST)

Investigators
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Dr J.A. Johnson,
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Krishnendu Banerjee,
Manisha Mathela,
Amarjeet Kaur,
Himangshu Bora,
Meghavi Purohit,
Dr Nishigandha and
Rakshit Rayal

Date of Initiation
December 2021

Proposed Date of Completion
December 2026

Objectives: The project aims to generate information on climate change impacts, assess ecosystem health, characterize climate refugia landscapes, establish a spatial database, and implement long-term monitoring. The project aims to inform conservation strategies and promote climate change adaptation in the IHR region.

Progress: The current sampling initiative focuses on establishing baseline data for species richness and occurrence patterns in the West Kameng basin, along with long-term sampling of species distribution and phenology from the Beas, Bhagirathi, and Teesta River basins, continuing from Phase I of the project. The sampling in the West Kameng basin identified 21 nematode genera from 7 orders, 86 butterfly species spanning 49 genera, and 14 fish species. Furthermore, the study identified eight orders and 48 families from approximately 1980 macroinvertebrate samples.

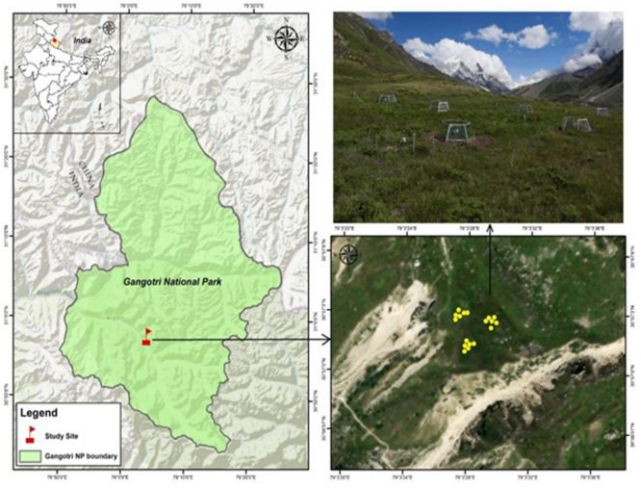
Long-term monitoring (2016-2023) of breeding phenology was also established for Snow trout, *Schizothorax richardsonii*. The monitoring revealed that gonad weight to somatic weight ratios ranged from a peak of 6.07 in November to a low of 0.14 in February, aligning with western Himalayan rivers' trends.

The Phase I and Phase II data are being compiled to develop a 'Web-based Decision Support System' (Wb-DSS) to inform policy decisions for wildlife conservation under climate change.

Outputs and Outcomes: The ongoing sampling of mammals includes the deployment of 134 camera traps for 4492 trap nights in the Teesta River basin, Sikkim, revealed 27 species of mammals, while 168 camera traps for 3,392 trap nights revealed 20 species of mammals in West Kameng basin of Arunachal Pradesh.

The latitude-based comparisons of riverine ecotones in the Himalayan rivers provided new insights into the macroecology of macroinvertebrates and climate change community turnovers. The study used Threshold Indicator Taxa Analysis to identify 11 indicator macroinvertebrate taxa out of 31, reflecting the altitudinal band with the highest community turnover.

Additionally, ongoing monitoring of soil respiration at established long-term monitoring sites is being continued through 'Open Top Chamber' experiments at Gangotri National Park, Uttarakhand and Sela Pas, Arunachal Pradesh.



Ongoing monitoring of soil respiration through Open Top Chamber experiments at established long-term monitoring sites in Gangotri National Park, Uttarakhand

RESEARCH ONGOING

WII

AN INTEGRATED APPROACH TO BIODIVERSITY CONSERVATION IN NANDA DEVI BIOSPHERE RESERVE, UTTARAKHAND

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India, New Delhi through ICFRE, Dehradun

Researcher
Debaleena Chatterjee

Date of Initiation
January 2022

Investigators
Dr B.S. Adhikari and
Dr Anukul Nath

Proposed Date of Completion
June 2027

Objective: The project aims to prepare an Integrated Management Plan for Nanda Devi Biosphere Reserve.

Progress: A reconnaissance survey was conducted in the Nanda Devi National Park, Joshimath Forest Division, to understand the current state of the environment and the current condition of the local population. Six villages, namely Thaing, Chai, Parsari, Bargaon, Tapovan and Merag, were visited. Focused group discussions were held with the village's head (Sarphan/Pradhan), the head of Mahila Mandal Dal (women's self-help group) and other village persons to gather information and perceptions about climate change, disaster occurrences, human-wildlife conflicts and the area's prevailing ecological issues. The conversations showed that severe human-wildlife conflict and climate change have impacted the prospects for generating revenue and agricultural patterns. Information on a few major subjects, including the relationship between humans and wildlife, using natural resources, livestock grazing, and climate change, was acquired from six communities in the NDBR's transition zone through group discussions.

Outputs and Outcomes: The present study traces the history of Nanda Devi Biosphere Reserve and synthesizes current research trends to determine the interests of scientific communities, which in turn influences the management efficacy of the reserve. A total of 459 scholarly publications were discovered through the literature review. Of these, 313 were utilized for content analysis to determine previous research interests, and 112 were examined for current research trends by identifying subject disciplines, landscapes covered, and techniques adopted. A noticeably skewed, uneven, and concentrated distribution of research disciplines, ecosystems was found and geographical coverage of study regions, where floristic studies still dominate ecological research. Thaing in Joshimath suffer serious problems for their crops such as potatoes, spinach, mustard seeds, pulses, carrots, radish, millets, maize, apples, peas and many more, due to raiding Wild boars, which nocturnal foragers. The collection and trading of medicinal plants, particularly *Hellebore, Picrorrhiza kurroa* and Caterpillar fungus (*Ophiocordyceps sinensis*), contribute largely to the livelihoods of local village communities. Livestock grazing is a major threat to medicinal plants, whereas grazing intensity varies greatly depending on the size, location, ownership of the pastures, number of migratory animals.

The most effective conservation method is to ensure that all the floral and faunal populations continue to thrive and evolve in their native habitat. No single sector, corporate or public, can take up conservation alone; it requires a collaborative effort including various organizations, disciplines and stakeholders. Thus, collaboration is crucial for developing and implementing any conservation and management approach such as sustainable tourism, creating new economic opportunities, capacity building and fund allocation for economic growth in the area, climate-resilient agriculture, watershed management and disaster risk reduction through community-based activities, use of RS & GIS technology in habitat and landscape level studies.

Photo credit Dr BS Adhikari

Milestone: Thrust areas of future research priorities to reflect a comprehensive perspective of organizational growth in the biosphere reserve laid out by UNESCO in terms of biodiversity, ecosystem, socio-ecological, management and development, and research and monitoring were suggested through this work. The findings of this study will guide academics and conservationists to broaden their areas of scientific interest and assist forest management agencies in implementing management strategies that balance socio-economic development and biological protection while ensuring the long-term sustainability of the surrounding landscapes.

RESEARCH ONGOING

WII

GAUR REINTRODUCTION PLAN 2023-28: ESTABLISHMENT OF GAUR, *BOS GAURUS GAURUS* IN SANJAY – DUBRI TIGER RESERVE, MADHYA PRADESH

Funding Source
Madhya Pradesh Forest Department

Investigators
Dr Parag Nigam,
Dr Bilal Habib and
Field Director, Sanjay Tiger Reserve

Researchers
Ritesh Vishwakarma and Bhaskar Bhandari

Date of Initiation
March 2023

Proposed Date of Completion
March 2028

Objectives: The objectives of the project are to (i) study the post-release exploration & establishment of the gaur population in STR, (ii) study the movement behaviour, ranging pattern, and habitat use of reintroduced gaur in STR, (iii) study the activity behaviour and interaction of reintroduced gaur in STR, (iv) study the food habits of gaur and competition with conspecific in the landscape (v) evaluate the post-reintroduction health status of gaur in STR.

Progress: As part of the project, 50 gaurs were reintroduced to the Sanjay Tiger Reserve from the Kanha and Satpura Tiger Reserves. In the first phase of capture and translocation, 28 gaurs (21 females and seven males) were translocated from Kanha between June 1st and 7th, 2023. In the second phase, 16 gaurs (13 females and three males) were translocated from Satpura between June 26th and 29th, 2023. The gaurs were equipped with Satellite-GPS VERTEX collars (4), VHF collars (8), and self-fabricated color-coded neck bands (22).

After translocation, the gaurs were initially released into a small 2-hectare soft-release enclosure for close observation and then moved to a larger 30-hectare enclosure for acclimatization. The first stock of translocated gaurs was released into the open forest on June 23rd, 2023, and the second stock was released on August 19th, 2023. The reintroduced gaurs are monitored using ground tracking, radio collars, satellite telemetry, and detailed visual observations.

Outputs and Outcomes: After the release from the enclosure, translocated gaurs dispersed into various ranges of Sanjay Tiger Reserve and neighbouring PAs, forming small, ephemeral herds primarily in the eastern and northern areas. Adult bulls occupied larger areas than

cows and sub-adult bulls. The released gaur initially explored all ranges and protected areas (PAs) around SDTR, covering an area of 384 km² in June 2023. This expanded to 751 km² in July before decreasing to 601 km² in October and 585 km² in December 2023. Eventually, after forming three separate herds comprising 12-17 individuals each, the gaur home range of these herds ranged from 274-418 km² in Jan-Feb 2024. The adult bulls of the translocated population remained solitary, with very few recorded instances of joining the herds during the mating season (November to February). The population increased to 54 individuals, with a total of 12 births and two natural mortalities.

The reintroduced gaurs mainly utilised deciduous forest, followed by agricultural land, scrubland, and barren grasslands. Habitat use ranked as follows: Deciduous Forest > Agricultural Land > Scrubland > Barren Grassland > Waterbodies > Open Forest. The study on food behaviour revealed gaurs foraging on 32 plant species, primarily *Dendrocalamus strictus, Shorea robusta, Diospyros melanoxylon, Heteropogon contortus* and *Chrysopogon zizanioides*. Their diet overlapped with resident elephants, indicating similar foraging habitats. All gaurs exhibited good body condition post-release, signifying successful adaptation. The study on stress levels during translocation was monitored through faecal cortisol metabolites. Elevated stress level (3035.75±383.4 pg/ml) during transport reduced to (254.1±73.59 pg/ml) post-release, reaching baseline levels by the thirtieth day on (220.58±66.62 pg/ml). Stable stress levels (234.86±45.86 pg/ml) on the forty-fifth day indicated successful adaptation to the new habitat.

Milestone: Forty-four gaurs were successfully reintroduced to the Sanjay Tiger Reserve from Kanha and Satpura Tiger Reserves. The drug protocol was standardized with the effective use of Thiafentanil (a narcotic) as the primary immobilizing agent. Comprehensive veterinary protocols were established, involving a well-equipped capture, animal transportation, and monitoring team. A cost-effective individual marking technique was also developed using colour-coded neckbands alongside radio collars. The project also saw the development of a group of sensitized and well-trained teams capable of carrying out mega-herbivore translocation.

RESEARCH ONGOING

WII

MONITORING OF WILDLIFE OVERPASSES AND UNDERPASSES OF SAMRUDDHI EXPRESS

Funding Source
Maharashtra State Road Development Corporation (MSRDC)

Researchers
Dr Shaheer Khan, Ankan Halder, Neha Yadav, Vedanshi Maheshwari and Mansi Arora

Date of Initiation
November 2023

Investigator
Dr Bilal Habib

Proposed Date of Completion
November 2028

Objectives: The project has the following objectives: (i) Monitoring for wildlife underpasses and overpasses during the operation phase of the expressway, (ii) Use of camera traps to determine the efficacy of mitigation measures, and (iii) Evaluation of habitat characteristics, noise and vibration level around mitigation structure.

Progress: We assessed the overpasses and underpasses structures, initiating a camera trap deployment exercise. Cameras were affixed to the walls of crossing structures. A total of 28 cameras were placed across seven wildlife overpasses, and 34 cameras were distributed among 17 wildlife underpasses. Each wildlife overpass accommodated four cameras, while two cameras were installed in each wildlife underpass.

The deployment of cameras serves to monitor wildlife activity and assess the effectiveness of the overpasses and underpasses in facilitating wildlife movement. This scientific approach enhances our understanding of the ecological impact of infrastructure projects and informs future conservation efforts.

Table 1: Details of Camera trap deployment on wildlife overpasses with package no. and chainage no. on Samruddhi expressway

Package no.	Chainage no	Cameras
1	15	4
2	77 & 71	4,4
5	217 & 218	4,4
9	406 & 436	4,4

Table 2: Details of Camera trap deployment on wildlife underpasses with package no. and chainage no. on Samruddhi Expressway

Package no.	Chainage no	Cameras
1	12+900	2
2	34+960	2
2	79+009	2

Outputs and Outcomes: The camera trap monitoring initiative has commenced, with the team verifying several cameras and observing the presence of various animal species. In two overpasses, the captured animals include Nilgai, *Boselaphus tragocamelus*, Chinkara, *Gazella bennettii*, Indian hare, *Lepus nigricollis*, Porcupine, *Hystrix indica*, Wild boar, *Sus scrofa*, Leopard, *Panthera pardus*, Mongoose, *Herpestidae*, and Gray langurs, *Semnopithecus*. These observations contribute valuable scientific data regarding wildlife utilization of the overpasses and assist in assessing the effectiveness of wildlife mitigation measures along the Nagpur-Mumbai Super Communication Expressway.

The team is concurrently conducting a bird count along the expressway. To date, data has been collected from 310 points. At intervals of every 500 meters, the team conducts point counts to enumerate bird species present in the vicinity. This systematic approach allows for a comprehensive assessment of avian diversity and distribution along the Nagpur-Mumbai Super Communication Expressway.

Package no.	Chainage no	Cameras
2	78+414	2
2	75+695	2
2	74+700	2
2	73+897	2
2	73+745	2
2	73+038	2
2	72+855	2
2	72+450	2
2	71+178	2
3	149+337	2
7	339.4, 339.3	2,2
9	398+682	2
10	452.985	2

RESEARCH ONGOING

WII

LONG-TERM MONITORING OF TIGERS, CO-PREDATORS AND PREY IN TIGER BEARING AREAS OF VIDARBHA, MAHARASHTRA

Funding Source
Maharashtra Forest Department, Govt of Maharashtra

Investigators
Dr Bilal Habib and Dr (Capt.) Parag Nigam

Researchers
A. Krishnan, Akshayi A.S., Ananya Ajay, Anjali Thapliyal, Anubhuti Krishna, Aritra Roy, Jaydeep Patil, Juri Roy, Kanishka Sharma, Khadija, Sajid Reza and Suman Koley

Date of Initiation
April 2019

Proposed Date of Completion
April 2029

Objectives: The project has the following objectives: (i) Evaluate the status of tiger, co-predators and prey species in the landscape; (ii) Identification of tiger dispersal in the landscape; (iii) Understand the movement of selected tiger females and subsequent generations; and (iv) Identify potential areas for conservation translocation to reduce human-wildlife conflict.

Progress: The tiger-bearing areas surveyed include Melghat Tiger Reserve, Pench Tiger Reserve Maharashtra, Navegaon-Nagzira Tiger Reserve, Tadoba-Andhari Tiger Reserve, the Brahmapuri (Territorial) Forest Division, Umred-Paoni-Karhandala Wildlife Sanctuary, Tipeshwar Wildlife Sanctuary, Pandharkawda Forest Division (Territorial), Painganga Wildlife Sanctuary, Bor Tiger Reserve and Akola Forest Division.

Capacity Building: The capacity building program aimed to enhance the knowledge, skills, and capabilities of Forest personnel involved in data collection for the project. Forest personnel (Guards & Foresters) of all sites were trained for Camera trapping and Transect surveys. The theory session was made up of a basic understanding of line transect and camera trapping and the science behind these methods. It was presented using simple PowerPoint presentations and was followed by a question-answer session regarding FAQs and basic doubts. In the second session, hands-on training was given to all the participants about the use of equipment like GPS, Compass, Rangefinder, etc and proper ways of walking a line transect. Furthermore, participants were also briefed about the right ways to place a camera trap and basic camera settings, including precautions necessary during the exercise.

Population Estimation of Tigers and Leopards: After a thorough sign survey, a camera trapping exercise was conducted to estimate the density abundance of tigers and

leopards in a 2 km2 grid-based framework. Camera trapping exercise was conducted in 1 or 2 blocks covering 3,230 grids across study areas in Vidarbha, Maharashtra. Camera trapping exercise of Tadoba-Andhari Tiger Reserve, Brahmapuri (Territorial) Forest Division, Umred-Paoni-Karhandala Wildlife Sanctuary, Pench Tiger Reserve, Tipeshwar Wildlife Sanctuary, Pandharkawda Forest Division (Territorial), Painganga Wildlife Sanctuary, Bor Tiger Reserve and Akola Forest Division have been completed. The second block of camera trapping of Melghat Tiger Reserve and Navegaon-Nagzira Tiger Reserve is ongoing.

Population Estimation of Prey: Along with camera trapping, line transect surveys were also carried out across study areas in Vidarbha, Maharashtra, to estimate the density of key ungulate species. Each transect line was surveyed during early morning hours for six consecutive days. The data collected from the above exercise is currently being processed.

NH44 Underpass Monitoring: 78 camera traps have been installed to monitor nine underpasses year-round on NH44 passing through Pench Tiger Reserve, Maharashtra. Important events captured in camera traps were communicated to the forest department. Regular patrolling of underpasses by researchers, field assistants and forest department staff is conducted.

Outputs and Outcomes: Comprehensive Monitoring: The project has established a robust protocol for the annual evaluation of tigers, co-predators, and prey densities. This sustained monitoring provides a crucial dataset for analyzing population trends, identifying potential threats, and informing conservation strategies.

Population Estimates: Through consistent data collection over the years, the project has generated reliable estimates of tiger, co-predator, and prey densities. This information is essential for assessing the ecosystem's health and understanding the predator-prey relationships within the landscape.

Trend Analysis: The multi-year data allows for the analysis of population trends for tigers, co-predators, and prey. This provides valuable insights into potential changes within the ecosystem, such as fluctuations in prey availability or the emergence of new threats. Early detection of trends allows for proactive conservation measures to be implemented.

Underpass Monitoring: Underpasses have yielded significant positive outcomes, aligning with its primary objective of facilitating safe wildlife movement and reducing conflict.

Translocation: The translocation of tigers aims to augment the current tiger population in NNTR and correct the male-biased sex ratio. Telemetry data will provide valuable insight into tigers' movement ecology, leading to better management strategies.

Report: Data collected in line transect and camera trapping exercises are being analysed to publish the 2024 Phase IV report.

RESEARCH ONGOING

WII

PAN INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITATS, CLOUDED LEOPARD

Funding Source
Ministry of Environment, Forest and Climate Change

Investigators
Dr Bilal Habib and
Dr Gopi G.V.

Researchers
Azam Khan, Daniel Miranda, Rameshwar Ghade and Tribhuwan Singh

Date of Initiation
December 2022

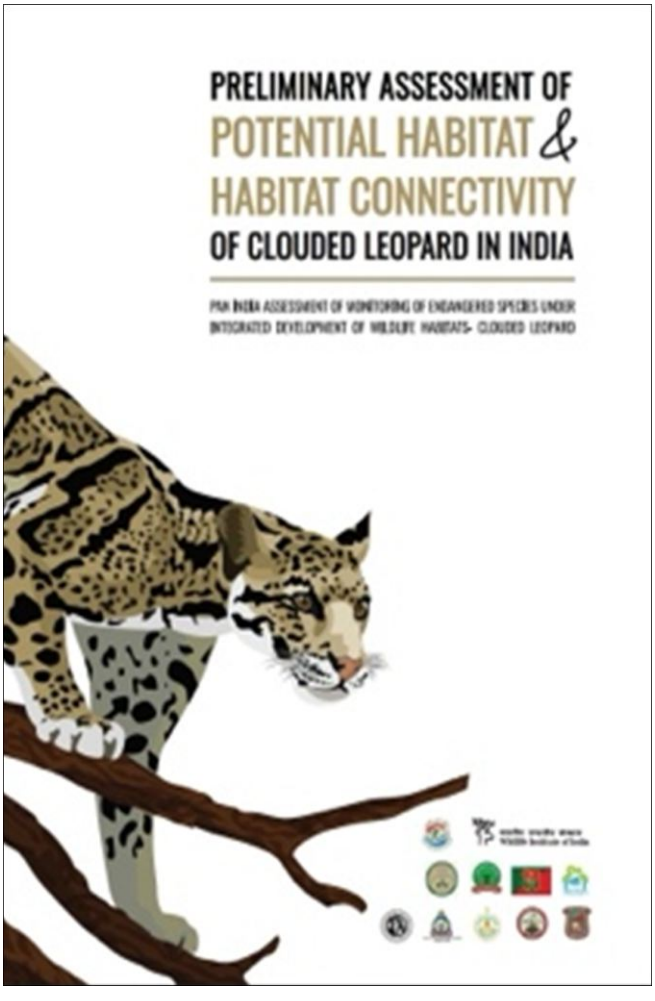
Proposed Date of Completion
December 2025

Objectives: The project has the following objectives: (i) To assess the current status of endangered species covered under the IDWH scheme - Clouded Leopard; and (ii) to develop long-term monitoring protocols for populations and habitat assessment of endangered species covered under IDWH scheme - Clouded Leopard.

Progress: The "Preliminary Assessment of Potential Habitat & Habitat Connectivity of Clouded Leopard in India" report was submitted on 14th March 2023. The output from this report was used to select high-suitability areas in our field sites for camera trapping exercises. The results of this report were also presented in IARS-WII 2023.

A research paper draft titled "The Neofelis connection: Investigating the habitat connectivity for clouded leopards, *Neofelis nebulosa* in Northeast India" was also submitted. This paper aims to model the potential habitat connectivity of the species within the Northeastern landscape of India. It also identifies conservation priority areas (bottlenecks). Camera trap deployment is on-going and is expected to be completed by July, 2024. Along with camera trapping, sign surveys and scat collection is also conducted. Faecal samples of felids were collected and sent to the lab.

Expected Outcome: The current camera trapping exercise results will give us an approximate population estimation of clouded leopards in northeastern India. The scat samples collected can give an insight into the diet and distribution of this species and other felids residing within these protected areas.



RESEARCH
ONGOING PROJECTS

WII

PAN INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITATS – RED PANDA (XV)

Funding Source
Ministry of Environment, Forest and Climate Change

Investigators
Dr Gopi GV and
Dr Bilal Habib

Researchers
Gaurav PJ, Meghna Limboo, Pooja Kumari, Pujan Pradhan and Roshme Borgohain

Date of Initiation
December 2022

Proposed Date of Completion
December 2025

Objectives: The objectives of the project are to (i) assess the distribution and abundance of Red Pandas in India; (ii) develop a monitoring protocol for the Red Panda survey; and (iii) assess and predict the habitat and distribution of Red Panda.

Progress: To gather the baseline information of this elusive species, Key informant surveys and Focal Group discussions were conducted in the fringe villages of Red Panda habitat areas with the semi-structured questionnaire sheet. The open and closed-ended questions were asked to gather information about their socio-economic status, human-wildlife conflict issues and the mitigation measures they were undertaking, perception of Red Pandas and awareness about its conservation status and Wildlife Protection Act, 1972.

The key informants during our survey were mostly Goan Bura, the village head man commonly known as GBs, Gram Panchayat member, hunters, trekkers, nature guides, herders, the targeted farmers who visit the forest frequently for the collection of NTFPs, forest department officials, people working in wildlife conservation and research scholars. In

Sign Survey- With inputs from the questionnaire survey and secondary literature, we scanned the animal trails for signs (direct sightings & indirect signs- scats, pug marks, foraging marks) of the Red Panda.

Camera Trapping- For camera trapping, 5 sqkm grid wise (with at least one camera in each grid), field surveys were conducted in the protected and non-protected areas of the states, Arunachal Pradesh, Sikkim and the Northern West Bengal along an altitudinal gradient of 2200m- 4000m. At each camera trap station, from a 10m radius circular plot environmental and habitat variables were collected pertaining to Red Panda. In Arunachal Pradesh, 187 camera traps have been deployed across 82 grids. In Sikkim, a total of 133 has been deployed over 86 grids and a sum of 226 camera traps have been deployed in both Darjeeling and Kalimpong districts of West Bengal covering 83 grids.

Outputs and Outcomes: Key Informant surveys: 421 key informants belonging to 158 villages were interviewed in the Anjaw, Tawang and West Kameng districts of Arunachal Pradesh with the semi-structured questionnaire sheet. In Sikkim, 130 respondents were interviewed from 58 villages. From Darjeeling and Kalimpong district of West Bengal 688 respondents were interviewed from 52 villages. A pelt of Red Panda was recorded from Tawang district of Arunachal Pradesh, during key informant survey. The data collected though these surveys is yet to be analysed.

Sign Surveys: A total of n=49 trails were walked systematically in the Anjaw, Tawang and West Kameng districts of Arunachal Pradesh with a total effort of 376.8 km in the potential Red Panda habitat during which 28 indirect signs of Red Panda were encountered. In Sikkim, 103 trails were walked covering a distance of 562.6 km resulting in 52 Red Panda signs at an encounter rate of 0.092 signs/km.

For the sign survey in Darjeeling and Kalimpong districts of West Bengal, a total of 65 trails of varying lengths were walked, covering a cumulative distance of 480 km. During these trail surveys, 160 signs of Red Panda were encountered (13 direct sightings and 147 indirect evidences), resulting in a sign encounter rate of 0.33 signs/km.

Camera trapping: In Arunachal Pradesh, 187 camera traps were deployed in the selected grids of 5 sqkm covering 82 grids, for a total of 6526 camera trap nights. 31 mammalian species were recorded from these camera traps with 20 independent captures of Red Panda with capture rate of 0.097(±0.037), 0.005(±0.233), and 0.001(±0.174) from Anjaw, Tawang and West Kameng districts respectively. We recorded the first photographic capture of Red Panda from Anjaw district.

In Sikkim, a total of 133 camera traps have been deployed covering 86 grids across different habitat areas. We retrieved 74 camera traps which were deployed for total effort of 5176 camera trap nights. A total of 52 species were recorded, including 32 mammals, 5 Galliformes, and 15+ bird species and 18 individual captures of Red Panda.

In West Bengal, out of 226 camera traps deployed covering 83 grids, a total of 89 camera traps (67-Darjeeling, 19-Kalimpong) were retrieved. Data from these 89 camera trap stations was analysed, yielding more than 20 mammalian captures and 135 independent captures (127-Darjeeling, 08-Kalimpong) of Red Panda over a combined trapping effort of 9186 camera trap nights (6147-Darjeeling, 3039-Kalimpong) corresponding to a Relative Abundance Index (RAI) of 2.06 ± 0.71 from Darjeeling and 0.26 per 100 trap nights from Kalimpong.

RESEARCH ONGOING

ASSESSING THE IMPACTS ON WILDLIFE IN CAPTIVITY AT NATIONAL ZOOLOGICAL PARK, NEW DELHI DUE TO THE PROPOSED DELHI-GURUGRAM-ALWAR-REWARI REGIONAL RAPID TRANSPORT SYSTEM TUNNELING WORK

Funding Source
National Capital Regional Transport Corporation (NRCTC)

Researchers
Dr Bharti Arora, Krishna Sharma and Mohit Singh

Date of Initiation
March 2023

Proposed Date of Completion
March 2026

Investigators
Dr Samrat Mondol and Dr R. Suresh Kumar

WII

Objectives: The project has the following objectives: (i) Assessment of behavioural responses and patterns of captive animals at National Zoological Park (NZP), New Delhi concerning exercising the construction project (i.e., underground tunnel of ~980 meters length at a depth of 25 meters) during its different phases of construction; and (ii) To assess the impact of the RRTS (Regional Rapid Transport System) corridor on the physiology of the species housed at Delhi Zoo during different stages of proposed construction work.

Progress: With the project's initiation in March 2023, we conducted an intensive literature review of the existing published work to understand the scope and different aspects of the proposed study. The team gathered background information about how anthropogenic noise and infrastructure construction affected the behaviour and physiology of different species in both captive and natural environments.

The alignment of the RRTS corridor was mapped to the coordinates of the NZP. This enabled the selection of species for the study based on the distance of the enclosures from the proposed tunnel route (10m, 30m, 50m, and 100m). A refined list of 13 species was finalized for the study, including four birds and 9 mammals (3 carnivores, 2 omnivores, and four herbivores) among 100 species housed at NZP. Reptiles were not included in this list as the reptile house at NZP is closed in the winter months from October to March.

The fieldwork was initiated after conducting an orientation workshop at NZP on 28th August 2023. This workshop played a key role in building rapport among the Wildlife Institute of India (WII) research team and the working staff, including the NZP zoo keepers. The objectives and scope of the project were discussed along with expected outcomes to understand the importance of the proposed study mutually.

The researchers were stationed at Delhi Zoo to collect behavioural data, and another team member was stationed in WII to prepare the laboratory for hormonal quantification and procure all the stress assay

quantification kits to conduct the assay. We conducted a pilot survey in October-November 2023, paid regular visits to NZP, and trained the keepers on collecting faecal samples.

Collection of behavioural (Indian Gray Wolf, Golden Jackal, Sloth Bear, Himalayan Black Bear, Swamp deer, Barking deer, Himalayan Goral, and Indian Bison) and faecal samples of herbivores (Swamp Deer, Barking Deer, Indian Bison, and Himalayan Goral) started in December by the researchers stationed at NZP. Furthermore, the samples were processed for hormone analysis in WII.

Outputs and Outcomes: As of 26 February 2024, 106 faecal samples of herbivores have been collected. All of these samples have been transported from NZP to the lab at WII, where they are being processed. An assay standardization, i.e., parallelism and accuracy, was conducted for each herbivore species before the stress hormone quantification was performed.

The analyzed outcome helped facilitate and build the baseline for selected species in captivity before the commencement of tunnel construction. A similar procedure will be continued during all the phases of construction (during and post-construction) to witness any changes in the stress of the selected species housed at NZP.

The ethograms for all the above-mentioned behavioural species were constructed to record and categorize behaviours using scan sampling.

RESEARCH ONGOING PROJECT

SACON

TAXONOMIC CHARACTERISATION OF SELECT GALLIFORMES OF INDIA USING FEATHER MORPHOMETRICS AND DNA FOR APPLICATION IN WILDLIFE FORENSICS

Funding Source
DST-SERB, Govt. of India

Researcher
Bhawani Sabat

Date of Initiation
November 2022

Investigator
Dr Ashutosh Singh

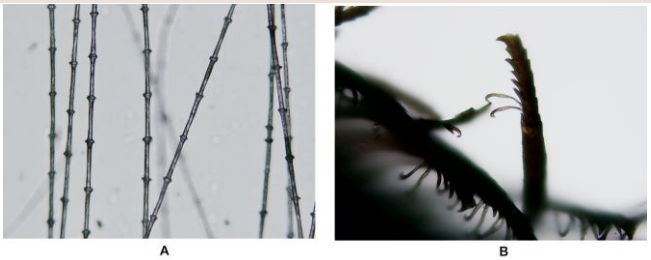
Proposed Date of Completion
November 2024

Objectives: The objectives of the project are to (i) develop a feather characteristics database of select Galliformes of India, and (ii) develop a DNA database (Mitochondrial) of select Galliformes of India.

Progress: Feather microstructures of two Indian and three exotic Galliformes species, i.e., Indian Peafowl, Kalij Pheasant, Silver Pheasant, Golden Pheasant, and Lady Amherst Pheasant, were analysed using Light Microscopy and Field Emission Scanning Electron Microscopy (FESEM). Macroscopic characteristics, such as wing, tail, contour, semiplume, down feathers and barbs from three interval sections, i.e., Proximal, Intermediate, and Distal, were examined. A part of the second objective was to process the collected unfertilised eggs for genomic DNA isolation and PCR amplification. Additionally, a questionnaire survey was conducted in 15 different localities in Koraput District, Odisha, to enlist the local tribals' traditional ethnobiological practices associated with Galliformes.

Outputs and Outcomes: Results indicate that plumulaceous and pennaceous barbs at 40X magnification, all species have small to long barbs, respectively, with varying colours and patterns. Considering the plumulaceous barbules at 400X magnification, the pennulum of barbules bears different types of nodes, such as expanded nodes, spined nodes, ring-like nodes, multiple nodes, and pronged nodes. Expanded and Spine nodes are present all over the proximal part of the barbules. Prominent ring nodes are present only in the proximal venule. These ring nodes get detached from the original site and slip off to the adjacent nodes to form multiple nodes called multiple annuli (2-5). The nodes are dark and lightly pigmented, whereas the internodes show dark, stippled, and light pigmentation. Pronged nodes are visible on the distal tip of the distal barbules. Considering the pennaceous barbules at 100X and 400X magnification, all species have short to medium barbules. Different colours of barbules, such as brown, orange, transparent, and dark brown, were observed due to coloured flight & contour feathers. The distal barbule showed various microstructures like leaf-like ventral teeth, hooklets, ventral cilia, dorsal cilia, and distinct nuclei. In contrast, the proximal barbules showed microstructures such as plates, distinct nuclei, teeth-like ventral teeth, dorsal spine, and dorsal flanges. Further, questionnaire surveys were also conducted from different markets and tribal areas to gather information on ethnozoological practices common in areas of the biological parts of Galliformes. In many parts of Odisha, out of 13 Galliformes species present, eight of them are used in 23 different ways to treat 15 different types of disease by using six various Galliformes- body parts. The compiled database will be helpful to law enforcement agencies for investigating/ examining seizure cases.

Milestone: So far, the Field Emission Scanning Electron Microscopy (FESEM) feather database has been generated for seven Indians and three exotic Species. A new observation regarding the Lady Amherst Pheasant flight feathers showed microstructures like hook-lets on both the proximal and distal barbules nearer to the distal tip. A variation arose from the bottom portion where the original structure of proximal barbules gradually showed a structure similar to the opposite distal barbules.



*Observation of **(A)** Ring nodes on plumulaceous barbules of body contour and **(B)** Hooklets on the pennaceous barbules of semiplume of India Peafowl Pavo cristatus under light microscope*

RESEARCH
ONGOING PROJECT
SACON

ECOLOGICAL ASSESSMENT OF ENDEMIC AND THREATENED LAUGHINGTHRUSHES OF THE WESTERN GHATS TO DEVELOP CONSERVATION PLAN FOR SECURING THEIR POPULATION AND HABITATS

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Investigators
Dr S. Babu,
Dr R. Jayapal, Director (AIWC) and Shri Anoop (KFD)

Researchers
Sujin NS and M. Kishore

Date of Initiation
December 2019

Proposed Date of Completion
December 2024

Objectives: The objectives of the project are to (i) assess the structure and composition of vegetation in different habitats of Laughingthrush and study the phenology of food plants of Laughingthrushes; (ii) elucidate the distribution pattern and abundance Banasura Laughingthrush, Nilgiri Laughingthrush and Ashambu Laughingthrush in the Western Ghats; (iii) identify the factors that influence the habitat, nest site selection of these Laughingthrushes; and (iv) evaluate the extent of anthropogenic pressures on the Population of the laughingthrushes in the Western Ghats and develop a conservation plan for these species to secure their Population and habitats.

Progress: The first and foremost step towards the conservation of range-restricted and threatened species could be the identification of the distribution range and the proximate causes that influence the current distribution range of the species. Detailed Population and other ecological studies are needed in the endemic and threatened Montecincla genus case. No ecological assessment on the laughingthrushes of the Western Ghats has been undertaken except for a few taxonomic and distribution studies. Considering the threat level, this project tries to fill the lacuna in studies about three endemic species of *Montecincla* laughingthrushes (Banasura Laughingthrush-Endangered, Nilgiri Laughingthrush- Endangered and Ashambu/Travancore Laughingthrush-Vulnerable).

We employed a single-season, single-species occupancy framework to estimate occupancy. The fixed-radius point count method was also conducted to estimate the abundance of laughingthrush. Nest site selection by the laughingthrushes was examined by comparing nest sites with randomly selected sites. Major vegetation types utilised by laughingthrushes were identified. Vegetation assessments within these habitats have been initiated. Occupancy surveys using the single-season, single-species framework was completed for Banasura and Nilgiri Laughingthrushes, while it was 50% for Ashambu Laughingthrush. Intensive sampling to estimate abundance was initiated at select locations for Banasura and Nilgiri Laughingthrushes. Currently, we are monitoring nests of the Nilgiri Laughingthrush using camera traps. A total of 34 nests have been observed so far. Major threats faced by laughingthrush populations in the Western Ghats and other high-elevation endemic birds of the southern Western Ghats are documented.

Outputs and Outcomes: The extent of occurrence and area of occupancy for both the Nilgiri and Banasura Laughingthrushes in the Western Ghats were delineated. Key factors influencing the occupancy of these species were identified. Additionally, the nest site selection of the Nilgiri Laughingthrush, along with the factors driving this selection, was assessed. The study also identified the primary anthropogenic threats impacting the populations of Laughingthrushes.

Nilgiri Laughingthrush and its nest in Upper Nilgiris

Milestone: The study has created the first baseline documentation of this endemic bird that would help the forest department design future conservation plans for the high elevation of the Western Ghats.

RESEARCH ONGOING PROJECTS

SACON

NON-INVASIVE APPROACH TO UNDERSTANDING THE HABITAT USE, ACTIVITY REGIME, AND MOVEMENT ECOLOGY OF INDIAN ROCK PYTHON, *PYTHON MOLURUS* FROM TWO SELECT LOCATIONS IN INDIA

Funding Source
DST-Science and Engineering Research Board, Govt. of India

Investigators
Dr Aditi Mukherjee,
Dr H.N. Kumara and
Dr Manchi Shirish S.

Researchers
Siddhesh Sitaram Bhor,
Singh Gaurav Sanjay,
Gourav Sonawane and
Avimanyu Mukherjee

Date of Initiation
January 2022

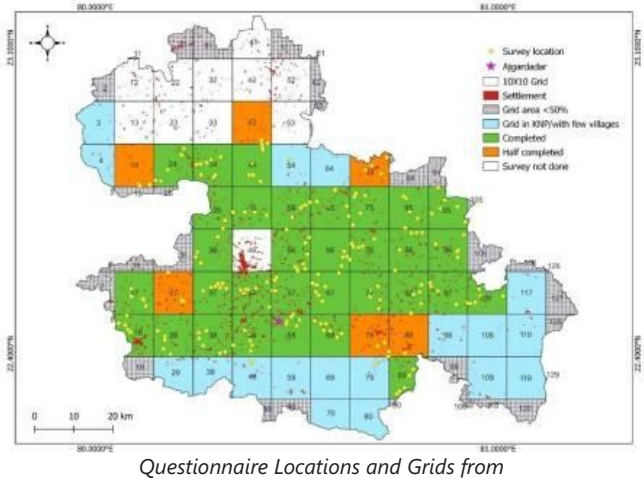
Proposed Date of Completion
January 2025

Objectives: The objectives of the project are to (i) assess and compare habitat use, suitability, and activity regime of *Python molurus* at two different biogeographic regions; (ii) standardise individual identification techniques for *Python molurus* using non-invasive methods of identification; and (iii) assess movement and patterns of survival rate of *Python molurus* individuals released inside the park based on non-invasive methods of individual identification.

Progress: During the second year of the study in Mandla, MP, we focused on understanding the distribution of pythons in the entire Mandla region apart from the famously known spot of Ajgar Dadar and the local Population's perceptions towards them. We divided the whole Mandla Range, spanning 5,800 sq km, into 10x10 km grids. We accessed and surveyed 49 grids using a semi-structured questionnaire.

Data collection in Keoladeo National Park, Rajasthan, began in April 2023 due to delayed permissions from the forest department. Camera trapping was conducted on a rotational basis at 29 burrows to monitor python activity and other species. Dorsal Blotch images of pythons (n=48) were collected from those locations using camera trapping, COAT Setup, and direct photographs. Blotch data for eight pythons encountered outside burrow sites was obtained using direct pictures. We collected basking behaviour and thermal data from 12 burrows with pythons using SEEK thermal cameras and HTC easy log for ambient data. Additionally, at 28 burrows, we completed vegetation sampling and collected burrow morphometric data following standard protocol. To study the prey base of pythons, camera trapping, Sherman trapping, line transects, and point counts are being conducted throughout the park following specific protocols.

Outputs and Outcomes: 212 surveys were conducted in Mandla, and the responses were collected from 507 individuals in 38 grids. The most significant representation came from the 21-50 age group, with 251 individuals, followed by 243 individuals from 51+ age groups and others. Farmer's representation was highest at 444, followed by labourers (19), shepherds (16), students (13),



Questionnaire Locations and Grids from Mandla, Madhya Pradesh

Python Blotch Images and COAT Setup, Keoladeo National Park

shopkeepers (10), and one sarpanch. Of the respondents, 442 reported python sightings in their locality. In Keoladeo National Park, we identified 39 python burrows, comprising 17 new burrows and 22 from the previous study period. Among these, pythons were in 25 burrows. Dorsal blotch images of pythons (n=48) and additional blotch data for eight pythons were collected. We also gathered basking behaviour data for 11 individuals. Vegetation sampling and burrow morphometric data were collected at 28 burrows.

Milestone: The team identified 39 python burrows in Keoladeo National Park, including 17 new burrows and 22 from previous studies.

RESEARCH ONGOING PROJECTS SACON

LONG-TERM MONITORING OF BIRD DIVERSITY AND POPULATIONS IN THE ANDAMAN AND NICOBAR ISLANDS

Funding Source
Ministry of Environment, Forests and Climate Change through Nature Conservation Foundation

Investigators
Dr Manchi Shirish S (SACON) and Dr Robin VV, IISER, Tirupati

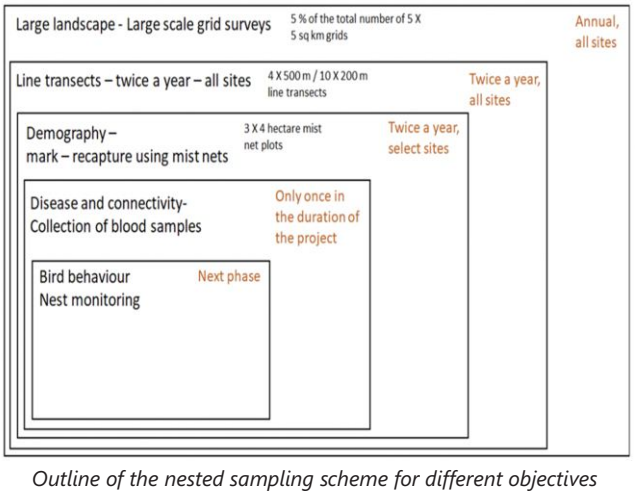
Date of Initiation
February 2020

Proposed Date of Completion
February 2025

Objectives: The project's objective was to answer the following questions: (i) How do individual species and bird communities respond to environmental gradients (altitude, habitat alteration, land-use regime) at different sites, and how are these responses similar or different across landscapes? (ii) Over time, what are the changes in individual species and bird communities across varied landscapes, and how are they related to environmental changes, including climate change and associated vegetation and land-use dynamics?

Progress: The Ministry of Environment, Forest and Climate Change is implementing India's Long-term Ecological Observatories (LTEO) program to monitor bird diversity and populations in six landscapes. The program aims to understand climate change's impact on bird communities, habitat changes, and demographic processes. The initiative involves semi-structured data collection and data analysis. In the Andaman and Nicobar Islands, a lack of valid permissions did not allow the commencement of the project work at the identified locations in South Andaman. During the financial year 2023-24, The ministry conducted a review meeting and assured continued support for the project. Since no grants were released, no project activities could be undertaken during the reporting period.

Outputs and Outcomes: Since no project work was undertaken because of the lack of permissions and funds, there are no outputs or outcomes to mention.



Outline of the nested sampling scheme for different objectives from large scale to small scale

SACON RESEARCH ONGOING PROJECTS

BIRD WILDLIFE HAZARDS TO AIRCRAFTS IN SELECT INDIAN CIVIL AIRFIELDS OF AIRPORTS AUTHORITY OF INDIA – PHASE II

(Kozhikode International Airport, Malappuram, Lal Bahadur Shastri International Airport, Varanasi)

Funding Source
Airports Authority of India

Investigators
Dr P. Pramod and
Dr P.V. Karunakaran

Researchers
Dr P.N. Anoop Raj, P.P. Ashiq, Adithya, Arjun Suresh and Lini Kaladharan

Date of Initiation
February 2022

Proposed Date of Completion
February 2025

Objectives: The objectives of the project were to (i) study the community structure of birds and animals in the airfield and neighbouring areas and identify the prominent species involved in the conflict, (ii) evaluate the land use and land cover in the neighbourhood of the airfield (10 km radius) and the community structure of the plants in the airfield, the habitat of the birds of the area, (iii) study the factors affecting bird/animal movements and other behavioural aspects to identify the factors responsible for strikes, and (iv) develop comprehensive and integrated strategies to mitigate bird strikes at the airfield.

Progress: At both airports, the annual project report has been submitted, and monitoring visits are ongoing. The airport has started implementing the recommendations of the report. The progress of the implementation of recommendations were recorded during each visit. Additionally, in Calicut, a plan is in place to monitor the movement of Golden Jackals within the airport premises, which is an important aspect of managing wildlife hazards to ensure aviation safety. At Varanasi, bird-related data is regularly being collected to evaluate the effectiveness of the mitigation strategies.

Varanasi airport - view from apron

Outputs and Outcomes: Airport operators are officials sensitised about the seriousness of wildlife hazard management. The concerned authorities give priority to waste management around the airport. The recommendations of the project final reports are being implemented by the authorities.

Milestone: Recommendations based on the findings are being implemented in Calicut and Varanasi Airports. Researchers are continuing their support to the AAI officials in the implementation of the recommendations.

SACON RESEARCH ONGOING PROJECTS

SPATIOTEMPORAL HABITAT ECOLOGY OF SMOOTH-COATED OTTER AND ASIAN SMALL- CLAWED OTTER IN RIVER BASINS OF SOUTHERN INDIA

Funding Source
Department of Science & Technology, INSPIRE

Investigator
Dr Riddhika Ramesh

Researcher
Ankit Moun

Date of Initiation
September 2021

Proposed Date of Completion
August 2026

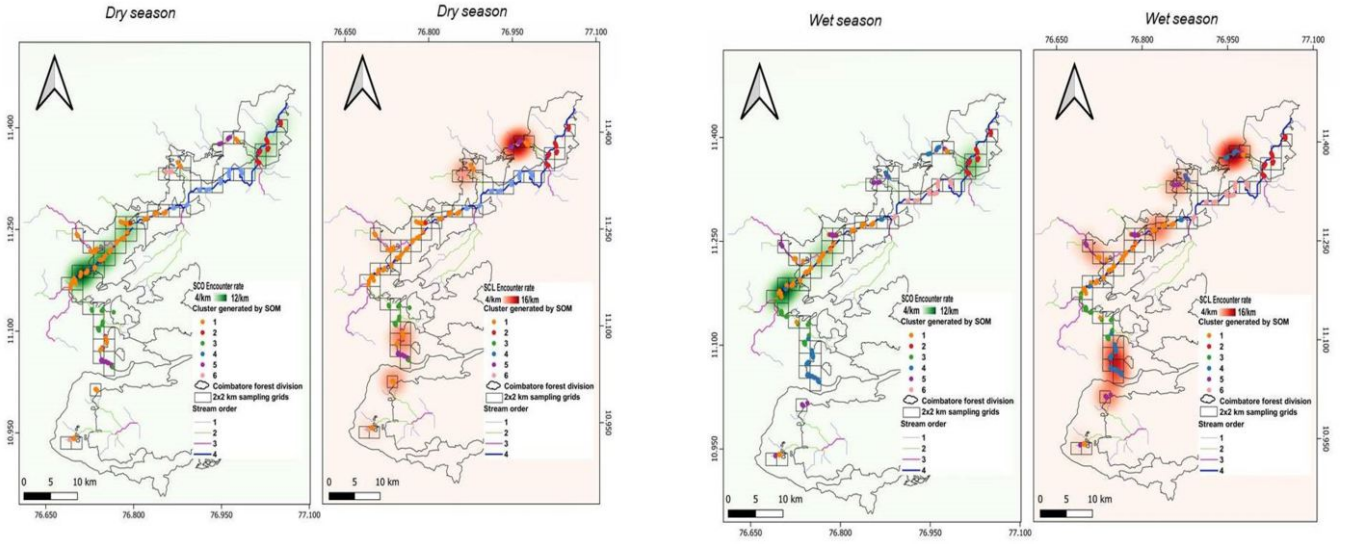
Objectives: In this study, we aim to understand site-specific patterns of habitat ecology of otters from seasonal otter sign surveys and camera-trapping along fixed riverine routes in the Bhavani-Noyyal river basin of Coimbatore Forest Division. On a large scale, we aim to predict otter species distributions' current and future probabilities using niche models. The objectives of the project are to (i) assess the spatiotemporal habitat use of smooth-coated otter and Asian small-clawed otters, (ii) predict the seasonal habitat suitability of both species of otters, and (iii) assess the impact of climate and land use change on both species of otters in Peninsular river basins.

Progress: The data analysis was completed for the first objective, where we applied self-organising maps to reduce the sizeable multivariate field data on environmental parameters (water quality, hydrology, land cover, riparian vegetation and human disturbances) into habitat clusters. Auto-kriging methods were applied to interpolate the environmental data and develop seasonal maps for each environmental variable to achieve the project's second objective. Then, various species distribution models were used to generate the ensemble habitat suitability maps. This analysis for the smooth-coated otter was completed in both seasons.

For the third objective, around 60 otter occurrence records were compiled for both species of otters from field surveys and secondary data sources. This compilation is still being processed as it is hoped to collate adequate otter occurrence records in each river basin. With the help of the water quality data from India's Water Resource Information System (India-WRIS) for select river basins, the aim is to characterise the water quality data using artificial neural networks and relate the characterised river basins to otter occurrence.

Outputs and Outcomes: The Asian small-clawed otter frequently used lower- order streams, while the smooth-coated otter preferred higher-order streams. We found that the self-organising map algorithm characterised the large multivariate environmental data (32 variables) into six habitat clusters representing a gradient of habitat conditions. The random forest algorithm identified forest cover, water quality parameters, stream & ground substratum, and riparian habitat heterogeneity as influential factors along streams in high-quality habitat clusters. The low-quality habitat clusters had streams with a high proportion of agriculture, weed cover and anthropogenic disturbance as influential factors in the random forest algorithm. The low-quality habitat clusters included the 4th stream order of the Bhavani River, where we recorded no evidence of both species of otters in both seasons. The high-quality habitats were found along river confluences where the Bhavani River meets the Siruvani and Kondugarapallam rivers in Kotathura town. We found that the sign evidence of the Asian small-clawed otter was more spatially distributed in the wet than the dry season.

Milestone: Through this study, we were able to develop fine-scale seasonal habitat suitability maps for sympatric species of otters at a regional scale. The study findings and data have helpful implications for the National Plan for Conservation of Aquatic Ecosystems, Water Conservation policies, and Climate change policies.



Sign encounter rates of Smooth-coated otter (SCO) and Asian small-clawed otter (SCL) across six habitat clusters along the tributaries of the Bhavani-Noyyal River in the dry and wet seasons

RESEARCH ONGOING PROJECTS

SACON

INTERSPECIFIC INTERACTIONS AND NICHE PARTITIONING AMONG PRIMATES AND SELECT SPECIES OF BIRDS IN THE TROPICAL FORESTS OF NORTHEAST INDIA

Funding Source
Science and Engineering Research Board (SERB)

Investigators
Dr H.N. Kumara, Dr Mewa Singh and Dr Jihosuo Biswas

Researcher
Dhiraj Kumar Das

Date of Initiation
September 2023

Proposed Date of Completion
September 2026

Objectives: The objectives of the project are to (i) study the interspecific interactions among primates and select species of birds, (ii) determine the food niche breadth of interacting species of primates and birds, and (iii) assess niche overlap and partitioning, for habitat use and food items, among primates and select species of birds.

Progress: Obtained permission from the Forest Department, Assam, to conduct the study by March 2023 and initiated the fieldwork. We obtained the shapefile of the sanctuary, and 0.5 km2 grid cells were overlaid on the map, resulting in 46 grid cells. Of that, we selected ~35 grid cells to sample for the occupancy of primates. We sampled ~15 grid cells by the end of March 2023, recorded Hoolock Gibbon, *Hoolock hoolock*, Capped Langur, *Trachypithecus pileatus*, Rhesus Macaque, *Macaca mulatta*, Pig-tailed Macaque, *Macaca nemestrina*, and Stump-tailed Macaque, *Macaca arctoides*.

Outputs and Outcomes: Spatial occupancy of primates was initiated, and primate groups for the detailed study were selected.

Team at Gibbon Wildlife Sanctuary

RESEARCH ONGOING PROJECTS

SACON

FUNCTIONAL ECOLOGY OF VERTEBRATE SCAVENGING COMMUNITY IN THE ARAVALLI HILL RANGES OF HARYANA

Funding Source
Council of Scientific & Industrial Research, Association for Tropical Biology & Conservation (ATBC) Seed Grant

Researcher
Hitesh Kumar

Date of Initiation
November 2022

Proposed Date of Completion
October 2027

Investigator
Dr Riddhika Ramesh

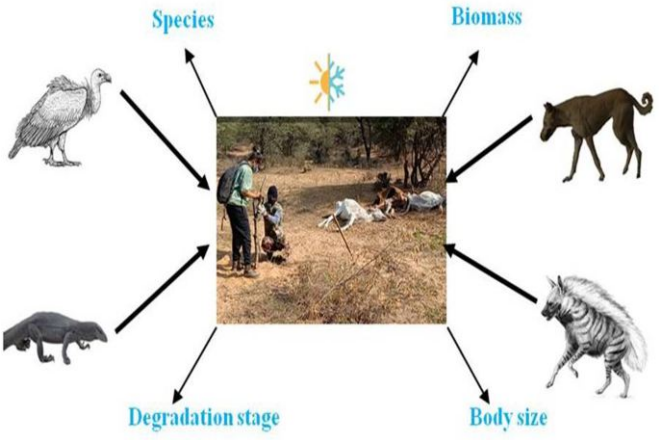
Objectives: The project's objectives are to: (i) assess the carcass (wild and livestock) utilisation by vertebrate scavengers. In this objective, we aim to relate carcass characteristics like species, body size, age, and degradation stages with visitation rate/frequency by scavengers. (ii) To assess the spatio-temporal inter- species or intra-species interactions among vertebrate scavengers. (iii) study local people's perception of the ecosystem services the vertebrate scavenger community provides.

Progress: The study sites cover the non-protected western region of the Aravalli hills in the Mahendragarh, Charkhi Dadri, and Rewari districts of Southern Haryana. Due to funding and logistic constraints, we have intensively surveyed Mahendragarh and a few locations in Rewari districts in summer and winter. There are 20 gaushalas in our intensive study site and nearly 30 village clusters near carcass dump sites. The region has extreme weather conditions in summer and winter, and it is a rainfall-deficient zone that falls in the semi-arid ecosystem. The land use patterns show that the region has high agriculture cover (70-80%) and relatively less forest cover (2-5%). Stone crushing, illegal mining using high- intensity blasts, deforestation, linear infrastructure, environmentally insensitive spatial planning and lack of legislative protection for biodiversity in the region are the major threats to the endangered scavenger species in the Aravalli's landscape.

Ten regular carcass provisioning sites managed by Gaushalas and local panchayats have been monitored, where the dumping of livestock carcasses was frequent, i.e., 5-7 carcasses/week. Apart from these common carcass provisioning sites, we have monitored 50 single carcasses (16 in summer and 34 in winter). We have conducted survey questionnaires of 120 respondents, mostly the local agropastoral communities. Through the questionnaires, the local people's perceptions and knowledge related to vertebrate scavengers were examined. The socio-demographic traits and the man-animal conflicts that influence their perceived value of scavengers' ecosystem service provisioning index were assessed.

Outputs and Outcomes: Based on the camera-trapping data, we have recorded nearly 25 species of vertebrate scavengers (mammals, birds and reptiles) visiting the carcass dump sites. Feral dogs, golden jackals and striped hyenas were the most dominant within the scavenger community. A large proportion of respondents perceived vultures and raptors as beneficial for scavenging services and existence value. In contrast, mammals such as feral dogs, leopards, striped hyenas, and wild boar were perceived as beneficial and harmful due to livestock predation, human attack, and crop damage. Without body-size differences, overall, the single carcasses were wholly consumed on an average in seven days, indicating that the facultative scavengers are providing ecological functions and have a high carcass biomass removal rate through carcass scavenging in areas that lack obligate scavengers (i.e. vultures) in Southern Haryana. Feral dogs avoided carcasses that had frequent visitation by leopards, suggesting that the top-down effects drive variations in carcass utilisation within the large body-sized scavengers.

It was found that single carcasses were "ephemeral resource patches" for select scavenger species. In contrast, the common carcass provisioning sites provide high biomass, thereby supporting higher vertebrate scavenger richness than single carcasses. The data shows that proper management of common carcass dump sites through identifying diseased livestock by the Gaushala authorities would help maintain the overall ecosystem health for the long-term conservation of a healthy population of vertebrate scavengers.



Carcass monitoring using camera traps in Mahendragarh, southern Haryana

©SACON

Striped hyena scavenging a Nilgai carcass in Sareli village in Mahendergarh Haryana

Milestone: The study brings the first-ever novel insights into the functional role of vertebrate scavengers through their interactions in the rapidly degrading, non-protected forests of the Aravalli hill range in Southern Haryana. Carcass provisioning through carcass disposal practices by the local agropastoral communities provides continuous resource availability for a sizeable facultative scavenger guild in semi- arid ecosystems in the Aravalli landscape. Through this preliminary data, we will expand the spatial coverage of our sampling sites in the state, including forested areas of Northern Haryana that have considerable carcass visitation by vulture species. Hence, a comparative understanding of the functional ecological aspects of scavengers at carcasses with and without vulture visitation would provide a complete understanding of the functional role of the vertebrate scavenger assemblage.

RESEARCH
ONGOING PROJECTS

SACON

EVALUATION OF SUITABLE HABITAT OF INDIAN GAUR POPULATION WITH SPECIAL EMPHASIS ON INVASIVE SPECIES AND WILDFIRE IN BANDIPUR TIGER RESERVE, KARNATAKA

Funding Source
DST Inspire Fellowship, Government of India

Date of Initiation
November 2022

Proposed Date of Completion
November 2027

Investigator
Dr T. Ramesh

Researcher
Subhadra Barik

Objectives: The objectives of the project are to (i) assess the role of landscape configuration on habitat suitability of Gaur in Bandipur Tiger Reserve, (ii) assess the impact of Lantana camara invasion on Gaur population, and (iii) assess the effect of forest fire on Gaur population.

Progress: In-depth knowledge about species' response was required to landscape habitat compositional change, for which we need information on the current distribution and suitable habitats of Indian gaur in Southern India. Therefore, this study was initiated at a major gaur conservation site in Southern India, i.e., Bandipur Tiger Reserve (BTR). No detailed scientific study is available in the study landscape documenting the habitat suitability of gaur with reference to the effect of invasive species like Lantana and forest fire. These two have emerged as major concerns in wildlife conservation, particularly in tropical regions. Therefore, we framed this study to assess the

impact of Lantana and wildfires on the habitat suitability of gaur in BTR.

For this reporting period, the currently suitable habitats of Indian gaur were mapped using explanatory variables. The study was conducted using a systematic ecological grid-based approach from January to December 2023. The field data (i.e., vegetation data & species occurrence data) and the spatial data were obtained from the field and the available secondary resources. We then accounted them together to acquire the final inference about the current suitable habitat for gaur in BTR. We used Random Forest models to analyse the data.

Outputs and Outcomes: It was found that a total of 40.56% of the area is high,21.21% is moderate, and 38.21% of the area is least suitable for Indian gaur in BTR. The % shrub cover, % herb cover, habitat heterogeneity, and density of waterholes were found as some of the important variables explaining the habitat preference of gaur in BTR. The presence of gaur positively correlated with the percentage of grass, herb and shrub coverage in BTR. The study revealed a positive association between the number of waterholes present within an area in BTR and the presence of gaur. A negative association between the presence of gaur and canopy coverage was also found.

Milestone: The study recommends Lantana eradication and dynamic water supply to sustain a viable gaur population inside Bandipur Tiger Reserve. The study is useful for habitat management of large herbivores and large carnivore species in Bandipur Tiger Reserve.

SACON RESEARCH EXTERNALLY FUNDED RESEARCH PROJECTS

THE CORMORANT OCEANOGRAPHY PROJECT – EXPANDED RESEARCH AS PART OF THE DISTRIBUTED, AUTONOMOUS, SCALABLE, HYDROGRAPHIC CHARTING AND METOC SAMPLING (DASHCAMS) DRI

Funding Source
Oregon State University

Date of Initiation
February 2022

Investigator
Dr Mahendiran Mylswamy

Proposed Date of Completion
December 2026

Objectives: The project aims to monitor cormorant species' movement patterns using biologging techniques.

Progress and Outputs: The cormorant survey was conducted from September 2022 to February 2023 along the east coast of Tamil Nadu. More than 51 main sites have been identified for the presence of cormorant species along the east coast of Tamil Nadu. The Little Cormorant and Indian Cormorant were widely distributed along the coast and interior areas of Tamil Nadu. The Great Cormorants were sighted at two sites as migrants to this region. Further, we suggested some hypothetical testable ideas about the nature and causes of breeding failure at some substantial nesting grounds of cormorants.

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The roosting site of the cormorant species (all three species, namely Little Cormorant, +Indian Cormorant, and Great Cormorant, are seen in the picture) is in a wetland in Kanyakumari district.

RESEARCH INITIATED PROJECT

MANAGEMENT EFFECTIVENESS EVALUATION OF NATIONAL PARKS AND WILDLIFE SANCTUARIES IN INDIA

Funding Source
Ministry of Environment, Forest and Climate Change

Researchers
Dr Avilekh and Ananya Das

Date of Initiation
April 2023

Proposed Date of Completion
March 2025

Investigator
Dr Gautam Talukdar

WII

Objectives: The objectives of the project are to (i) assess the management efficacy of 116 National Parks and Wildlife Sanctuaries in the country, and (ii) provide valuable insights into their management systems and practices.

Progress: The Constitution of Independent Regional Expert Committees and communication with Chief Wildlife Wardens were done. An inception cum planning workshop with Regional Expert Committees was organized on September 2023 at India Habitat Centre, Delhi. Active field visits began in October and are still ongoing for 25 National Parks and Wildlife Sanctuaries.

Outputs and Outcomes: Report writing will commence once all the field visits have been completed.

Milestone: 60 National Parks and Wildlife Sanctuaries have been evaluated so far.

RESEARCH INITIATED PROJECTS

STUDY ON THE STATUS, HABITAT AND CONSERVATION OF INDIAN GREY WOLVES AND ASSOCIATED CARNIVORES AT KAPPATHAGUDDA WILDLIFE SANCTUARY AND OTHER FOREST IN GADAG DIVISION

Funding Source
Gadag Division, Karnataka Forest Department

Researcher
Supriya Hangal

Date of Initiation
April 2023

Proposed Date of Completion
March 2026

Investigators
Dr Salvador Lyngdoh and Smt. Dipika Bajpai

WII

Kappathagudda Wildlife Sanctuary

Indian Grey Wolf captured during camera trap survey

Objectives: The objectives of the project are to (i) determine the status and population of Wolves in Gadag, Karnataka and establish baseline information on key species of prey and predators; (ii) determine the interaction of Wolves and other intra-guild predators in terms of food resources; (iii) examine human drivers and prey base with respect to conservation of Wolves; and (iv) capacity building of frontline staff with respect to ecology and conservation of wolves and with respect to latest monitoring techniques for wildlife.

Progress: The study aimed to document the status and distribution of mammalian fauna and also provide their estimates of diversity, encounter rate, and abundance in Kappathagudda Wildlife Sanctuary, Gadag division, with intensive surveys conducted across 23 beats, using line transect and camera trap and socio-economic survey methods. Line transects were laid across the Sanctuary to study the prey-predator abundance, with a total effort of 230 km with five replicates. Sign surveys were conducted for a 2-8 km distance, covering 331.25 km across all the beats for collecting carnivore data. Direct signs like sightings and indirect signs such as scat, pug marks, scrape marks, calls, and kills of mammals were recorded with their GPS coordinates.

Research team interviewing the shepherds during socio-economic survey

Paired Camera traps were deployed in 48 locations, based on active animal trails, vantage points, and strategic locations based on earlier sign surveys. Camera traps were set to operate, with a total trap effort of 1,440 days. Camera trap surveys were done mainly to understand the activity pattern and relative abundance of mammals. A socio-economy survey with an open-ended questionnaire was conducted to understand human-wolf interactions in the study area.

The workshops were conducted to train the forest department staff with field methods and techniques such as line transect, sign survey and camera trapping, which were used during the study.

Outputs and Outcomes: A total of 19 mammalian species were recorded from the Kappathagudda sanctuary, which includes four Ungulates, two Primates, three Canids, three Felids, two Viverrids, one Hyaenid, one Herpestid, one Leporid, one Suidae, and one Hystricidae species.

The encounter rate (EN) per kilometre was calculated for all the mammalian species based on the sign survey and line transects data. The highest rate was for the Golden Jackal (0.42 ± 0.14), followed by the Indian grey Wolf (0.25 ± 0.02), and the lowest rate was for Chinkara (0.02 ± 0.01) and Black-naped Hare (0.01± 0.006).

The relative abundance index (RAI) for all mammalian species captured in the camera traps was calculated per 100 trap nights. Among which Jackal (23.20 ± 7.73) and Porcupine (11.54 ± 4.19) were the highest and lowest being Indian grey Wolf (0.46 ± 0.23), Leopard (0.31 ± 0.19) and Palm civet (0.09 ± 0.09). The activity patterns of mammalian fauna, such as the Jackal, Jungle cat, Porcupine, Small Indian civet, Wild pig, and striped Hyena, were analyzed using R analysis. The findings revealed distinct activity trends among these mammalian species, while the majority of mammals exhibited nocturnal behavior, Jackal

and Jungle cat displayed diurnal activities occurring notably from 12 am to 6 am. Porcupines show more crepuscular behavior from 8 pm to 2 am, and striped hyena exhibited nocturnal activities.

Socio-economic survey conducted in 70 villages, with a total of 260 respondents data shows that the human-wolf conflict is more in the fringe area as compared to the forest area, which might be because of the scarcity of wild prey for the wolf. Socio-economic surveys reveal that the Wolf is dependent on domestic livestock nearly same in all the beats; however, there is a slight seasonal variation with respect to the movement of shepherds.

Milestone: Integrated socio-economic surveys, camera trap and line transect surveys and field observations reveal that the major threats for Wolves are habitat degradation, human disturbance, dogs and diseases. Thus, further studies will help to identify causes and recommend action to be taken.

RESEARCH INITIATED PROJECTS

WII

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITAT PROGRAM (IDWH) – JERDON'S COURSER

Funding Source
National CAMPA Authority

Researcher
Pavithra Ganesh

Date of Initiation
May 2023

Investigators
Dr Sutirtha Dutta,
Dr Suresh R Kumar,
Dr P Jegannathan

Proposed Date of Completion
December, 2024

Objectives: The project has the following objectives (i) Develop an approach to assess the species' presence, occupancy, and abundance/index; (ii) Assess the species' occurrence and local usage in its last known habitat (SLWL) and other potential habitats elsewhere in its range.

Progress: Literature review for mapping the historical records of the species has been completed. Systematic camera trapping was carried out intensively to detect the species' presence in its last recorded location,Sri Lankamaleswara Wildlife Sanctuary. Around 380 points have been generated with 250 sq m grid size across the potential habitat. Across these points 70 units of camera traps were deployed in a staggered manner from October 2023 to June 2024. Of these points, 250 survey locations were actively camera-trapped for a 20-day period each within the specified timeframe. Vegetation data was also quantified at all the camera-trapped locations. Additionally, Field surveys were carried out in the nearby scrub habitat of Madanpally and Gandikota Reserve forests to identify other potential regions.

Outputs and Outcomes: Habitat quantification of the Lankamalla Sanctuary along the entire scrub jungle foothills. Though the study could not conclude the presence of the rare and near-extinct Jerdon's Courser, the systematic methods designed for carrying outfield surveys, and the documentation of species historical presence analysis will serve to streamline future surveys for the target species, management of its potential habitat as well as for other associated species.

RESEARCH INITIATED PROJECTS

WII

UNDERSTANDING ELEPHANT CONFLICT ISSUES FOR SUGGESTING CONFLICT REDUCTION MEASURES (CHHATTISGARH, JHARKHAND, ASSAM)

Funding Source
Project Elephant, Ministry of Environment, Forest and Climate Change, Government of India

Researchers
Dr Sudip Banerjee, Kalpana Roy, Ananya Dutta and Athira Ganeshan

Investigator
Dr Bilal Habib

Date of Initiation
October 2023

Proposed Date of Completion
March 2025

Objectives: The project aims to understand the aspects of human-elephant conflict in the states of Chhattisgarh, Jharkhand and Assam through the following main objectives: (i) Development of a village-level database. (ii) Assess the present status of the human-elephant conflict. (iii) Assess the vulnerability of villages to conflict. (iv) To track forest loss and pattern of fragmentation in target states. (v) Suggest measures for mitigation of conflict.

Progress: The fieldwork was conducted from December 2023 to January 2024. Comprehensive data and insights on elephant-human conflict issues in different divisions of Chhattisgarh, Jharkhand and Assam was collected. The work involved coordinating with forest officials of multiple sectors to ensure a thorough and systematic data collection on; details of conflict incidents, their GPS locations, conflict mitigation measures adopted and divisional map records. Detailed information on mitigation measures used to reduce elephant-human conflict as well as data on elephant herds and their movement was gathered. The team also engaged with the forest officials to understand their perspectives and plans for conflict reduction. Further, data on human and elephant mortality, crop/property damage and mitigation measures were collected from all the affected areas.

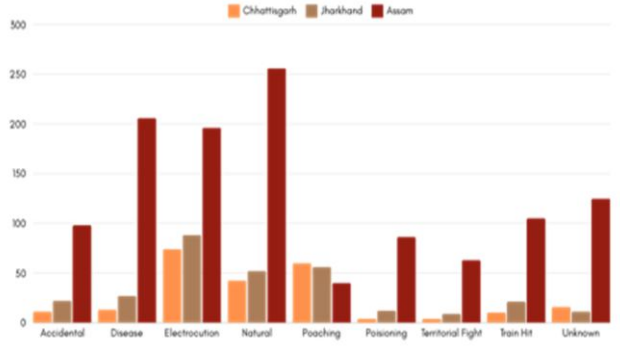


Figure showing reasons of elephant mortalities in Chhattisgarh, Jharkhand and Assam.

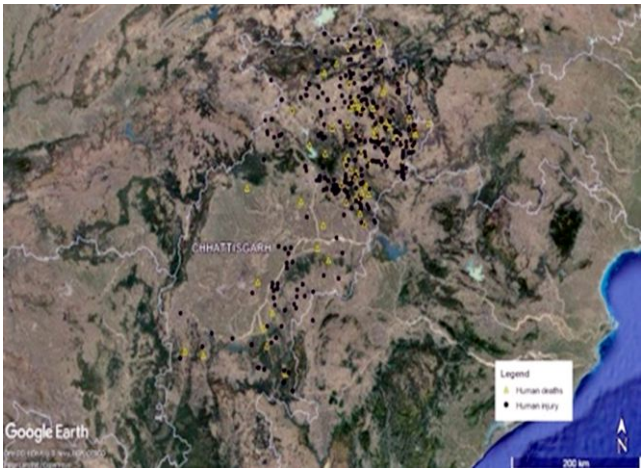
Output and outcomes: Elephant Mortality: (i) Identification of age groups of the elephant mortality in three states. (ii) Understanding mortality rates between male and female elephants. (iii) Understanding the causes of mortality, such as electrocution, poaching, natural causes, and diseases. (iv) Mapping the geographic locations of death to identify the hotspots and regions with variable mortality rates. (v) Understanding the annual temporal pattern of mortality due to seasonal cropping patterns, if any.

Human Mortality: (i) Understanding differences in mortality rates between males and females. (ii) Understanding the type of incident like death or injury. (iii) Identifying the compensation amount paid for the death or injury of humans. (iv) Mapping the geographic locations of death or injury to identify the hotspots and regions with variable mortality rates.

Crop/Property Damage: (i) Identifying the exact geographic location of the incident (village, district, region). (ii) Identify the type of damaged crops, property damage, storage facilities, or both. (ii) Identify the extent of the damaged area of crops affected (in acres/hectares), the type of crops damaged, and the extent of property damage. (iv) Understanding the trends of compensation for crop/property damage incidents.

Mitigation Measures Used: (i) Identifying the types of mitigation measures being used in three states: Electric fences, trenches, and solar fences. (ii) Identifying the buffer zones where unpalatable crops and corridors are present in the states. (iii) Identifying the different types of warning systems (alarms, warning systems, mobile alerts) for reducing human-elephant conflict.

Milestones: *Elephant and Human Mortality:* Data on elephant deaths, including age, cause of death, and geographic location, were analyzed. Data collected on



Field inspection for a case of electrocution of an elephant in Doom Dooma Range, Assam.

Solar power fencing for reducing human-elephant conflict in Sivasagar Division, Assam

human death and injury, focusing on factors like age, sex, and location of conflict, were analyzed. Temporal trends to identify patterns and seasonal variations in conflicts were also analyzed.

Preparation of Conflict Maps: The detailed spatial maps highlighting conflict zones were created. The maps were developed to illustrate various aspects, such as the frequency of incidents, types of damage, and proximity to human settlements.

RESEARCH INITIATED PROJECTS

WII

TRACKING MOVEMENTS AND POPULATION ASSESSMENT OF NESTING SEABIRDS IN THE PITTI ISLAND BIRD SANCTUARY AND OTHER ISLANDS OF THE LAKSHADWEEP ARCHIPELAGO – A PILOT INITIATIVE

Funding Source
Department of Environment and Forest Lakshadweep UTLA

Researcher
Rajdeep Mitra

Date of Initiation
December 2023

Investigator
Dr R Suresh Kumar

Proposed Date of Completion
December 2024

Objectives: The objectives of the project are to (i) understand the status of the population of nesting seabirds in the Pitti Island Bird Sanctuary and other sites in the Lakshadweep Islands; (ii) study the fine-scale movements of select seabird species with satellite telemetry; and (iii) contribute to the ongoing long-term efforts of seabird research across the Southern Indian Ocean.

Progress: To gain a comprehensive understanding of the nesting seabirds in Lakshadweep islands, extensive field surveys were carried out across all accessible islands in the archipelago. These surveys aimed to collect detailed data on seabird nesting activities. In addition, the Pitti Island Bird Sanctuary was specifically monitored, with nesting data being systematically collected every week. Further, one Sooty Tern *Onychoprion fuscatus* and one Brown Noddy *Anous stolidus* from Pitti Island were tagged with satellite transmitters to track their movement patterns, which contributed to a broader understanding of their ecology.

Outputs and Outcomes: Nesting activity was documented on only two islands, Pitti Island Bird Sanctuary and Cherabaniani Reef. Through systematic data collection, it was observed that nesting occurred from winter to summer and possibly throughout the year, with activity peaking at the onset of the monsoon. Pitti Island recorded the highest number of nests, with counts reaching 1,500 for Sooty Terns and 1,200 for Brown Noddies. Further insights were gained from satellite tracking, which revealed distinct movement patterns for

the two species. The Sooty Tern was observed to travel far and wide, up to 90 km away from Pitti Island, possibly in search of food for its young, as it was seen bringing food back during capture. In contrast, the Brown Noddy mostly stayed in and around Pitti Island, as it was incubating an egg.

Milestone: This study is the first to tag seabirds in the Indian region. The tracking data is crucial in identifying key foraging areas for Arabian sea seabirds. The systematic nesting data collected during the study also enhances our understanding of the nesting ecology of seabirds breeding in Lakshadweep.

RESEARCH INITIATED PROJECTS

WII

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITAT PROGRAM (IDWH) – SNOW LEOPARD

Funding Source
Ministry of Environment, Forest and Climate Change, Government of India

Researchers
Anuj Joshi and Mukesh Kumar

Date of Initiation
December 2023

Proposed Date of Completion
December 2024

Investigator
Dr S. Sathyakumar

Objectives: Systematically assessing the spatial distribution of snow leopard in its potential distribution range and, estimating the snow leopard population and capturing spatial variation in snow leopard density.

Progress: The spatial distribution of snow leopards was systematically assessed using habitat covariates, occupancy (sign surveys/questionnaires/threats), and stratification (low, medium, high). The research team conducted population assessments using camera trapping and genetics in habitat patches greater than 500 km² (low, medium, high), considering the heterogeneity of the landscape.

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Outputs and Outcomes: A total of 13,450 km of trail was surveyed to record snow leopard signs. Cameras were deployed at 1,971 locations in all four states and two UTs. A total of 20.2 lakh camera traps were photographed, and the snow leopard occupancy was recorded in 93,392 km^2 and an estimated presence in 1,00,841 km^2. Intensive monitoring is underway in the selected sites for prey population assessment and habitat characterization.

Milestone: The sampling exercise has been completed in all four Indian states, i.e. Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh and two Union territories of Jammu & Kashmir and Ladakh.

RESEARCH INITIATED PROJECTS

WII

COASTAL AND MARINE BIODIVERSITY PROFILE OF GOA STATE

Funding Source
Goa Forest Department

Researcher
Diksha Mandlik

Date of Initiation
December 2023

Investigators
Ms Chinmaya Ghanekar and
Dr JA Johnson

Proposed Date of Completion
December 2025

Objectives: The objectives of the project are to (i) document the coastal and marine flora and fauna of Goa state and (ii) understand the distribution status of marine mammals on the Goa coast.

Progress: A preliminary survey of beaches from Querim in North Goa to Polem in South Goa. All the accessible beaches were surveyed on foot to identify habitats. The field team also collected information from local lifeguards and forest guards deployed at various beaches. Mangrove and rocky intertidal habitats were identified across the surveyed stretch for seasonal biodiversity surveys.

Outputs and Outcomes: Five mangrove areas along the Goa coast, primarily characterized by *Rhizophora spp.* and *Avicinnia spp.*, are known for their small fishes, crabs, and mollusks. Eighteen rocky intertidal zones were identified, including Querim Beach, Anjuna Beach, Baga Beach, Vagator Beach, Candolim, Reis Margos, Bogmalo Beach, Hollant Beach, Aganda Beach, Rajbagh Beach, Talpona Beach, Galgibaga beach, and Polem beach. Crabs, gastropods, and sea anemones dominate these habitats. A method for a survey of crabs and mollusks in rocky intertidal zones has been standardized.

RESEARCH INITIATED PROJECTS

WII

AN INDICATOR SPECIES APPROACH FOR MONITORING STREAM HEALTH AND CLIMATE CHANGE IMPACTS FOR HIMALAYAS: TESTING USING *AMOLOPS FORMOSUS*

Funding Source
Japan International Cooperation Agency (JICA)

Researcher
Saurav Chaudhary

Date of Initiation
March 2024

Investigator
Dr Salvador Lyngdoh

Proposed Date of Completion
August 2025

Objectives: The objectives of the project are to (i) assess the species as the ecological indicator for the Himalayan stream ecosystem; (ii) estimate the population size and density of Amolops formosus in the selected areas of Himachal Pradesh using spatially explicit capture-recapture (SECR) and secrlinear methodologies; (iii) analyze the influence of different parameters (TDS, salinity, temperature, conductivity, pH, ORP, flow, canopy, substrate) on the relative abundance, density and distribution of Amolops formosus.

Progress: The baseline data about the *Amolops formosus* population and diversity was collected in the selected protected areas. The water and ecological parameters ideal for the survival and conservation of the species were measured, implementing the species to be an ecological indicator for monitoring the health of the Himalayan stream ecosystem.

Amolops formosus in its natural habitat in Churdhar Wildlife Sanctuary

Outputs and Outcomes: The selected streams of the Churdhar Wildlife Sanctuary were surveyed. The population and parameter data of the species were collected. Forty-six individuals were identified in the three streams, with recaptures for three times in each stream. The average low temperature of the individuals in comparison to the substrate was documented. The data analysis showed the influence of stream parameters such as the stream flow and surrounding temperature on changes in the population

RESEARCH INITIATED PROJECTS

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITAT PROGRAM (IDWH) – INDIAN RHINOCEROS

Funding Source
Integrated Development Wildlife Habitats (IDWH)

Researchers
Harshavardhan Singh Rathore and Shreya Yadav

Date of Initiation
March 2024

Proposed Date of Completion
December 2024

Investigators
Shri Qamar Qureshi and Dr Vishnupriya Kolipakam

WII

Objectives: The project has the following objectives: (i) Assess the current population status of Indian rhinoceros; (ii) Develop long-term monitoring protocols for populations and their habitats of Indian rhinoceros; and (iii) Identify suitable habitat for reintroduction of Indian rhinoceros.

Progress: The systematic literature review on habitat, distribution, population trends and conservation issues of Indian rhinoceros' populations in India was completed. The land use/ land cover classification covering the Terai, Northeast India and Central Indian regions till Telangana is in progress. Field assessment for abundance estimation has been completed. The preparation of the Countrywide Conservation Action Plan for the species is in process.

Outputs and Outcomes: Potential habitats for the reintroduction of Indian rhinoceros were identified using the habitat suitability modelling Priority areas for effective conservation planning were identified. Workshops and consultations were organized with officials and stakeholders of current and historic range states to develop monitoring methods for Indian rhinoceros' populations and their habitat.

Milestone: The stakeholders and officials of current and historic range states of Indian rhinoceros in India were invited for workshop consultation at Wildlife Institute of India. The team supervised classification of grassland and swamp habitats across the current and potential range of Indian rhinoceros has been done using Google Earth Engine.

RESEARCH INITIATED PROJECTS

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITAT PROGRAM (IDWH) – SWAMP DEER" (2023-24)

Funding Source
Integrated Development of Wildlife Habitats (IDWH)

Researcher
Dr Neha Awasthi

Proposed Date of Completion
December 2024

Date of Initiation
March 2024

Investigators
Shri Qamar Qureshi and Dr Vishnupriya Kolipakam

Objectives: The project has the following objectives: (i) Assess the current status of swamp deer in India and (ii) Develop long-term monitoring protocols for swamp deer populations and their habitat.

Progress: A detailed literature review covering the species habitat, distribution, population trends and threats in India was carried out. Land use/land cover classification covering the regions of Terai, Northeast and Central India is in progress. The field assessment for abundance estimation is in progress. Preparation of a countrywide action plan for the species is a process.

Outputs and Outcomes: Identification of potential habitats, current population status and distribution and identification of priority areas for swamp deer reintroduction for effective conservation planning. Development of monitoring methods for swamp deer populations ad their habitat through consultation with stakeholders and officials of current and historic range states.

Milestone: Field sampling training was conducted for swamp deer in central Indian landscapes of Kanha and Satpura Tiger Reserve, and in northern India atDudhwa, and in Manas Tiger Reserve in Northeastern India. A workshop is planned to be conducted for the stakeholders and officials of current and historic range states of swamp deer in India to discuss the final preparation of conservation action plan for the species and its habitat.

RESEARCH INITIATED PROJECTS

WII

PAN-INDIA ASSESSMENT AND MONITORING OF ENDANGERED SPECIES COVERED UNDER THE INTEGRATED DEVELOPMENT OF WILDLIFE HABITAT PROGRAM (IDWH) – WILD WATER BUFFALO

Funding Source
Integrated Development Wildlife Habitats (IDWH)

Researchers
Harshavardhan Singh Rathore and Arnav Gandhe

Date of Initiation
March 2024

Proposed Date of Completion
December 2024

Investigators
Shri Qamar Qureshi,
Dr Vishnupriya Kolipakam

Objectives: The project has the following objectives: (i) Assess the current status of wild water buffalo; and (ii) Develop long-term monitoring protocols for populations and the habitats of water buffalo.

Progress: A thorough literature review covering aspects like habitat, distribution, population trends and threats to wild water buffalo populations in India was completed. Land Use/Land cover classification covering the Terai, Northeast India and Central Indian regions till Telangana is in progress. The field assessment for species abundance estimation as well aspreparation of a countrywide conservation action plan for the species are in process.

Outputs and Outcomes: Identify potential remaining habitats using habitat suitability modelling for wild water buffalo reintroduction and identify priority areas for effective conservation planning. Development of monitoring method for wild water buffalo populations and their habitat through workshop consultation with stakeholders and officials of current and historic range states.

Milestone: The team supervised the classification of grassland and swamp habitats across the current and potential range of wild water buffalo using Google Earth Engine. Stakeholders and officials of current and historic range states of wild water buffalo in India were invited for workshop consultation at the Wildlife Institute of India. Field sampling training was conducted for the forest staff at Indravati Tiger Reserve, Chhattisgarh.

RESEARCH INITIATED PROJECTS

WII

LONG-TERM ECOLOGICAL MONITORING OF MUKUNDARA HILLS TIGER RESERVE & RAMGARH VISDHARI TIGER RESERVE

Funding Source
Forest Department of Rajasthan (MHTR & RVTR)

Researchers
Mohit Kumar Patra and Rajrajeshwar Thakar

Date of Initiation
March 2024

Proposed Date of Completion
March, 2028

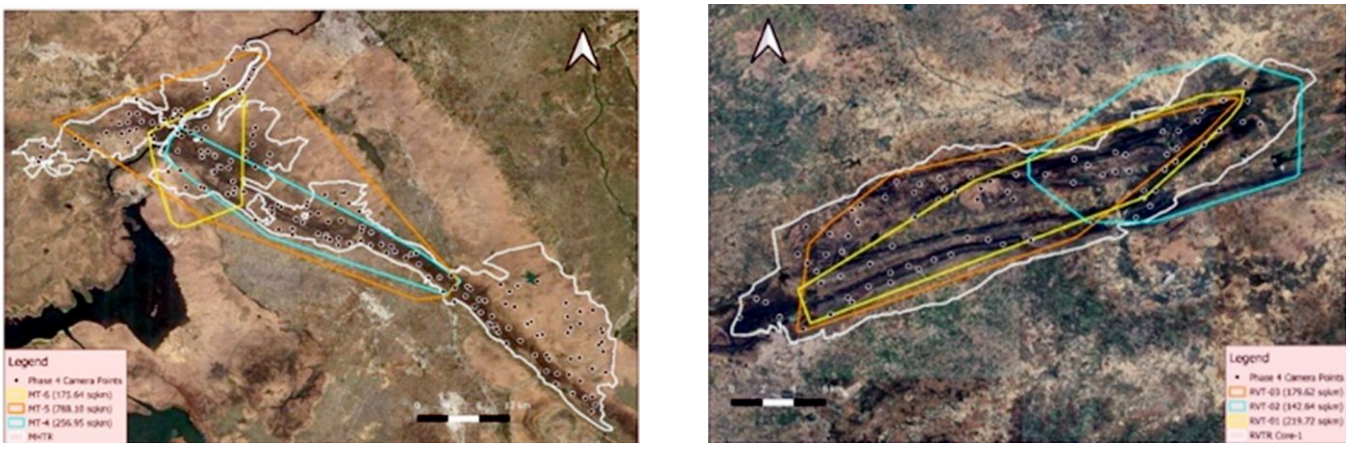
Investigators
Shri Qamar Qureshi,
Dr Ayan Sadhu and
Dr Vishnupriya Kolipakam

Objectives: The project has the following objectives: (i) Long-term monitoring of tiger and co-predator populations in Mukundara Hills Tiger Reserve (MHTR) and Ramgarh Visdhari Tiger Reserve (RVTR); (ii) Monitoring of ungulate population & habitat in the above TRs; and (iii) Monitoring of wildlife corridors in the greater MHTR-RVTR landscape.

Progress: Intensive ecological and behavioural monitoring of tigers through radio telemetry, camera trapping, and direct observations was carried out in both MHTR & RVTR to determine their home range, habitat use and settlement period. Systematic grid-based camera trapping and line transect survey as per Phase 4 protocol has been implemented in both the Tiger Reserves to identify the spatiotemporal movement of animals and determine the density of wild prey. Kills made by Tigers and other carnivores were monitored to assess prey and site preference. Capacity-building workshops and training for the frontline staff were conducted to ensure proper monitoring and technical guidance to the Forest Department.

Outputs and Outcomes: In MHTR, the annual home range of male tiger MT-5 was 788.10 km2 and showed occasional sallies outside the tiger reserve, while the female tigresses explored relatively smaller areas (MT4 – 256.95 km2 & MT6 – 175.64 km2). In RVTR, the effective home ranges of both females did not overlap, indicating spatial segregation, with RVT-02 exploring 142.34 km2 and RVT-03 covering 179.62 km2.In both MHTR and RVTR, the home range of males significantly overlapped that of the females. Prey density estimates and camera trap data indicate the abundance of Cattle and Nilgai in both the Tiger Reserves while other important prey, i.e., Sambar and Chital, remain scarce. Kill monitoring of tigers yielded interesting results. In both the Tiger reserves, Cattle were preyed upon the most (>60 %), while Nilgai was the highest among wild prey (~14% - 28%). This is consistent with prey density estimates. Although multiple kills were made during a month, results indicate cattle dependency on tigers and the need for wild prey augmentation. M-STrIPES desktop and mobile applications have been fully implemented in both the tiger reserves for monitoring and data collection.

Milestone: Reintroduced tigers took between 30 and 135 days to explore and settle the area. New dispersal routes were identified while tracking MT-5 in MHTR. This could help delineate active corridors between the protected areas. Long-distance dispersal of leopards was confirmed in both MHTR and RVTR from Kuno Wildlife Sanctuary, which gave rise to potential corridors.



Home Ranges of Reintroduced Tigers in MHTR (left) and RVTR (Right)

RESEARCH INITIATED PROJECTS

SACON

MODELLING THE EFFECT OF TOP PREDATORS AND HABITAT ON THE DISTRIBUTION OF MESOCARNIVORES IN LARGE CARNIVORE LANDSCAPES OF INDIA AND CENTRAL EUROPE

Funding Source
DST International Cooperation Division, Govt of India

Researchers
Ashish Kumar

Date of Initiation
April 2023

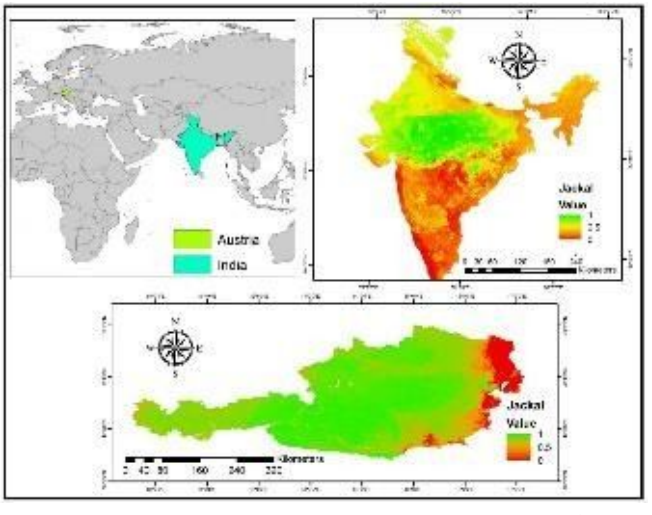
Investigators
Dr T. Ramesh and Dr Riddhika Ramesh

Proposed Date of Completion
April 2025

Objectives: The objectives of the project are to (i) assess and map the current population status of striped hyaena and golden jackal in all potential large predator conservation landscapes of both India and Austria; (ii) understand the impact of large carnivore populations on the population dynamics of jackal and striped hyaena in all potential tiger conservation landscape of India.

Progress: This project was conceptualised to study the potential impact of top predators on hyenas in India and jackals in India and Europe (at a continental scale), aiming to comprehend simultaneously the differential and non-stationary patterns of top-down control. Following a thorough literature review, the presence and absence of information from various data sources on hyenas, jackals, tigers, leopards, and their two major prey species, Chital and Sambar, were collated. The habitat suitability of jackal and hyaena was assessed as a function of different biogeological factors and the top-down effect of their co-occurring predators in their respective countries. A random forest analytical framework was used to calibrate both models at discrete tiger conservation landscapes in India, and a single consolidated model was used with pooled data for both countries.

Outputs and Outcomes: In Austria, we found that proximity to wolves was the most important factor determining the spatial distribution of jackals, showing a significant negative relationship. Conversely, the variable 'bio18' (Precipitation of Warmest Quarter) appeared as the most important factor in determining the spatial distribution of jackals in India. The partial dependence graph plotted from the consolidated jackal model showed a negative relationship between occurrence probability and bio18, indicating that increased precipitation during the warmest quarter would decrease jackals' occurrence probability at the country level. Additionally, the occurrence probability of chital, leopard, and tiger, along with population density, also appeared as one of the top predictors of habitat suitability for jackals in India.



Study area map showing the predicted suitable habitat of Jackals in India and Austria

RESEARCH INITIATED PROJECTS

SACON

CHARACTERISATION OF WETLAND HABITAT IN A BREEDING RANGE OF SPOT-BILLED PELICAN

Funding Source
Science and Engineering Research Board, Govt of India

Researcher
Rachaveelpula Sreeja

Date of Initiation
August 2023

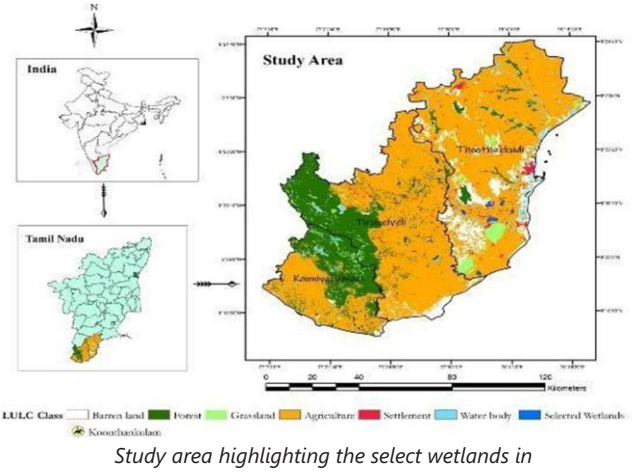
Proposed Date of Completion
August 2026

Investigators
Dr T. Ramesh and Dr Riddhika Ramesh

Objectives: The objectives of the project are to (i) monitor movement and habitat utilisation patterns of Spot-billed Pelicans from the southernmost breeding range, Koonthankulam Bird Sanctuary; (ii) assess the seasonal wetland site use probability of Spot-billed Pelicans across a network of wetlands, and (iii) assess the land use changes around Koonthankulam Bird Sanctuary.

Progress: The study investigates the habitat quality of 51 wetlands present in the 100km radius of Koonthankulam, assesses site use probability of pelicans and the land use changes over the decadal time frame to understand the role of wetlands in supporting the breeding population of Spot-billed Pelican. Various physiochemical water parameters such as pH, dissolved oxygen (DO), salinity, total dissolved solids (TDS), temperature, oxidation-reduction potential (ORP), conductivity, resistivity, atmosphere pressure, ammonia and chloride were measured. Habitat characteristics, such as vegetation type, wetland size, water column depth, light penetration and disturbance gradient were measured to assess habitat health. To analyse the first season data collected, we used the single- season occupancy modelling to assess the site use probability of Spot-billed Pelicans in relation to the water parameters.

Outputs and Outcomes: The results showed a positive correlation between salinity and dissolved oxygen with the site occupancy of Pelican. The light penetration and temperature negatively affected the detection of Spot-billed Pelican in each site. The optimal level of salinity can increase the prey diversity compared to the freshwater systems, and optimal levels of dissolved oxygen can enhance the fish's productivity, thus benefitting the Pelican. The paradoxical phenomenon of reduced light penetration positively affecting pelican detection can be explained. The reduced light penetration limits the macrophyte growth, reducing competition for phytoplankton, resulting in enhanced primary production and thus attracting the pelicans. Increasing water temperatures increase the evaporation rate, thus interfering with pelicans' detection.



Study area highlighting the select wetlands in southern districts of Tamil Nadu

RESEARCH INITIATED PROJECTS

MECHANISMS OF COEXISTENCE IN A SPECIES-RICH CARNIVORE ASSEMBLAGE FROM A HUMAN-DOMINATED LANDSCAPE IN KACHCHH, GUJARAT, INDIA

Funding Source
Panthera, New York

Date of Initiation
September 2023

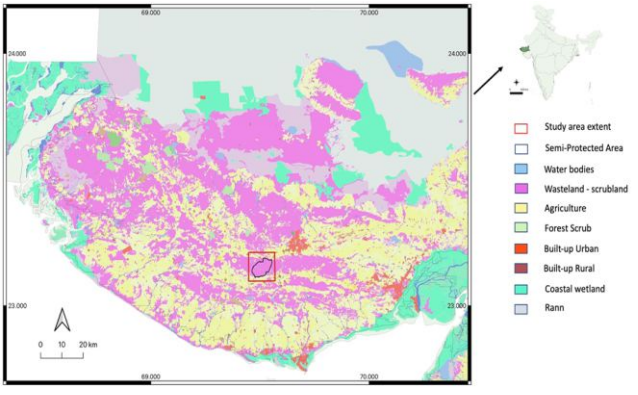
Proposed Date of Completion
September 2024

Investigators
Dr Shomita Mukherjee and Dr Nandini Rajamani, IISER Tirupati

Objectives: The project has the following objectives: (i) Assess the spatiotemporal distribution of carnivores within Chadva Rakhal (CR) (partially protected) and in the surrounding savanna landscape designated as wasteland; (ii) Assess the distribution of potential prey (rodents and ground birds) in the selected landscape; (iii) Compare the diet of carnivores within the selected landscape; and (iv) Share the results of the study with locals living in the landscape.

Progress: The fieldwork was initiated in November 2023, and the volunteer was trained to deploy camera traps and gather habitat data. Diet estimation through scat analysis was also initiated in the laboratory at IISER, Tirupati. Until March 2024, we deployed cameras in 74 grids of 1x1 km for approximately 1,480 days. Of the 120 scats collected, 100 were analysed for species assignments using felid primers.

Outputs and Outcomes: Sixty-nine scats were assigned to various cat species (Rusty-spotted Cat:15, Jungle Cat: 11 and Afro-Asiatic Wildcat: 43) after sequencing. We recorded 22 mammals, including 17 wild species. Results from camera trapping suggest that carnivores were distributed throughout CR, but certain areas are affluent in species. Both molecular tools and camera trapping are essential to document the presence of cats since some are better detected through scats (e.g. Rusty-spotted Cat) while others through camera traps (e.g. Caracal). Fieldwork is ongoing, and we are now exploring areas outside CR in the surrounding crop fields. Laboratory work is in progress to estimate the diet of cats through scat analysis.



LULC map of Kachchh district with study site

RESEARCH INITIATED PROJECTS

DEVELOPING BASELINE INFORMATION ON THE AVIFAUNAL DIVERSITY AT THE BONAL BIRD CONSERVATION RESERVE

Funding Source
Karnataka Forest Department

Researcher
Aravind Kumar P.

Date of Initiation
January 2024

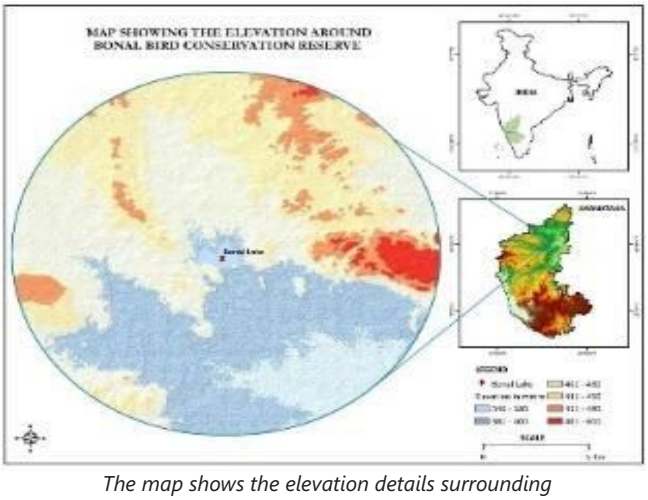
Investigators
Dr Mahendiran Mylswamy and Vidhyadar Atkore

Proposed Date of Completion
February 2025

Objectives: The objectives of the project are to (i) study the distribution and status of the residents as well as migratory avifauna in the Bonal Bird Conservation Reserve and (ii) consolidate the past & present avifaunal and biodiversity literature of BBC.

Progress: Bonal Bird Conservation Reserve, situated in a rural environment surrounded by rocky hillocks and irrigation-rich agricultural fields (16°31′ 43.41″ N and 76°39′ 17.71″ E), is located near Bonal Village, which is about 10 km away from the west of Shorapur City of Yadgir district, Karnataka. A scientific study has been initiated to collect the baseline information on the birds (including migratory) and the lake habitat.

Outputs and Outcomes: Initial results suggest that this lake serves as an important bird conservation reserve and provides shelter for approximately 153 species of birds, including many migratory birds. The fishermen from nearby Ammapura village use a variety of gill nets and hook nets, along with bamboo trap boxes known as "butti" in Kannada.



The map shows the elevation details surrounding the Bonal Bird Conservation Reserve (BBCR) areas.

SACON RESEARCH INITIATED PROJECTS

ESTIMATION OF RHESUS MACAQUE, *MACACA MULATTA* POPULATION AND SOCIAL ORGANISATION IN HIMACHAL PRADESH

Funding Source
Forest Department, Himachal Pradesh

Researchers
Dr R. Sasi and G. Praphul

Date of Initiation
January 2024

Proposed Date of Completion
December 2024

Investigator
Dr H.N. Kumara

Objectives: The project has the following objectives (i) Coordinate the rhesus macaque population assessment in association with the Forest Department; (ii) Estimate the population status of rhesus macaque for Himachal Pradesh using the data from state-level assessment-2023; (iii) Develop a macaque density map, and identify the high-density zones for the entire Himachal Pradesh; and (iv) Assess the social organisation of the macaque population around the sterilisation center to assess their reproductive rate.

Progress: We initiated a training program for department personnel on macaque assessment on 1st March at Shimla, then conducted training programs at Dharamshala and Sunder Nagar.

Outputs and Outcomes: The synchronised survey was carried out on 7th March 2024 following the Double Observer sampling technique. About 1,300 trials were walked correctly, and the data was collected. The data compilation was initiated during the reporting period.

Rhesus macaque in Himachal Pradesh

©Dipesh Kumar Jangir

Academic & Training Activities

ACADEMICPROGRAMME

XVIII M.Sc. Wildlife Science

The course was commenced in August 2022. The third semester commenced on 1 August 2023 and all the modules were completed per course schedule. The students were taken to the Vulture Conservation Breeding Centre (VCBC), Pinjore, under the Module on 11 August 2024. The students visited the National Parks, Coastal Areas and Forest Division of Karnataka, Kerala and Tamil Nadu during the Conservation Practice Tour to the Western Ghats from 6-27 October 2023. The students presented for defending the Dissertation Proposal from 13-14 November 2023. The third-semester examinations were conducted from 12-18 December 2023.

The fourth semester of the XVIII M.Sc. course commenced in January 2024, and the students proceeded to their study site for carrying out the fieldwork for their dissertation with the concerned State Forest Department permits. Students completed their Field Dissertation Study and started writing their thesis for the final presentation.

XIX M.Sc. (Wildlife Science) Course 2023-25

The XIX MSc Wildlife Science Course commenced on 7 August 2023 with a capacity of 20 students, including eight WII-sponsored and 12 self-sponsored. The students are from 11 states of India, with diverse backgrounds and interests. All first semester modules were completed as per the course calendar.

The following tours were conducted during the first semester: (i) Orientation-cum-study tour to Lansdowne Forest Division was conducted from 4-9 September 2023. The Technique Tour was taken to Panna Tiger Reserve from 27 October to 10 November 2023. First semester examinations were conducted from 11-20 December 2023. The Wetland Management tour to Odisha was carried out from 19-28 February 2024.

M.Sc. Thesis

Abhimanyu Madhusudanan, **Population size and social organization of male Asian Elephants, *Elephas maximus* in the eastern Rajaji and Haridwar Forest Division.** Supervisors: Dr Bivash Pandav, Dr N Lakshminarayanan and Dr Samrat Mondol.

Abhishek Tangaria, **Nest-site selection in a Piscivore raptor, Pallas's Fish-Eagle, *Haliaeetus leucoryphus*, in the sub-Himalayan tract, Uttarakhand**. Supervisors: Dr Ashish Jha, Dr Bivash Pandav and Dr R. Suresh Kumar.

Aditya Satish, **The response of mixed-species bird flocks to a disturbance gradient in the oak forests of the Western Himalayas.** Supervisors: Dr Navendu Page, Dr Ghazala Sahabuddin and Dr Priti Bangal.

Arnab Dey Sarkar, **Spatial dynamics and drivers of nearshore aggregations in Olive Ridley Sea Turtles, *Lepidochelys olivacea* along the Gahirmatha Coast.** Supervisors: Dr Nehru Prabhakaran, Dr R. Suresh Kumar and Dr Bivash Pandav.

Ashik CS, **Assessing microhabitat use, occupancy, and density of the Fishing cat in Bhitarkanika mangroves of eastern India.** Supervisor: Dr Bivash Pandav.

Aslam Mohammad, **Determining the difference in behaviour and habitat use of Nilgiri Tahr, *Nilgiritragus hylocrius* in the tourism area and core in Eravikulam National Park, Kerala.** Supervisors: Dr C. Ramesh, Dr K. Ramesh & Dr Karunakaran.

Bindu K, **Effect of social hierarchy and age-sex classes on seed dispersal by lion-tailed macaques, *Macaca silenus*.** Supervisors: Dr H.N. Kumara, Dr Rohit Naniwadekar and Dr Navendu Page.

Charushree Santosh, **Beyond the forest: Intraspecific and interspecific aggression in *Rhesus macaques, Macaca mulatta***. Supervisors: Dr H.N. Kumara and Sh. Prashant Mahajan.

David Phinehas N, **Leveraging citizen science for bird monitoring: A case study assessing the impacts of urbanization on bird assemblages of the Nilgiris**. Sh. Varun Kher and Dr Robin Vijayan.

Krishnapriya M, **Habitat selection by desert fox in human modified landscape of Thar desert**. Supervisors: Dr Sutirtha Dutta, Dr Vishnupriya K. and Dr Gautam Talukdar.

K Niyaz Ahamed, **Poison on a plate: Risk assessment of potentially toxic elements in the habitat and diet of Smooth-coated Otter, *Lutrogale perspicillata* in Tungabhadra Otter Conservation Reserve**. Supervisors: Dr J.A. Johnson, Dr S.A. Hussain and Ms Ruchika Sah.

Mukul Sudhakar, **Understanding the efficacy of enrichment intervention from behavioural and physiological responses in Sloth Bears.** Dr Lallianpuii Kawlni and Dr Sutirtha Dutta.

Nandita Madhu, **Effects of local and landscape-level drivers in influencing bird diversity and persistence in cashew plantations of the Northern Western Ghats.** Dr Rajah Jayapal and Dr Navendu Page.

Prakruthi GM, **Exploring Ecological separation between Himalayan Blue Sheep and Himalayan Ibex during winter in Indian Trans-Himalayas**. Supervisors: Dr S. Sathyakumar, Dr Salvador Lyngdoh and Dr Yashveer Bhatanagar.

Rakshith Gowda HN, **Effect of land use change on composition of Odonate assemblages in Seethanadi River Basin, Central Western Ghats**. Supervisors: Sh. Ritesh Gautam and Dr J.A. Johnson.

Rishi Basumatary, **Golden langur distribution and corridor – Connectivity: assessing patterns and**

addressing threats. Supervisors: Dr Anukul Nath, Dr Gopi G.V. and Dr Dilip Chhetry.

Sanjana Vadakke Kuruppath, **Assessing free-ranging domestic dog population and wildlife interaction in Mudumalai Tiger Reserve, India.** Supervisors: Dr K. Ramesh and Sh. Varun Kher.

Shashank Jagdish Nagarale, **Subsidized mammals: Understanding the mammalian interactions with garbage sites in and around western Rajaji National Park, Uttarakhand.** Supervisor: Dr Bivash Pandav and Dr Shivam Shrotriya.

Shilpa Bevoor, **Effects of land use change on habitats and abundance of Grizzled Giant Squirrel in and around Srivilliputhur Grizzled Squirrel Wildlife Sanctuary, Tamil Nadu.** Supervisors: Dr Gopi G.V., Shri Varun Kher and Dr Surendra Prakash Goyal.

Tiewlyngksiar Lyngdoh Nongrang, **Assessing the effect of anthropogenic disturbance on epiphytes in Khasi Hills of Meghalaya, India.** Supervisor: Dr Amit Kumar.

MSc Dissertation Supervised (External)

Arya P (2023). **Isolation, Identification, and Characterization of Zoonotic Bacteria (*Salmonella* spp.) of Occupational Significance from Rescued Testudines.** Submitted to Graphic Era Deemed to Be University, partially fulfilling the requirement for the Master of Science in Biotechnology degree. Supervisor: Dr Lallianpuii Kawlni.

Jyoti Nagarkoti (2023). **Ethnographic perception of the human-snake interaction in the communities of the Nicobar Archipelago, India**. Doon University. Supervisors: Dr Ramesh Chinnasamy and Dr Suneet Naithani.

Shristi Negi (2023). **Spatio-temporal distribution of avian species in an airfield to address the risk of bird strike hazard**. Dr Kusum Arunachalam and Dr R. Suresh Kumar.

Harsh P. Chauhan (2023). **From flight to feast: Unveiling the diet of an avian aerial insectivore, Barn Swallow *Hirundo rustica*, a summer breeding visitor to the Himalayas**. Dr Kusum Arunachalam and Dr R. Suresh Kumar.

Arpit Singh (2023). **Relative abundance and population status of House Sparrows, *Passer domesticus* along an elevational gradient in the Uttarakhand State.** Dr Suneet Naithani and Dr R. Suresh Kumar.

Status of Doctoral Research in WII

Thesis Submitted

Kalzang Targe (2023). **Patterns of grazing, natural resources used by the local community and their influence on wild ungulate (Ibex) habitats in Pin Valley National Park, Himachal Pradesh**. Saurashtra University, Gujarat. Supervisors: Dr B.S. Adhikari and Dr Salvador Lyngdoh.

Sarabjeet Kaur (2024). **Foraging ecology of the Great Slaty Woodpecker in and around Pawalgarh Conservation Reserve in Western Himalaya**. Supervisor: Dr Gopi G.V.

Vishnu CS (2023). **Spatio-temporal and thermal ecology of Indian python, *Python molurus*, in Mudumalai and Sathyamangalam Tiger Reserve, Tamil Nadu. Forest Research Institute (Deemed to be University), Dehradun**. Supervisors: Dr. Ramesh Chinnasamy and Dr. Gautam Talukdar.

Awarded

Amira Sharief (2023). **The Conservation of Musk deer: Integrating ecology and genetics in North Western Himalaya. Saurashtra University, Rajkot, Gujarat.** Supervisors: Dr Ramesh Chinnasamy, Dr Lalit Kumar Sharma and Dr Mukesh Thakur.

Mansa Srivastav (2024). **Systematics, biogeography, and organ fusion in the plant lineage *Lonicera*. Yale University, USA. (External Affiliation).** Supervisors: Professor Michael Donoghue, Dr Amit Kumar and Dr GS Rawat.

Rahul Kumar (2024). **Temporal changes in composition, patterns of biomass production and carbon sequestration potential of various alpine communities in Tungnath, Western Himalaya.** Saurashtra University. Supervisor: Dr B.S. Adhikari.

Urjit Bhatt (2024). **Habitat use and interactions of mammalian carnivores in the tropical forest of Manas National Park, Assam, India.** Saurashtra University, Gujarat. Supervisors: Dr B.S. Adhikari and Dr Salvador Lyngdoh.

Vineet Kumar (2024). **Habitat, food resource utilization of Himalayan Brown Bear, *Ursus arctos isabellinus*, Horsfield 1826) and conflict with humans in Lahaul Valley, Himachal Pradesh. Saurashtra University, Gujarat.** Supervisors: Dr B.S. Adhikari and Dr Lalit K Sharma.

Registered

Shagun Thakur, (2023). **Community ecology of mammals in a multi-use landscape of a biodiversity hotspot, Eastern Himalaya, India.** Supervisor: Dr S. Sathyakumar.

Tannu (2024). **Conservation ecology of Reticulated python, *Malayopython reticulatus* in the Nicobar Archipelago.** AcSIR. Supervisors: Dr Ramesh Chinnasamy and Dr S.K. Gupta.

Tiewlyngksiar Lyngdoh Nongrang (2024). **Assessing the effect of anthropogenic disturbance on epiphytes in Khasi Hills of Meghalaya, India.** Supervisor: Dr Amit Kumar.

TRAININGPROGRAMMES

43rd Post Graduate Diploma in Advanced Wildlife Management, Dehradun, 1 October 2022 to 31 July 2023.

The 10-month P.G. Diploma Course Advanced Wildlife Management commenced on 1 October 2022 at this institute, with 10 officer trainees, including one lady officer from Myanmar of the rank of Deputy Conservator of Forests/ Assistant Conservator of Forests and equivalent levels. The officers represented the following states: two from Odisha, Uttar Pradesh, and one from Madhya Pradesh, Rajasthan, Tripura, Meghalaya and Mizoram.

During the reporting period, the modules on 'Principles & Practices of Wildlife and PA Management', 'Ex-situ Conservation and Management', 'Visitor use Management and Interpretive Planning', 'Human Dimensions of Wildlife Management and Conflict Resolution' and 'Integrated Wildlife Management Planning & Landscape Level Planning' were completed.

44th Post-Graduate Diploma in Advanced Wildlife Management, Dehradun, 15 September 2023 to 15 July 2024.

The 44th Post-Graduate Diploma Course in Advanced Wildlife Management commenced on 15 September 2023. A total of 16 Officer trainees from various Indian States: three each from Odisha and Madhya Pradesh, two from Rajasthan, and one each from Arunachal, Sikkim, Mizoram, Assam, Uttar Pradesh, Kerala, AGMUT, and Maharashtra.

The following field tours were conducted during the reporting period: (i) Orientation Tour at Lansdowne Forest Area from 3-7 October 2023. (ii) High Altitude Tour at Kedarnath and adjoining area from 13-19 November 2023. (iii) Techniques Tour at Rajaji Tiger Reserve from 19-30 December 2023. (iv) Wetland Tour at Odisha from 7-18 February 2024. (v) Management Tour in South India from 26 February 2024 to 10 March 2024. (vi) South Africa Study Tour from 18 March 2024 to 3 April 2024.

38th Certificate Course in Wildlife Management, Dehradun, 1 November 2023 – 31 January 2024.

The 38th Certificate Course commenced on 1 November 2023. A total of 28 officer trainees from different states of India and abroad joined the course. The main objectives of the course were to (a) provide understanding and knowledge on modern concepts in wildlife management; (b) provide an insight into relevant conservation policies and legislation and their enforcement mechanism at the global and local level; (c) provide hands-on experience and training in the use of modern scientific methods, techniques and tools that are required for biodiversity assessment and monitoring of conservation goals; (d) develop an understanding of landscape approach to conservation and skills for scientific wildlife management planning, and (e) develop scientific skills for resolving human-wildlife conflict including capture, handling, care and management of wild animals.

First Certificate Course in Heritage Management, Dehradun, 7 August 2023 – 15 September 2023.

The first Certificate Course on Heritage Management (CCHM) was initiated by the WII-Category 2 Centre on World Natural Heritage Management and Training for Asia and the Pacific Region (WII-C2C) to equip officer trainees with the concepts, theories and practices implemented in the multi-disciplinary field of heritage conservation. Through this 6-week course, the participants learnt how landscape level interventions maximize the potential of scale and unforeseen beneficial interconnections as cultural, ecological and economic benefits are compounded. The class consisted of 7 students – Forest Officers from Madhya Pradesh, Andhra Pradesh, and Tripura along with an equivalent Officer from the Geological Survey of India and Maharashtra Tourism. The course covered fundamental and applied subjects including biodiversity and natural heritage, site management, nature culture linkages and heritage risk management.

CAPACITY BUILDING & PROFESSIONAL EXCHANGE

Organised by WII and/ or in collaboration with other institutions:

First Indian Conservation Conference (ICCON), Mysuru, Karnataka, 9-11 April 2023.

The conference's objective was to celebrate 50 years of project tiger and building capacity for natural resource conservation in India through knowledge sharing. It was jointly organised by the Ministry of Environment, Forest and Climate Change, Government of India, National Tiger Conservation Authority, and Wildlife Institute of India.

The conference brought together Wildlife Managers, Policy Makers, Conservationists, Students, & Scientists associated with tiger conservation, world heritage, and climate change research in this country. The conference had more than 100 research studies.

World Heritage Day Celebration at WII, Dehradun, 18 April, 2023.

On World Heritage Day, WII-C2C organised "The Journey: A Natural Heritage Quiz, " which saw enthusiastic participation by WII Departments/Cells/Courses' representatives at WII Porta Cabin. The programme was initiated with an introduction to the World Heritage Convention and World Heritage Day by Dr Nehru Prabakaran, Associate Nodal Officer, WII-C2C. This was followed by the quiz, which took the seven participating teams of six members each, along with all those in

attendance, on a trip to the world of heritage – its wonders and its mysteries. There were three rounds of questions dedicated to Pioneers (of the conservation movement), Landscapes (of heritage importance) and Characters (flora and fauna representing natural heritage). The MSc Wildlife Science team came through as a clear winner. Dr S Sathyakumar, Registrar, WII, awarded the winners and encouraged the attendees to take an active interest in quizzing as it increased their base of knowledge while asking them to use the World Heritage Site list as an indicator of must-visit places wherever they go.

Biodiversity Conservation and Management Training for RFO Trainees, Dehradun, 19 April 2023.

A three-day course on "Biodiversity Conservation and Management" Training Programme for Range Forest Officer Trainees of Uttarakhand Forest Training Academy, Haldwani, was coordinated by the Ministry of Environment, Forest & Climate Change's EIACP Programme Centre at Wildlife Institute of India. Dr S. Sathyakumar, Scientist-G & Registrar, WII, addressed the course trainees. A total of 57 Range Forest Officers participated in this training programme. More than 20 faculty members from WII and four external resource persons shared their valuable expertise with the participants. All Range Forest Officer trainees greatly appreciated the resource persons' presentation case.

Three days course on "Biodiversity Conservation and Management" for Range Forest Officer Trainees, Uttarakhand Forest Training Academy, Haldwani" Conducted at WII, 19-21 April 2023.

The objective of the course was to train the Range Forest Officer Trainees on Biodiversity Conservation and Management. It was organised by the Wildlife Institute of India and sponsored by Uttarakhand Forest Training Academy, Haldwani. In all, 57 Range Forest Officer Trainees participated in the course.

Inception-cum-Training Workshop of the Gaur Reintroduction Project, Kanha Tiger Reserve, 26 April 2023.

An inception-cum-planning workshop on Gaur reintroduction was organised at Kanha Tiger Reserve (TR) with the participation of eminent scientists, experts, and park managers. A total of 31 officials, including Park Officials and Veterinary officers from Kanha TR, Satpura TR, Bandhavgarh TR, Pench TR and Sanjay TR, besides faculty from the School of Wildlife Forensic & Health, Jabalpur and wildlife capture experts from Wildlife and Forestry Services, Ujjain participated in the workshop and provided valuable comments. Various aspects of animal capture, translocation, critical considerations during field operation, learnings from Bandhavgarh TR, and monitoring essentials were discussed at length. Sh. JS Chauhan, Principle Chief Conservator of Forest and Chief Wildlife Warden, Madhya Pradesh, steered the workshop and highlighted the learning from past Gaur reintroduction from Bandhavgarh. Dr Parag Nigam, Scientist-G, presented the action plan for Gaur reintroduction. He flagged various activities planned for ensuring safe capture, capacity building of officers and frontline staff, and post-release monitoring. A document titled "Resurgence of Gaur in Bandhavgarh Tiger Reserve" as an outcome of the long-term research on Gaur in Bandhavgarh TR and the Project Logo of Gaur reintroduction in Sanjay TR was released during the occasion.

7th Technical Workshop of the Asia Protected Areas Partnership (APAP), Dehradun, 27-29 April 2023.

The workshop's objective was to demonstrate the value of collaboration, capacity-building, and knowledge exchange in strengthening the management and conservation of Protected Areas across Asia. It was jointly organised by the Wildlife Institute of India, the Ministry of Environment, Forest and Climate Change, and the IUCN Asia Regional Office, Bangkok. A total of 70 participants attended the workshop.

The inaugural session of the workshop was graced by Shri Bivash Ranjan, Additional Director General of Forest (Wildlife), Ministry of Environment, Forest and Climate Change, Government of India; Shri Virendra Tiwari, Director, Wildlife Institute of India; Shri Raquibul Amin, Head, IUCN South Asia Sub-Region and Shri Rohit Tiwari, Inspector General of Forest (Wildlife), Ministry of Environment, Forest and Climate Change, Government of India. There were 12 member countries, viz. Maldives, Indonesia, the Republic of Korea, Bangladesh, Mongolia, Myanmar, Nepal, Vietnam, Thailand, Sri Lanka and Japan were represented by 30 delegates. Three sessions were organized for the first day of the workshop, session 1 was on Kunming-Montreal Global Biodiversity Framework (GBF) 2020 and Target 3 (30x30), and Session 2 & 3 was designed for each participating country to provide a snapshot of their Terrestrial, Marine and Freshwater Protected Areas, Planning on Target 3 and next steps for their respective countries towards implementing Post-2020 GBF. On day 2, delegates visited the FRI Museums, WII Forensic Laboratory and were taken for a field tour to Rajaji Tiger Reserve.

Oath Taking Ceremony Under Mission Life, May 2023.

Oath-taking activities were organized at the following places: (i) On 19 May 2023 at Government Inter College, Ganga Bhogpur, Pauri Garhwal, for 200 school children, (ii) On 19 May 2023, at Government Inter College, Nagni, Tehri Garhwal, for 524 schoolchildren, (iii) On 20 May 2023 at Kisan Inter College, Bijnor, Uttar Pradesh for 1,650 school children, (iv) On 22 May 2023 at RNI. Inter College, Bhagwanpur, Haridwar for 2,700 school children, (v) On 23 May 2023 at Government Middle School, Tajewala Head, Haryana for 180 school children, (vi) On 22 May 2023 at Government Model Inter College Matli, Uttarkashi for 250 school-children, (vii) On 23 May 2023 at Janki Children Acadamy, Dehradun for 600 school children, (viii) On 24

May 2023 at SGRR Barkot, Uttarkashi for 420 school-children, (ix) On 27 May 2023 at GIC Chamrada Devi, Bharpoor for 100 school children and ten teachers.

Online Painting Contest to Celebrate International Day for Biological Diversity by the EIACP Programme Centre, WII, 22 May 2023.

To promote Mission LiFE and raise awareness among youngsters, the EIACP Programme Centre at the Wildlife Institute of India, Dehradun, organised an Online Painting Contest titled "Biodiversity in My Backyard" to commemorate the International Day for Biological Diversity. The contest was available to all school students up to class XII. Ninety-four school students from various States enrolled and participated in the online painting contest. The top three entries were awarded prizes, and three entries received appreciation prizes.

WII's Foundation Day, 22 May 2023.

The Wildlife Institute of India (WII) was established on 22 May 1982. The Institute celebrated its 41st anniversary with the International Day for Biological Diversity. The celebration took place with a small function held at the WII Auditorium. Approximately 400 participants attended the event, including the Director, Dean, Registrar, current and retired faculty, teaching & non-teaching staff, researchers, students, former Directors, family members of staff and faculty, including retired staff. Dean, WII inaugurated the event, and a collection of vintage photos from the early days of the Institute, shared by the Audio-Visual Cell, were screened. A movie showcasing the Institute's historical background and past research works was also shown, evoking nostalgia and transporting the audience to another time. The Director addressed the gathering, expressing gratitude and honouring the former Directors and staff at the event. This was followed by a cultural program featuring a dance performance & a singing performance performed by WII researcher, Naitik Patel. The event was live-streamed on YouTube. Furthermore, the evening marked a significant moment when the Chairman of AICTE and the Director of WII signed a Memorandum of Understanding, symbolising collaborative efforts to promote technical education in the country.

Training Workshop on 'Biodiversity & Wetland Conservation', Maldevta, Dehradun, 22-23 May 2023.

A training workshop on 'Biodiversity & Wetland Conservation' was conducted at Government P.G. College Maldevta, Dehradun. The training aimed to enhance knowledge and awareness among participants regarding the conservation of biodiversity and wetlands. The workshop included lectures from experts, interactive sessions, and engaging activities. Lectures on "Mission Life" focused on promoting an environmentally friendly lifestyle, solid waste management, and wetland conservation. The interactive activities further enhanced the learning experience and encouraged active participation from the students. About 70 students and 11 professors participated in the training.

Mission LiFE activities, May - June, 2023.

Mission LiFE activities of oath taking were organized under the banner of WII-NMCG Project: (i) On 18 May 2023 at Madhyamik Vidyalaya, Auraiya, for 25 school students, (ii) On 25 May 2023 at Sarnath Zoo, Varanasi, for 50 enthusiastic participants (iii) On 27 May 2023 at Subhash Chandra Bose Academy, Dehradun, for 150 students and teachers; and (iv) On 27 May 2023 with handloom workers and Banarsi Saree vendors of Sarnath, Varanasi, for 30 participants; (v) On 28 May 2023, cleanliness drive at Kaithi Ghat in Varanasi, for 20 members of the local community; (vi) On 29 May 2023, at a village of Chaubeypur, Varanasi at Naipali Dham Temple, for 20 members of the local community (vii) During 30-31 May 2023, at the Ganga Darpan Interpretation Centre, with 20 villagers of Baraipur, ten villagers of Parvatpur; and (viii) During 30-31 May 2023, with 45 members of the local community at Navapura Village, Varanasi.

World Environment Day Quiz, 5 June, 2023.

Ministry of Environment, Forest & Climate Change, Government of India's EIACP Programme Centre and M.Sc. Wildlife Sciences, Wildlife Institute of India, Dehradun collaboratively organised a quiz to celebrate World Environment Day on 5 June 2023 at WII Auditorium. Shri Virendra R. Tiwari, Director, Wildlife Institute of India distributed prizes and certificates to winning teams in the presence of Dr S. Sathyakumar, Scientist-G & Registrar and Dr K. Ramesh, Scientist-F & EIACP Programme Coordinator.

Mission LiFE Programme in 59th Annual Meeting of the Association for Tropical Biology and Conservation Conference (ATBC) 2023, Coimbatore, Tamil Nadu, 6 July 2023.

The Association for Tropical Biology and Conservation (ATBC) is a scientific professional society formed in 1963 as the Association for Tropical Biology. The ATBC is global in scope, membership, and objectives, functioning as an international body to promote research, education, and communication of tropical biology and conservation. In July 2023, ATBC organised its 59th Annual Meeting Conference at Coimbatore, Tamil Nadu and Dr K. Ramesh, Scientist-F, WII led this event. The EIACP Programme Centre, WII, organised the Mission LiFE Programme at the annual meeting. A group of more than 500 school students from a local school visited the WII-EIACP Programme Centre stall. Dr Ramesh Chinnasamy, Scientist-E, briefed school students about the seven themes of Mission LiFE & various capacity-building activities performed by the EIACP Programme Centre. A Mission LiFE Pledge was conducted for school students during the ATBC conference. This activity aimed to bring together more than 500 school children, researchers, scientists and foreign delegates to raise awareness about the Mission LiFE as a mass movement for "mindful and deliberate utilisation, instead of mindless and destructive

consumption" to protect and preserve the environment, which Hon'ble Prime Minister Narendra Modi introduced at COP26 in Glasgow on 1 November 2021.

International Tiger Day 2023 Celebration at WII, Dehradun, 29 July to 7 August 2023.

The Wildlife Institute of India, in association with The Times of India and Swami Rama Himalayan University, celebrated International Tiger Day 2023 from 29 July to 7 August 2023. Garhwal Mandal Vikas Nigam, The Tons Bridge School, Hotel Saffron Leaf, Kamal Jewellers, Doon Art Council and Hotel Inderlok supported the event. Nineteen schools participated in various activities. The students attended sessions like Nature Trail visits, Wildlife Photography, Talks on Tiger Conservation, Use of Technology in Tiger Conservation, Photo Exhibitions, etc. Uttarakhand Forest Department displayed a wildlife photo exhibition. Achintya Singh and Jenisha Aggarwal also conducted Wildlife photography workshop sessions for students. The participating schools from Dehradun were Doon Global School, Welham Boys' School, Doon Girls' School, Welham Girls' School, Guru Nanak Academy, St Jude's School, Doon Yudhishtera Public School, Himalayan Public School, Doon Presidency School, The Tons Bridge School, Olympus High, Raja Ram Mohan Roy Academy, Universal Academy, Pine Hall, Shri Ram Centennial School, Doon Heritage School, Rose Mount School, Doon Valley International School and Brooklyn School. The concluding ceremony was held at the Institute on 7 August 2023. The dialogue explored 'Conserving Our Stripes: Tigers, Wildlife, and Tourism'. At the outset, Shri Virendra R. Tiwari, Director, WII, enlightened everyone on WII's contribution to Project Tiger, followed by the screening of a film on wildlife titled 'Return of the Magnificent Gaur in Sanjay Tiger Reserve: A Success Story' by Dr Parag Nigam, Scientist-G and Shri Ritesh Vishwakarma, WII. The event also featured three engaging panel discussions: (i) Living on the Edge of Humans, (ii) Tiger Conservation: Challenges and Pathways Forward, and (iii) Tiger & Tourism: Balancing Economics and Responsibility. The event served as a platform for the participants to deepen their understanding of the interaction between humans, wildlife, and sustainable tourism.

Release of WII-EIACP Bulletin "An Illustrative Profile of Tiger Reserves of India", Corbett Tiger Reserve, 29 July 2023.

EIACP Programme Centre, Wildlife Institute of India, Dehradun published WII-EIACP Bulletin "An Illustrative Profile of Tiger Reserves of India," which was released by Hon'ble Union Minister of State, Ministry of Environment, Forest and Climate Change on International Tiger Day, 29 July 2023 at Corbett Tiger Reserve. This publication provides information on the conservation status of tigers in our country and serves as a valuable handbook for researchers & wildlife managers working in wildlife conservation.

EIACP Programme Centre Online Quiz on 'Plastic Free July', 2023.

"Plastic-free July" is a global movement for July to encourage people to reduce plastic usage and waste. EIACP Programme Centre, Wildlife Institute of India, Dehradun, organised an online "Plastic Free July 2023" quiz. The online quiz participation was open to all, and more than 110 participants registered themselves for this online contest. This online activity aimed to raise awareness of environmental issues associated with single-use plastics and inspire people to make more sustainable choices in their daily lives.

Meeting on Multi-stakeholder Meeting to Discuss Wildlife Conservation in the Thar - A Community - Based Conservation Approach, 8 September 2023.

This meeting was organised by the Rajasthan Biodiversity Board & WCS-India. The project team presented their work, experiences, and insights, focusing on community conservation in the desert landscape. This was followed by a discussion on the challenges faced by wildlife and the people of Thar. The meeting concluded with the group identifying opportunities to advance community-based conservation efforts in the Thar desert.

Wildlife Institute of India's 34th Annual Research Seminar, Dehradun, 21-22 September 2023.

Under the aegis of the Ministry of Environment, Forest, and Climate Change, Wildlife Institute of India (WII) successfully concluded its much-anticipated Annual Research Seminar (ARS) within its scenic campus in Dehradun. Spearheaded by Director, Shri Virendra R. Tiwari, the two-day seminar illuminated pressing challenges, innovative resolutions, and cutting-edge research within the domain of wildlife and conservation. The inaugural address was delivered by Dr Rajesh Gopal, who underscored the pivotal role of institutions like the Wildlife Institute of India and wildlife researchers in shaping conservation practices both in India and globally. Guest of Honour, Shri Bharat Jyoti, IFS, Director Indira Gandhi National Forest Academy, shared his remarks and insights, emphasizing the importance of such gatherings in the larger context of wildlife conservation.

A vibrant poster session showcased captivating presentations on diverse topics. The concluding session marked the wrap-up of the seminar, chaired by Dr Rajesh Gopal and co-chaired by Shri Virendra R Tiwari, summarizing the key takeaways from the two-day discussion. The awards segment showcased the promising work of emerging wildlife scholars and photographers who have captured nature's essence through their lenses. ARS 2023 saw the launch of six publications and a total of 6 lead talks, 26 oral presentations, 11 speed talks and 31 posters presented at the ARS in eight technical sessions. The awards were given to the following researchers:

XXXIV –Annual Research Seminar, 21-22 September 2023.

Oral Presentation Awards

I Supratim Dutta
II Akanksha Saxena
III Priyanka Justa

Poster Presentation

I Thirumurugan V.
II Shekhar Sarkar
II Aarti Chauhan
III Sameeha Pathan

Speed Talks

I Sagar Rajpukar
II Akshayi AS
III Uddalak Bindhani

Photographic Competition

I Moulik Sarkar
II Sagar Rajpurkar
III Ameya

Category: Jury Special Prize

Rohan Desai

Category: Field Research Activity

I Ritesh Vishwakarma
II Gaurav PJ
II Moulik Sarkar

Category: Non-Theme

I Moulik Sarkar
II Ajay Chauhan

Category: Camera Trap

I Gaurav PJ
II Ayan Khanra

Shri Virendra R. Tiwari, Director, WII, mentioned that "The Annual Research Seminar at the Wildlife Institute of India showcased a variety of efforts aimed at protecting the rich biodiversity. It served as a vibrant platform displaying the profound research endeavours undertaken at the institute. The collective insights garnered during these engagements propel our research initiatives into new dimensions, ensuring a continuous enhancement in the quality of our work, which is fundamental to the rigorous field of wildlife conservation and study." The Chief Guest, Dr Rajesh Gopal, IFS, Secretary General, Global Tiger Forum, and TRAC Chairman, said, "In the panorama of conservation, the vital role of thorough research and the relentless pursuit of knowledge cannot be overstated, as we navigate through the current conservation challenges. It is wildlife researchers who stand as beacons of hope.

Walk to Assess the Butterfly Diversity of WII Campus, Dehradun, 24 September 2023.

The Wildlife Institute of India, in collaboration with Titli trust and Doon Nature Walk, organized the Butterfly Walk in WII campus to assess the diversity of butterflies and other insects to contribute to national events . Dr B.S. Adhikari participated in the walk.

Inception-cum-Planning Workshop on Management Effectiveness Evaluation (MEE) of 116 National Parks and Wildlife Sanctuaries in India, New Delhi, 29 September 2023.

The objective of the workshop was to orient the new MEE Teams and discuss field plans for evaluating 116 National Parks and Wildlife Sanctuaries in India for the period of 2023-24. It was jointly organised by the Wildlife Institute of India and the Ministry of Environment, Forest and Climate Change, Government of India at India Habitat Centre, New Delhi. A total of 64 participants took part in the workshop. The workshop was under the chairpersonship of Shri Bivash Ranjan, ADGF-Wildlife, MoEFCC. Shri Virendra R. Tiwari, Director WII, welcomed all the participants with a brief round of introductions. Shri R. Raghu Prasad, IGF-Wildlife, MoEFCC, delivered his opening remarks emphasizing on the significance of the MEE exercise for both MoEFCC and the nation. He highlighted that MEE assesses the effectiveness of protected areas, serving as a crucial tool in shaping interventions at various levels, including state, national, and international. In Technical Session-I, Dr Gautam Talukdar, Scientist WII, delivered a presentation on the overview of the MEE exercise and discussed the criteria & indicators of the MEE Framework. In Technical Session II, there was a group discussion on the tentative field visit plans to finalise the evaluation of all 116 parks within the 2023-24 timeframe.

Wildlife Week Celebrations at WII, Dehradun, 2-8 October 2023.

The Wildlife Institute of India conducted a quiz on 7 October 2023 at its auditorium. Twelve teams, each

comprising three members, enrolled for the event. Shri Virendra R. Tiwari, Director, WII, Dr S. Sathyakumar, Registrar, WII, and other faculty colleagues graciously attended the event. After the written prelims round, eight teams made it to the finals. Team Sus(t) scrofa emerged as the winner after the final round. Shri Virendra R. Tiwari, Director, Wildlife Institute of India awarded prizes to the winners and the first (Wild Wonderers) and second runner-up (Neofelis) teams.

A module on "Wildlife and Biodiversity Conservation for IFS officers of 35th Professional Upgradation Course for inducted officers from Indira Gandhi National Forest Academy, Dehradun, 10-13 October 2023.

The objective of the module was to train the IFS officers of 35th Professional Upgradation Course for inducted officers from Indira Gandhi National Forest Academy, Dehradun. It was organised by the Wildlife Institute of India and sponsored by Indira Gandhi National Forest Academy. A total of 46 Indian Forest Service Officer Trainees participants in the module.

Workshop on 'Framework for the Preparation of Elephant Conservation Plan (ECP) for the Elephant Reserves, 13 October 2023.

The workshop aimed to address the challenges of human-elephant conflict, safeguard Asian Elephant populations, and achieve sustainable conservation and prepare a framework for the Preparation of Elephant Conservation Plan (ECP) for the elephant reserves. It was jointly organised by the Wildlife Institute of Institute and Project Elephant Division, MoEFCC. A total of 28 experts attended the workshop. The key points discussed include the importance of ecological protection, restoration measures, stakeholder engagement, and the need for greater cooperation and financial support for elephant conservation. The document highlights the establishment of a core team, discussions on the ECP framework, conservation philosophy, planning processes, and group discussions on key chapters, including the involvement of stakeholders, corridor monitoring, genetic research, and financial planning. The workshop emphasized the need for a comprehensive approach considering ecological, socioeconomic, and cultural aspects to ensure the long-term viability of Asian Elephant populations.

The Global River Dolphin Declaration Meeting for all River Dolphin Range Countries, 23-24 October 2023.

The Global River Dolphin Declaration meeting was held for all River Dolphin Range countries to address key conservation challenges of river dolphins and under¬standing the socioecological dynamics of South Amer¬ica and Asia. Representatives of 14 governments, including India, Bangladesh, Nepal, Pakistan, Myan¬mar, China, Cambodia, Indonesia, Peru, Bolivia, Co¬lombia, Brazil, Venezuela and Equador participated in the meeting. In this regard, Sh. Virendra R Tiwari, Director, Wild¬life Institute of India, and Dr Vishnupriya Kolipakam, Scientist-D were nominated to represent the Indian delegation at the meeting.

A presentation was made on India's progress and achievement, including the effort undertaken by the government for the rangewide river survey, spanning over 9,000 kms. It was highly appreciated in the in¬ternational community, regarding the nation leading the way forward by including 11 ministries working together as part of the Project Dolphin Steering com¬mittee, in order to secure the aquatic habitats of the country. The meeting ended with the official reading and sign¬ing of the Global Declaration for River Dolphins. It was signed by all river dolphin range government representatives.

Five-day Intensive Course on Wild Animal Restraint and Immobilisation, Sariska Tiger Reserve, 16-20 November 2023.

The objectives of the workshop were to (i) Understand species biology, behaviour, and conflict for effective wildlife management (ii) Familiarize participants with wild animal capture, including drugs, equipment, and immobilisation techniques (iii) Teach applied physiology, basic pharmacology, and address post-immobilization emergencies (iv) Conduct practical sessions on dart systems, field procedures, and capture operations (v) Discuss conservation strategies, disease challenges, and transportation methods, concluding with an assessment.

The workshop was organized by the Wildlife Institute of India in partnership with Wildlife Pharmaceuticals (Pty) Limited, South Africa and Estonian University of Life Sciences, Estonia. In all, 27 participants from across 13 states of India took part in the workshop.

This course was designed with more than just a series of lectures; it was an immersive experience. The hands-on exercises were designed to demonstrate the challenges faced in the field, providing a unique opportunity to apply theoretical knowledge to real-world scenarios. It included animal immobilisation, post-immobilization monitoring, general field procedures and health assessment of a leopard (Panthera pardus) in captivity and Sambar, Rusa unicolor, Nilgai, Boselaphus tragocamelus, Spotted Deer, Axis axis and Wild Pig, Sus scrofa in free range scenario. This exercise introduced the participants to advances in applied pharmacology and sedation protocols, best practices for immobilisation and post immobilisation monitoring to avoid emergencies, equipment usage along with species-specific and ethical considerations in the field.

The course was aimed at being more than an academic endeavour, it was a transformative experience that shapes the way that veterinary professionals perceive and interact with the wild and further at imbibing a culture that would

promote an understanding that our actions today contribute to a sustainable and harmonious coexistence. The ultimate goal was to fostering a community of professionals dedicated to the responsible handling and conservation of wild animals

GIS Day Celebration-cum-Workshop 2023: Unleashing the Power of GIS: Mapping Our World, Solving Real-World Challenges, Dehradun, 21-22 November 2023.

The objective of the workshop was to encourage the use of GIS technologies to answer ecological questions, wildlife research and environmental conservation. The workshop was organised by the Wildlife Institute of India, in which 135 participants took part. The workshop was officially inaugurated by the Director, Dean, and Registrar of WII, who shared their profound experiences in the GIS field. Dr Gautam Talukdar, Nodal Officer IT, RS & GIS cell, and Shri Qamar Qureshi, Scientist, further enriched the inaugural session with their valuable insights.

A series of sessions were organized from covering topics such as data availability for RS GIS analysis (J. Haritha & Himani Khati), Basics of Cartography (Shri Debanjan Sarkar & Ms Shatakshi Sharma), Hands-on session on QGIS (Shri Ashish Mani & Ms Aishwarya R.). Attendees also participated in Google Earth Exploration Quiz event (Shri Varun Kher and Ms Deepali Bansal).

Workshop on Minimizing the Impact of Railways on Elephants and Other Wildlife for the Officials of Indian Railways, Dehradun, 23-25 November 2023.

The objective of the workshop was to recognize the importance of collaborative multi-prolonged efforts to minimized railway–related wildlife mortalities, initiative of the MoEFCC in collaboration with the Ministry of Railways. It was jointly organised by the Wildlife Institute of Institute and Project Elephant Division, Ministry of Environment, Forest and Climate Change. A total of 18 serving railway officers participated in the workshop.

The inter-ministerial workshop was conducted at the Wildlife Institute of India, and field visits were made to the Rajaji Tiger Reserve in Uttarakhand. Nomination of field-level officers were received from nine zonal railways primarily from the elephant range areas across India. A total of 18 serving Railway officers participated in the workshop. The officers that participated in the workshop came from diverse group of departments within Railways representing the signal and telecommunication, permanent way, construction, traffic, training, rail safety and others. The participants opined that the workshop provided them an opportunity for them to enhance and diversify their skill in managing the rail–elephant conflict situation.

Capacity Build Capacity Building Workshop on "Mainstreaming management of the Elephant Reserves" for the Elephant Reserve Managers, Dehradun, 28–29 November 2023.

Wildlife Institute of India organized the workshop under the aegis of Project Elephant Division, Ministry of Environment, Forest and Climate Change at Dehradun. This workshop was aimed to mainstream Elephant Reserves with wildlife management and also standardizing elephant specific management requirements for the improvement of habitat and populations. It also aimed in bringing elephant reserve management across the country together to deliberate on range of topics relevant to elephant conservation and management including aspects of human elephant conflict.

The workshop was attended by 14 officers working with the State forest departments of Andhra Pradesh, Assam, Jharkhand, Chhattisgarh, Tamil Nadu, Uttar Pradesh and Uttarakhand. The participants shared their feedback that the workshop was effective in enhancing their understanding and provided an opportunity for them to diversify their skill and gain knowledge proficiency in management of the Elephant Reserves.

Training Programme for Frontline Staff on Monitoring of Monitoring of Outstanding Universal Value of Natural World Heritage Sites Heritage Sites Sundarbans National Park, 11–12 December 2023.

Wildlife Institute of India hosted a training programme for frontline staff of the Natural World Heritage Site, Sundarbans National Park at Sajnekhali, West Bengal. The focus of the programme was to facilitate the staff in learning about why Sundarbans NP was nominated as a World Heritage Site and Outstanding Universal Value which form the basis for inscription. The purpose of the training included helping the staff monitor values and analyse current management challenges as experienced by them at the frontlines. 27 frontline staff from various beats and ranges of the site participated.

Three-days Sensitization Workshop on Urban Biodiversity and Ecosystem Services, Dehradun, 13-15 December 2023.

The objective of the workshop was to generate awareness on urban biodiversity and ecosystem services to contribute to environmental conservation for group-A, state level officers, Government and semi-govt officers. It was organised by Wildlife Institute of India and Ministry of Environment, Forest and Climate Change, Government of India. A total of 24 participants attended the workshop.

The Director of the Wildlife Institute of India, Shri Virendra R. Tiwari delivered the opening remarks. Further special remarks by Shri S.B. Limaye enriched the inaugural session with valuable insights. A series of enlightening sessions unfolded, Personnel of Other Services. Dr V.B. Mathur

delivered the keynote address "Biodiversity Conservation: Global Overview and Perspectives on Urban Biodiversity". The sensitization workshop was conducted with a professional approach, eliminating prolonged inaugural and valedictory sessions. The context was established before delving into in-depth discussions on key issues. The workshop adopted an interactive format, incorporating panel discussions on both days to encourage the exchange of ideas between experts and participants. Field visits were also organized to enhance understanding of urban biodiversity, ecosystem services, and related issues.

Second Orientation Workshop Under the NMCG-WII "Jalaj: Connecting River and People to Realize Arth Ganga" Project, Dehradun, 27-29 December 2023.

Second orientation workshop under the National Mission for Clean Ganga-Wildlife Institute of India (NMCG-WII) "Jalaj: Connecting River and People to Realize Arth Ganga" Project for New Recruits and Ganga Prahari was organised at the WII Auditorium. A total of 80 participants, including 34 females from 55 districts of 10 States across the Ganga River basin were trained during the three days capacity building workshop. The workshop comprised four technical sessions including both classroom and field trip. Participants were briefed on reporting of field activities, including socio-economic data collection, photographic and videography record keeping. Apart from these detailed sessions on financial management of SHGs, Book keeping, auditing, importance of regular meetings, trainings, laws governing business, accounting and taxation were conducted. Towards the end new recruits were explained on the rules and regulations of Financial Management System at WII. The participants were taken on WII Nature Trail to familiarise them with the flora and fauna of the WII Campus.

Exploring Solutions for Minimizing Electrocution Risks and Promoting Wildlife Safety across Power Infrastructure in India, 11–13 January 2024.

The MoEFCC embarked on an inter-ministerial consultative workshop aimed at bringing forest officials, wildlife scientists and officials from the power sector (including Ministry officials, power distribution companies) together to discuss the gamut of issues pertaining to wildlife electrocution and ways to means to address the same. It was jointly organised by the Wildlife Institute of Institute and Project Elephant Division, MoEFCC. 40 serving officials participated in the workshop.

A total of 40 participants attended the workshop. The attendees included senior forest officials (DCF and above) from the States of Odisha, Jharkhand, Uttarakhand, Madhya Pradesh, Tamil Nadu, Kerala, Chhattisgarh, West Bengal, officials from the NTCA, Power grid corporation, Central Electricity Authority and from other state power distribution and transmission agencies. Overall, the workshop fostered cooperation, knowledge exchange, and practical strategies to protect India's diverse flora and fauna while meeting energy needs sustainably, marking a significant step in addressing the challenge of animal electrocution and laying the groundwork for collaborative conservation efforts nationwide.

Workshop on Gaur Monitoring and Population Estimation Method, Bandhavgarh Tiger Reserve, 31 January 2024.

The objectives of the workshop were: (i) to offer hands-on training in the identification of the sex and age of gaur using various methods, recognizing individual gaurs through different morphological markings and enhance understanding of general characteristics and ecological aspects (behavior, food, and social dynamics) and emphasizing the importance of recording observations. The workshop was organized by the Wildlife Institute of India in partnership with Madhya Pradesh Forest Department. A total of 26 officials and frontline staff of Bandhavgarh Tiger Reserve attended the workshop.

Workshop on Finalization of the 'Framework for the Preparation of Elephant Conservation Plan (ECP), Dehradun, 6 February 2024.

The workshop aimed to refine the Elephant Conservation Plan (ECP) draft. It was jointly organised by the Wildlife Institute of Institute and Project Elephant Division, Ministry of Environment, Forest and Climate Change. A total of 25 experts attended the workshop. Working groups proposed measures for human-elephant conflict (HEC) mitigation, ecological sustainability, and administrative reforms Suggestions included stakeholder engagement, innovative HEC solutions, and enhancing wildlife veterinary capabilities. Transparency in institutional reputations and database management across management units were underscored. The workshop advocated for a comprehensive "Elephant conservation book" for site-specific data. Overall, it served as a crucial platform for refining the ECP, ensuring effective conservation strategies, and fostering administrative coherence for elephant reserves, thereby advancing holistic approaches to elephant conservation.

Workshop on Intervention in Wild Animal Health-2024, Sariska Tiger Reserve, 10-27 February 2024.

The objectives of the workshop were to: (i) gain a critical understanding in terrestrial wildlife population monitoring and biological management, (ii) gain a critical awareness of best practice intervention methods at the human wildlife interface, (iii) develop a systematic understanding of the planning of, and field methods in, pathological examination and disease outbreak investigation, and the practical implementation of a wildlife disease surveillance programme, (iv) gain a critical awareness of health monitoring of wildlife and field methods to investigate the role of disease in the decline of species, and (v) A comprehensive understanding of best practice of terrestrial wild animal restraint and anesthesia techniques.

It was a collaborative initiative between Wildlife Institute of India, Zoological Society of London (ZSL), University of Edinburgh (UoE) and University of Melbourne and Royal Veterinary College. A total of 24 participants from across the globe (United Kingdom (2), Germany (1), Spain (3), Portugal (1) Philippines (1), Australia (1) participated in the workshop.

Training of Other Service Officers (Group II & III) on "Human-Wildlife Conflict Issues & Mitigation", Dehradun, 26-28 February 2024.

The objective of the training course was to train the Other Service Officers (Group II & III) on "Human Wildlife Conflict Issues & Mitigation. The program was organised by the Wildlife Institute of India which was sponsored by MoEFCC (RT Division). A total of 20 Other Service Officers (Group II & III) participated in the training.

ATTENDEDBY WIIPERSONNEL

World Veterinary Day 2023, New Delhi, 29 April 2023.

The objective of the programme was to create awareness about animal health and welfare with the motto to offer global cooperation and leadership I veterinary profession. It was organised by Department of Animal Husbandry and Fisheries (DAHF), Ministry of Fisheries, Animal Husbandry and Dairying, Government of India and the Veterinary Council of India (VCI). As a part of the World Veterinary day, the VCI and DAHF organized technical sessions to discuss various issues related to veterinary sciences and animal health. Dr Parag Nigam, Scientist-G delivered a talk on "Veterinary Interventions for wildlife conservation and management" at Vigyan Bhawan, New Delhi. More than 1,200 delegates from across the country attended the session.

Workshops on Approaches and Advancements in ex-situ Management of Wild Animals, Bhopal, 16-18 October 2023.

Dr Parag Nigam, Scientist-G, WII provided inputs on the 'Options and concerns in wild animal capture, post immobilization emergencies and their management, case studies of rescue and rehabilitation of wild animals and management of seized animals in zoos' for the workshop organized by the Van Vihar National Park under the aegis of Central Zoo Authority. The objectives of the workshop were to: (i) emphasize the importance of animal welfare in the captive environment, with an emphasis on enriching the lives of zoo animals. (ii) expose veterinary officers to the latest advancements in veterinary medicine, anesthesia, diagnostics, and surgical techniques specifically tailored for zoo animals. (iii) to develop understanding on managing the behavioural needs of captive animals. (iv) discuss the role of zoos in wildlife conservation and how veterinarians can contribute to these efforts. (v) to enhance knowledge on emergency response strategies for natural disasters, disease outbreaks, and other crises that could affect zoo animals. (vi) discuss management of non-native species and species confiscated in illicit wildlife trade.

The 3-day workshop was instrumental in imparting comprehensive understanding of the strategies and innovations employed in the conservation and care of wild animals, examine the historical evolution of ex-situ management, its contribution to species recovery and conservation, and the ethical dilemmas it raises. A total of 37 wildlife veterinarians from zoos spread across 10 states of India (Madhya Pradesh, Gujarat, West Bengal, Haryana, Uttar Pradesh, Kerala, Hyderabad, Jharkhand, Chennai, Uttarakhand) and from 4 Tiger reserves of Madhya Pradesh (MP) (Bandhavgarh Tiger Reserve, Kanha Tiger Reserve, Panna Tiger Reserve and Sanjay- Dubri Tiger Reserve)

attended the workshop. Inputs included both theoretical and field sessions that were delivered by eminent scientists, Zoo Directors and senior biologists.

National Conclave for Augmented Zoonotic Diseases Surveillance at Human Wildlife Interface", New Delhi, 17-18 October 2023.

Dr Lallianpuii Kawlni was invited as a resource speaker to deliver a talk on "Disease Surveillance at the Human Wildlife Interface" at National Conclave for Augmented Zoonotic Diseases Surveillance at Human Wildlife Interface" conducted by the National Centre for Disease Control under the chairmanship of Secretary (Health), MoHFW at Nalanda Hall, Dr Ambedkar International Centre, New Delhi.

Intra-Regional Workshop on "Developing Strategies to Support Dugong Conservation in the Palk Bay, Tamil Nadu", 19-20 October 2023.

Ms. Chinmaya Ghanekar, Scientist-C, WII participated in this inter-regional workshop organised by Wildlife Conservation Society India. The workshop aimed to provide an inclusive space for stakeholders to engage in constructive discussions, share their insights, and collaborate on potential solutions. The workshop featured expert presentations on various topics, emphasizing dugongs and seagrass conservation and issues faced by fisheries in the region. The goal was to develop a strategy to guide management for the continued sustenance of marine biodiversity and fisheries in the Palk Bay region.

The program aimed to provide an opportunity for marine conservation initiatives to be presented. The workshop included a Question & Answer session and a facilitated group discussion on identifying challenges to Palk Bay conservation and management, covering research & monitoring, capacity development, and conservation interventions.

Marine Mammal Consortium of India, 4-5 November 2023.

Ms. Chinmaya Ghanekar, Scientist-C, WII represented WII in the Marine Mammal Consortium of India (MMCOI). The objectives of the consortium were to (i) Bring together inter-disciplinary professionals linked to marine mammal science and conservation to share information and foster collaborations; and (ii) discuss and recommend a potential Marine Mammal Consortium of India governance structure to support its long-term operations.

MMCOI was organized by Wildlife Conservation Society India. The MMCOI is an informal body of managers, researchers, conservationists, and practitioners working on marine mammals and their habitats in India. The workshop focused on collaboration among researchers, students, policymakers, and stakeholders for effective marine mammal conservation. The workshop featured keynote speeches, institutional updates, researcher presentations, and interactive sessions.

Workshop on "Consultation for Developing State Action Plan for Prevention and Control for Zoonotic Diseases for the State of Orissa", Bhubaneshwar, 21-22 November 2023.

Dr Lallianpuii Kawlni attended a workshop on "Consultation for Developing State Action Plan for Prevention and Control for Zoonotic Diseases for the State of Orissa", which was conducted by the National Centre for Disease Control.

Training Program on Exploring Apollo Server Functionality for the Web-based Decision Support System Development under NMSHE, Dehradun, 13-14 December 2023.

The objective of the training program was to train the participants on the operational functionalities of the Apollo server for data-base management and visualization of climate data. It was organized by DST-NMSHE Phase II Project, WII.

A total of 25 participants attended the workshop, which included researchers, Ph.D. scholars, and personnel from the IT cell. The training sessions covered the designing of the server's requirements and maintenance procedures. Detailed discussions were held on improving desktop features to ensure coherence for various decision-makers. Furthermore, a practical demonstration was conducted using field-based data from the Bhagirathi River basin, facilitating subsequent processing and in-depth analysis. Dr. S. Sathyakumar, Scientist-G and Registrar attended the training programme.

International Cooperation for Bustard Conservation: Side Event in CMS COP-14 (virtually), 12-17 February 2024.

Dr. Sutirtha Dutta, Scientist – E, WII presented an oral talk at the International Cooperation for Bustard Conservation, organised by CMS COP / IUCN SSC Bustard specialist group. The Great Indian Bustard is Critically Endangered with ~140 individuals left in India, largely in Jaisalmer. The talk included the work under the Bustard Recovery Program implementing conservation actions such as conservation breeding and science-based inputs to enforcement agencies for habitat restoration. A national vision plan for the species to continue conservation breeding and habitat restoration, backed by science, is in place to improve the species' status.

Stakeholder Consultation on National Plan of Action for Conservation and Management of Sharks in India, Kochi, 19 February 2024.

Ms. Chinmaya Ghanekar, Scientist-C, WII represented WII at the stakeholder workshop organized to finalize National Plan of Action for Conservation and Management of Sharks in India for its adoption by the Government of India The workshop was organised by Bay of Bengal Programme Intergovernmental Organization.

Dr Kim Friedman, Sr. Fishery Resource Officer at FAO, Rome, presented on the global perspective of shark management. Special remarks were given by Dr A. Gopalakrishnan, Director of ICAR-CMFRI, followed by the inaugural address by Ms Neetu Kumari Prasad, Joint Secretary of DoF, GoI. The status of shark fishery in India was discussed by a representative from CMFRI, Kochi. The event concluded with a discussion on the way forward by Shri A. Antony Xavier, FDC of DoF, GoI.

Training on Shaping Zoos of the Future through Scientific Management and Collaboration, Jamnagar, 11-12 March, 2024.

Dr Parag Nigam, Scientist-G, provided his inputs on "Optimizing scientific approaches to health management of captive wildlife." The objective of the training course was to develop capacities of Zoo Directors, Curators, Officer in-charge aimed at enhancing their knowledge, sharpen skills. It was organised by Greens Zoological Rescue & Rehabilitation Centre, Jamnagar. The two-day training exposed the Zoo officials to various aspects of ex-situ management through scientific sessions and field visits to various facilities. Emphasis was given towards scientific management of wild animals in captivity taking due care of animal welfare concerns.

International Conference of Biodiversity in Genomics Era, Pachhunga University College, Aizawl, Mizoram, 22-23 March 2024.

Dr Lallianpuii Kawlni gave an oral presentation in the International Conference of Biodiversity in Genomics Era on 'Integrating Genetic Analysis with Population Studies and Disease Surveillance in Protected Areas of Mizoram: Implications for Conservation and Human-Wildlife Coexistence'.

STUDY TOUR AND VISITS

Training of Staff on Artificial Breeding Techniques in Houbara and Arabian Bustards, Abu Dhabi, 26 March – 5 April 2023.

Technical partners for the GIB project in National Avian Research Center, Abu Dhabi trained Ms Tushna Karkaria, Project Scientist, WII on artificial breeding techniques like semen collection, storage and artificial insemination. The training was funded by Rajasthan Forest Department and supported by NARC.

SACON
(SOUTH INDIA CENTRE OF WII)
ACADEMICPROGRAMMES

M.Sc. Wildlife Science (Ornithology)

The academic program encompassed three semesters during the reporting period, with significant milestones achieved in each semester. Towards the conclusion of the first semester, students participated in a Wildlife Techniques Tour, visiting Bandipur Tiger Reserve (BTR), Karnataka, from 16–22 April 2023. This tour, coordinated by Dr. T. Ramesh and Dr. Vidyadhar Atkore, provided students with hands-on field training imparted by BTR biologists. Additionally, Dr. Ramesh Kumar, IFS, Field Director of BTR, engaged with the students, sharing insights into the management challenges of a tiger reserve. The tour also included a visit to Mudumalai Tiger Reserve. Upon their return, students completed two modules, namely Herpetology and Ichthyology & Invertebrate Biology, before undertaking their first-semester university examinations from 11–16 May 2023.

The second semester commenced on 12 June 2023, encompassing 12 modules covering foundational topics such as Ornithology-II, Conservation Biology-I, Landscape Ecology, Aquatic & Marine Ecology, Animal Behavior & Evolutionary Ecology, and Fundamentals of Ecology-II. As part of the Wetlands Tour, students traveled to Odisha from 2–13 September 2023, gaining field experience in wetland conservation and management. The tour included visits to Rushikulya, Chilika Lake, Mangalajodi wetlands, and Bhitarkanika mangroves, where students engaged with Tiasa Adhya's Fishing Cat Conservation Programme at Chilika Lake. In continuation of the second semester, students visited Anamalai Tiger Reserve, Tamil Nadu, on 23 August 2023 for behavioral ecology field trials, followed by a visit to the Valparai Plateau from 13–16 October 2023 to fulfill the requirements of the Conservation Biology module. During this exposure visit, biologists from the Nature Conservation Foundation elaborated on ecological restoration principles and challenges. The second-semester examinations were conducted from 1–7 November 2023.

The third semester commenced on 18 December 2023, focusing on ten modules that addressed applied aspects of wildlife science, including core subjects such as Conservation Biology-II, Applied & Economic Ornithology, Wildlife Health & Zoo Science, and Wildlife Management & Policy. As part of the Climate Change module, Dr. Riddhika Ramesh guided students on a visit to the Agroclimate Research Centre of Tamil Nadu Agricultural University on 24 January 2024. Two specialized modules, Animal Capture & Wildlife Health and Zoo Management, were conducted at Sri Chamarajendra Zoological Gardens, Mysuru, from 14–20 March 2024. These sessions, organized by Dr. H. N. Kumara and Dr. Manchi Shirish S., involved training by zoo biologists and veterinarians. Students also visited the Regional Museum of Natural History (RMNH), Mysuru, under the guidance of Dr. M. Mahendran.

During the third semester, students developed dissertation proposals for the fourth semester and successfully defended them in an open seminar held on 22 March 2024. The finalized proposals were subsequently submitted to the relevant authorities for research permits.

Throughout the reporting period, several external experts were invited to deliver lectures to MSc students, both online and in-person, enriching their academic experience.

MSc Students setting up a camera traps in Bandipur Tiger Reserve, Karnataka.

M.Sc. students in a hands-on training session on fish sampling in the field.

M.Sc. Thesis Guided by SACON Faculty

Merin Roy (2023). **Effects of Land use and Land cover on river habitats, water quality and fish communities in Eastern Arunachal Pradesh, India.** M.Sc. thesis in Environmental Science, Kerala University of Fisheries and Ocean Studies, Kochi, Kerala. Supervisor: Dr Vidyadhar Atkore.

Sanobar Imam (2023). **Effects of development projects and Urbanization on livelihoods of the fishing community residing near Thane Creek**. MSc dissertation, Centre of Water Policy and Governance, School of Habitat Studies, TISS-Mumbai. Evaluated by: Dr Vidyadhar Atkore.

Tak U (2023). **Population Status, Activity Pattern and Habitat Use of Rhesus Macaque in Keoladeo National Park, Bharatpur.** M.Sc. Thesis Submitted to Kota University, Rajasthan. Supervisor: Dr Aditi Mukherjee.

Status of Doctoral Research at SACON Degree Awarded

Aakriti Singh (2024). **Ecology of elephants, Elephas maximus and their interactions with humans in South West Bengal, India.** Manipal Academy of Higher Education. Supervisor: Dr H. N. Kumara.

Anoop V (2023). **Impact of the wind farm on select faunal components of a dry deciduous forest at Harapanahalli, Davangere, Karnataka.** PhD Thesis. Bharathiar University, Coimbatore. Supervisor: Dr Arun PR.

Thesis Submitted

Anoop Raj PN (2024). **Diversity of birds in Bharathapuzha river basin.** Manipal University of Higher Education, Manipal, Karnataka. Supervisor: Dr. P. Pramod.

Gurjarpadhye Prathamesh Hemnat Anjali (2023), **Inter-colonial dispersal patterns of the endemic Andaman Edible-nest Swiftlet.** Bharathiyar University, Coimbatore. Supervisors: Dr Manchi Shirish S. and Dr Ram Pratap Singh.

Registered

Ritika Singh C (2023). **Effect of habitat characteristics on the abundance, nest site selection and nest success of select understory endemic birds in upper Nilgiris, the southern Western Ghats.** Manipal Academy of Higher Education. Supervisor: Dr S. Babu.

Sujin NS (2023). **Ecology and Conservation of endangered Banasura Laughingthrush Montecincla jerdoni in the Western Ghats, India.** Manipal Academy of Higher Education. Supervisor: Dr S. Babu.

Bhavani Sabat (2023). **Taxonomic characterization of select Galliformes of India by integrating morphometrics and molecular approach;** Bharathiar University. Supervisors: Dr Ashutosh Singh & Dr Riddhika Ramesh.

Devika Mardachalam (2023). **Ecology and Diversity of Spiders in Select Natural and Man-modified Landscape of Anaikatty Hills, Southern Western Ghats.** University: Bharathiar University, Coimbatore, Tamil Nadu. Supervisor: Dr Goldin Quadros.

Kanchan Choudhary (2023). **Assessing carbon sequestration in Biodiversity rich wetlands of Tamil Nadu.** Bharathiar University, Coimbatore, Tamil Nadu. Supervisor: Dr Vidyadhar Atkore.

Anirudhkumar Vasava (2023). **Human Dimensions of Mugger Crocodile Crocodylus palustris Conservation in Central Gujarat.** Supervisor: Dr Vidyadhar Atkore.

Keval Paliya (2023). **Birds in ecological networks of grassland-agriculture mosaic landscapes.** Bharathiar University. Supervisor: Dr Riddhika Ramesh.

R. Kishore (2023). **Study of parental investment pattern associated with the dominance rank of the mother with reference to the sex of the offspring in bonnet macaque Macaca radiata.** Bharathiar University, Supervisor: Dr HN Kumara.

R Sreeja (2023). **Movement Pattern of Spot-billed Pelican, Pelecanus philippensis and characterization of wetlands in their southernmost breeding range in India.** Bharathiar University. Supervisor: Dr T. Ramesh.

Saswathi Mishra (2023). **Dimensions of human-elephant, Elephas maximus interactions in Karnataka, India.** Manipal Academy of Higher Education, Supervisor: Dr H.N. Kumara.

Gourav Sonawane (2023). **Population status of carnivores in and around Keoladeo National Park, Rajasthan- with special emphasis on Striped Hyaena and Golden Jackal.** Bharathiar University, Coimbatore, Tamil Nadu. Supervisor: Dr Aditi Mukherjee.

TRAININGPROGRAMMES

Short Courses/Workshops/Seminars Organised by SACON and/or in Collaboration with Other Institutions

One-day Workshop on the Himalayan Freshwaters: Assessing the Service and Vulnerability of Freshwater Ecosystems (FES) in the Himalayas, IIT Roorkee, Uttarakhand, 6 June 2023.

The workshop's objectives were to (i) discuss and understand the status and trends of the freshwater ecosystem and its services in the Himalayas and (ii) discuss the potential threats and vulnerability of freshwater ecosystems in the Himalayas. It was organized by the Department of Hydrology, Indian Institute of Technology, Roorkee. The Asia-Pacific Network sponsored the workshop for Global Change Research (APN).

The Himalayas are the major source of freshwater, and ecosystem services play a pivotal role in supporting the livelihoods of millions of people. However, a strong knowledge gap exists regarding the availability of FES and the influence of climate extreme events on human activities in the region. A series of Himalayan Freshwater Workshops have been organized to fill this gap. This will facilitate discussion and brainstorm ideas about India's freshwater ecosystems. Dr Vidyadhar Atkore participated in the workshop.

National Training Programme on the Management of Birds Wildlife Hazards to Aircraft for Indian Airforce Officials, Coimbatore, 24-28 July 2023.

Salim Ali Centre for Ornithology and Natural History (SACON) organized a five-day training program focused on the "Management of Bird Wildlife Hazards to Aircraft" for Indian Air Force officials at its campus in Anaikatti, Coimbatore. The program was attended by 25 participants from the Indian Air Force. Throughout the program, participants attended 11 technical sessions and took part in three outdoor bird-watching activities. The training emphasized on understanding the ecology of birds and animal communities and implementing mitigation

strategies to reduce the risk of wildlife-related hazards at airports. Participants were also trained in monitoring and documenting the flora and fauna present at airports. The sessions featured discussions on global bird hazard management initiatives, success stories, and case studies to provide practical insights. The event concluded on the fifth day with an experience-sharing session, certificate distribution, and a valedictory ceremony.

Short-term Course (5-day) on Bird Identification and Forensics for Tamil Nadu Forest Academy Officers, Coimbatore, 8–12 January 2024.

Under the "Modernization of Tamil Nadu Forest Force" scheme, SACON conducted a five-day training program on "Bird Identification and Forensics" for 20 forest officials from Tamil Nadu. The objective was to enhance bird identification skills and introduce forensic techniques for wildlife crime investigation. Located at SACON's campus in Coimbatore, the training covered bird census techniques, species identification, and the application of forensics in conservation. Sessions included lectures, field visits to wetlands, hands-on forensics exercises, and a visit to SACON's Avian Forensics Laboratory, equipping participants with practical skills for bird conservation and crime investigation.

Three-day Workshop on Wildlife Conservation as part of "Training of Personnel of Other Services for Class-I/Group A Officers", Coimbatore, 22-24 January 2024.

The objectives of the workshop were to (i) provide an overview of India's rich biodiversity and conservation issues; (ii) provide stakeholders with multidisciplinary knowledge about current wildlife concerns and conservation measures; (iii) disseminate information on achievements of various wildlife conservation initiatives; (iv) sensitize the stakeholders of other line departments about their involvements in order to foster interdepartmental cooperation for wildlife conservation; and (v) provide an overview of the numerous laboratory exercises involved in wildlife conservation.

It was sponsored by the Ministry of Environment, Forest and Climate Change, Govt of India. A total of 23 participants attended the workshop.

Mahseer Monitoring Workshop-cum-Field Training for Monitoring Humpback Mahseer and other Aquatic Wildlife in Moyar River, Bandipur Tiger Reserve, Karnataka, 26-28 January 2024.

The objectives of the workshop were to (i) assess the aquatic biodiversity (Hump- backed mahseer and associated fishes of Moyar) using scientific tools and (ii) develop capacity building of forest department staff.

It was organized and sponsored by the Field Director of Bandipur Tiger Reserve. A field training-cum-capacity building workshop was organized by the Bandipur Tiger Reserve, Karnataka. A total of 40 Forest Department staff, including Assistant Conservator of Forests, Range Forest Officers, Forest guards, and Forest watchers, were trained in assessing the aquatic biodiversity. Measuring river habitat characteristics (width, depth, flow, substrate composition, bank vegetation), fish sampling and identification. Dr Vidyadhar Atkore participated in the workshop-cum-field training.

Workshops, Seminars, Conferences and Meetings Attended by SACON Personnel

Consultative workshop on developing a proposal to designate Kanger Valley National Park, 12 June 2023.

During the consultative workshop, Dr Ashutosh Singh provided inputs on developing a proposal to designate Kanger Valley National Park as a World Heritage Site.

59th Annual Meeting of Association for Tropical Biology and Conservation, Coimbatore, Tamil Nadu, 2-6 July 2023.

The 59th Annual meeting of ATBC was jointly organised by Indian Regional Association for Landscape Ecology (IRALE), Kumaraguru Institute and ATBC. The theme of the conference was "Balancing Science, Conservation, and Society". The objective of the annual meeting was to create the opportunity for active interaction on tropical biodiversity between researchers, conservationists, decision-makers, and educationists from diverse backgrounds and from across the globe. The Annual Conference was attended by more than 450 participants representing 11 countries. SACON was represented by faculty members; Drs PV Karunakaran (Organizing Committee), Shomita Mukharjee and Rajah Jayapal (both in Scientific Committee). Kavin D and Atkore V gave a talk on the preliminary assessment of freshwater fish fauna of Namdapha Tiger Reserve in Eastern Arunachal Pradesh and Sandeep P, Sherief MU, Karunakaran PV, Kumara HN and Babu S presented a poster on past management regime of the Community Reserves and its influence on floristic structure and composition in Meghalaya.

Consultative/ Planning meeting and site visit at Tirumala Tirupati Devasthanams, 27-28 September 2023.

Dr Ashutosh Singh participated in a Consultative/ Planning meeting and site visit at Tirumala Tirupati Devasthanams (TTD) for detailed situation analyses on the Human-wildlife interface and preparing preventive strategies. Based on the site survey certain short-term and long-term mitigation strategies which included Garbage Management, negative conditioning of prey and predators, Strategic Fencing and Aerial Walkways, Movement Restrictions and Early Warning, Development of Underpass/Overpass, Long-term Monitoring of Prey and Predator Populations, community sensitization and engagement through comprehensive outreach programs and awareness campaigns were suggested.

Planning and orientation meeting for the GEF-7 project – Strengthening the conservation and resilience of globally significant wild cats through a focus on small cat and leopard conservation, New Delhi, 30–31 October 2023.

The objective of the meeting was to plan and orient the GEF-7 project on small cats. The Ministry of Environment, Forest and Climate Change, United Nations Development Programme and Global Tiger Forum sponsored the meeting. The presentations were made by States (UP and Arunachal) on the progress of the projects in their field sites (Dudhwa Tiger Reserve, UP and Pakke Tiger Reserve, Eaglenest Wildlife Sanctuary, Arunachal Pradesh). The workshop provided guidelines for future work and budgets. Dr Shomita Mukherjee attended the meeting.

Workshop on "Mhadei: A Multidisciplinary Exploration", Goa University, 30-31 October 2023.

Dr Vidyadhar Atkore participated in the workshop (online) and delivered a lecture on 'Effect of environmental variables on freshwater fish diversity of Mhadei River, Goa.'

National Seminar on Plant Biodiversity, Genetics, Breeding and Biotechnology (GMF Seminar 2023), Calicut, Kerala, 7-8 December 2023.

Dr PV Karunakaran participated in the National Seminar on Plant Biodiversity, Genetics, Breeding and Biotechnology (GMF Seminar 2023), which was organized by the Department of Botany, University of Calicut, Kerala and presented a paper on 'Community Conservation in India - A case study on Community Reserves of Meghalaya'.

Workshop for Integrated Management Planning of Wetlands, held at Patna, Bihar, 12-13 December 2023.

The Department of Environment, Forest and Climate Change, Govt of Bihar, and GIZ India organized a workshop for integrated Management Planning of Wetlands. Dr Goldin Quadros represented the SACON in the workshop.

National Seminar on "Human-Wildlife conflict; The way ahead", Calicut, Meenchanda, Kozhikode, 19 December 2023.

Environmental Impact Assessment (EIA) is used as a pre-emptive tool for conflict mitigation. Dr Arun PR was invited to deliver a talk at the two-day National Seminar on "Human-Wildlife conflict; The way ahead", which was

organized by the Department of Zoology, Govt. Arts & Science College, Calicut, Meenchanda, Kozhikode.

Transboundary Workshop for the GEF-7 Project – Strengthening the Conservation and Resilience of Globally Significant Wild Cats through a Focus on Small Cat and Leopard Conservation, New Delhi, 11–12 January 2024.

The workshop's objective was to cover conservation issues, such as poaching, illegal wildlife trade, and human-wildlife interactions, to develop a roadmap for collaborative joint action on the GEF-7 small cats' project. It was sponsored by the Ministry of Environment, Forest and Climate Change, and Global Tiger Forum.

On the first day, the presentations were made by countries (India, Bhutan, Nepal), and deliberations were held on research techniques and protocols for monitoring small cat populations and sharing intelligence on illegal wildlife trade in transboundary areas. On the second day, discussions on a joint Action Plan and Funding and Mobilization were held. Dr Shomita Mukherjee attended the workshop.

IRALE Conference 2024, Murti, West Bengal, 21-23 February 2024.

Dr Vidyadhar Atkore was a moderator and coordinator of keynote lecture sessionat the IRALE conference 2024.

National Symposium on Avian Biology and 5th Annual Meeting of Association of Avian Biologists in India, Dehradun, 23–25 February 2024.

Organised by Graphic Era (Deemed to be University),the objective of the symposium was to promote interactions and discussion on various aspects of avian biology through invited talks and poster presentations. 80 participants from 22 institutions attended the Meeting.

Forest birds were studied during the symposium. Galliformes had the maximum representation, while Falconiformes, Columbiformes, and Ciconiiformes were the least represented orders in these studies. There are various limitations in data acquisition from different sectors such as agriculture, economy, health, land use, etc. Therefore, collaborations between ornithologists and remote sensing experts and involving people in data acquisition (e.g., citizen science data on plant phenology and human health) would be practical steps toward developing policies that benefit avian conservation and human well-being. Dr Ashutosh Singh attended the symposium.

Regional Workshop on Conservation and Wise Use of Wetlands for the Eastern Region States, Held at Bhubaneshwar, Odisha 6-7 March 2024.

Ministry of Environment, Forest and Climate Change, Govt of India, Wetlands Division, and Chilika Development Authority, Odisha, organized the regional workshop on conservation and wise use of wetlands for eastern region states. Dr Goldin Quadros participated in the workshop and the panel discussion on carbon sequestration and the wise use of wetlands.

STUDY TOURS AND VISITS

11th IALE (International Association of Landscape Ecology) World Congress 2023 in Nairobi, Kenya, 10-15 July 2023.

It was organised by the International Association of Landscape Ecology (IALE). More than 500 participants joined the World Congress. Dr P.V. Karanakaran represented the Salim Ali Centre for Ornithology and Natural History at the congress.

Wetland Ecology and its Management, Wetland Trip to Krishnampathy and Perur Lakes of Officer Trainees of 2022-24 SFS Induction Course, CASFOS, Burnihat, Assam, 7 December 2023.

Wetland Ecology and its Management, Wetland Trip to Krishnampathy and Perur Lakes of Officer Trainees of 2022-24 SFS Induction Course was jointly organised by Sálim Ali Centre for Ornithology and Natural History (SACON) and Central Academy for State Forest Service (CASFoS), Burnihat. A total of 47 participants joined the trip.

Visit to Coimbatore Wetlands as part of Wetland Ecology and Management Module (2 days) for CASFOS Burnihat Officers, 7 December 2023.

A two-day training program was organised for 47 Officer Trainees of the SFS Induction Course 2022-2024 batch from CASFOS, Burnihat, Assam, as part of their South India Tour. The training was planned for 06 and 07 December 2023, which included lectures and interactions with various SACON faculty on Wetland Ecology and its Management and a field visit to a few wetlands of Coimbatore.

Visit to Coimbatore Wetlands as part of a Short-term Course (5-day) on Bird Identification and Forensics for Tamil Nadu Forest Academy Officers. 11 January 2024.

A total of 18 participants joined the visit. As part of the five-day short-term course on "Bird Identification and Forensics" for Tamil Nadu Forest Academy, 18 Officers visited the Coimbatore wetlands on January 11, 2024. The field trip included stops at Krishnampathy Lake, Perur Lake, and Singanallur Lake, where participants applied their bird identification skills in a real-world setting. The wetlands provided a rich diversity of bird species, allowing the officers to practice using field guides and bird census techniques learned during the course while observing a variety of waterbirds and other species in their natural habitats. During the field trip, participants were also informed of the environmental issues affecting these crucial habitats. Discussions highlighted the challenges facing the wetlands, such as pollution, habitat degradation, and the impacts of urbanisation. By understanding these environmental concerns, the officers gained a broader perspective on the importance of conservation efforts and the need for sustainable management practices to protect both bird populations and their ecosystems.

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Activities & Professional Support

COLLABORATIONS

The Wildlife Institute of India partnered with 12 other national organizations to create State of India's Bird Report 2023 (available at https://stateofindiasbirds.in/).

The State of India's Birds report was created to assess the conservation status of the majority of species that regularly occur in the country. This was achieved by using over 30 million observations uploaded to the eBird platform by more than 30,000 birdwatchers to evaluate the distribution range size of 942 Indian birds, and their trends in abundance in both the long term (over 25+ years) and currently (since 2015). Using these three measures, plus information from the IUCN Red List of global threat status, this report places Indian species into Low, Moderate and High categories of Conservation Priority for India. A large number of species that are thought to be common and widespread find themselves as of High Conservation Priority.

CELLS

Information Technology, Remote Sensing & GIS and Audio-Visual Cell

Information Technology, Remote Sensing, and Geographic Information System facilities are integral to all wildlife research projects, education, and training. The facility is available round the clock to the faculty members, trainees, researchers, students, and collaborators working with the Institute. Numerous desktop computers configured with MS Windows, Linux, and specialized analytical software for data processing are available in the dedicated laboratories.

The computer facility by an extensive array of hardware setups connected to the Local Area Network (LAN) supported by high-end servers, Storage Area Network (SAN), and Network Attached Storage (NAS) systems, essential for the Internet, Intranet, database management, and library automation services. With more than 400 nodes and serving over 700 users, the WII LAN ensures smooth connectivity. Moreover, Wi-Fi accessibility extends across essential areas such as hostels, guest houses, classrooms, auditoriums, board rooms, and Porta Cabin. The Institute has dedicated and exclusive 500 Mbps (fibre) internet leased line connectivity through BSNL.

The Remote Sensing & GIS Lab facilitates the Institute's research and training program. The laboratory is equipped with several high-end workstations, high-end scanner-cum-plotter, and software packages viz. ArcGIS, ERDAS Imagine/Drone image processing software for landscape-level analysis. A dedicated team provides support and training in IT and Geoinformatics for students of M.Sc. in Wildlife Science, researchers, and trainees enrolled in Advanced PG Diploma and Certificate Courses in Wildlife Management. Hands-on training is also extended to other graduates, post-graduate students, and interns. In addition to proprietary software, the laboratory also leverages open-source tools like QGIS, GRASS, and R for teaching and training purposes.

Online Facility for Workshop/ Webinar/ Meeting/ Lectures: The IT and RS/ GIS Cell consistently offers facility for hosting online meetings, workshops, webinars, and across various locations within the Institute and in the users' office desktops of the Institute using online communication software viz. Microsoft Team, Webex, Video Conferencing Facility.

Upgradation of Internet Leased Line Facility: The Institute's exclusive internet leased line connection has been upgraded from 350 to 500 Mbps by BSNL. An alternative internet leased line from JIO, offering 500 Mbps, has also been installed.

Implementation of New Internet Communication and Email Service on Linux-based Server: A new Internet Communication and email Service, based on a Linux-based server, has been implemented. It ensures enhanced security with measures to prevent spamming/spoiling emails and daily anti-spam reports for all email users. Each user is allocated 50 GB of space on the new mail server, facilitating efficient communication and storage.

Implementation of e-Office: The Institute has introduced an e-Office system to streamline and enhance correspondence among its departments, cells, and external offices, including sister organizations and the Ministry of Environment, Forest and Climate Change (MoEFCC). As part of this initiative, email IDs on the "gov.in" domain have been created for all permanent employees in consultation with the National Informatics Centre (NIC). Additionally, steps have been taken to establish VPN connections for all users, enabling access to the MoEFCC e-Office portal.

Smart Performance Appraisal Report Recording Online Window (SPARROW): In compliance with the e-governance mandate, WII has implemented the SPARROW portal for the appraisal reports of Indian Forest Service Officers (IFS) serving at WII and those participating in various training courses conducted by the Institute. This digital initiative ensures transparency, efficiency, and standardization in the appraisal process, aligning with contemporary governance practices.

Foreign Student Information System (FSIS): In accordance with e-governance directives and periodic instructions from the Bureau of Immigration (BOI), WII consistently shares information via BOI portals regarding foreign nationals enrolled in various training courses organized by the Institute. Additionally, WII facilitates the registration of foreign visitors staying in its guesthouses. This proactive approach ensures compliance with immigration regulations and enhances transparency in the management of foreign nationals' activities within the institute premises.

Government Land Information System (GLIS): In line with the e-governance mandate concerning the government land information system, WII consistently updates all institute land and building details on the GLIS portal. This digital platform ensures accurate and up-to-date information on WII's land and building holdings, facilitating transparency and efficient management of land resources. By adhering to e-governance guidelines and leveraging technology, WII aims to enhance accountability and accessibility in the administration of its land and building assets.

E-Procurement/GeM Services: WII hosts all Government of India (GOI) e-procurement portal tenders and also operates on GeM. The IT, RS, and GIS cells extend technical support for both portals. WII strictly adheres to these platforms' procurement guidelines and regulations, ensuring compliance with rules and regulations. This commitment to following established procedures guarantees transparency and fairness in the procurement process, aligning with the principles of good governance.

Website auto-conversion to Hindi: A facility was added to the Institute website for auto conversion of web content into Hindi language.

Social Media updates: The Institute has official social media handles (viz. Twitter, Facebook, Koo, Instagram, and YouTube). The ministry has asked to proactively share the Institute's research and academic activity on these social media platforms and upload/share the statistics to the ministry. A blue tick (verified account) was awarded to the Institute's Twitter account, letting people know that an account of public interest is authentic.

Online webinars/interviews/meetings: Microsoft Teams is being used as a workspace for real-time collaboration, screen sharing, and communication for online webinars, interviews, and virtual meetings. Re-vamping of internet connectivity in the residential complex: Re-vamping work is done in faculty residential area for better internet connectivity.

Live streaming: National and essential events were live-streamed on the Institute's website and social media platforms.

Implementing/training Visitor Management Software for security guards: Implemented and trained security guards on Visitor Management Software, which further enhanced security protocols by considering factors such as visitor volume, integration capabilities with existing systems, and user interface intuitiveness.

Leave & Attendance Management System (LAMS): As per the e-governance mandate, all permanent/contractual employees and researchers are enrolled in the Biometric Attendance system at WII. Daily attendance, Leave, and Tours are managed through web-based software (LAMS). Presently, 745 employees and researchers are enrolled in LAMS.

Expansion of Data Storage System: Network Area Storage (NAS) of 240 TB capacity (Dell EMC NX3240) has been installed in this Cell for the Tiger Project database.

Commissioning Video wall in the Auditorium: Commissioning a video wall in an auditorium to ensure it functions optimally and hire a professional AV installation team to install the video wall in the WII Auditorium. Integrate the video wall with the Auditorium's audiovisual systems, such as sound reinforcement, lighting, and control systems.

Installation of boom barrier and RFID system: Installing a boom barrier and RFID in the main gate to ensure smooth operation and security. The Cell was involved in purchasing boom barriers, RFID readers, RFID tags/cards, control panels, wiring, and other necessary equipment. RFID has been provided to the Estate office for distribution to faculty/staff.

Spatial Data in the GIS domain: In the GIS domain, we maintain a spatial database of the Protected Area Network of India (PAs) and Biogeographic zones/provinces and disseminate it within the Institute and MoEFCC.

Application of Geoinformatics in Research Projects: GIS, RS, GPS, and Mobile apps are used in most of the research projects of the Institute for Wildlife Research and Conservation. Work is in progress on developing a spatial database on the boundaries of the country's national parks, wildlife sanctuaries, conservation reserves, and community reserves.

Library & Documentation Centre

The Wildlife institute of India's Library and Documentation Center (L&DC) is an essential center for fulfilling information demand to a variety of users, viz. Students, researchers, scientists, and wildlife managers. It was founded in keeping with WII's objective to serve as a multidisciplinary information and learning resource center for the protection and management of biodiversity. Its main objective are as follows: (i) To serve as an information center to disseminate all wildlife-related literature published in India; (ii) To acquire, organize and disseminate all relevant literature on biodiversity conservation and related fields; (iii) To serve the user readership through normal and special library & information services; (iv) To establish and maintain links with other national information systems in India and other countries to ensure free flow of information at national and international levels;

(v) To serve as a training center for information personnel and users; and (vi) To bring out periodic updates/bulletins on Current content of periodicals, Research in progress, unpublished research literature i.e., dissertations, thesis, Compilation of bibliographies on various themes for EICAP bulletins and database for WII publications.

There are two designated seating areas called "Researchers' Rooms," one located behind the main library and the other on first floor, with 48 and 80 seats, respectively.

Approximately 28,570 books, 9,372 maps and toposheets, over 8,352 bound volumes of ancient and rare periodicals, 104 CDs and DVDs pertaining to wildlife literature, and a good collection of scientific papers up to 11,400 are now held by the L & DC library. Additionally, the Library and Documentation Center offers the ability to access e-journals through the BIOONE package, which includes over 250 journals, as well as the print edition of Current Science and the online version of Indian Forester. Library resources are enabled with RFID technologies and automated using Web-centric LIBSYS 10 (Library Automation Software). Being connected to the library facility, users can access all in-house databases like books, reprints, Indian wildlife abstracts, map/toposheet collection, press clippings, and specialized bibliographic databases. The L&DC provides a variety of Library & Information Services to its users.

Infrastructure and physical environment of Lib. & doc. Centre is reorganized. During this period, approximately 15,000 documents were issued and consulted. Value Added Service/ Ready Reference Service was provided to approx. 800 users. More than 100 queries were attended from outside users and more than 2,000 bibliographic references were provided to the users. E-Document delivery service was also provided to outside users during this period. In-house databases were regularly updated during the reporting period.

Tiger Cell

To achieve the goal of tiger conservation through a holistic approach based on science, the Tiger Cell (in collaboration with the National Tiger Conservation Authority – NTCA) was initiated at WII in April 2016. Major activities of the Cell during the past year include:

(I) *Countrywide assessment of tigers, co-predators, prey and their habitat:* (i) Customised shapefile for 720 Forest Divisions of the country for systematic collection of Phase I data in the MSTrIPES framework. (ii) Analysed Phase I data from about 597 Forest Divisions of India to generate country-wide occupancy and distribution maps for tigers, co-predators and prey. (iii) In Phase II, covariates on habitat characteristics and human impacts were obtained from remotely sensed data to model tiger occupancy and abundance. (iv) Processed and analysed about 4.70 crores of camera trap images received from 174 sites with 32,588 camera trap locations. (v) Analysed 97,399 tiger images and 85,488 leopard images in program ExtractCompare for individual identification. From these images, 3,080 unique tigers and 6889 unique leopards were identified. (vi) The summary report titled "Status of Tigers in India 2022" was released by the Hon'ble Prime Minister of India on 9 April 2023 on the occasion of 50 Years of Project Tiger. (vii) The Hon'ble Minister of State for Forests and Climate Change, India, released a comprehensive report titled "Status of Tigers, Co-predators, and Prey in India 2022" on 29 July 2023 on the occasion of Global Tiger Day. (viii) A Comprehensive report titled "Status of Leopards in India 2022" was released by the Hon'ble Minister of Forests and Climate Change, India, on 29th February 2024. (ix) Monitoring System for Tigers: Intensive Protection and Ecological Status (MSTrIPES): (i) An image processing software known as CaTRAT (Camera Trap data Repository and Analysis Tool) was developed and used for geo-tagging of camera trap images obtained from the field.

(II) *MSTrIPES:* (i) Coordination of implementing MSTrIPES across the Tiger reserves. (ii) Development and updation of the MSTrIPES system for PAs other than Tiger reserves. (iii) Regular inputs into conceptualising, designing, and customising multilingual Android mobile applications for MSTrIPES patrol and ecological modules. (iv) MSTrIPES Polygon search module app was developed for complex terrain in the Northeast, Himalayas, and Sundarbans.

(III) *Other Technical work assigned by NTCA:* (i) Evaluation of developmental projects for wildlife clearance (< 100) across the Tiger Landscapes for the National Tiger Conservation Authority.

(IV) *National Repository for Camera Trap Photographs of Tigers (NRCTPT):* (i) Over 80,000 tiger photographs are maintained under the National Tiger Photo Database library at the Cell. New tiger photographs obtained as a part of the National Tiger Assessment 2022 have been archived and are used to track dispersing tiger individuals and the source of seized tiger skin. (ii) Matching is done with photographs of the tiger carcasses and tiger skins seized and snared tigers to

ascertain the individuals' identities, as well as their photo-capture histories and information shared with the NTCA and State Forest Departments.

(V) *Training and Capacity Building:* Research and technical assistance to NTCA, Government of India and State Forest Departments: (i) Evaluation of about 28 proposals on developmental projects in the tiger landscapes of the entire country and reports communicated to NTCA and Wildlife Division of MoEFCC for the Standing Committee of National Board for Wildlife. (ii) Supervision of research projects (a) Intensive monitoring of tiger, co-predators, and Prey in Kanha, (b) Feasibility of tiger corridor and status of tiger and prey in Palamau Tiger Reserve, Jharkhand, (c) Carrying capacity of tigers in Rajaji-Corbett Tiger Reserve, Uttarakhand, (d) Long-term Ecological Monitoring of Ramgarh Visdhari and Mukundara Hills Tiger Reserve, (e) Scientific Research Study for Rewilding of the PAs in Mukundara Hills Tiger Reserve. (iii) As part of an MoU between NTCA and Land of Leopard National Park, Russia, regarding capacity building, Tiger Cell supervised the preparation and analysis of Amur Tiger and Amur leopard data from Land of the Leopard National Park, Russia. It also provided training to the biologists in open capture-mark recapture analysis and PHVA basics. (iv) In collaboration with Dr Saket Anand, IIT Delhi, we prepared AI-based species segregation software for Land of Leopard National Park, Russia. (v) Regular inputs are provided in review meetings, technical committee meetings, Chief Wildlife Warden meetings, and Field Directors' meetings organised by NTCA. (vi) Regular inputs in PG Diploma, Certificate, M.Sc., PhD courses of WII. (vii) Regular inputs for visiting classes at WII.

The Hon'ble Prime Minister of India releasing Tiger Status Report 2022 on the occasion of 50 Years of Project Tiger on April 9, 2023

Milestones: (i) Prepared the comprehensive report on "Status of Tigers, Co-predators, and Prey in India 2022" which depicts latest status of tigers and associated species in India, based on the world's largest camera trap survey. (ii) Prepared the comprehensive report on "Status of Leopards in India 2022", presented the latest status of leopards in India and highlighted the conservation issues faced by the species.

Setting up of 'Pashmina Certification Centre' in WII, Dehradun

With the initiative and motivation from the Hon'ble Minister of Environment, Forest and Climate Change, Government of India; Wildlife Institute of India (WII), Dehradun, signed an 'Memorandum of Understanding (MoU) with the Export Promotion Council for Handicrafts (EPCH), New Delhi, for setting up a 'Pashmina Certification Centre' in WII on 05th January 2023. Through this MoU, the EPCH collaborated with WII to establish a Pashmina Certification Center for its associated members involved in the Pashmina Trade. EPCH has assured a continuous supply of the Pashmina consignments from the traders. EPCH has also initiated procurement of Scanning Electron Microscopy, which will be transferred to WII for analysis purposes. It was formally inaugurated on 19 May 2023 by Shri Bhupender Yadav, Hon'ble Minister of Environment,

Forest and Climate Change, Government of India, with tagging the first unique ID barcode and issuing a PCC certificate.

PCC has procured 4 light microscopes and other associated facilities for the center's operation and engaged 11 professionals at various levels for its routine operation. This laboratory aims to streamline the Pashmina Trade and provide a one-stop testing facility to certify genuine Pashmina Products to the associated manufacturers, exporters, and traders. All the tested products will be labeled with a traceable unique ID tag with individual e-certificates, enabling a seamless trade of such products in national and international markets. In the absence of such a facility in the country, commercial woolen products get under scrutiny at the exit points of the country, which causes delays in clearance and associated demurrage charges and financial/business loss to the exporters and traders. The PCC at WII, Dehradun, assists authentic exporters and traders involved in the trade of genuine Pashmina products. Setting up such a facility in India will be a game changer for the seamless trade of genuine Pashmina products with authentic certification.

In concurrence with the Central Government's policy, it is a kind of facility based on the Public-Private Partnerships (PPP) model for assisting the Pashmina traders in obtaining authenticity certificates for selling certified and genuine Pashmina products. Under this MoU, the advanced technologies have been housed in a single facility supporting Pashmina test procedures. It is an example of a self-sustaining and revenue-generating facility in a government organization supporting associated exporters and traders on a payment basis. This facility has generated employment opportunities for budding professionals on the PPP model. It will help buyers procure authenticated and certified Pashmina products. Further, this will discourage the use of prohibited fiber, thereby resulting in the conservation of Tibetan antelope (Chiru) in their habitat. PCC has examined 24 consignments amounting to more than 6000 shawls during the financial year 2023-24.

WILDLIFE HEALTH SERVICES

Technical Support in Capture and Translocation of Tigers from Ranthambore to Other Reserves, 31 July 2023 to 5 August 2023 and 8-13 August 2023.

As a part of the population building exercise, Rajasthan Forest Department initiated a project to supplement/ augment tiger population in various reserves of Rajasthan. Technical support in capture and translocation of tigers from Ranthambore to other reserves were sought from WII. Dr Parag Nigam, Scientist-G, provided technical support in capture and translocation of two tigress from Ranthambore to Ramgarh Vishdhari Tiger Reserve and Mukundra Tiger Reserve. The field operation was carried out during July and August 2023 and two tigresses were successfully supplemented in Ramgarh Vishdhari TR and Mukundra TR.

Tigress Successfully Immobilized, Collared, and Released in the Reserve, Navegaon Nagzira Tiger Reserve, Maharashtra, 17-20 May 2023.

As a part of the population building exercise in Navegaon Nagzira Tiger Reserve, Maharashtra, two tigresses were successfully immobilized, collared and released in the reserve. Field operation was carried out by team of Maharashtra Forest Department and the Wildlife Institute of India. Dr. Parag Nigam, Scientist-G and Dr Bilal Habib, Scientist-F steered the field operation, resulting in the successful release of two tigresses in Navegaon Nagzira

Tiger Reserve.

Gaur, *Bos gaurus gaurus* reintroduction in Sanjay Tiger Reserve (TR) from Kanha TR and Satpura TR, 1-7 June 2023 and 26-30 June 2023.

As part of the collaborative initiative between Madhya

Pradesh Forest Department and WII, a total of 50 Gaur, Bos gaurus gaurus were planned to be reintroduced in the Sanjay TR from Kanha TR and Satpura TR. The project involved identifying individuals and herds from source populations, assessing their health, and capturing and translocating them to Sanjay TR. Team of WII and School of Wildlife Forensic and Health, NDVSU, Jabalpur carried out detailed health assessment through intensive sampling in Kanha TR and Satpura TR and subsequent laboratory analysis for parasitic diversity & load as well as select infectious diseases. Based on the outcomes, only healthy herds were identified and individuals captured and translocated to Sanjay TR. A total of 28 Gaurs from Kanha TR and 16 Gaurs from Satpura TR were captured and translocated to Sanjay Dubri TR between 1-7 June 2023 and 26-30 June 2023 respectively.

Report on "Comments on Identification of Animal Responsible for Human Casualties in Areas Close to Bhimtal in Nainital District", 26 December 2023.

Vide order passed by the Hon'ble High Court of Uttarakhand in Suo moto WPPIL 218/2023 and based on the request received from PCCF(Wildlife) & Chief Wildlife Warden, Uttarakhand letter no. 1646/6-28 dated 21 December 2023, a report "Comments on Identification of Animal Responsible for Human Casualty in Areas Close to Bhimtal in Nainital District" was submitted on 26 December 2023.

OTHER ACTIVITIES

A film titled "Restoration of Gaur in Sanjay Tiger Reserve: A successful effort was made based on the work carried out

under the project titled Establishment of Gaur in Sanjay Tiger Reserve, Madhya Pradesh and hosted on YouTube (https://www.youtube.com/watch?v=y357ccCl KxA).

A film titled "Return of the Magnificent Gaur in Sanjay Tiger Reserve: A success story was made inhouse and hosted on

YouTube (https://www.youtube.com/watch?v=Cjp85qTlOr0&t=174s). The film was part of the project titled Establishment of Gaur in Sanjay Tiger Reserve, M.P. being carried out by WII in partnership with MPFD. The documentary is a collaborative initiative between the Madhya Pradesh Forest Department and the Wildlife Institute of India. It captures not only the journey of gaur reintroduction but also the significance of conserving our natural heritage. It highlights the delicate balance between humans and wildlife and reminds us of our responsibility to protect and preserve our rich biodiversity. Let us be inspired by the triumphs and challenges faced throughout this process and let it be a testament to the power of collaboration and the potential we have to restore the ecological balance through species recovery initiatives.

An introductory film titled "Reintroduction of Gaur in Sanjay Tiger Reserve: Journey Unfolded" based on the efforts made by the WII-MPFD as part of the collaborative project titled "Establishment of Gaur in Sanjay Tiger Reserve'' was made inhouse and hosted on Youtube https://www.youtube.com/watch?v=AGek3dPC9SE&t=344s

Hindi Activities at WII, 22 March 2024.

An official language workshop was organized in the Institute on March 22, 2024. On this occasion, 27 officers and employees of the Institute including the Dean of the

Institute, Dr. Ruchi Badola, and Registrar, Dr. S. Satyakumar participated in the programme. The topic of the workshop was 'Indispensability of Hindi in government work'. Dr. Ruchi Badola gave an interesting lecture on this subject and instructions were given to do the government work in Hindi as much as possible. The Registrar gave the guidelines to the participants on the necessity of Hindi.

Environmental Impact Assessment Cell

Dr Gopi G.V., Scientist-F, provided technical inputs to Primate Research Centre, North East India for Establishing Artificial Canopy Bridges (ACB) as road overpasses to augment the aerial movement of Golden langur in some specific locations.

Environmental Information Awareness Capacity Building and Livelihood Programme (EIACP)

EIACP Centre Resource Partner "Wildlife & Protected Areas", Wildlife Institute of India, Dehradun formerly known as ENVIS was established as the 23rd Environmental Information System (ENVIS) Centre in India in September 1997. The following activities were performed by the EIACP Programme Centre "Wildlife & Protected Areas", Wildlife Institute of India, Dehradun during the Financial Year 2023-24:

World Environment Day Quiz, Dehradun, 5 June 2023.

EIACP Programme Centre and M.Sc. (Wildlife Sciences) team collaboratively organized a quiz competition to celebrate World Environment Day. The winners were awarded by the Director, Wildlife Institute of India

Mission LiFE Programme organized in 59th Annual Meeting of the Association for Tropical Biology and Conservation Conference, Coimbatore, Tamil Nadu, 6 July 2023.

The Association for Tropical Biology and Conservation (ATBC) held its 59th Annual Meeting Conference in Coimbatore, which was led by Dr K. Ramesh, Scientist-F. The objective of the meeting was to honour and celebrate the contributions of scientists, whose work has significantly advanced tropical biology and/or conservation over a long period of time. During this event, EIACP Programme Centre, WII organized a Mission LiFE event targeting school students to brief them on seven different themes under Mission LiFE. A total of 500 school students (from where?) took Mission LiFE pledge during the conference. .

Release of WII-EIACP Bulletin "An Illustrative Profile of Tiger Reserves of India", Corbett Tiger Reserve, 29 July 2023.

EIACP Programme Centre at Wildlife Institute of India, Dehradun published WII-EIACP Bulletin "An Illustrative Profile of Tiger Reserves of India", which was released by the Hon'ble Union Minister of State, Ministry of Environment, Forest and Climate Change on International Tiger Day, 29 July 2023 at Corbett Tiger Reserve. The bulletin provides state-wise profiles regarding the status of 53 tiger reserves across India becoming on of the valuable handbook for wildlife researchers. Each state's profile includes information regarding estimations of the total, core, and buffer areas, current tiger population, tiger reserve biodiversity, gazette notifications, and land cover maps of each reserve in the state.

Release of EIACP Bulletin "The Millets of India"

In recognition of the International Year of Millets 2023, EIACP Programme Centre at the Wildlife Institute of India, Dehradun published EIACP Bulletin "The Millets of India '' to commemorate the United Nations-designated International Year of Millets 2023. This publication provides a quick overview of all varieties of millets found in India, as well as their benefits and nutritional value.

International Mountain Day, 11 December 2023

The United Nations General Assembly adopted International Mountain Day as an annual event. The theme for 2023 was Restoring Mountain Ecosystems. Mountains suffer from the impacts of climate change. As a result, International Mountain Day is an essential reminder to international communities to take steps to protect their biodiversity. To raise awareness to preserve these majestic landscapes and their rich biodiversity EIACP Centre at Wildlife Institute of India organized a symposium to celebrate the International Mountain Day. More than 52 participants attended the programme including Post Graduate students from Graphic Era Deemed University, Dehradun; Doon University, Dehradun; Faculty and staff of

Wildlife Institute of India.

Drawing Competition to celebrate World Wetlands Day, Asan Wetland Conservation Reserve, 2 February 2024.

EIACP Centre at Wildlife Institute of India, Dehradun, in collaboration with the Uttarakhand Forest Department, Chakrata Division, Kalsi organized drawing contest for local school children from Shishu Vidhya Mandir, Dhalipur to celebrate World Wetlands Day to raise awareness on the values of wetlands. Thirty-eight participants, showcased their artistic talents by expressing their perspectives on wetlands through art. The event garnered enthusiastic participation from the local community, including school children, the Range Forest Officer of Chakrata Forest Division, forest trainees, environmental enthusiasts, and esteemed local dignitaries.

Nature Walk and Cleanliness Drive, Asan Wetland Conservation Reserve, 2 February 2024.

A nature walk and cleanliness drive was organized as a major event for the celebration of World Wetlands Day at Asan Wetland Conservation Reserve. Over 70 participants, including forest officers, forest guard trainees, staff, school students, teachers, and officials from WII-EIACP Centre, actively took part in these activities led by the Range Forest Officer and Forest Daroga trainees. The cleanliness drive emphasized the importance of preserving clean natural spaces, particularly around the Asan barrage. This initiative aimed to raise awareness about environmental conservation among the participants.

Following the cleanliness drive, a nature walk was organized for children, focusing on the significance of migratory birds at the Asan Barrage. This interactive experience provided participants with insights into the rich biodiversity of wetlands and the importance of protecting their habitats. The day concluded with an essay writing competition, showcasing the participants' resilience and creativity in expressing their thoughts on wetland conservation.

Essay Writing Competition, Arya Inter College, Subhash Nagar, Dehradun, 2 February 2024.

EIACP Programme Centre at Wildlife Institute of India organized an essay writing competition for the students of Arya Inter College, Subhash Nagar focusing on the theme of

wetlands and their importance to humans and the environment. The event provided a platform for students to articulate their understanding and perspectives on wetland conservation. Shri Jyoti Prasad Nautiyal, Programme Officer, EIACP-WII briefed students on the importance of the day and how we can save our wetlands and how we can inspire others to do the same for nature. The high level of participation and the quality of essays submitted were indicative of the event's success, with winners being honoured with certificates and prizes.

Online Quiz Competition to celebrate World Wetlands Day, 2 February 2024

EIACP Programme Centre at Wildlife Institute of India also organized an Online Quiz Competition and more than 789 participants participated in this online quiz competition and received e-certificate for their participation. The aim of

conducting this online quiz competition on wetlands was to raise mass awareness on Wetlands among the students and citizens of India.

Campus Bird Count under Great Backyard Bird Count (GBBC), 16-19 February, 2024

Great Backyard Bird Count is an annual, four-day event that engages bird enthusiasts of all ages worldwide. During the GBBC, participants count birds in their respective locations and submit their observations through the GBBC website or mobile app. This collective effort creates a real-time snapshot of bird populations and distributions across different regions. The GBBC helps scientists and conservationists better understand bird migration patterns, population trends, and the overall health of bird species. It also serves as a fun and educational activity that encourages people to connect with nature and contribute to citizen science efforts. To celebrate Campus Bird Count under Great Backyard Bird Count, 16-19 February, 2024, WII-EIACP Centre organizes the Campus Bird Counting at the Institute's campus- students, researchers, and staff participated actively in this event.

Mission LiFE and EIACP Activities Exhibition Stall at Kurukshetra University, Kurukshetra, 18 March 2024.

Kurukshetra University, in a groundbreaking initiative, hosted an Awareness and Exhibition Program on "Mission Life (Lifestyle for Environment)" on 18 March 2024. This event, a collaborative effort with various EIACP centers from WII-EIACP, WWF-India, FRI-EIACP, and Punjab EIACP Centre, aimed to sensitize and mobilize the student community towards sustainable and environmentally friendly lifestyle choices. Vice-Chancellor Prof. Somnath Sachdeva inaugurated the Mission LiFE event, setting a tone of enthusiasm and commitment towards environmental stewardship. The program commenced with an inaugural speech by Prof. Somnath Sachdeva, emphasizing the critical need for integrating environmental consciousness into our daily lives. Following the inauguration, Prof. Somnath led a tour of the exhibition stalls. Each stall, meticulously prepared by the participating EIACP centres, showcased posters, infographics, bulletins and other publications highlighting their recent research, outreach efforts under Mission Life.

A significant moment was the Mission LiFE pledge taken by all students, affirming their commitment to adopting a lifestyle that supports environmental sustainability. More than 1,500 students participated in Mission LiFE pledge. Symbolizing active participation in the cause, a marathon rally was organized, witnessing enthusiastic participation from students and faculty alike, rallying for environmental awareness. WII-EIACP centre presented a presentation on outreach initiatives, publications, Green Skill Development Programme Courses and the various activities under the Mission Life. The presentation provided a comprehensive overview of the efforts undertaken by the centre to promote environmental conservation and sustainable living.

The event at Kurukshetra University represents a pivotal step towards fostering a culture of environmental consciousness within the academic community. Prof. Somnath recommended that such initiatives become a regular feature on the university calendar, encouraging ongoing student engagement with environmental issues and in future more collaboration with EIACP centres, leveraging their expertise to enrich the educational experience and prepare students as ambassadors of environmental stewardship.

Campus Development

The works of construction of a cement concrete road in front of the Ganga building; renovation of toilets in the

Institutional block; bituminous road surface carpeting work in Block I & Block III Type IV, V, Type III & Type II quarters; canteen road and sports ground road; construction of brick boundary wall with MS Grill in block I & IV; internal and external finishing (Painting) work in Type II, III, IV and V quarters; and External finishing (painting) work in Admin Block, Teaching Block, New Institutional Block, Library, Auditorium Hall, Old hostel, New Hostel and Guest House have been completed during the reporting period. The construction of the souvenir shop and brick boundary wall in Block III is underway.

WILDLIFE INSTITUTE OF INDIA – CATEGORY 2 CENTRE (WII-C2C)

Mission and Objectives

The Centre's mission is to strengthen the implementation of the World Heritage Convention in Asia and the Pacific Region by building the capacity of all those professionals and bodies involved with Natural Heritage site inscription, protection, conservation and management in Asia and the Pacific region, through training, research, dissemination of information and network building. The overall objective is to focus on Natural Heritage conservation issues with the aim to (i) contribute to the strengthening of capacities in the management of Natural World Heritage in the region, (ii) contribute to achieving a more balanced representation of properties from Asia and the Pacific on the World Heritage List, (iii) raise awareness among the general public and the youth in particular of the importance of Natural World Heritage and the need to protect it, and (iv) foster international cooperation on Natural World Heritage initiatives.

Activities Undertaken During 2023-24

Capacity-Building Programmes and Outreach:

- Natural Heritage Session at ICCON Conference, Mysuru, 9-11 April 2023.
- World Heritage Day, WII, Dehradun, 18 April 2023.
- Mission LiFE Programme, 5 May – 5 June 2023.
- Module on International Biodiversity Conventions for IFS Officers, WII Dehradun, 23 August, 2023.
- Certificate Course in Heritage Management, 7 August – 15 September 2023.
- Participation at United Nations Forum on Forests, FRI Dehradun, 26-27 October 2023.
- World Natural Heritage Site Managers Meeting Round-II: Role, Responsibilities and Partnership, Keoladeo National Park, Bharatpur, Rajasthan, 27–28 October 2023.
- Natural Heritage through Education, Awareness and Network Building among Teachers, Keoladeo National Park, Bharatpur, Rajasthan, 29 October 2023.
- Capacity Building Programme on World Heritage Nomination of Bhedaghat-Lametaghat for staff of MPTB, Forests and Tourist Guides, 6–7 November 2023.
- Asian Rangers Forum Session, Guwahati, Assam, 5–8 December 2023.
- Training Programme for Frontline Staff on Monitoring of Outstanding Universal Value of Natural World Heritage Sites: Sundarbans National Park, Sajnekhali, Sundarbans National Park, 11-12 December 2023.
- International Webinar on 'Heritage in the Asia-Pacific: Nature, Culture and the World Heritage Convention', 18 December, 2023.
- Role of Civil Society in Tourism and Natural Heritage Conservation, 29– 31 January 2024.
- Capacity Building for Declaration of UNESCO World Heritage, Mangaluru / Karkala, 5–9 February 2024.
- Nature's Chorus: Heritage Narratives from Kaziranga and Beyond, Kaziranga National Park, 12–13 February 2024.
- Certificate Course in Natural Heritage Management, 19 Feb–15 March 2024.

Research Activities on Identified World Heritage Priority Issues:

- Keibul Lamjao Conservation Area, Manipur World Heritage Nomination Dossier preparation, June 2023.
- Consultation Meeting on Kanger Valley National Park World Heritage Inscription process, Jagdalpur, Chhattisgarh, 12 June 2023.
- Report of the IUCN Reactive Monitoring Mission to Keoladeo National Park, July 2023.
- ASEAN Cultural Heritage List Meeting, Jakarta, 16 August 2023.
- ICOMOS General Assembly, Sydney, 1-9 September 2023.
- Review of State of Conservation Reports and Nomination Dossiers for 45th World Heritage Committee Session, Riyadh, 10-25 September 2023.
- Heritage Asia-Pacific Chat on 3rd Cycle World Heritage Periodic Reporting for Asia and the Pacific Region, Virtual Meeting, 18 October 2023.
- Knowledge-Sharing Meeting between WII-C2C and Geological Survey of India, Virtual Meeting, 18 October 2023.
- WII-C2C meeting with ASI, New Delhi, 1 November 2023.
- ASEAN Cultural Heritage List Meeting, Virtual, 6 December 2023.
- Meeting with Geological Survey of India on World Heritage Inscription of Geoheritage Sites and Geoparks, 14 December 2023.
- Reconnaissance Survey in Dhala Crater, Madhya Pradesh and Lonar Crater, Maharashtra, 16-19 January 2024.

- Ramgarh Crater Visit, 29 October 2023.
- Evaluation of State of Conservation Reports of Natural World Heritage Sites, November 2023 - January 2024.

Co-ordinated activities with World Heritage Stakeholders and Expert Exchanges:

- World Heritage and Climate Change Session at UNESCO Sub-Regional Conference on World Heritage, Bhopal, 17-18 April 2023.
- World Heritage Volunteer Programme, Sikkim, 15-24 April 2023.
- IUCN Asia Protected Area Partnership, WII, Dehradun, 27-29 April 2023.
- 8th Annual C2C Coordination Meeting, Sejong, Korea, 31 May – 2 June 2023.
- ICCROM Asia-Pacific Regional Information Meeting – Online, 26 June 2023.
- Inception Workshop by UNESCO on "Heritage for Peace: Enhancing Transboundary and Regional Cooperation for Natural and Mixed World Heritage Sites in Asia" – Online, 6 July 2023.
- Bern III Conference on Cooperation among the Biodiversity- related Conventions for implementing the Kunming-Montreal Global Biodiversity Framework, Bern, Switzerland, 22-26 January 2024.
- Visit of UNESCO Mission for the Renewal Evaluation of the Agreement between UNESCO and Government of India for the Wildlife Institute of India - Category 2 Centre (WII-C2C), 5-10 March 2024.

Certificate Course in Heritage Management, Dehradun, 7 August – 15 September, 2023.

Heritage studies is an exciting new interdisciplinary field of inquiry which draws on a range of academic disciplines and skills, including history, archaeology, anthropology, sociology, art history, biology, geography, textual analysis, and visual communication, to name but a few. Heritage is becoming a management mandate in many national and international agendas, and the need for professionals is growing every day.

The first Certificate Course on Heritage Management (CCHM) commenced on 7 August 2023 to equip officer trainees with the concepts, theories and practices implemented in the multi-disciplinary field of heritage conservation. Through this 6-week course, the participants learnt how landscape-level interventions maximize the potential of scale and unforeseen beneficial interconnections as cultural, ecological and economic benefits are compounded. The class consisted of 7 students – Forest Officers from Madhya Pradesh, Andhra Pradesh, and Tripura, along with an equivalent Officer from the Geological Survey of India and Maharashtra Tourism. The course covered fundamental and applied subjects, including biodiversity and natural heritage, site management, nature-culture linkages and heritage risk management. The participants developed a

comprehensive understanding of the span and variety of heritage studies through interactive presentations and discussions, Best Practice Guidelines and recent Policies, management techniques, heritage expert talks and field tours to Keoladeo NP, Sultanpur NP, Agra, and Jaipur.

Participation at United Nations Forum on Forests, FRI Dehradun (26-27 October, 2023)

The Ministry of Environment, Forest and Climate Change organized a Country-Led Initiative (CLI) event as part of the United Nations Forum on Forests (UNFF) from 26-28 October 2023 at the Forest Research Institute (FRI), Dehradun, Uttarakhand. The United Nations Forum on Forests promotes the management, conservation, and sustainable development of all types of forests. India holds the distinction of being a founding member of UNFF. The UN General Assembly adopted the first-ever UN Strategic Plan for Forests from 2017 to 2030. This Strategic Plan serves as a global framework for actions at all levels to achieve the sustainable management of all types of forests,

including trees outside forests, and to combat deforestation and forest degradation. The CLI's primary goal is to contribute to the discussions of UNFF regarding the implementation of Sustainable Forest Management and the UN Strategic Plan for Forests. It also aims to facilitate the sharing best practices among UNFF Member States for implementing SFM and the UNSPF. The CLI will discuss thematic areas involving forest fires and forest certification. During this event, experts from UNFF member countries, the UN organizations, regional and sub-regional partners, and significant groups will deliberate on the thematic issues. WII-C2C staff participated in the event by making poster presentations on the importance of natural heritage and its larger associations with some of the most well-protected ecological habitats in the world.

Certificate Course in Natural Heritage Management, 19 February – 15 March 2024.

A Certificate Course on Heritage Management (CCNHM) was organized in WII-C2C from 19th February to 15 March 2023 for International Participants sponsored by the Ministry of External Affairs – Indian Technical & Economic Cooperation (MEA-ITEC) Programme. In a first-of-its-kind international course, the 12 participants from 8 countries (Costa Rica, Bulgaria, Ethiopia, Kenya, Tanzania, Madagascar, Sri Lanka and Mongolia) were trained on the core principles and theory of heritage along with the ability to incorporate the same into their official roles and responsibilities. The course drew on the Wildlife Institute of India's (WII's) expertise in wildlife conservation and natural heritage management and the global diversity of officer trainees to boost cross-learning. This 4-week course equipped the trainees with critical skills on themes like Concepts and Conventions, Heritage Management, and Heritage Interpretation. Classroom topics covered included Heritage Values – From Personal to Outstanding Universal Value; Nature-Culture Linkages and Sustainable Development; Managing Mountain World Heritage Sites; Human Dimensions of Natural Heritage Management; Visual Communication and Heritage and Interpretation Principles and Planning, among others. Practical aspects of heritage management were also addressed through multiple field day trips (Wadia Institute, FRI and Rajaji National Park) and a 5-day field trip which included visits to the Indian Institute of Heritage, Archaeological Survey of India and 5 World Heritage Sites based in Bharatpur, Delhi and Agra. This international course provided ample proof that across the world, the challenge of sustainably balancing heritage promotion and protection remains and reinforced the need for a focused study of nature-culture links, besides illustrating how natural heritage provides invaluable opportunities for interdisciplinary and cross-disciplinary learning on-site, acting as a living classroom.

Research Activities on Identified World Heritage Priority Issues

Besides the previously stated workshops, courses, international conferences and outreach initiatives for capacity-building, a vital function of WII-C2C is to research identified priority issues related to World Natural Heritage protection and management, whether it be for Reporting & Monitoring Requirements for Natural WHS, Advisory Services to a variety of Stakeholders and Nominations of Natural/Mixed World Heritage Sites. The Centre endeavors to explain the key concepts and processes of the World Heritage Convention and ensure that all stakeholders are able to make the most effective use of the Convention to support World Heritage conservation. The Centre offers advisory services and technical inputs to Central and State Governments of India, other countries on request, UNESCO Advisory Bodies and other relevant institutions on World Natural and Mixed Heritage issues, including those for conservation and management of World Heritage Sites, State of Conservation reports, State Party interventions at World Heritage Centre sessions among

others. To contribute towards enhanced representation of natural or mixed properties on the World Heritage List, the Centre offers technical support to State Parties in the nomination process of World Heritage Sites. With respect to this, in 2023-24, WII-C2C has embarked on multiple avenues of enquiry through nature-culture discussions, advice on newly initiated heritage conventions, promoting geological heritage and providing expertise on State of Conservation reports.

Keibul Lamjao Conservation Area, Manipur World Heritage Nomination Dossier Preparation, June 2023.

In 2018, WII-C2C successfully facilitated the inclusion of the Keibul Lamjao Conservation Area in India's Tentative List. The Agreement has now been operationalised to prepare the site's full nomination dossier. The Keibul Lamjao Conservation Area (KLCA) represents an extraordinary story of natural antiquity, diversity, beauty and human attachment with a core area of Keibul Lamjao National Park (KLNP) (40 sq. km) and a buffer of Loktak Lake (140 sq km) and Pumlen Pat (43 sq. km). The property and buffer areas are located in the southern part of the Bishnupur district and the eastern part of the Thoubal district of Manipur, India. The entire area has a rich natural flora and fauna history in the Indo Burma Biodiversity hotspot. It is known for its diverse freshwater ecosystem under varied geo-morphologic and ecological regimes. This national park, covering an area of 40 km^2 is the only floating national park in the world and the last natural refuge of Manipur brow-antlered deer, Rucervus eldii eldii, locally known as Sangai, which is the state animal of Manipur. About 29 sq. km is covered by a thick and almost contiguous mat of Phumdis, which is a combination of soil, vegetation and organic matter in different decaying stages. A nomination document for the proposed site is in the drafting stage, which is to be followed by site-level consultations based on the restoration of peace from ethnic conflict in the region.

ASEAN Cultural Heritage List Meeting, Jakarta (16 August 2023)

WII-C2C participated in the 1st Expert Panel Meeting on the Feasibility in the Development of Association of Southeast Asian Nations (ASEAN) Cultural Heritage List (ACHL), held on 16 August 2023 at the ASEAN Secretariat in Jakarta, Indonesia. As part of the efforts to strengthen cooperation in the ASEAN arts and culture sector, the ASEAN Senior Officials Meeting for Culture and Arts (SOMCA) in 2019 noted the proposed idea for the development of the ASEAN Cultural Heritage List. It was attended by representatives from the 10 ASEAN member Countries, 2 UNESCO Experts, 3 External Experts and two Indian Experts with cultural (ASI) and natural heritage (WII) expertise. Shri Niraj Kakati from WII-C2C represented India from the natural heritage component. The objective of the meeting was to develop the feasibility study for the ACHL and to provide recommendations on substantive and operational matters related to the setup of the ACHL.

Major outcomes included understanding ACHL may be seen as a paradigm shift and distinguished from the existing UNESCO World Heritage concept of Outstanding 'Universal' to 'Regional' Value; the need to consider shared regional heritage along with individual country assets; use of culture-sensitive terminology; the need for capacity-building in protection and preservation of heritage, community participation and stakeholder engagement; cultural heritage inventory mapping; adoption of sustainability principles; and fund-raising strategy. Shri Niraj Kakati of WII-C2C emphasized linking nature and suggested a fund-raising consultation with potential donors and partners could be considered both to share the vision of ACHL and raise resources for it. Follow-up Expert Panel Meetings are proposed to take the initiative forward.

ICOMOS General Assembly, Sydney, 1-9 September 2023

The overarching theme of the International Council on Monuments and Sites (ICOMOS) GA2023, organized in Sydney, Australia, was 'Heritage Changes' from 1-9 September 2023. Shri Anuranjan Roy, World Heritage Assistant, WII-C2C, had been selected for and participated in the ICOMOS GA 2023 Youth Forum organized at the World Heritage Site of Cockatoo Island/ Waremeah from the 1-3 September 2023. The Youth Forum looked at how the youth and emerging professionals in heritage conservation can contribute new ideas. As part of a final presentation with colleagues from Australia and Saudi

Arabia, he presented how the site of Cockatoo Island/ Waremeah had inadequate representations of its natural past. On 6 September 2023, Shri Roy presented his selected abstract, "Nature as Heritage – Communicating the Implicit", at the main GA at the International Convention Centre, Sydney, on how the values of nature are implicitly understood and sometimes quantified as ecosystem services. Still, there is a need to bolster its acceptance of heritage as the concept of heritage (particularly for urban constituencies) remains strongly linked with generational objects of culture in the form of built heritage, artefacts, crafts, and customs. As part of a GA field tour, Shri Roy also studied the exemplary site management adopted at the World Heritage Site of the Greater Blue Mountains Area in the locations of the Three Sister and the Gully Aboriginal Settlement.

Review of State of Conservation Reports and Nomination Dossiers for 45th World Heritage Committee Session at Riyadh, 10-25 September 2023

The 45th World Heritage Committee Session was held in Riyadh, Saudi Arabia, from 10-25 September 2023. As India is a member of the World Heritage Committee, WII-C2C provided technical support to the Indian delegation through the review and inputs on matters concerning Indian and world natural heritage sites in India and the world. In continuation of the review and submission of 25 State of Conservation Reports of World Heritage properties earlier, WII-C2C commented on nomination dossiers of 7 new sites to be considered for inscription and three sites with boundary modification proposals at the 45th Session of the Committee. These included sites in Bale Mountains National Park (Ethiopia), Nyungwe National Park (Rwanda), 'Uruq Bani Ma'arid (Saudi Arabia), Cold Winter Deserts of Turan (Kazakhstan/ Turkmenistan/ Uzbekistan), Tugay forests of the Tigrovaya Balka Nature Reserve (Tajikistan), Zagori Cultural Landscape (Greece), Evaporitic Karst and Caves on Northern Apennines (Italy), Hyrcanian Forests (Azerbaijan), Ha Long Bay - Cat Ba Archipelago (Viet Nam), Azerbaijan/Iran, Forests of the Carpathian and Europe. WII-C2C was also called upon to offer expert opinions on specific sites in Venezuela and Mongolia.

ASEAN Cultural Heritage List Meeting – Online, 6 December 2023

Following the first Expert Panel Meeting on the Feasibility in the Development of ASEAN Cultural Heritage List (ACHL) held on 16 August 2023 at the ASEAN Secretariat, Jakarta, with the support of the Government of India, the 2nd Expert Panel Meeting on the Feasibility in the Development of ASEAN Cultural Heritage List (ACHL) was organised on 06 December 2023 via video conference. The objective of the second meeting was to build on the discussions at the First Expert Panel Meeting to arrive at proposing recommendations and due considerations, specifically on defining the envisaged ASEAN Cultural Heritage through suggested themes/topics/stories and developing the approach and the criteria to be used. Represented by Shri Niraj Kakati from WII-C2C, key outcomes that emerged from discussions of the meeting included the understanding that the scope of ACHL includes both tangible and intangible heritage; evolution and changing character of heritage is an essential quality of living heritage; other categories of heritage may include transboundary heritage, heritage at risk, etc.; Culture – Nature linkage is important to consider; the importance of inclusivity in the approach to the implementation of ACHL;

need for multi-stakeholder consultations in identifying and implementing ACHL; collaborative rather than competitive approach and representation of the shared heritage of the region; need to understand the views of ASEAN countries on the values and criteria that is considered essential to be conveyed. Follow-up meetings of the Expert Panel and the SOMCA Working Group are proposed for 2024.

IUCN Asia Protected Area Partnership, WII, Dehradun, 27-29 April 2023

The 7th Technical Workshop and 8th Steering Committee Meeting of the Asia Protected Areas Partnership (APAP) with India as the Co-Chair since 2020 was organized by the Ministry of Environment, Forest and Climate Change, Government of India in association with the IUCN Asia Regional Office, Bangkok and hosted by the Wildlife Institute of India, Dehradun from 27th to 29th April, 2023. The Asia Protected Area Partnership (APAP), established in 2014, is a regional platform that aims to strengthen the management and governance of protected areas across Asia. APAP serves as a model for regional collaboration, showcasing the power of partnerships in driving progress toward the United Nations' Sustainable Development Goals and the Convention on Biological Diversity's post-2020 global biodiversity framework. The APAP agenda included various technical sessions on the APAP context, Country Updates, OECMS, IUCN Green Listing, Protected and Conserved Areas, and Strategy for achieving Target 3 of post-2020 GBF. WII-C2C provided technical support for the conduct of the APAP Meeting and further presented a session on Natural Heritage Sites in the Asia-Pacific Region, providing highlights of the World Heritage Convention as one of the most ratified conventions in the globe concerning the protection of world cultural and natural heritage properties; and detailed information of World Heritage properties in Asia-Pacific sub-regions along with the scope of areas which may contribute to natural heritage in the region. Participants included 30 representatives from member countries, 10 from IUCN, four from MoEFCC, and 20 scientists and staff from WII.

8th Annual C2C Coordination Meeting, Sejong, Korea, 31 May–2 June 2023

WII-C2C participated in the 8th Annual Coordination Meeting of the UNESCO World Heritage-Related Category 2 Centres and Institutes held in Sejong, South Korea, at the International Centre for the Interpretation and Presentation of World Heritage Sites (WHIPIC) from 31 May to 2 June 2023 which included representatives from 10 World Heritage-related C2Cs. Dr Gautam Talukdar, Scientist - F represented WII-C2C at the same. He made presentations on the mandate & activities of the WII-C2C and a selection of World Heritage Sites, summarizing community perceptions. The meeting led to constructive dialogue on various topics, including the importance of the interpretation and presentation of World Heritage properties and sharing experiences on key activities that C2Cs should contribute to and support, such as periodic reporting and the World Heritage Capacity Building Strategy. Participants at the meeting adopted the "Declaration on Understanding and Cooperation among UNESCO World Heritage-related Category 2 Centres," also referred to as the "Sejong Declaration." a commitment from C2Cs to take a more active role in the conservation and management of World Heritage properties. The key objectives covered in the same were providing capacity-building programmes to stakeholders at all levels, understanding the regional characteristics, improving the visibility of the contribution of Category 2 Centres, and strengthening and developing the expertise of the Category 2 Centres. These aims were to be pursued by taking advantage of the geographical locations of Category 2 Centres worldwide and exploring the possibility of implementing joint capacity-building activities such as annual seminars.

Bern III Conference on Cooperation among the Biodiversity- related Conventions for the implementation of the Kunming-Montreal Global Biodiversity Framework, Bern, Switzerland, 22-26 January 2024.

Dr Nehru Prabakaran, Associate Nodal Officer, WII-C2C, participated in "Bern III Conference on Cooperation among the Biodiversity- related Conventions for the implementation of the Kunming-Montreal Global Biodiversity Framework", held from 22-26 January 2024 at the Universal Postal Union in Bern, Switzerland. Dr Nehru highlighted the potential role that national and regional level players like WII-C2C can play in advocating/implementing synergy among the biodiversity-related policies at the national and grassroots levels. The Conference, attended by more than 150 participants from 70 countries representing over 18 Multilateral Environmental Agreements, was organised by the United Nations Environment Programme (UNEP), which aims to contribute to the efficient and effective implementation of the Kunming-Montreal Global Biodiversity Framework by identifying opportunities to drive and coordinate an inclusive, collaborative approach in the implementation of the framework, whilst respecting the respective mandates of biodiversity-related conventions, other relevant multilateral agreements and United Nations organizations. Taking advantage of the Bern conference, a brief meeting was held exclusively for the World Heritage Convention (WHC) team after the conference on 25 January 2024, in which five state parties and three representatives from the Secretariat were represented.

Visit of UNESCO Mission for the renewal evaluation of the Agreement between UNESCO and the Government of India for the Wildlife Institute of India - Category 2 Centre (WII-C2C), 5-10 March 2024.

The Agreement between the Government of India and UNESCO for the establishment of the Wildlife Institute of

India - Category 2 Centre (WII-C2C) for 'World Natural Heritage Management and Training for Asia and the Pacific Region' under the auspices of UNESCO was formally signed on 2 September 2015 by the Director General of Forests, Ministry of Environment, Forest and Climate Change, Government of India as the counterpart to the signature by the Director General, UNESCO, Paris.

As per the notification of the entry-into-force clause of the Agreement dated October 2018, the tenure of the Centre is due for renewal by 2024 for a subsequent period of eight years. Under this, a UNESCO Mission, comprising Prof. Robin Coningham from the University of Durham and Shri Rajendra Suwal of WWF-Nepal, visited the WII-C2C premises in Dehradun to evaluate the extent to which the C2C's objectives were achieved and the relevance of the contribution of the C2C's activities to the achievement of UNESCO's programme.

Their 5-day visit began with meetings in New Delhi with the Ministry of Environment, Forest and Climate Change (MoEFCC) officials and the Archaeological Survey of India (ASI), the nodal authority for World Heritage Sites. After arriving at the Wildlife Institute of India (WII) campus in Dehradun, the team interacted with the Director of WII, Registrar, Dean, Faculty members and WII-C2C staff. Besides this, they also had meetings with other stakeholders who had been part of WII-C2C programmes, including DFO, Keoladeo National Park and the international participants of the then-ongoing Certificate Course in Natural Heritage Management (CCNHM) on their field trip there. Following the visit of the Mission to WII-C2C, the evaluation team will now prepare and submit the report for consideration.

SACON
(SOUTH INDIA CENTRE OF WII)

PROFESSIONAL SUPPORT

Remote Sensing & Geographical Information System Cell

The remote sensing and geographical information system facility is part of almost all field-based research projects, as well as education and training. The facility is available to the faculty members, trainees, researchers, and students working with the Institute. The laboratory has high-end workstations, integrated desktops, and software packages. ArcGIS, ERDAS Imagine software for spatial analysis.

The data repository includes more than 2500 Survey of India Toposheets, Satellite images, and various thematic layers such as administrative, road network, drainage network & wetlands, land-use/ land-cover, and vegetation

National Centre for Avian Ecotoxicology at SACON

maps from different biogeographic regions of the country. A Remote Sensing and GIS module was conducted for students of M.Sc. in Wildlife Science (Ornithology) by the Centre. The hands-on training was also provided to other students and interns. Open-source software, viz. QGIS was also used for teaching and training. Geoinformatics technology is used in most of the institute's research projects for research and conservation.

National Centre for Avian Ecotoxicology

The National Centre for Avian Ecotoxicology (NCAE), SACON, has a state-of-the- art analytical laboratory with significant instruments, namely LC-MSMS, GC- MSMS and ICP-MS to quantify and qualify different types of environmental contaminants such as pesticides, metals, PCBs, PAHs, and non-steroidal anti- inflammatory drugs in a variety of biological and non-biological matrices. During the reporting period, many samples collected under the project "Long-term ecotoxicological monitoring of Sewari-Nhava Seascape, Mumbai," and submitted by other agencies were analyzed in the facility. Further, several cases of wildlife poisoning across the country were also investigated at the division. Tigers, leopards, and elephants were notable species affected by wildlife poisoning. During the referred period, thousands of students, faculty, and officials from different institutions, colleges, universities, and departments visited the facilities.

National Avian Forensic Laboratory

The National Avian Forensic Laboratory (NAFL) at SACON was established with financial support from the Ministry of Environment, Forest and Climate Change in 2018. The facility is well equipped with sophisticated equipment, viz. Next Generation DNA Sequencer, Sanger DNA Sequencer, Covaris, Fragment Analyzer, Homogenizer, Horizontal and Vertical gel electrophoresis, Centrifuge, Gel-Documentation system, Deep Freezer (-80ºC), Cryocans, Biosafety Cabinet, Thermal Cyclers, etc. During the current financial period, three more equipment, i.e. BIORAD T100 Thermal Cycler, Labomed Lx400 Light Microscope, and Canon DSLR EOS 90D Camera, along with the lens, were procured under the ongoing project.

Four forensic cases received from the Forest Department, Indian Airforce and Department of Revenue Intelligence were successfully resolved using morphometric/DNA-based analysis. In association with the Tamil Nadu Forest Academy, NAFL organized a 5-day short training course on "Bird Identification and Forensics" for Forest Officers of Tamil Nadu under the Modernization of Tamil Nadu Forest Force curriculum. A practical session on mock crime scene investigation, sample collection, preservation and documentation was conducted. Further, they were provided with hands-on training on laboratory practices such as DNA-based analysis, feather morphometrics, and eco-toxicological analysis to understand better the process involved in resolving wildlife crime cases.

NAFL also sensitized c. 300 persons belonging to different sectors (Government officials, teachers, NGOs, undergraduate and postgraduate students of forestry, biotechnology, and wildlife science) on various wildlife trade and practices during their visit to the laboratory as part of capacity building. Currently, 02 Ph. D scholars and 03 M.Sc. Dissertation candidates are pursuing their work from the NAFL laboratory.

Nature Education and Extension Cell

During 2023-24, SACON arranged an extensive array of Nature Education, Extension Programmes, and Outreach Events, underscoring its unwavering commitment to environmental education and wildlife conservation. These initiatives engaged with numerous schools, students, and trainees, fostering a deeper appreciation for biodiversity and ecosystem management.

The year commenced with the Coimbatore Bird Atlas Meeting on April 9, 2023, where 30 members gathered to discuss avian biodiversity. This was followed by educational programmes at Sri Jayendra Saraswathi Vidyalaya on April 12 and 13, involving 77 students and seven staff in bird-watching and environmental activities. One of the year's highlights was a five-day training programme for Indian Air Force Officers from July 24 to 28, focused on managing bird and wildlife hazards to aircraft. This comprehensive training included technical sessions and practical field trips, equipping participants with essential skills for mitigating wildlife hazards. On August 10, the TNFA Training Programme on Wildlife Management educated 50 foresters on bird identification and forensic techniques, further enhancing their

conservation capabilities. The Swachhata Hi Seva campaign, from September 14 to October 31, emphasized environmental cleanliness and waste management, engaging students, researchers, and faculty in proactive environmental stewardship activities.

Wildlife Week in October featured a series of webinars highlighting women in wildlife conservation, covering topics from ornithology to ecosystem restoration. These webinars were complemented by on-campus activities and student visits, enriching participants' understanding of wildlife conservation. Notable engagements included visits from the Commissioner of Police, Coimbatore City, on 18 November and the celebration of Indian Constitution Day on 26 November. Numerous educational visits marked December, including groups from Isha Home School, CASFOS trainees from Assam, and forestry students from Jhansi and Maharashtra. These visits exposed students to SACON's research activities and state-of-the-art laboratories.

January saw a five-day training session on bird identification and forensics for Tamil Nadu Forest Officials, followed by a three-day workshop on wildlife conservation for Class 1 personnel from various services. These programmes featured technical sessions and field visits, emphasizing the importance of conservation practices and legal protection for wildlife. In February and March, SACON continued its outreach with one-day and half-day programmes for students from various colleges, focusing on environmental economics, wildlife research, and conservation practices. These initiatives engaged over 16 schools and colleges, 641 students, and 180 officer trainees (CASFOS, TNFA, IGNFA), highlighting SACON's dedication to nurturing the next generation of environmental stewards.

Overall, SACON's extensive programmes and events throughout 2023-24 reflected its mission to instill environmental consciousness and empower individuals to contribute to conserving our planet's precious ecosystems. Through these efforts, SACON continues to inspire proactive change and foster a sustainable future for all.

EIACP on Wetlands Including Inland Wetlands

The objectives of the EIACP are to (i) collect, collate, and disseminate information on Wetlands, including inland wetlands, and (ii) contribute to the decision-making system of the Ministry of Environment, Forest and Climate Change, Govt. of India.

During the FY 2023-2024, the SACON EIACP Programme Centre observed several environmental days, which include Earth Day on 22 April 2023, International Day for Biological Diversity on 22 May 2023, World Environment Day on 5 June 2024, Van Mahotsav from 1–7 July 2023, the International Day for the Conservation of the Mangrove Ecosystem on 26 July 2023, International day for the preservation of Ozone layer on 16 September 2023, World Rivers Day on 24 September 2023, World Tourism Day on 27 September 2023, National Wildlife Week during 2–8 October 2023, World Fisheries Day on 27 November 2023, International Mountain Day on 11 December 2023, World Wetlands Day on 2

February 2024, World Wildlife Day on 3 March 2024, International Day of Forests on 21 March 2024, World Water Day on 22 March 2024 and International Women's Day on 8 March 2024.

As part of each event, awareness posters and videos were published and shared on social media platforms for wider dissemination. SACON EIACP Programme Centre also promoted MoEFCC flagship schemes like the Save Wetlands Campaign, Swachhata Hi Seva and Mission LiFE (Lifestyle For Environment), which are among the key objectives of EIACP. The centre has carried out online activities, events, webinars and mass mobile van awareness campaigns on environment-related issues and the Mission LiFE campaign in and around Coimbatore city, targeting stakeholders, the general public, school children and college students. The SACON EIACP team participated in the Evaluation Workshop for the Southern Region on 9 October 2023 at Trivandrum, where the team presented the activities carried out by the centre since 2019.

As one of the key objectives of EIACP, to implement the activities/ action plan of Mission LiFE, the SACON EIACP team distributed 1,000 cloth bags to the public as part of Mission LiFE's campaign "Say No to Single-use Plastics". Additionally, they provided 1,400 seedball pen-pencil kits to school children and college students to promote tree planting. To spread awareness about Mission LiFE, the SACON EIACP team set up a Mission LiFE photo booth inside the SACON campus. Shri Chandra Prakash Goyal, IFS, DGF and Special Secretary, MoEFCC, GoI, officially inaugurated it on 2 September 2023.

SACON EIACP Programme Centre also participated in the National Exhibition- cum-Awareness Programme on Mission LiFE, held at the India Gate in New Delhi on 9-10 February 2024. The team exhibited knowledge products, including information on wetlands and related species, cloth bags, speedball pens and pencil kits, and Mission LiFE awareness materials to engage visitors on environmental issues and promote sustainable living. The exhibition attracted about 5,000 visitors, including school children, teachers, college students, researchers, MoEF& CC officials, NGOs, and regular people.

The following four issues of the EIACP Newsletter were published during the reporting period:

EIACP Newsletter SAROVAR SAURABH Vol. 19(2) Apr. – June 2023

EIACP Newsletter SAROVAR SAURABH Vol. 19(3) Jul. – Sept. 2023

EIACP Newsletter SAROVAR SAURABH Vol. 19(4) Oct. – Dec 2023

EIACP Newsletter SAROVAR SAURABH Vol. 20(1) Jan.- Mar. 2024

Laboratory Minor Projects

SACON Ecotoxicology Laboratory receives regular requests for sample analysis from various agencies such as State Forest Departments, Universities, and other institutions. These analytical works are considered laboratory minor projects with the primary objective of an ecotoxicological analysis of samples received at the lab and submitting the results to the user agencies.

The SACON ecotoxicology lab takes up requests from various agencies to analyze samples of pesticides and metals. For instance, BNHS has been conducting long-term ecological monitoring of the Sewri Nhava Seascape in Mumbai from 2020 to 2030. As part of this study, BNHS is collaborating with SACON to carry out analysis of 150 samples for metal analysis and 100 samples for PAHs analysis per year, and BNHS pays the sum of Rs.15,31,248 (Rupees Fifteen lakh thirty-one thousand two hundred forty-eight only) annually to SACON.

The current MoU between SACON and BNHS is valid till December 2024 and may be renewed upon its expiry, with the agreement of both partner institutions. SACON is also analysing samples for the WII project "A comprehensive study on the Ecology and Population Status of a human commensal – the House Sparrow, Passer domesticus in the Uttarakhand State". Apart from the above, the Centre also analysed samples submitted by other agencies, such as state forest departments and other institutions.

A set of Himalayan Griffon vulture samples from seventeen mass mortality incidents in Assam was received from BNHS for toxicological investigation at SACON. It was analysed for pesticide residues using LC-MSMS and GC-MSMS and submitted results to the agency.

Twelve incidents of suspected wildlife poisoning involved five species of wild animals, namely Elephant, Tiger, Leopard, Indian Gaur and Wild Dog, and two species of wild birds, namely Himalayan Griffon Vulture and Indian Peafowl from Tamil Nadu and West Bengal, were investigated and report submitted to the forest departments concerned.

Soil samples received from Tamil Nadu Agriculture University, Coimbatore, for pharmaceutical drug analysis, and plant samples obtained from Centre for Bioscience and Nanoscience, Coimbatore, for phytochemical work, were analysed using LC-MSMS and the results submitted to the respective institutes.

All the samples received for analysis during the year were completed, and the reports were submitted.

Library and Documentation Centre

The Library and Documentation Centre at SACON continues to grow and enhance its collection, contributing significantly to the institution's academic and research pursuits. In the year 2023-2024, 38 new books, 32 technical reports, 3 theses and dissertations, and 450 back volumes were added. This brings the total collection to 3,868 books, 4,190 back volumes, 2,668 survey maps, 117 CD/DVDs, 267 project technical reports, and 103 theses and dissertations, including 80 Ph.D., 14 M.Phil., and 9 M.Sc. works. Additionally, the library subscribes to 10 national periodicals, keeping its users updated with the latest scientific literature. The library plays a key role in supporting research activities, not only at SACON but also for scholars and scientists from institutions across India.

To complement its extensive physical collection, the SACON Library offers robust online reference services. It provides access to the BioOne database, which includes critical, peer-reviewed e-journals in biology, ecology, and environmental sciences. In collaboration with the WII Library, SACON also grants access to 30 selected online journals from Wiley Publishers, further expanding research opportunities in biological and ecological disciplines. The Journal of the Bombay Natural History Society (JBNHS), which has been publishing original research since 1886, is another valuable resource. SACON's own technical reports, authored by faculty members, are available online for reference. The library also supports researchers with Wi-Fi connectivity, a dedicated reading room for Ph.D. scholars, and literature search services, reinforcing its role as a vital resource center for the academic and scientific community.

Hostel & Other Infrastructure Facility

SACON offers well-maintained hostel facilities to accommodate its research scholars, interns, M.Sc. dissertation candidates, and field assistants. There are three main hostel blocks on campus. Block I and Block II each contain four double-occupancy rooms, providing comfortable living arrangements for individuals involved in various research projects and academic programs. Block III, also known as the Postgraduate (PG) Hostel, has four rooms, each designed to accommodate three students, specifically for those enrolled in the M.Sc. course in Wildlife Science (Ornithology).

In addition to these blocks, SACON has two annexes, Hostel Annex I and II, which can collectively house 12 additional students. Overall, the hostel facility at SACON can accommodate up to 40 individuals. All hostels are equipped with essential amenities, including Wi-Fi, ensuring that residents have access to the necessary resources for both academic and personal needs. The hostel environment is designed to support a productive and comfortable stay for students, scholars, and researchers, contributing to a vibrant academic community at SACON.

Visitors

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VISITORS

- 50 students from College of Horticulture and Forestry, Jhalawar, 5 April 2023.
- 50 students from Deen Dayal Upadhyay College, University of Delhi, 6 April 2023.
- 54 students from Mukund Lal National College, Yamuna Nagar, Haryana, 11 April 2023.
- 45 trainees from Himachal Pradesh Forest Academy, Mandi, 11 April 2023.
- 45 students from Applied and Life Sciences, Uttaranchal University, Dehradun, 24 April 2023.
- 42 students from Birsa Agricultural University, Kanke, Ranchi, 28 April 2023.
- 45 RFO from Karnataka Forest Academy, Dharwad, 28 April 2023.
- 66 students from Dept. of M.Sc. Zoology, Babasaheb Bhimrao Ambedkar University, Lucknow, 3 May 2023.
- 11 DFO, Kolasib Forest Division, EF& CC and Journalists, from Mizoram, 9 May 2023.
- 38 students from Institute of Forestry, Pokhara, Nepal, 12 May 2023.
- 11 students from Bhartiya Engineering Science & Technology Innovation University, Andhra Pradesh, 17 May 2023.
- 38 students from Institute of Forestry, Pokhara, Nepal, 19 May 2023.
- 30 students from Maya Group of College, Selaqui, Dehradun 25 May 2023.
- 60 Officer trainees from State Forest Service College, Coimbatore, 31 May 2023.
- 50 trainees from Corbett Wildlife Training Centre, Kalagarh, 1 June 2023.
- 56 students from Kundal Academy of Development Administration and Management, Kundal, 2 June 2023.
- 47 students from Tribhuvan Institute of Forestry, Hetauda, Nepal, 5 June 2023.
- 80 students from B.Sc. Forestry Students from University of Agricultural & Horticultural Science, Shivamoga, Kodagu, Karnataka, 5 June 023.
- 35 students from AISECT, University, Hazaribag, Jharkhand, 5 June 2023.
- 47 students from Tribhuvan Institute of Forestry, Hetauda, Nepal, 5 June 2023.
- 45 students from Kathmandu Forestry College, Koteshwar, Nepal, 13 June 2023.
- 54 M.Sc. Botany students from Udai Pratap College, Varanasi, 20 June 2023.
- 15 students from College of Horticulture and Forestry, Rani Lakshmi Bai Central Agricultural University, Jhansi, 22 June 2023.
- 34 students from Department of Geography (GIS & Remote Sensing), Institute of Science, Banaras Hindu University, Varanasi, 28 June 2023.
- 30 trainees from Training Division, Forest Department, Government Of Haryana, Pinjore, 10 July 2023.
- 43 students from Convent of Jesus and Mary, Dehradun, 9 August 2023.
- 24 students from class Carman Residential & Day School, Premnagar, 10 August 2023.
- 48 officer trainees from Central Academy for State Forest Service CASFOS, Burnihat, Assam, SFS Induction Course, 10 August 2023.
- 53 trainees from Wildlife Guard Forestry Training, Sohna, Haryana, 21 August 2023.
- 60 UG & PG students from BFIT Group of Institute, Sudhowala Dehradun, 22 August 2023.
- 41 Forest Guard from Uttarakhand Forestry Training Academy Haldwani, 23 August 2023.
- 42 Forest Guard from Uttarakhand Forestry Training Academy, Haldwani, 25 August 2023.
- 27 Forest Guard from Uttarakhand Forestry Training Academy Haldwani, 29 August 2023.
- 45 Officer trainees Central Academy for State Forest Service Dehradun, 1 September 2023.
- 18 PG students and a Professor, Department of Zoology University of Lucknow, 8 September 2023.
- 64 students of 4th Year BVSc & AH, Central Agriculture University, Selesih, Aizwl, Mizoram, 8 September 2023.
- 49 FRO Trainees from Chandrapur Forest Academy of Administration, Development and Management Chandrapur (Maharashtra), 19 September 2023.
- 31 Forest Range Officer trainees from Odisha, 9 October 2023.
- 45 Forest Range Officer trainees from Tamil Nadu Forest Academy, 9 October 2023.
- 99 BVSc. & AH students from College of Veterinary and Animal Science, Mannuthy, Thrissur, Kerala, 26 October 2023.
- 70 Students from Grace Academy, 27 October 2023.
- 26 B.Sc. (Hons.) Forestry students from Sam Higginbottom University of Agriculture, Technology and Science, Prayagraj, 6 November 2023.
- 45 Corbett Wildlife Training Centre, Kalagarh (Garhwal) Uttarakhand, 24 November 2023.
- 27 Trainees from Forestry Training Academy Haldwani, Uttarakhand, 28 November 2023.
- 30 Trainees from Forestry Training Academy Haldwani, Uttarakhand, 29 November 2023.

- 38 Trainees from Forestry Training Academy Haldwani, Uttarakhand, 1 December 2023.
- 115 Officer trainees from Indira Gandhi National Forest Academy, Dehradun, 1 December 2023.
- 58 Forester Trainees from Rajasthan Forestry and Wildlife Training Institute, 5 December 2023.
- 39 Bachelor's level students from Institute of Forestry, Hetauda Campus, Makwanpur, 7 December 2023.
- 48 Bachelor's level students from Institute of Forestry, Hetauda Campus Makwanpur, 8 December 2023.
- 57 Foresters Trainees from Rajasthan Forestry and Wildlife Training Institute, 8 December 2023.
- 11 M.Sc. Botany students from Maharaja's College, Ernakulam Kerala, 11 December 2023.
- 29 students from Forest Guard Trainees Division, Hoshiarpur, 4 January 2024.
- 40 students from Forest Guard Trainees Division, Hoshiarpur, 18 January 2024.
- 38 students from Haryana Forestry Training Institute, Sohana, 31 January 2024.
- 38 students from ICFRE - Forest Research Institute University, Kaulagarh, 1 February 2024.
- 23 students from College of Horticulture & Forestry Central Agricultural University, Pasighat, 2 February 2024.
- 46 Forest Guard Trainees from Forest Training Institute, Chail, 6 February 2024.
- 25 Officer trainees from ITBP Academy, Mussoorie, 8 February 2024.
- 24 students from Haryana Forestry Training Institute, Sohana, 8 February 2024.
- 20 students from Department of Psychology School of Social Science, 9 February 2024.
- 40 students from Tribhuvan University Institute of Forestry Pokhara Campus, 15 February 2024.
- 10 students from Himachal Pradesh Forest Academy, Mandi, 21 February 2024.
- 48 students from Kathmandu Forestry College, B.Sc. Forestry Students Study Tour, 22 February 2024.
- 40 students from Tribhuvan University Institute of Forestry Pokhara Campus, 22 February 2024.
- 115 students from Veer Narmad South Gujrat University, 23 February 2024.
- 12 students of P.G. Diploma and M.Tech. Course from Indian Institute of Remote Sensing, Dehradun, 26 February 2024.
- 60 students from Forest College and Research Institute B.Sc. (Forestry), Telangana, 28 February 2024.
- 33 students from Kerala Agriculture University College of Forestry, 6 March 2024.
- 47 students from College of Forestry University of Agriculture and technology, 13 March 2024.
- 114 students from Imayam Institute of Agriculture and Technology, Odisha, Tamil Nadu, 13 March 2024.
- 48 students from Jaya Agriculture College B.Sc Homs (Agriculture), Tamil Nadu, 20 March 2024.
- 41 students from Rajiv Gandhi Institute of Veterinary Education & Research Kurumbapet, Puducheery, 20 March 2024.
- 199 IV B.Sc students from J.K.K. Munirajah College Agriculture Science, Tamil Nadu, 21 March 2024.
- 74 students from Woodstock School, Mussoorie, 22 March 2024.

SACON
(SOUTH INDIA CENTRE OF WII)

Dr Trevor Price, Professor, University of Chicago. Biogeography of Himalayan Birds in Breeding and Wintering Ground: The Importance of Competition. 4 July, 2023. **Forest trainees** of Tamil Nadu Forest Department on 9 August 2023.

PG (Zoology) students, Nehru Memorial College, Trichy. 1 March 2024.

TEACHING INPUTS/TALKS PROVIDED TO OTHER INSTITUTIONS

Dr Mahendiran Mylswamy (20 May 2023). **Mission LiFE - Lifestyle for Environment.** 28th foundation day of the Regional Museum of Natural History, Mysore.

Dr Ashutosh Singh (23 May 2023). **Resource person during the Faculty Development Program** (FDP). Amity University, Noida.

Dr Ashutosh Singh (7 October 2023). **Himalayan Birds during the Holocene.** Siddharth University, Kapilvastu.

Dr Aditi Mukherjee (27 February 2024). **Fostering Harmony in Life on Land - Integrating Human & Ecological Needs.** Kumaraguru College of Liberal Arts and Science, Coimbatore.

TALKS & MEETINGS

Dr Vidyadhar Atkore (23 April 2023). **Career in Wildlife, Forestry and Environmental Science.** For PRAYOJAN, an initiative by the Indian Young Academy of Sciences. (online).

Dr Vidyadhar Atkore (6 June 2023). **Threat/ Vulnerability of Freshwater Ecosystems.** Panel discussion in a day workshop on Himalayan Freshwaters: Assessing the Service and Vulnerability of Freshwater Ecosystems of the Himalayas. IIT Roorkee, Uttarakhand.

Dr Vidyadhar Atkore (19 July 2023). **Significance of Stakeholder Participation in Wetland Management.** As a part of a three-day workshop on Wetland Conservation and Management in Tamil Nadu, which TNFA and GIZ India organized in Coimbatore,

Jayapal R (24-28 July, 2023). **Common Birds of the Indian Airfields: An Introduction.** National Training Programme on Management of Bird/Wildlife Hazards to Aircraft organized by SACON for the Indian Air Force (IAF).

Jayapal R (1 August 2023). **Studies & Career in Wildlife Ecology and Conservation: An Indian Perspective.** SACON organized the UGC-HRDC Faculty Induction Programme for Bharathiar University.

Jayapal R (6 October 2023). **Ecology and Wildlife Studies in India.** Bharathiar University, Coimbatore, conducted the UGC-HRDC Short-term Course in Environmental Education.

Dr Vidyadhar Atkore (26 October 2023). **Role of Conservation Organization in Wildlife Management.** (online), Banda University, Uttar Pradesh.

Jayapal R (20-21 December 2023). **State of India's Birds: Conservation Assessment using Citizen Science Data.** SACON organized the Ram Hattikudur Advanced Training in Conservation (RHATC) for the Zoo Outreach Organization.

Kumara HN (11 December 2023). **Primates of India and associated conflicts.** Central Academy for State Forest Service, Coimbatore, during their visit to SACON.

Jayapal R (7 January 2024). **How do Bird Counts Help Bird Conservation?** The Tamil Birders Annual Meet 2024 was organized by Bird Count India & eBird-India programme at Bishop Heber College of Arts and Science, Tiruchirappalli.

Jayapal R (22-24 January 2024). **India's wildlife heritage: Why it matters?** At the Training Workshop on Wildlife Conservation for Class-I/ Group-A Officers conducted by SACON.

Jayapal R (22-24 January 2024). **Wildlife Conservation through Citizen Science and Citizen Movements.** The Training Workshop on Wildlife Conservation for Class-I/Group-A Officers was conducted by SACON.

Dr S. Mukherjee (2 February 2024). **"Fishing Cats" – The Ambassador of Wetlands in India".** The talk was delivered in a World Wetlands Day webinar organised by The Global Tiger Forum.

Dr Karunakaran PV (20-24 February 2024). **Management and Conservation Priorities of Wetland Birds in Tamil Nadu.** As part of the IFS Workshop on 'Monitoring and Management of Wetlands held at Coimbatore.

Dr M Mahendiran (20-24 February 2024). **Population Census and Monitoring of Wetland Birds.** The IFS training workshop, "Monitoring and Management of Wetland," was held in Coimbatore.

Dr R Jayapal (20-24 February 2024). **Wetland Birds of India: Status & Conservation.** SACON organized the IFS Officers Workshop on Monitoring and Management of Wetlands.

Dr S. Mukherjee (29 February 2024). **Molecular Tools in Biodiversity Conservation.** Invited talk at BIOCONCORRENZA'24, TNAU Campus, Coimbatore.

Dr Vidyadhar Atkore (20-21 March 2024). **Exploring Freshwater Science.** A plenary talk at an International conference on 'The New Horizons in Life Sciences-2024. Organized by Dept of Zoology and Fisheries. Ryant Shikshan Santha's Yashvantrao Chavan Institute of Science, Satara (Lead College of Karmaveer Bhavurao Patil University, Satara), Maharashtra.

Governance

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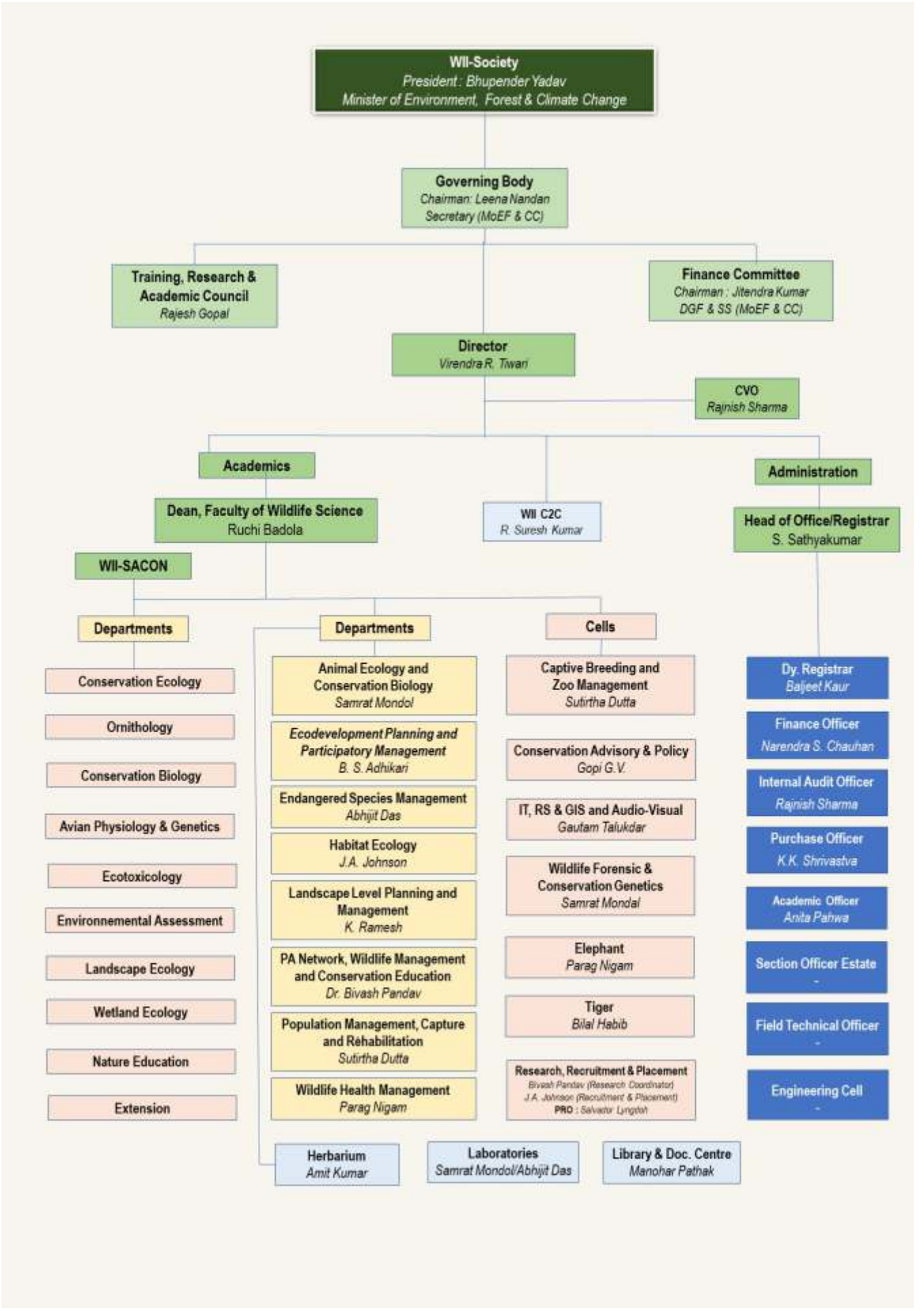
WII-Society
President : Bhupender Yadav
Minister of Environment, Forest & Climate Change
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Secretary (MoEF & CC)
Training, Research & Academic Council
Rajesh Gopal
Finance Committee
Chairman : Jitendra Kumar
DGF & SS (MoEF & CC)
Director
Virendra R. Tiwari
CVO
Rajnish Sharma
Academics
Administration
Dean, Faculty of Wildlife Science
Ruchi Badola
WII C2C
R. Suresh Kumar
Head of Office/Registrar
S. Sathyakumar
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Conservation Ecology
Ornithology
Conservation Biology
Avian Physiology & Genetics
Ecotoxicology
Environnemental Assessment
Landscape Ecology
Wetland Ecology
Nature Education
Extension
Departments
Animal Ecology and Conservation Biology
Samrat Mondol
Ecodevelopment Planning and Participatory Management
B. S. Adhikari
Endangered Species Management
Abhijit Das
Habitat Ecology
J.A. Johnson
Landscape Level Planning and Management
K. Ramesh
PA Network, Wildlife Management and Conservation Education
Dr. Bivash Pandav
Population Management, Capture and Rehabilitation
Sutirtha Dutta
Wildlife Health Management
Parag Nigam
Herbarium
Amit Kumar
Laboratories
Samrat Mondol/Abhijit Das
Library & Doc. Centre
Manohar Pathak
Cells
Captive Breeding and Zoo Management
Sutirtha Dutta
Conservation Advisory & Policy
Gopi G.V.
IT, RS & GIS and Audio-Visual
Gautam Talukdar
Wildlife Forensic & Conservation Genetics
Samrat Mondal
Elephant
Parag Nigam
Tiger
Bilal Habib
Research, Recruitment & Placement
Bivash Pandav (Research Coordinator)
J.A. Johnson (Recruitment & Placement)
PRO : Salvador Lyngdoh
Dy. Registrar
Baljeet Kaur
Finance Officer
Narendra S. Chauhan
Internal Audit Officer
Rajnish Sharma
Purchase Officer
K.K. Shrivastva
Academic Officer
Anita Pahwa
Section Officer Estate
-
Field Technical Officer
-
Engineering Cell
-

WII- SOCIETY

1. **President**
   Shri Bhupender Yadav,
   Minister of Environment, Forest & Climate Change
   Government of India,
   Indira ParyavaranBhavan
   Jor Bagh Road
   New Delhi -110003

2. Shri Ashwini Kumar Choubey
   Minister of State for Environment, Forest & Climate Change
   Government of India
   Indira Paryavaran Bhavan,
   Jor Bagh Road,
   New Delhi -110003

3. Shri Naresh Bansal
   Hon'ble Member of Parliament
   Rajya Sabha
   New Delhi

4. PCCF and CWLW
   Environment, Forests & Climate Change Department,
   Government of Mizoram,
   Environment Forest Complex
   Tuikhuahtlang,
   Aizawl, P.O. Aizwal – 796 001 (Mizoram)

5. PCCF (HoFF) and Chief Wildlife Warden,
   Dept. of Forest,
   Government of Manipur,
   Forest Headquarters,
   Sanjenthong,
   Imphal - 795001 (Manipur)

6. CWLW and APCCF (Wildlife)
   Dept. of Environment, Forest and Climate Change,
   Government of Nagaland,
   Office of the Principal Chief Conservator of Forests,
   Kohima – 797 001 (Nagaland)

7. The PCCF & CWLW
   Forest, Environment and Climate Change Department,
   Government of Orissa, State Wildlife Headquarters,
   Office of the PCCF and Chief Wildlife Warden,
   Prakruti Bhavan, Plot No. 1459, Saheed Nagar,
   Bhubaneshwar – 751 007

8. Principal Chief Conservator of Forests Wildlife & CWLW, Department of Forests,
   Government of West Bengal,
   Bikash Bhawan, North Block,
   3rd Floor, Saltlake,
   Kolkata - 700 091 (West Bengal)

9. PCCF & Chief Wildlife Warden,
   Maharashtra Forest Department,
   Government of Maharashtra, 3rd Floor, Van Bhawan,
   Civil Lines, Ramgiri Road,
   Nagpur – 440 001 (Maharashtra)

10. PCCF and Chief Wildlife Warden,
    Forest Department,
    Government of Rajasthan,
    Van Bhawan, Vaniki Path,
    Jaipur – 302 005 (Rajasthan)

11. PCCF (Wildlife) & Chief Wildlife Warden,
    Kerala Forest and Wildlife Department,
    Government of Kerala,
    Van Laxmi Forest Headquarters
    Thiruvananthaprum – 695 014

12. PCCF & Chief Wildlife Warden
    Government of Tamil Nadu,
    No.1 Jeenis Road,
    Panagal Building, Saidapet,
    Chennai-600015

13. CCF & CWLW,
    Himachal Pradesh Forest Department,
    Government of Himachal Pradesh,
    Shimla

14. PCCF (HoFF) & Chief Wildlife Warden,
    Department of Wildlife Protection,
    U.T. of Jammu & Kashmir,
    Manda Hills, Near Hotel Ashok,
    Jammu, Jammu & Kashmir

15. Chief Wildlife Warden,
    Dept. of Environment, Forest and Climate Change,
    Government of Uttar Pradesh,
    17, Rana Pratap Marg,
    Lucknow – 226 001 (Uttar Pradesh)

16. Chief Wildlife Warden,
    Dept. of Forest,
    Government of Uttarakhand,
    85, Rajpur Road,
    Dehradun (Uttarakhand)

17. Prof. MH Fulekar,
    Dean, School of Environment & Sustainable Development Central University,
    Gandhinagar (Gujarat)

18. Dr Payal Mago,
    Principal,
    Shaheed Rajguru College of Applied Sciences for Women (DU)
    New Delhi- 110096

19. Dr Ramakrishna,
Retd from ZSI
Bangalore

20. Dr Himmat Singh Negi
Retired Forest Officer of MP
Shimla,
Himachal Pradesh

21. Dr Gopal Singh Rawat,
Retd. Dean,
Wildlife Institute of India,
Doon Officers Enclave,
Dehradun (Uttarakhand)

22. Shri Kishan Singh Sugara,
PCCF & HoFF, (Retd)
Karnataka

23. Dr Ranjana Gupta, IFS (Retd)
Flat No A-203 Plot-C-58/20
PMO Cooperative Housing Society
Sector 62, Noida
Gautam Budha Nagar – 201 309 (Uttar Pradesh)

24. Prof. Sanjeev Puri,
Biotechnology Branch,
University Institute of Engineering & Technology (UIET),
Punjab University,
Chandigarh – 160 014

25. Prof. K Sivakumar,
Dept. of Ecology and Environment
Sciences, Pondicherry University,
Pondicherry

26. Dr H.S Singh
Former Principal Chief Conservator of Forests,
Government of Gujarat
Plot 44, Sector- 8
Gandhinagar – 382 010 (Gujarat)

27. Bombay Natural History Society (BNHS)
Hornbil House,
Dr Salim Ali Chowk,
Shaheed Bhagat Singh Road,
Mumbai – 400 023

28. World Wide Fund for Nature-India (WWF),
"Secretariat"
172-Lodhi Estate,
New Delhi – 110 003

29. Wildlife Preservation Society of India,
7, Astley Hall,
Dehradun – 248 001

30. Centre for Environment Education,
Nehru Foundation for Development,
Thaltej Tekra,
Ahmadabad (Gujarat)

31. Dr Ravi Singh
Secretary General & CEO,
WWF India,
172 B, Lodhi Estate
New Delhi - 110003

32. Secretary to the Government of India,
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhavan
Jor Bagh Road,
New Delhi - 110003

33. Secretary,
Government of India,
Ministry of Finance,
North Block,
New Delhi - 110001

34. Secretary,
Government of India
Department of Science and Technology,
Technology Bhavan,
New Mehrauli Road,
New Delhi - 110001

35. Secretary,
Government of India
Department of Education,
Ministry of Human Resource Development,
Shastri Bhavan,
New Delhi – 110 001

36. Representative of
Niti Aayog
Yojana Bhavan,
Sansad Marg,
New Delhi

37. Representative of the University Grant Commission
(UGC)
Bahadur Shah Zafar Marg,
New Delhi

38. Chief Secretary,
Government of Uttarakhand
"Sachivalaya"
Dehradun

39. Director General of Forest & Member
Special Secretary to the Government of India,
Ministry of Environment, Forest & Climate Change
Indira ParyavaranBhavan
Jor Bagh Road,
New Delhi – 110 003

40. Director of Wildlife Preservation,
Government of India,
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhavan
Jor Bagh Road,
New Delhi – 110 003

41. Additional Secretary (Finance Advisor),
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhavan,
Jor Bagh Road,
New Delhi -110003

42. Director General
Indian Council of Forestry Research & Education,
P.O New Forest,
Dehradun

43. Director
Zoological Survey of India
M-Block, New Alipore,
Kolkata – 700 053 (West Bengal)

44. Director
Botanical Survey of India,
CGO Complex, 3 MSO Building,
Block F, 5th& 6th Floor,
DF Block,
Sector-I, Salt Lak City
Kolkata – 700 064 (West Bengal)

45. Dean
Faculty of Wildlife Sciences
Wildlife Institute of India
Dehradun – 248 001

46. Registrar
Wildlife Institute of India
Dehradun – 248 001

47. Director,
Wildlife Institute of India
Dehradun – 248 001

48. Inspector General of Forest (WL)
Ministry of Environment, Forest & Climate Change,
Indira Paryavaran Bhavan,
Jor Bagh Road, Ali Ganj,
New Delhi – 110 003

49. Member Secretary
National Tiger Conservation Authority
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ParyavaranBhavan
CGO Complex,
New Delhi - 110003

50. Director (Project Elephant)
Ministry of Environment, Forest & Climate Change,
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2. Director General of Forest &
Special Secretary to the Government of India,
Ministry of Environment, Forest & Climate Change
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Jor Bagh Road, Ali Ganj,
New Delhi – 110 003

3. Dr H.S Singh
Former Principal Chief Conservator of Forests,
Government of Gujarat
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4. Prof MH Fulekar,
Prof & Dean, School of Environment &
Sustainable Development Central University,
Gandhinagar (Gujarat)

5. Dr Payal Mago,
Principal, Shaheed Rajguru College of
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New Delhi- 110096

6. Dr Ramakrishna,
Retd from ZSI
Bangalore, Karnataka

7. Dr Himmat Singh Negi,
Retired Forest Officer of MP
Shimla, Himachal Pradesh

8. Dr Gopal Singh Rawat,
Retd. Dean,
Wildlife Institute of India,
Doon Officers Enclave,
Dehradun (Uttarakhand)

9. Financial Advisor & Additional Secretary,
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10. Chief Secretary,
Government of Uttarakhand
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11. North Eastern Region - Manipur
12. Eastern Region - Odisha
13. Northern Region - Himachal Pradesh
14. Western Region - Gujarat
15. Southern Region - Karnataka

16. Permanent Member - Uttarakhand

17. Director
Wildlife Preservation,
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhavan, Jor Bagh Road,
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18. Director General
Indian Council of Forestry Research and Education,
PO New Forest,
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19. Dr Rajesh Gopal
Chairman, WII-TRAC &
Secretary, General, Global Tiger Forum
New Delhi

20. Registrar,
Wildlife Institute of India,
Wildlife Institute of India
Dehradun (Uttarakhand)

21. Director,
Wildlife Institute of India
Dehradun – 248001 (Uttarakhand)

22. Inspector General of Forests (WL)
Ministry of Environment, Forest & Climate Change
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Jor Bagh Road, Ali Ganj,
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23. **Member Secretary**
National Tiger Conservation Authority
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Ministry of Environment, Forest & Climate Change
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New Delhi – 110 003

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Director (Wildlife Preservation),
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Ministry of Environment, Forest & Climate Change,
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New Delhi - 110 003

3. Additional Secretary & Financial Advisor,
Ministry of Environment, Forest & Climate Change,
Indira Paryavaran Bhavan,
Jor Bagh Road,
New Delhi - 110 003

4. Shri. P.R.Sinha
(Former Director, WII)
Country Representative, India Country Office,
IUCN (International Union for Conservation of Nature),
B-88, Neeti Bagh,
New Delhi – 110 049

5. Dr Biswajit Mohanty
Shantikunj, Link Road
Cuttack (Orissa)

6. Dr Ruchi Badola, Dean, FWS
Wildlife Institute of India
Dehra Dun

Member-Secretary

7. Sh. Virendra R. Tiwari,
Director,
Wildlife Institute of India,
P.B.#18, Chandrabani,
Dehra Dun

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Secretary-General,
Global Tiger Forum
New Delhi

Members

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Additional Director General (Wildlife),
Ministry of Environment, Forest & Climate Change,
Government of India,
Indira Paryavaran Bhavan,
Jor Bagh Road,
New Delhi – 110003

3-14 Chief Wildlife Wardens on a regional rotation basis for three years

3.	Northern Region (2 Representatives)	Delhi Himachal Pradesh
4.	Eastern Region (1 Representative)	Bihar
5.	Central India (1 Representative)	Uttar Pradesh
6.	Western Region (2 Representatives)	Rajasthan Goa
7.	Southern Region (2 Representatives)	Andhra Pradesh Tamil Nadu
8.	North-eastern Region (3 Representatives)	Assam, Tripura Arunachal Pradesh
9.	Permanent Invitee	Uttarakhand

15-17 Three Representation from organization/Institution

15. Director,
Botanical Survey of India,
Ministry of Environment, Forest & Climate Change
C.G.O Complex, 3 M.S.O Building
Block- F, 5th & 6th Floor, DF Block
Sector –I Salt Lake City,
Kolkata (West Bengal)

16. Director,
Zoological Survey of India,
Prani Vigyan Bhawan
M-Block, New Alipore,
Kolkata - 700053 (West Bengal)

17. Member Secretary,
Central Zoo Authority
B-1 Wing, 6th Floor
Pt. Deendayal Antyodaya Bhawan
CGO Complex, Lodhi Road
New Delhi - 110003

(18-19) Two Representatives from Universities who are members of WII- Society

18. Prof. Sanjeev Puri
Biotechnology Branch,
University Institute of
Engineering & Technology (UIET),
Punjab University,
Chandigarh - 160014

19. Prof. K. Sivakumar
Department of Ecology and
Environment, Science
Pondicherry University
Puducherry

Three eminent Scientists/Conservationists/ Socio-economists/ Professional wildlife with experience relevant to wildlife science

20. Dr Gopal Singh Rawat
Retd. Dean,
Wildlife Institute of India,
Doon Officers Enclave,
Dehradun (Uttarakhand)

21. Dr Himmat Singh Negi
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Panchkula, Haryana – 134 103

22. Prof. Madhusudan Hiraram Fulekar
Prof. & Dean, School of Environment
& Sustainable Development
Central University,
Gandhinagar, Gujarat

23. A Representative of the Indian Council of Forest, Research & Education (ICFRE)
P.O. New Forest
Dehradun – 248006 (Uttarakhand)

24. Dean,
Faculty of Wildlife Sciences
Wildlife Institute of India
Chandrabani
Dehradun – 248 001 (Uttarakhand)

25-26 Two senior Head of Departments

25. Dr Ruchi Badola
Head of Eco-Development Planning
& Participatory Management
Wildlife Institute of India
Chandrabani,
Dehradun – 248 001 (Uttarakhand)

26. Dr B. S. Adhikari
Head of Habitat Ecology
Wildlife Institute of India
Chandrabani
Dehradun – 248 001 (Uttarakhand)

Faculty Member (In-Charge of Research Coordination)

27. Dr Bitapi C Sinha
Scientist-G
Wildlife Institute of India
Chandrabani,
Dehradun – 248 001 (Uttarakhand)

Member- Secretary

28. Director
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Publications

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PEER REVIEWED NATIONAL JOURNALS

Abinesh A, CS Vishnu & Ramesh, C. (2023). **Auto-fellatio behaviour observed in the Indian Palm Squirrel, Funambulus palmarum (Linnaeus, 1766).** *Journal of Threatened Taxa*, 15(8), 23817–23818. doi:10.11609/jott.8370.15.8.23817-23818

Ahamad M, Saeed U, Ranjan V, Hussain SA, Badola R, S Kumarasamy (2023). **Photographic evidence of the Indian Pangolin, Manis crassicaudata Geoffroy, 1803 (Mammalia: Pholidota: Manidae), in Kaimur Wildlife Sanctuary, Bihar, India.** *Journal of Threatened Taxa*, 15(5), 23270–23272. doi:10.11609/jott.8248.15.5.23270-23272

Ankit K, Ahmad M, Ranjan V, Kumar S, Hussain SA & Gopi GV (2024). **Observations on Indian Skimmer, Rynchops albicollis Swainson, 1838 (Aves: Charadriiformes: Laridae) breeding colonies in Middle Ganges stretch, India.** *Journal of Threatened Taxa*, 16(2), 24737–24745. doi:10.11609/jott.8593.16.2.24737-24745

Bhatt S, Kumar A, Arunachalam A & Arunachalam K (2024). **Ethnomedicinal diversity and traditional knowledge system of the jaunsari tribe in Uttarakhand, western Himalaya. Proceedings of the National Academy of Sciences, India.** Section B, 94(1), 177–192. doi:10.1007/s40011-023-01514-y

Bhatt U, Habib B & Lyngdoh S (2023). **Further photographic record of Asiatic Brush-tailed Porcupine, Atherurus macrourus Linnaeus, 1758 (Mammalia: Rodentia: Hystricidae) from Manas National Park, Assam, India.** *Journal of Threatened Taxa*, 15(6), 23446–23448. doi:10.11609/jott.5591.15.6.23446-23448

Kumar R & Adhikari BS (2024). **Natural snowmelt timing influences community structure and phenological patterns in Alpine Meadows, west Himalaya: A case study. Proceedings of the National Academy of Sciences, India.** Section B, 94(1): 107–119. doi:10.1007/s40011-023-01509-9

PN Anoop Raj, AD Velankar & P Pramod (2023). **Diversity and Distribution of Birds in the Bharathapuzha river basin, Kerala, India.** *Journal of Threatened Taxa*, 15(11), 24169–24183. doi:10.11609/jott.8573.15.11. 24169-24183

Patel D, Ramesh C, Ghosal S & Raina P (2023). **Communal egg-laying by the Frontier Bow-fingered Gecko, Altiphylax stoliczkai (Steindachner, 1867) in Ladakh, India.** *Journal of Threatened Taxa*, 15(8): 23763–23770. doi:10.11609/jott.8250.15.8.23763-23770

Rathore HS, Pati J, Pandav B & Mondol S (2024). **First record of mutual allogrooming in wild northern red muntjac, Muntiacus Vaginalis.** *Acta Ethologica*, doi:10.1007/s10211-024-00441-z

Sadhukhan S, Khan S & Habib B (2024). **Silencing the call of the wild – howling behaviour and responses of the wolf to Anthropocene in India.** *Animal Conservation*, 27(1): 98–111. doi:10.1111/acv.12881

Saeed U, Ahamad M, Ranjan V, Hussain SA & Badola R (2023). **Assessing and understanding diversity and foraging guilds of bird community structure in Gautam Buddha Wildlife Sanctuary, Bihar and Jharkhand, India.** *Journal of Threatened Taxa*, 15(12): 24331–24344. doi:10.11609/jott.8357.15.12.24331-24344

Sah R, Khanduri M, Chaudhary P, Thomas Paul K, Gururani S, Banwala K, … Hussain SA (2024). **Dietary exposure of potentially toxic elements to freshwater mammals in the Ganga river basin, India.** *Environmental Pollution* (Barking, Essex: 1987), 351(123928), 123928. doi:10.1016/j.envpol.2024.123928

Sahoo S, Kumar A, Rai J & Gupta SK (2023). **Turtle and tortoise mitogenomes under contrasting positive selection pressure.** *Organisms, Diversity & Evolution*, 23(4), 953–965. doi:10.1007/s13127-023-00625-8

Sahu K & Gupta SK (2024). **Status of pig rearing practices in the urban districts of Uttarakhand.** *Indian Journal of Animal Production and Management*, 40(2), 100–106. doi:10.48165/ijapm.2024.40.2.6

Saini D, Yadav P, Kolipakam V, Sathyakumar S & Gupta SK (2023). **The complete mitogenome of blue sheep, Pseudoi:s nayaur from the Indian Himalayan Region and its comparative phylogenetic relationship with other related species.** *Animal Gene*, 29(200155), 200155.

Sarkar D & Talukdar G (2023). **Predicting the impact of future climate changes and range-shifts of Indian hornbills (family: Bucerotidae).** *Ecological Informatics*, 74(101987), 101987. doi:10.1016/j.ecoinf.2023.101987

Sarkar D, Jagannivsan H, Debnath A & Talukdar G (2024). **A systematic review on the potential impact of future climate change on India's biodiversity using species distribution model (SDM) studies: trends, and data gaps.** *Biodiversity and Conservation*, doi:10.1007/s10531-024-02785-1

Sarkar D, Tomar B, Kumar RS, Saran S & Talukdar G (2023). **Influence of seasonal variables on the distribution of pied cuckoo, Clamator jacobinus in India.** *Journal of the Indian Society of Remote Sensing*. doi:10.1007/s12524-023-01771-4

Sharma A, S Noorunnisa Begum, GS Goraya, Rawat GS & Jishtu V (2023). **Three new additions to the flora of Himachal Pradesh, India from Khokhan Wildlife Sanctuary, Kullu District.** *Journal of Threatened Taxa*, 15(12): 24402–24408. doi:10.11609/jott.8647.15.12.

PEER-REVIEWED INTERNATIONAL JOURNALS

Adhikari BS & Kumar R (2023). **Herbaceous vegetation structure and phenology at treeline ecotone in relation to natural snowmelt.** *Ecology of Himalayan Treeline Ecotone*, (pp. 411–437). doi:10.1007/978-981-19-4476-5_17

Ahmad A & Gopi GV (2024). **Site occupancy of select mammals in the tropical forest of Eastern Himalaya.** *Frontiers in Ecology and Evolution*, 11. doi:10.3389/fevo.2023.1106329

Ahmad K, Mirelli M, Charoo S, Nigam P, Qureshi Q, Naqash RY & Focardi S (2023). **Is the hangul Cervus hanglu hanglu in Kashmir drifting towards extinction? Evidence from 19 years of monitoring.** *Oryx: The Journal of the Fauna Preservation Society*, 57(5): 585–591. doi:10.1017/s0030605323000686

Ahmad K, Shankar Pacha A, Yahya Naqash R, Kumar Peddamma S, Yellapu S, Hudson S, … Mondol S (2023). **Evolutionary insights on critically endangered Kashmir red deer or hangul, Cervus hanglu hanglu through a mitogenomic lens.** *PeerJ*, 11, e15746. doi:10.7717/peerj.15746

Angmo K, Adhikari BS, Bussmann RW & Rawat GS (2024). **Harmony in nature: understanding the cultural and ecological aspects of plant use in Ladakh.** *Journal of Ethnobiology and Ethnomedicine*, 20(1): 34. doi:10.1186/s13002-024-00670-3

Bala R, Kumar RS, Gokhale P, Mohan D & Barve S (2024). **House Sparrows Passer domesticus increase in body size and dorsal feather insulation along a Himalayan elevational gradient.** *Journal of Field Ornithology*, 95(2). doi:10.5751/jfo-00469-950210

Bandyopadhyay K, Banerjee K, Vittoria Mazzamuto M, Koley S, Koprowski JL, Qureshi Q & Jhala Y (2024). **Review of small cat ecology and status within India**. *Mammal Review*, 54(4), 341–356. doi:10.1111/mam.12348

Bargali H, Bhatt D, Sundriyal RC, Uniyal VP, Pandey A & Ranjan R (2023). **Effect of forest fire on tree diversity and regeneration in the forests of Uttarakhand, Western Himalaya, India.** *Frontiers in Forests and Global Change*, 6. doi:10.3389/ffgc.2023.1198143

Bargali H, Pandey A, Bhatt D, Sundriyal RC & Uniyal VP (2024). **Forest fire management, funding dynamics, and research in the burning frontier: A comprehensive review.** *Trees, Forests and People*, 16(100526), 100526. doi:10.1016/j.tfp.2024.100526

Bhatia D, Sharma CP, Sharma S & Singh R (2024). **Species discrimination from hair using ATR-FTIR spectroscopy: Application in wildlife forensics.** *Science & Justice: Journal of the Forensic Science Society*, 64(3), 314–321. doi:10.1016/j.scijus.2024.04.002

Bhatnagar YV, Mathur VB, Sathyakumar S, Pal R, Ghoshal A, Sharma RK, … Lal P (2024). **Securing India's snow leopards: Status, threats, and conservation.** *In Snow Leopards* (Pp. 513–529). doi:10.1016/b978-0-323-85775-8.00003-0

Bhatt U & Lyngdoh S (2023a). **Do dholes segregate themselves from their sympatrids? Habitat use and carnivore co-existence in the tropical forest.** *Zeitschrift Für Saugetierkunde* [Mammalian Biology], 103(6), 591–601. doi:10.1007/s42991-023-00378-z

Bhatt U & Lyngdoh S (2023b). **Secrets of the clouded leopard: abundance, habitat use and carnivore coexistence in tropical forest of Manas National Park, Assam, India.** *Oryx: The Journal of the Fauna Preservation Society*, 57(6), 757–768. doi:10.1017/s0030605322001661

Bhattacharjee D, Sau S, Das J & Bhadra A (2024). **Does novelty influence the foraging decisions of a scavenger?** *PeerJ*, 12, e17121. doi:10.7717/peerj.17121

Bisht S, Bargali SS, Bargali K, Rawat YS & Rawat GS (2023). **Dry matter dynamics and carbon flux along riverine forests of Gori valley, Western Himalaya.** *Frontiers in Forests and Global Change*, 6. doi:10.3389/ffgc.2023.1206677

Biswas J, Shil J, Sasi R, Ahmed MU, Barman K, Das N, … Kumara HN (2024). **Ecological determinants of occupancy of Golden langur, Trachypithecus geei and its population characteristics in India.** *Global Ecology and Conservation*, 53(e03003), e03003. doi:10.1016/j.gecco.2024.e03003

Biswas S, Kumar S, Bandhopadhyay M, Patel SK, Lyngdoh S, Pandav B & Mondol S (2023). **What drives prey selection? Assessment of Tiger, Panthera tigris food habits across the Terai-Arc Landscape, India.** *Journal of Mammalogy*, 104(6), 1302–1316. doi:10.1093/jmammal/gyad069

Bora JK, Vardhan V, Vijh RK, Deshmukh AV, Srinivas Y, Mungi NA, … Jhala Y (2024). **Evaluating the potential for reintroducing the endangered wild water buffalo, Bubalus arnee in Kanha National Park, Central India.** *Restoration Ecology*, 32(3). doi:10.1111/rec.14079

Boruah B, Deepak V, Patel NG, Jithin V, Yomcha T & Das A (2023). **A new species of green tree frog of the genus Gracixalus (Anura: Rhacophoridae) from the evergreen forest of Northeast India.** *Vertebrate Zoology*, 73, 557–574. doi:10.3897/vz.73.e98444

Boruah B, Narayanan S, Aravind NA, Lalronunga S, Deepak V & Das A (2024). **Description of six new species of Cyrtodactylus Gray (Squamata: Gekkonidae) from northeastern India.** *Vertebrate Zoology*, 74, 453–486. doi:10.3897/vz.74.e124752

Chandra N, Kumar A, Mishra AP, Singh G & Rawat GS (2023). **Wigandia urens (Ruiz & Pav.) Kunth: a new emergent invasive alien species in the Western Himalaya.** *The International Journal of Environmental Studies*, 80(5), 1259–1272. doi:10.1080/00207233.2023.2194157

Chakrabarti S, Kolipakam V, Bump JK & Jhala YV (2024). **Author Correction: The role of kinship and demography in shaping cooperation amongst male lions.** *Scientific Reports*, 14(1): 3744. doi:10.1038/s41598-024-54226-2

Chakrabarti S, Wikenros C, Borg B, Jhala Y & Bump J (2023). Editorial: **New century wolf conservation and conflict management. Frontiers in Ecology and Evolution**, 11. doi:10.3389/fevo.2023.1174661

Chatterjee N, Mukhopadhyay I, Nigam P & Habib B (2023). **Predicting carrying capacity of a large carnivore from prey densities: a new approach.** *PeerJ*, 11, e15914. doi:10.7717/peerj.15914

Das GC, Usmani AA, Sharma SP, Guha S, Ali SZ, Barthwal S, … Hussain SA (2024). **Conservation planning for Gangetic dolphin, Platanista gangetica in smaller rivers of the Ganga River Basin, India.** *Global Ecology and Conservation*, 51(e02900), e02900. doi:10.1016/j.gecco.2024.e02900

Das P, Goyal SP & Lyngdoh S (2023). **Spatial vigilance architecture of Indian flying fox colonies in rural parts of Barak Valley, Northeast India.** *Behavioral Ecology and Sociobiology*, 77(6). doi:10.1007/s00265-023-03329-3

De R, Sharma R, Nigam P, Williams AC, Habib B & Goyal SP (2023). **Identifying sex and individual from faecal DNA of the Asian elephant using a single multiplex PCR for population monitoring.** *Conservation Genetics Resources*, 15(4): 163–173. doi:10.1007/s12686-023-01316-4

De R, Sharma R, Singh SK, Rasteiro R, Bhaskar R, Khan I, … Goyal SP (2024). **Conservation implications of high gene flow and lack of pronounced spatial genetic structure in elephants supported by contiguous suitable habitat in north-western India.** *Conservation Science and Practice*, 6(2). doi:10.1111/csp2.13075

Dutta S & Krishnamurthy R (2024). **Successful conservation translocation: Population dynamics of tiger recovery in Panna Tiger Reserve, Central India.** *Ecological Solutions and Evidence*, 5(2). doi:10.1002/2688-8319.12337

Gole S, Prabakaran N, Prajapati S, Dudhat S, Das H, Kuppusamy S & Johnson JA (2024). **Latitudinal variation in seagrass communities with special emphasis on post-tsunami status in the Andaman and Nicobar archipelago, India.** *PloS One*, 19(3): e0300654. doi:10.1371/journal.pone.0300654

Gole S, Prajapati S, Prabakaran N, Das H, Kuppusamy S & Johnson JA (2023). **Spatial diversity and habitat characteristics of seagrass meadows with management recommendations in the Andaman and Nicobar Islands, India.** *Frontiers in Marine Science*, 10. doi:10.3389/fmars.2023.1251887

Gomes L, Modi S, Nigam P & Habib B (2024). **The bear truth: Analyzing genetic variability and population structure in sloth bear across the Vidarbha landscape using microsatellite markers.** *Diversity*, 16(2): 74. doi:10.3390/d16020074

Gower DJ, Das S, Deepak V, Gerard JD & Narayanan S (2024). **A new species of Uropeltis Cuvier, 1829 (Serpentes: Uropeltidae) from the eastern escarpment of the southern Western Ghats, India.** *Zootaxa*, 5477(3), 333–357. doi:10.11646/zootaxa.5477.3.4

Jain A, Akshay VA, Deepak V, Das A, Barnes P, Tapley B & Cavada-Blanco F (2024). **Using local ecological knowledge to determine the status of Cantor's giant softshell turtle Pelochelys cantorii in Kerala, India.** *Oryx: The Journal of the Fauna Preservation Society*, 58(3): 300–309. doi:10.1017/s003060533001370

Kanagaraj R, Joshi BD, De R, Predit MA, Singh SK, Pandey P, … Goyal SP (2023). **Predicting the impact of climate change on range and genetic diversity patterns of the endangered endemic Nilgiri tahr (Nilgiritragus hylocrius) in the western Ghats, India.** *Landscape Ecology*, 38(8): 2085–2101. doi:10.1007/s10980-023-01681-3

Khanduri M, Sah R, Ramachandran A, Hussain SA, Badola R, Candolin U & Hölker F (2023). **Spatial-temporal expansion and determinants of light pollution in India's riparian habitats.** *Environmental Impact Assessment Review*, 98(106952). doi:10.1016/j.eiar.2022.

Kumar A, Negi N, Yadav N, Badola R, Hussain SA & Gupta SK (2024). **Genetic diversity, spatial connectivity, and population structure of Asian silurid catfish, Wallago attu (Bloch and Schneider, 1801) in the Ganga River System: insights from mitochondrial DNA analysis.** *Molecular Biology Reports*, 51(1): 378. doi:10.1007/s11033-024-09323-w

Kumar A, Panda AK, Usmani AA, Yadav P, Panwar A, Badola R, … Gupta SK (2024). **Population genetics of the critically endangered three-striped turtle, Batagur dhongoka from the Ganga river system using mitochondrial DNA and microsatellite analysis.** *Scientific Reports*, 14(1), 5920. doi:10.1038/s41598-024-54816-0

Kumar R & Adhikari BS (2023). **Snowmelt influence on phenological events of herbaceous plants in alpine region of West Himalaya. Revista Brasileira de Botanica.** *Brazilian Journal of Botany*, 46(4): 1041–1054. doi:10.1007/s40415-023-00939-z

Mahar N, Dobriyal P, Badola R & Hussain SA (2024). **Tourism on the roof of the world: Socio-ecological impacts of tourism on the Indian Trans-Himalaya.** *Land Use Policy*, 138(107031), 107031. doi:10.1016/j.landusepol.2023.107031

Mahar N, Habib B & Hussain SA (2024). **Do we need to unfriend a few friends? Free-ranging dogs affect wildlife and pastoralists in the Indian Trans-Himalaya.** *Animal Conservation*, 27(1): 53–64. doi:10.1111/acv.12876

Mahar N, Habib B, Hussain SA, Shawl T & Takpa J (2023). **Influence of anthropogenic factors on the waterbirds in Trans-Himalayan wetlands.** *Global Ecology and Conservation*, 46(e02567), e02567. doi:10.1016/j.gecco.2023.e02567

Malla G, Ray P, Srinivas Y, Malla S, Reddy TB, Hayward M & Sivakumar K (2024). **Fish on the platter! Dietary habits of fishing cats (Prionailurus viverrinus) in the Godavari Delta, India.** *Mammal Research*, 69(2): 221–230. doi:10.1007/s13364-023-00731-0

Mishra AP, Chandra N, Mandy JJ, Dwivedi SK, Alruzuq A & Pande CB (2023). **Analytical hierarchy process (AHP) based on the spatial assessment of an endangered alpine medicinal herb Aconitum heterophyllum in the western Himalayan environment.** *In Springer Climate* (Pp. 579–594). doi:10.1007/978-3-031-19059-9_25

Mishra AP, Kumar A & Yadav SN (2023). **Ecology and conservation of threatened medicinal plants in the Trans-Himalayan region of Nanda Devi Biosphere Reserve, Western Himalaya.** *Trees, Forests and People*, 14(100451), 100451. doi:10.1016/j.tfp.2023.100451

Mishra AP, Kumar S, Patra R, Kumar A, Sahu H, Chandra N, … Alshehri F (2023). **Physicochemical parameters of water and its implications on avifauna and habitat quality.** *Sustainability*, 15(12): 9494. doi:10.3390/su15129494

Mungi NA, Jhala YV, Qureshi Q, le Roux E & Svenning J-C (2023). **Megaherbivores provide biotic resistance against alien plant dominance.** *Nature Ecology & Evolution*, 7(10): 1645–1653. doi:10.1038/s41559-023-02181-y

Mungi NA, Qureshi Q & Jhala YV (2023). **Distribution, drivers and restoration priorities of plant invasions in India.** *The Journal of Applied Ecology*, 60(11): 2400–2412. doi:10.1111/1365-2664.14506

Napper IE, Baroth A, Barrett AC, Bhola S, Chowdhury GW, Davies BFR, … Koldewey H (2023). **The distribution and characterisation of microplastics in air, surface water and sediment within a major river system.** *The Science of the Total Environment*, 901(166640). doi:10.1016/j.scitotenv.2023.166640

Nath A, Lahkar BP, Brahma N, Sarmah P, Kr Das A, Das S, … Swargowari A (2023). **Breaking Dawn: Factors influencing mammalian habitat usage in western Assam following socio-political instability.** *Journal for Nature Conservation*, 72(126357), 126357. doi:10.1016/j.jnc.2023.

Nath Tripathi R, Ghazanfarullah Ghazi M, Badola R & Ainul Hussain S (2024). **Feasibility study of UAV based ecological monitoring and habitat assessment of cervids in the floating meadows of Keibul Lamjao National Park in Manipur, India.** *Measurement: Journal of the International Measurement Confederation*, 229(114411), 114411. doi:10.1016/j.measurement.2024.

Naniwadekar R, Taneja Y, Page N, Gopal A & Ghuman S (2024). **Should the Narcondam Hornbill be introduced on other islands in the Andaman archipelago?** *Global Ecology and Conservation*, 51(e02928), e02928. doi:10.1016/j.gecco.2024.e02928

Pacha AS, Pande A, Arya S, Saini S, Sivakumar K & Mondol S (2023). **New insights on the phylogeny and genetic status of a highly vagile seabird from East Antarctica.** *Polar Science*, 38(100972), 100972. doi:10.1016/j.polar.2023.100972

Panda AK, Verma V, Srivastav A, Badola R & Hussain SA (2024). **Digital image processing: A new tool for morphological measurements of freshwater turtles under rehabilitation.** *PloS One*, 19(3): e0300253. doi:10.1371/journal.pone.0300253

Page N (2023). **A new species of Meiogyne (Annonaceae) from The Eastern Himalayas of northeast India.** *Edinburgh Journal of Botany*, 80, 1–8. doi:10.24823/ejb.2023.1954

Panda AK, Katdare S, Gawan S, Sharma SP, Badola R & Hussain SA (2023). **Population status and factors influencing the distribution of Critically Endangered gharial, Gavialis gangeticus in a regulated unprotected river system in India.** *Global Ecology and Conservation*, 46(e02547), e02547. doi:10.1016/j.gecco.2023.e02547

Pandey RK, Yadav SP, Selvan KM, Natarajan L & Nigam P (2024). **Elephant conservation in India: Striking a balance between coexistence and conflicts.** *Integrative Conservation*, doi:10.1002/inc3.38

Paul S, Saha S, Nigam P, Pandey G, Habib B, Mohan D, … Mondol S (2024). **Functional connectivity in northern swamp deer, Rucervus duvaucelii duvaucelii population across a fragmented, human-dominated landscape along Gangetic Plains of north India: implications for conservation in non-protected areas.** *Conservation Genetics*, 25(1): 17–31. doi:10.1007/s10592-023-01555-w

Paul S, Saha S, Nigam P, Ali SZ, Page N, Khan AS, … Mondol S (2023). **Spatiotemporal evaluation of waning grassland habitats for swamp deer conservation across the human-dominated upper Gangetic Plains, India.** *Environmental Conservation*, 50(3): 169–178. doi:10.1017/s0376892923000140

Payal M, Ahmed T, Hussain SA & Badola R (2024). **Willingness to Pay for forest corridor conservation: A contingent valuation study of Similipal-Satkosia corridor affected by mining in Odisha, India.** *Trees, Forests and People*, 16(100564): 100564. doi:10.1016/j.tfp.2024.100564

Raina RH, Kumar K, Parrey AH, Sharma I, Uniyal VP & Saini MS (2024). **Bombus cryptarum (Fabricius, 1775), a rare bumblebee species (Hymenoptera, Apidae) new to India.** *Journal of Insect Biodiversity and Systematics*, 10(1): 51–58. doi:10.61186/jibs.10.1.51

Rana SK, Dangwal B, Rawat GS & Price TD (2024). **Constructing a database of alien plants in the Himalaya to test patterns structuring diversity.** *Ecology and Evolution*, 14(2), e10884. doi:10.1002/ece3.10884

Rastogi R, Qureshi Q, Shrivastava A & Jhala YV (2023). **Multiple invasions exert combined magnified effects on native plants, soil nutrients and alters the plant-herbivore interaction in dry tropical forest.** *Forest Ecology and Management*, 531(120781): 120781. doi:10.1016/j.foreco.2023.120781

Read DJ & Habib B (2022). **Hybrid hilltops: metabolism and the ecology of labor and capital in colonial central India.** *The Journal of Peasant Studies*, 1–25. doi:10.1080/03066150.2022.2080548

Sahoo S, Kumar A, Rai J & Gupta SK (2024). **Unlocking the genetic enigma: A paradigm shift towards evidence-based conservation of Indian star tortoise, Geochelone elegans.** *Biological Conservation*, 290(110421): 110421. doi:10.1016/j.biocon.2023.110421

Sawan S, Mondal T, Williams AC, Yadav SP & Krishnamurthy R (2023). **Hybrid drone-based survey of riverine habitat and crocodiles in complex landscapes.** *International Journal of*

Environmental Science and Technology: IJEST. doi:10.1007/s13762-022-04739-y

Seal S, Bayyana S, Pande A, Ghanekar C, Hatkar PS, Pathan S, … Johnson JA (2024). **Spatial prioritization of dugong habitats in India can contribute towards achieving the 30 × 30 global biodiversity target.** *Scientific Reports*, 14(1), 13984. doi:10.1038/s41598-024-64760-8

Sharief A, Kumar V, Joshi BD, Singh H, Bhattacharjee S, Dutta R, … Sharma LK (2023). **Towards effective conservation planning: integrating landscape modelling to safeguard the future of the endangered Kashmir musk deer in the face of land use change**. *Frontiers in Ecology and Evolution*, 11. doi:10.3389/fevo.2023.1239905

Sharma SP, Ghazi MG, Katdare S, Badola R & Hussain SA (2024). **Population status and genetic assessment of mugger, Crocodylus palustris in a tropical regulated river system in North India.** *Scientific Reports,* 14(1): 7438. doi:10.1038/s41598-024-57983-2

Sharma CP, Sharma S & Singh R (2023). **Species discrimination from blood traces using ATR FT-IR spectroscopy and chemometrics: Application in wildlife forensics.** *Forensic Science International. Animals and Environments*, 3(100060): 100060. doi:10.1016/j.fsiae.2022.

Sharma M, Devi A, Badola R, Sharma RK & Hussain SA (2023). **Impact of management practices on the tropical riverine grasslands of Brahmaputra floodplains: Implications for conservation.** *Ecological Indicators*, 151(110265): 110265. doi:10.1016/j.ecolind.2023.110265

Silva JP, Marques AT, Bernardino J, Allinson T, Andryushchenko Y, Dutta S, … Collar, N. J. (2023). **The effects of powerlines on bustards: how best to mitigate, how best to monitor?** *Bird Conservation International*, 33(e30), 1–14. doi:10.1017/s0959270922000314

Singh AP, De K, Uniyal VP & Sathyakumar S (2024a). **Livestock depredation by large carnivores in Western Himalayan region of Jammu and Kashmir: Temporal adherence in predator's choice.** *Tropical Ecology*, 65(1): 26–31. doi:10.1007/s42965-022-00290-6

Singh AP, De K, Uniyal VP & Sathyakumar S (2024b). **Unveiling of climate change-driven decline of suitable habitat for Himalayan bumblebees.** *Scientific Reports*, 14(1): 4983. doi:10.1038/s41598-024-52340-9

Singh AR, Thirumurugan V & Prabakaran N (2024a). **Distribution of Avicennia spp. in the Andaman and Nicobar Islands with special reference to new distributional reports and post-tsunami colonization patterns.** *Journal of the Marine Biological Association of the United Kingdom. Marine Biological Association of the United Kingdom,* 104(e43). doi:10.1017/s0025315424000262

Singh AR, Thirumurugan V & Prabakaran N (2024b). **Monitoring the mangrove colonization on the uplifted reef beds in the north Andaman island, India.** *Ocean Science Journal: OSJ*, 59(3). doi:10.1007/s12601-024-00156-z

Singh AR, Thirumurugan V, Bhomia RK & Prabakaran N (2024c). **Mangrove vegetation response to alteration in coastal geomorphology after an earthquake in Andaman Islands, India.** *Regional Studies in Marine Science*, 76(103583), 103583. doi:10.1016/j.rsma.2024.103583

Srinivas Y & Jhala Y (2024). **Genetic diversity, structure, and demographic histories of unique and ancient wolf lineages in India.** *Conservation Genetics*, 25(1): 33–48. doi:10.1007/s10592-023-01553-y

Supratim D & Krishnamurthy R (2023). **First photographic evidence of mange manifestation in Panna Tiger Reserve, India.** *Journal of Threatened Taxa*, 15(10): 24116–24119. doi:10.11609/jott.8699.15.10.24116-24119

Tripathi RN, Ramachandran A, Agarwal K, Tripathi V, Badola R & Hussain SA (2024). **UAV and Deep Learning: Detection of selected riparian species along the Ganga River.** *ISPRS - International Archives of the Photogrammetry Remote Sensing and Spatial Information Sciences*, XLVIII-1–2024, 637–642. doi:10.5194/isprs-archives-xlviii-1-2024-637-2024

Tordiffe ASW, Jhala YV, Boitani L, Cristescu B, Kock RA, Meyer LRC, … Marker L (2023). **The case for the reintroduction of cheetahs to India.** *Nature Ecology & Evolution*, 7(4): 480–481. doi:10.1038/s41559-023-02002-2

Vishwakarma R, Sharma CP, Mondol S, Habib B, Bhandari B, Mishra R, … Nigam P (2024). **Preliminary study on cranial measurements and sexual dimorphism in skull bones of gaur, Bos gaurus gaurus (Smith 1827).** *Anatomia, Histologia, Embryologia*, 53(3), e13031. doi:10.1111/ahe.

Wang K, Deepak V, Das A, Grismer LL, Liu S & Che J (2024). **Systematic revision of the Calotes jerdoni complex (Reptilia: Squamata: Agamidae) in the**

Pan-Himalaya. *Vertebrate Zoology*, 74, 169–192. doi:10.3897/vz.74.e109088

BOOKS

Nautiyal JP, Lone AM, Ghosh T, Sharma M, Malick A, Yadav SP, Ramesh C, Ramesh K (2023). **An Illustrative Profile of Tiger Reserves in India.** EIACP Programme Centre (MoEFCC), Wildlife Institute of India, Dehradun, Uttarakhand, India. 20: 314.

Nautiyal JP, Lone AM, Ghosh T, Sharma, Tiwari Virendra R, Ramesh C, Ramesh K (2023). **The Millets of India.** EIACP Centre (MoEFCC) Wildlife Institute of India, Dehradun, Uttarakhand, India.

Nigam P, Chakraborty A, Karikalan M, Shrivastav AB, Mallapur, G, Pandey R (Eds) (2023). **PE-Ministry of Environment, Forest and Climate Change, Government of India-WII (2023)**. *Necropsy and Carcass Disposal of Asian Elephant; Recommended Operating Procedure.* Published by Project Elephant Division, Ministry of Environment Forest and Climate Change, Government of India and Wildlife Institute of India. Pp 120.

Shrivastav AB, Nigam P (2023). *Learning from Dead: Necropsy Essentials for large felids*, Nitya Publication, Bhopal, M.P. Bharat. ISBN 978-93-5857-422-7. Pp 41.

Wildlife Institute of India - Ganga Aqualife Conservation Monitoring Centre (2024). *Ganga ka Safar, Gaumukh se Ganga Sagar tak.* Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehra Dun, India. Pp 56.

Wildlife Institute of India - Ganga Aqualife Conservation Monitoring Centre (2024). *Kahani Uddu Udbilao ki.* Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehra Dun, India. Pp 40.

Wildlife Institute of India - Ganga Aqualife Conservation Monitoring Centre (2024). *Nadi Kinare Chidiyon ka Dera*. Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehra Dun, India. Pp 52.

Wildlife Institute of India - Ganga Aqualife Conservation Monitoring Centre (2024). *Wings of Ganga- IV*. Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehra Dun, India. Pp 74.

Wildlife Institute of India- Ganga Aqualife Conservation Monitoring Centre (2024). *Hydrophytes: Green lungs of Ganga.* Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehra Dun, India. Pp 124.

BOOK CHAPTERS

Adhikari BS, Lyngdoh S, Chatterjee D (2023). **Economic loss assessment of faunal diversity due to forest fire.** Chapter 6, 239-382 p ICFRE (2023). *Estimation of economic losses in real term per hectare basis due to forest fire in Uttarakhand and Madhya Pradesh. Final Report*.

Adhikari BS, Lyngdoh S, Chatterjee D (2023). **Economic losses caused by forest fire to wildlife.** Chapter 4, 45-58p. In: ICFRE (2023). *Estimation of economic losses in real term per hectare basis due to forest fire in Uttarakhand and Madhya Pradesh (A booklet)*.

Bala R, Kaur A, Kumar RS, Mohan D (2023). **Goraiya of the Sacred Mountains - a comprehensive study of House sparrows in the Uttarakhand, Himalayas. In: Wildlife Institute of India.** *PM's Mann ki Baat – Reference to Wildlife Conservation*, Wildlife Institute of India, Dehradun. ISBN: 81-85496-84-6. Pp 18-23.

Bhatnagar YV, Mathur VB, Sathyakumar S, Pal R, Ghoshal A, Sharma RK, Bijoor A, Raghunath R, Timbadia R, Lal P (2024). **Securing India's snow leopards: Status, threats, and conservation.** *In Snow Leopards, Academic Press*. Pp 513-529.

de Zwaan, Barras AG, Altamirano TA, Asefa A, Gokhale P, Kumar RS, Li S, Lin RS, Sevillano-Ríos, Weston K (2023). **Global Bird Communities of Alpine and Nival Habitats. In: Chamberlain D, Lehikoinen A, Martin K, (eds.). Ecology and Conservation of Mountain Birds.** Ecology, Biodiversity and Conservation. Cambridge University Press. Pp 90-136.

Jha Ashish (2023). **Square-tailed Bulbul, Hypsipetes ganeesa, version 2.0**. *In Birds of the World* (S. M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA.

Jha Ashish (2023). Y**ellow-browed Bulbul, Iole indica, version 2.0.** *In Birds of the World* (S.M. Billerman, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA.

Natarajan L, Nigam P, Pandav B (2023). **The expanding range of elephants in the Adivasi Hinterland of Central India: Perspective from Chhattisgarh.** In: Johnsingh, A and Pandey, N (Eds) (2023). *Trampled*

Boundaries: Understanding elephants in the Indian subcontinent. The Corbett Foundation, India, Pp 60-64.

Nath A, Islam N, Dar SA, Sinha A, Lahkar BP & Ghosh S (2023). **Factors affecting the habitat suitability of eastern swamp deer, Rucervus duvaucelii ranjitsinhi groves, 1982 in Manas National Park and implication for terai grassland restoration.** In Ecosystem and Species Habitat Modeling for Conservation and Restoration (Pp. 291–308). doi:10.1007/978-981-99-0131-9_15

Sharma A, Dubey VK, Johnson JA, Rawal YK, Sivakumar K (2023). **Himalaya in a Rapidly Changing World: Climate Change Impacts and Conservation Implications on the Montane Freshwater Fauna.** In Sobti, *et al.* (Eds.) E*nvironmental Studies and Climate Change*. CRC Press, Taylor and Francis Group, Florida. Pp. 321-345.

REPORTS

Food and Agricultural Organisation (FAO) (2024): **Information brief: The wildlife–livelihoods–health nexus: challenges and priorities in Asia and the Pacific. Bangkok.**

Gopi G.V and Abhijit Das (2023). **Site visit report for the recommendations on the Proposal for use of 103.95 ha forest land from Dibang Wildlife Sanctuary for construction of Mipi Andrala Road by Border Road Organization (BRO) in Dibang Valley District of Arunachal Pradesh.** The report submitted to the Standing Committee of the National Board for Wildlife.

Jha RRS, Gopi GV (2023). **Review of Biodiversity Conservation and Management Plans for four road infrastructure-related forest diversion proposals in North Sikkim.** Wildlife Institute of India, Dehradun.

Jha RRS, Gopi GV (2024). **Addendum Report regarding delineation of critical zones for wildlife in areas of Uttar Pradesh within 10 km-radius widths of Rajaji Tiger Reserve.** Wildlife Institute of India, Dehradun. Pp 11.

Krishnan A, Lahiri S, Kher V, Mohan R, Sangwan T (2023). **Acoustic monitoring of grassland birds at D'Ering Wildlife Sanctuary, East Siang district, Arunachal Pradesh.** Project completion report submitted to the Arunachal Forest Department in September 2023.

Mahajan P (2023). **Ecology and conservation of mesocarnivores in Gir Protected Area, Gujarat.** Report submitted to INLAKS foundation.

Mondol S, Kumar S, Soun J, Sharma A (2024). **Implementing Rhino DNA Indexing System (RhoDIS) to counter Rhino poaching threat and aid Rhino popula**tion management in India- Phase II (2023-2024). Wildlife Institute of India. Pp39 (MoEFCC report)

Ramesh K, Mahajan P, Singh A (2023). **Rapid Assessment Report of Leopard Attack on Human in Tirumala, Tirupati, Andhra Pradesh.** Wildlife Institute of India, Dehradun.

Wildlife Institute of India (2024). **Water Quality of Select River of Ganga Basin Pollution Threats & Hotspot Assessment.** Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehra Dun, India. Pp 54.

TECHNICAL REPORTS

Gopi GV and Amit Kumar (2023). Site visit report and recommendations on the proposal for use of 2.753 ha of forest land from Shikari Devi Wildlife Sanctuary for upgradation of road from Thunag - Panjot Lambashafer – Chilmgad - Shikari Mata Temple and 1.59 ha of forest land from Shikari Devi Wildlife Sanctuary for up-gradation/widening of existing jeepable road from Janjehli – Raigarh - Shikari Mata temple. Wildlife Institute of India, Dehradun. TR No/2023/10. TR/No/2023/10. Pp 20.

Gopi GV, Abhijit Das (2023). **Site visit report for the recommendations on the Proposal for use of 103.95 ha forest land from Dibang Wildlife Sanctuary for construction of Mipi Andrala Road by Border Roads Organization (BRO) in Dibang Valley District of Arunachal Pradesh.** Report Submitted to Standing Committee of National Board for Wildlife.

Gopi GV, Amit Kumar (2023). **Site visit report and recommendations on the proposal for use of 2.753 ha of forest land from Shikari Devi Wildlife Sanctuary for upgradation of road from Thunag-Panjot Lambashafer-Chilmgad-Shikari Mata Temple and 1.59 ha of forest land from Shikari Devi Wildlife Sanctuary for up-gradation/ widening of existing jeepable road from Janjehli-Raigarh-Shikari Mata temple.** Wildlife Institute of India, Dehradun. TR No/2023/10. TR/No/2023/10. Pp. 20.

Gopi GV, Arya S, Yadav A, Zangmo S, Saini S, Laha DR and Banerjee K (2023). **Site Inspection Report on the Ecological Impacts of Jamrani Multipurpose Project, Nainital District, Uttarakhand.** Wildlife Institute of India, Dehradun. TR/No/2023/12. Pp 74.

Gopi GV, Frank SJD, Karthy S and Sunderraj S (2023). **Wildlife / Elephant Management Plan for the Proposed Naini Open-Cast Coal Mine (SCCL) Project Within Chhendipada, Jarpada, Kaniha Ranges (Angul Forest Division) and Reamal Ranges (Deogarh Forest Division), Odisha.** Wildlife Institute of India, Dehradun. TR. No. 2023/20, Pp 372.

Jha RRS, Gopi GV (2024). **Addendum Report regarding delineation of critical zones for wildlife in areas of Uttar Pradesh within 10 km-radius width of Rajaji TR.** Wildlife Institute of India, Dehradun. Pp.11.

Jha RRS, GV Gopi (2023). **Review of Biodiversity Conservation and Management Plans for four road infrastructure-related forest diversion proposals in North Sikkim.** Wildlife Institute of India, Dehradun.

Jha RRS, Zangmo S and GV Gopi. (2023). **Artificial Canopy Bridge Design to facilitate Western Hoolock Gibbon (Hoolock hoolock) crossing over Mariani-Dibrugarh broad-gauge single-track Railway Line in Hollongapar Gibbon Sanctuary, Assam.** Wildlife Institute of India, Dehradun. TR No/2023/07. Pp 30.

Jha RRS, Zangmo S, Das P and GV Gopi. (2023). **Cumulative Impact Study of a 10 km-radius landscape area around Ranthambhore Tiger Reserve towards identifying critical zones for wildlife & ensuring environment-friendly mining practices.** Wildlife Institute of India, Dehradun. TR No/2023/02. Pp. 70.

Kawlni L, Gogoi A, Kolipakam V, Qureshi Q, Sathyakumar S (2024). **Assessment of Disease Prevalence in Ungulates in Protected Areas of Mizoram, Dehradun.** Pp 283. TR. No./2024/11.

Kher V, Pandey D, Jadhav M, Dutta S, Krishnan A (2024) **Monitoring threatened birds of the Thar Desert: How does habitat restoration for the Great Indian Bustard impact associated avifauna?** Final project report submitted to Wildlife Institute of India, Dehradun and Rufford Foundation, UK. Technical Report # 2024/08.

Kumar RS, Baraiya H, Mitra R, Shakyawal GP, Chalani S, Gaur S, Muthiah I (2023). **Ockhi – rewilding a rescued Cinereous Vulture, Aegypius monachus.** Final Report. Wildlife Institute of India. Pp 45.

Lakshminarayanan N, Karthy S, Dey S, Nawani S, Balaji V, Kri SK, Nath A, Das A, Nigam P, Gopi GV (2024). **Plan for Ensuring Safe Passage for Elephants between Panir and Dulung Reserved Forests in the downstream of Lower Subansiri Hydroelectric Project.** Report Submitted to the Standing Committee of the National Board for Wildlife. Wildlife Institute of India, Dehradun. TR.No.2024/01. Pp 83.

Mitra R, Negi S, Kumar A, Mohan D, Kumar RS (2023). **Assessment of wildlife hazard in and around the Jolly Grant Airport, Dehradun and suggest mitigation measures.** Wildlife Institute of India, Dehradun. Technical Report No. 2023/13. Pp 69.

Mudliar MM, Kumar RS (2023). **Tracking the nearshore and migratory movements of Olive Ridley Sea Turtles occurring in the coastal waters of Maharashtra.** Technical Report. Wildlife Institute of India. Pp 50.

Wildlife Institute of India (2024). **Population estimation of Sangai and Hog deer in Keibul Lamjao National Park, Manipur.** Wildlife Institute of India and Manipur Forest Department. Page 68.

STATUS SURVEY/SHORT STUDY REPORT/ENVIS CHAPTERS

Bala R, Mohan D, Kumar RS (2024). **A comprehensive study on the ecology and population Status of a human commensal - the House Sparrow, Passer domesticus in the Uttarakhand State.** Progress Report submitted to the Uttarakhand Forest Department, Pp 71.

Kaur A, Sathyakumar S, Mohan D, Kumar RS (2024). **Monitoring common birds in a changing world: Ecological and Phylogenetic aspects of Barn Swallows in the Himalaya.** Progress Status Report submitted to the Uttarakhand Forest Department. Pp 51.

Kumar RS (2023). **Standard Operating Procedure (SoP) for release of captive-bred vultures in India.** Report submitted to MoEFCC. Pp 13.

Mondol S, Arora B, Sharma K, Singh M, Kumar RS (2024). **Assessing the impacts on wildlife in captivity at**

National Zoological Park, New Delhi due to the proposed Delhi-Gurugram-Rewari-Alwar regional rapid transport system tunneling work. Submitted to National Capital Regional Transport Corporation (NCRTC), New Delhi, India. Pp 69.

Mudliar M, Mahari B, Prabakaran N, Kumar RS, Pandav B (2024). **Assessment of night lighting at the Rushikulya mass-nesting beach, Southern Odisha.** Status Report. Wildlife Institute of India, Dehradun. 13 pp.

PAPERS PRESENTED

Bhomia RK, Singh AR, Thirumurugan V, Prabakaran N, MacKenzie R (2023). **Carbon Dynamics in Mangrove Ecosystems of Andaman Islands: A living laboratory for studying natural disturbance and ecological succession.** MMM6, Columbia, July 24-28.

Poti M, Prabakaran N, Hugé J, Koedam N, Shanker K, Dahdouh-Guebas F (2023). **Understanding the post-tsunami mangrove socio-ecological system recovery in the Nicobar archipelago drawing on the adaptive cycle heuristic.** MMM6, Columbia, 24-28 July 2023.

Singh AR, Thirumurugan T, Prabakaran N (2023). **Mangrove vegetation response to sea level decrease caused by coastal uplift in North Andaman Islands, India.** MMM6, Columbia, 24-28 July 2023.

Singh AR, Thirumurugan V, Prabakaran N (2023). **Mangrove vegetation response to sea level decrease caused by coastal uplift in North Andaman Islands, India.** ATBC, India, 2-6 July 2023.

Thirumurugan V, Singh AR, Gnanasekaran G, Prabakaran N (2023). **A decadal change on the mangrove colonization on the new intertidal habitats of Andaman and Nicobar archipelago – a post tsunami and subsidence scenario.** MMM6, Columbia, 24-28 July 2023.

Thirumurugan V, Singh AR, Gnanasekaran G, Prabakaran N (2023). **A decadal change on the mangrove colonization in the new intertidal habitats of Andaman and Nicobar archipelago.** ATBC, India, 2-6 July 2023.

MANUALS

Kher V, Thakkar S, Jangid AK, Dutta S (2024). AniPredictor ver.1.0: An end-to-end pipeline for automated processing of camera trap data. Technical Manual # TR/2024/10 submitted to Wildlife Institute of India, Dehradun, India.

Tiwari VR, Talukdar GH, Naryal A (2023). **Technical Manual for Management Effectiveness Evaluation (MEE) of 116 National Parks and Wildlife Sanctuaries in India during 2023-24.** (Technical Manual Number OR ISBN No)Wildlife Institute of India, Dehradun.

WORKSHOP PROCEEDINGS

Nigam P (2023). **Proceedings of the Inter-ministerial Workshop: Minimizing the Impact of Railways on Elephants and Other Wildlife.** Workshop organized for the Officials of Indian Railways held at WII on 23–25 November 2023.

Nigam P (2023). **Proceedings of the Consultative Workshop: Mainstreaming management of the Elephant Reserves.** Workshop organized for the Elephant Reserve Managers at Wildlife Institute of India on 28–29 November 2023.

Nigam P (2023). **Proceedings of the Inter-ministerial Workshop: Exploring solutions for minimizing electrocution risks and promoting wildlife safety across power infrastructure in India.** Workshop organized for the officials from the Ministry of Power and select Distribution Agencies, and Forest Officials at WII on 11–13 January 2024.

Nigam P (2023). **Proceedings of the Inception/ Stakeholder Consultation Workshop on the 'Framework for the Preparation of Elephant Conservation Plan (ECP).** Workshop organized for the elephant reserves at Wildlife Institute of India, Dehradun on 13 October 2023.

TECHNICAL MANUAL

Project Elephant, MoEFCC, Government of India (2023). **Elephant Corridors of India 2023** (Edition – 1/2023).

Project Elephant, MoEFCC, Government of India (2024). **Project Elephant – 20 Giant Steps – 2024**.

Wildlife Institute of India – Project Elephant, MoEFCC (2023). **Elephant Reserves of India: An Atlas** (Version – 2/2023). Pp:99 (WII-TR NO/2023/19).

PICTORIAL GUIDES

Das A and Boruah B (2023). **A Pocket Guide to Amphibians of Namdapha Tiger Reserve.** Wildlife Institute of India, Dehradun. Pp 16.

Das A and Boruah B (2023). **A Pocket Guide to Amphibians and Reptiles of Kamlang Tiger Reserve.** Wildlife Institute of India, Dehradun. Pp 24.

POPULAR ARTICLES

Dhanesh Ponnu, Jyoti Nagarkoti, Chinnasamy Ramesh (2023). **The Traditional Fire Burning Festival of Teressa Island: An Unheard Tale of Bringing New Life to the Island.** *e-Newsletter of WII, Monsoon* , 17.

Jha RRS and Gopi GV (2023). **Cornered & Broken – Hollongapar Gibbon Sanctuary is a Litmus Test for India's Conservation Philosophy.** *WII Newsletter (Monsoon Edition).* 13-15.

Jha RRS, Gopi GV (2023). C**ornered & Broken – Hollongapar Gibbon Sanctuary is a Litmus Test for India's Conservation Philosophy.** *e-Newsletter of WII, Monsoon* 2023:13-15.

Nigam P (2023). Trumpet., 3: (1-2). **A quarterly newsletter published by Project Elephant Division and Elephant Cell, Wildlife Institute of India**. pp

Nigam P (2023). Trumpet., 3: (3). **A quarterly newsletter published by Project Elephant Division and Elephant Cell, Wildlife Institute of India.** pp

Nigam P (2023). Trumpet., 4: (1). **A quarterly newsletter published by Project Elephant Division and Elephant Cell, Wildlife Institute of India.** pp

BROCHURES

Bagmati River. Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehradun, Uttarakhand, India.

Mahanada River. Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehradun, Uttarakhand, India.

Rapti River. Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehradun, Uttarakhand, India.

Sharda River. Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehradun, Uttarakhand, India.

Tributaries of Ghaghra River. Ganga Aqualife Conservation Monitoring Centre, Wildlife Institute of India, Dehradun, Uttarakhand, India. (Bilingual).

BLOGS

Field work on first-ever intensive data logger deployment for climate change monitoring in the Himalayan streams was published as a blog in the Journal of Applied Ecology's **The Applied Ecologist: Fieldwork Insights: Himalayan hill streams and data loggers.** https://appliedecologistsblog.com/2023/09/07/fieldwork-insights-himalayan-hill-streams-and-data-loggers/

Teaching inputs provided to other institutions

Dr Gopi G.V. (11 April 2023). **Conducted a post conference workshop as a Lead Coordinator titled "Workshop on Integrated Wetlands conservation and management.** Indian Conservation Conference, Mysuru.

Dr Gopi G.V. (4 May 2023). **Indian Wetlands, their conservation and Management.** Sultanpur National Park (For Visiting CAF delegates).

Dr Gopi G.V. (14 June 2023). **Environmental Impact Assessments and Application of Geospatial techniques.** Indian Institute of Remote Sensing, Dehradun.

Dr Amit Kumar (1-2 August 2023). **'The ecology of Invasive Plant Species' and 'Habitat Diversity and Challenges for Conservation in Indian Himalayan Region' (02 sessions).** Indira Gandhi National Forest Academy, Dehradun.

Dr Parag Nigam (14-16 August 2023). **Elephant capture techniques, captive elephant health management including field demonstration of various techniques of veterinary interventions in elephants.** Guruvayur Temple Elephant Camp, Thrisoor.

Dr Sutirtha Dutta (August 2023). **Behavioral ecology, Population ecology.** Indira Gandhi National Forest Academy, Dehradun.

Dr Parag Nigam (28-30 August 2023). **Introduction to Wildlife Health Management and Management of animal in distress and their rehabilitation.** Indira Gandhi National Forest Academy, Dehradun.

Dr Gopi G.V. (7 October 2023). **Celebrating Indian Wetlands during "Celebration of National Wildlife Week – 2023.** Aligarh Muslim University, Aligarh.

Teaching inputs provided to other institutions in Dehradun

Dr Amit Kumar (22 November 2023). **Plants in illegal Wildlife Trade (02 sessions).** Central Academy for State Forest Service, Dehradun.

Dr Amit Kumar (Nov-Dec 2023). **'Elementary biology' module (15 sessions).** Indira Gandhi National Forest Academy, Dehradun.

Dr Amit Kumar (13-14 December 2023). **Field inputs for Botanization at Botanical Garden, Bamboosetum & Arboretum FRI.** Indira Gandhi National Forest Academy, Dehradun.

Dr Nehru Prabakaran (13-15 December 2023). **Forest Ecology (sessions).** Indira Gandhi National Forest Academy, Dehradun.

Dr Gopi G.V. (19 December 2023). **How to conduct Environmental Impact Assessment.** Lal Bahadur Shastri National Academy of Administration, Mussoorie.

Dr Gopi G.V. (8 January 2024). **Integrated Wetlands Management Planning, Conservation and management: Introduction, Overview and Prospects.** Indira Gandhi National Forest Academy, Dehradun.

Dr Ashish Jha (9 January 2024). **Inputs during the field visit to Asan Barrage Wetland Conservation Reserve as part of training programme on "Integrated Wetland Conservation and Management".** Indira Gandhi National Forest Academy, Dehradun.

Dr Amit Kumar (1 February 2024). F**ield inputs for Botanization trek at Narendernagar FD.** Indira Gandhi National Forest Academy, Dehradun.

Dr Amit Kumar (24 February 2024). **Field inputs for Working Plan Exercise at Lansdowne FD.** Indira Gandhi National Forest Academy, Dehradun.

AWARDS

Dr Parag Nigam, Scientist-G was awarded the Certificate of excellence for valuable contributions for the cause of our wilderness & wildlife and our natural heritage was awarded by Sariska Tiger Foundation and World Wilderness Congress Trust, India on 4 August 2023 at Jaipur.

Dr Ashish Jha, Scientist-C was awarded the prestigious Fulbright - Nehru Post Doctoral Fellowship (FNPDF) 2024-2025 to participate in the student exchange program at Louisiana State University, Baton Rouge for 9 months.

Shri Prashant Mahajan, Scientist-C was awarded the prestigious Fulbright - Nehru Doctoral Research Fellowship (FNDR) 2024-2025 to participate in the student exchange program at University of Washington, Seattle for 9 months.

WII SACON

PEER REVIEWED JOURNALS: NATIONAL

Kasbekar SP, Kadam G, Bhor SS, Kumara HN, Babu S, Karunakaran PV (2023). **New distribution record of Himalayan water shrew, Chimarrogale himalayica (Gray, 1842) Soricomorpha: Soricidae and its attempt to feed on a cascade frog amolops sp. from Jaintia Hills, Meghalaya, India**. *National Academy Science Letters*, 1-5.

Kumara HN, Mahato S, Singh M, Molur S, Velankar AD (2023). **Mammalian diversity, distribution and potential key conservation areas in the Western Ghats**. *Current Science*, 124: 38-49.

Praphul G, Kumara HN (2023). **A review of the status of vultures in the southern state of Karnataka, India.** *Journal of Threatened Taxa*, 15: 24184-24200.

Praveen J and Jayapal R (2024). **Taxonomic updates to the checklists of birds of India and the South Asian region—2024.** *Indian BIRDS*, 19 (5): 155–158.

Raj PNA, Velankar AD, Pramod P (2023). **Diversity and distribution of birds in the Bharathapuzha River Basin, Kerala, India.** *Journal of Threatened Taxa*, 15(11): 24169–24183.

Raj PNA, Velankar AD, Pramod P (2024). **Avifaunal assemblage patterns in Bharathapuzha River Basin, Kerala, India.** *Journal of Threatened Taxa*, 16(2): 24646–24657.

Teja V, Manu S, Kumara HN, Umapathy G (2023). **Phylogenetic insights on the delineation of Mysore and Malabar subspecies of the Grey Slender Loris Loris lydekkerianus in Southern India.** *Journal of Threatened Taxa*, 15: 23827-23835.

Thapa A, Pradhan A, Chatterjee P, Singh A (2023). **A note on Indian hare Lepus nigricollis: presence beyond the IUCN distribution in the Himalayas.** *Academia Biology*, 1(2): 1-4. https://doi.org/10.20935/AcadBiol6023

Velankar AD, Kumara HN, Pal A, Mishra PS, Singh M (2023). **A tough nut to crack? The proficiency of coconut processing in the Nicobar long-tailed macaque Macaca fascicularis umbrosus.** *Journal of Biosciences*, 48: 28.

PEER REVIEWED JOURNALS: INTERNATIONAL

Ashish K, Arora B, Karne D, Kumar V, Khan AS, Umapathy G, Ramesh T, Kalle R (2023). **Glucocorticoid concentration and parasitic load in a wild striped hyaena, Hyaena hyaena population in Southern India.** *Theriogenology Wild*, 3: 1-8.

Ashish K, Ramesh T, Kalle R, Giordano AJ (2024). **Spatial heterogeneity facilitates coexistence between striped hyaenas and sympatric carnivores.** *Journal of Biogeography*, 51: 173-184.

Arjun MS, Panda BP, Arun PR (2023). **Sand mining as a contemporary threat to Sandbar Nesting Birds: A review.** *Contemporary Problems of Ecology*, 16,

189–204.

Arjun MS, Panda BP, Arun PR, Bharos, AMK (2023) **Status of ornithological works from the State of Chhattisgarh, India, and conservation implications: A review.** *Journal for Nature Conservation* 75, 1–27.

Ashwin CP, Alby JM, Arjun MS, Arun PR, Nandu VS (2023) **Raptors and linear infrastructure in Chhattisgarh, India: species composition and conservation concern.** *Ornis Hungarica* 31, 1–12.

Ashwin CP, Clince P Jose, Arun PR (2023). **Impact of linear infrastructure intrusions on avifauna: A review.** *Bulletin of the Iraq Natural History Museum*, 17, 481–498.

Behera AK, Kumar PR, Priya MM, Zollner PA, Ramesh T, Kalle R (2024). **Coexistence in the multi-use landscape: linking human activities with functional traits of wild mammals in Southern India.** *Landscape Ecology*, 39:1-9.

Bhattacharya M, Adhikari BS, Gopi GV (2021). **Tawny Fish-owl, Ketupa flavipes Hodgson, 1836 (Aves: Strigiformes: Strigidae): Recent record from Arunachal Pradesh, India.** *Journal of Threatened Taxa*, 13(2): 17837-17840.

Clements HS, Do Linh San E, Hempson G, Linden B, Maritz B, ... Ramesh T..... (2024). **The bii4africa dataset of faunal and floral population intactness estimates across Africa's major land uses.** *Scientific Data*, 11:191.

Deepak D, Babu S, Kumara HN, Naveen RS (2023). **First record of the Indian smooth snake *Wallophis brachyura* from Karnataka, India.** *The Herpetological Bulletin*, 163: 37-38.

Dey P, Ray SD, Pramod P, Singh RP (2023). **Dataset from genome sequencing, assembly and mining of microsatellite markers in barred-button quail, Turnix suscitator.** *Data in Brief*, 1–8: 109288.

Dhanusha Kawalkar, Shirish S Manchi, Rajat Parab, Pritish Lad (2024). **First report of a freshwater turtle species as a permanent resident of a cave.** *Herpetological Bulletin*, 167: 34-36.

Kawalkar D, Manchi S (2023). **First confirmed breeding record of the Blyth's swift Apus leuconyx Blyth, 1845 (Apodiformes: Apodidae: Apus) in Southern Western Ghats.** *Bulletin of the Iraq Natural History Museum*, 17 (3): 469-480.

Lyngdoh AW, Kumara HN, Babu S, Karunakaran PV (2023). **Community reserves: Their significance for the conservation of mammals in a mosaic of community-managed lands in Meghalaya, Northeast India.** *PLoS ONE*, 18(1): e0280994.

Mahendiran M, Parthiban M and Azeez PA (2022). **Signals of local bioclimate- driven ecomorphological changes in wild birds**. *Scientific Reports*, 12(1):15815.

Mondal T, Dey P, Kumari D, Ray SD, Quadros G, Kochiganti VHS, Singh RP (2023). **Genome survey sequencing and mining of genome-wide microsatellite markers in yellow-billed babbler, Turdoides affinis Heliyon** Vol: 9 (1). e12735 https://doi.org/10.1016/j.heliyon.2022.e12735

Naveen R, Tapley B, Chandramouli S, Jervis PA, Babu S, Meetei A, Karunakaran P V (2023). **A new species of Bufoides Pillai and Yazdani 1973 (Amphibia: Bufonidae) from Mizoram (India) and the delimitation of the distribution range of Bufoides meghalayanus (Yazdani & Chanda 1971) to the Khasi hills, Meghalaya, India.** *Biodiversitas Journal of Biological Diversity*, 24(9): 4617-4627.

Naveen RS, Liu S, Chandramouli SR, Babu S, Karunakaran PV, Kumara HN (2023). **Redescription of Rhacophorus tuberculatus (Anderson, 1871) and the validity of Rhacophorus verrucopus Huang, 1983.** *Herpetozoa*, 36: 325-333.

Ramesh Kumar P, Deepak D, Kumara HN, Babu S (2023). **The occupancy of Great Indian Bustard, Ardeotis nigriceps, using local people's knowledge in the Deccan Plateau, Karnataka, India.** *Biodiversitas*, 24: 1400-1407.

Rao GB, Babu S, Quadros G (2023). **Environmental factors and prey availability determine wintering habitat use by shorebirds along the west coast of India.** *Regional Studies in Marine Science*, 67 (2023): 103219, ISSN 2352-4855.

Ray SD, Dey P, Sarkar I, Sharma SK, Quadros G, Pramod P, Kochiganti VHS, Singh RP (2023). **Complete mitogenome of common myna, Acridotheres tristis – characterization and phylogenetic implications.** *Biologia*, 78(4), 1079-1091

Ray SD, Olga S, Quadros G, Dey P, Pramod P, Singh RP (2023). **Macro- and microstructural features of feathers for four Columbidae species.** *Biology Bulletin*, 1–16.

Ray SD, Quadros G, Dey P, Pramod P, & Singh RP (2023). **Wildlife casualties from the road stretch adjacent to two national parks of Assam, North-East India.** *Asian Journal of Conservation Biology*, 12(2): 314–325.

Sarkar A, Sailas SS, Babu S, Karunakaran PV, Kumara HN, Shanmugavel S, Pramod P (2023). **Community reserves serve as refugia sites for cavity- nesting owls in Northeast India.** *Journal of Raptor Research*, 57(1): 22-29.

Singh A, Kumara HN, Mahato S (2023). **Mayurjharna Elephant Reserve is just a gateway for elephants: Changes in the range use pattern by Asian elephants over seven decades.** *Mammal Study*, 48(4): 283-288.

Singh A, Kumara HN, Mahato S, Velankar AD (2023). **Anthropogenic driven range expansion of Asian elephant, Elephas maximus in an agricultural landscape and its consequences in South West Bengal, India.** *Journal for Nature Conservation*, 73: 126374.

Singh M, Edgaonkar A, Ramesh T (2024). **Effect of passage through the common palm civet gut on seed germination of fleshy fruits in Pachmarhi Wildlife Sanctuary, Central India.** *Nordic Journal of Botany*, 2023: e03981.

Streicher JP, Ramesh T, Downs CT (2024). **Not all mammalian small carnivores are equal: A global review of the research effort in urban areas.** *African Journal of Wildlife Research*, 53: 72-102.

Sureshmarimuthu S, Babu S, Kumara HN, Rajeshkumar N (2023). **Where do the tropical owl's roost: Multiscale habitat variables explain roost site selection by two sympatric otus species in the Andaman archipelago, India.** *Acta Ornithologica*, 57: 181-196.

Thapa A, Pradhan A, Chatterjee P, Singh A (2023). **A note on Indian hare, Lepus nigricollis: Presence beyond the IUCN distribution in the Himalayas.** *Academia Biology*, 1(2): 1-4.

BOOK CHAPTERS

Atkore Vidyadhar (2024). **Lakpa Tamang: An extraordinary Ichthyologist. In: More than just footnotes - Field assistants in Wildlife Research and Conservation.** Ed. by Ambika Aiyadurai and Mamta Pandya. *Book well Publication*. 172-182.

Biswas J, Chutia D, Das J, Shil J, Kumara HN (2023). **Demography and group dynamics of Western Hoolock Gibbons, Hoolock hoolock in a community conserved village population in Upper Assam, India. In Gibbon Conservation in the Anthropocene (eds. Cheyne SM, Thompson C, Fan P and Chatterjee H).** Cambridge University Press: United Kingdom. (ISBN 978-1108429023). Pp 131-146.

Thapa A, Singh A (2023). **An account of birds observed in the municipality and adjoining green spaces of Darjeeling, West Bengal**. In: Kushwaha S and Khare, P. Biodiversity, Conservation and its Application. Aryan Press, Rathore Academic Research Publication, New Delhi. ISBN No. 978-93-90648-87-0. Pp 62-104.

BOOK

Prakash L, Sureshmarimuthu S, Kirubanandhini V, Jayapal R, Babu S (2023). **Flowering plants of Vaduvoor Bird Sanctuary – A pictorial field guide.** Published by SACON. ISBN 978-93-340-0580-6.

REPORTS

Arun PR, Arjun MS, Bibhu Prasad Panda (2023). **State Action Plan for conservation of avian diversity, their ecosystems, habitats & landscapes in Chhattisgarh. SACON, Coimbatore.** *Project Report*, Pp 151.

Arun PR, Babu S, Babu Rao G (2023). **Avifauna study for the proposed replacement transmission lines of 110 KV Khopoli-Mankhurd and Khopoli- Chembur with reference to the Thane Creek Flamingo Sanctuary to suggest appropriate bird diverters.** *SACON Project Report*, Pp 66.

Arun PR, Babu S, Babu Rao G (2023). **Monitoring of avifauna for the areas of Sewri, Thane Creek and the adjoining region as part of the environmental monitoring programme.** *SACON Project Report*, Pp 69.

Arun PR, Babu S, Harif P (2023). **Effect of construction of Kamakura Bridge near Ranganathittu Bird Sanctuary on the migratory birds and their habitat.** *SACON Project Report*, Pp 100.

Arun PR, Jayapal R, Babu S, Ashwin CP, Alby JM (2023) **Revised Avifauna Conservation Plans for five developmental projects in Chhattisgarh. SACON, Coimbatore.** *Project Report*, Pp 126.

Arun PR, Jayapal R, Karunakaran PV, Ritika SC, Rajan P (2023). **Management plan for Fudam Bird Sanctuary, Diu (2023-24 to 2027-28). SACON, Coimbatore.** *Project Report*, Pp 117.

Arun PR, Karunakaran PV (2024). **Report of site inspection on 16th January 2024 at the proposed residential project site "Marine View" by M/s Puravankara Projects Ltd. at Marine Drive, Cochin, Ernakulam. SACON, Coimbatore.** *Site inspection Report*. Pp 5.

Atkore V, Prakash H, Bhattacharya A (2023). **Uttarakhand State Level Action Plan for implementing SACON's visionary perspective plan for the conservation of avian diversity, their ecosystems, habitats and landscapes in the country.** Salim Ali Centre for Ornithology and Natural History (SACON), South India Centre of Wildlife Institute of India, Coimbatore. Pp 226.

Babu S, Jayapal R, Kirubanandhini V (2023). **Assessing the population status and temporal patterns of migratory birds in Vaduvoor Bird Sanctuary, Tamil Nadu.** *SACON Project Report*. Pp 100.

Babu S, Prasath S (2023). **State Action Plan for the conservation of avian diversity, their ecosystems, habitats and landscapes in Tamil Nadu.** *SACON Project Report*. Pp 217.

Harini V, Ramesh K, Lakshminarayanan N, Karunakaran PV, Babu S (2024). **Human-wildlife conflict in Wayanad district, Kerala and Gudalur district, Tamil Nadu**. *Site Appraisal Report Submitted to MoEFCC*. Pp 14.

Jayapal R, Babu S, Arun PR, Karunakaran PV, Santhosini R (2023). **Establish a Bird Observatory on the SACON campus to study the phenology of bird migration and breeding vis-à-vis climate change and other ecosystem processes. Project closure report.** SACON, Coimbatore. *Project Closure Report*, Pp 30.

Kalle R, Saleevan A (2023). **State Action Plan for conservation of avian diversity, their ecosystems, habitats & landscapes in Andhra Pradesh. Sálim Ali Centre for Ornithology and Natural History (South India Centre of Wildlife Institute of India), Coimbatore, MoEFCC, Government of India** (PR#251). Pp 216.

Karunakaran PV, Anjitha Devarajan, Riju PN (2023). **State Action Plan for conservation of avian diversity, their ecosystems, habitats & landscapes in Kerala.** *SACON Coimbatore, Project Report*. Pp191.

Karunakaran PV, Nandu VS (2023). **Spatial mapping of Mathikettan Shola National Park. SACON, Coimbatore** *Project Report*. Pp 51.

Mahendiran M, Divya P, Ankita B (2023). **State Level Action Plan for implementing SACON's visionary perspective plan for the conservation of avian diversity, their ecosystem, habitats, & landscape in the country; NCR Delhi. Final Report.** *Salim Ali Centre for Ornithology and Natural History* (SACON) Coimbatore, Pp 1-167.

Pramod P, Karunakaran PV, Anoop Raj PN, Arjun MS, Ashiq PP (2024). **Study on bird wildlife hazards to select Indian civil airfields.** The project report was submitted to Lal Bahadur Shastri International Airport, Varanasi, Utter Pradesh. Pp 136.

Pramod P, Karunakaran PV, Anoop Raj PN, Lini K, Ashiq PP (2023). **Study of the Bird and wildlife hazards to aircraft in select Indian Civil Airfield: Calicut International Airport, Malappuram Kerala.** Salim Ali Centre for Ornithology and Natural History, South India Centre of Wildlife Institute of India, Coimbatore. Pp 93.

Ramesh T, Rachaveelpula S, Panda BP (2023). **State Action Plan for conservation of avian diversity, their ecosystems, habitats & landscapes in Telangana.** Sálim Ali Centre for Ornithology and Natural History, South India Centre of Wildlife Institute of India, Coimbatore, MoEFCC, Government of India (PR 245). Pp 161.

Singh A, Narayanappa Y, Amruth K, Gautam A (2023). **Genetic diversity and phylogeographic patterns of House Sparrow, Passer domesticus from select landscapes in India (PR241). Salim Ali Centre for Ornithology and Natural History, South India Centre of Wildlife Institute of India, MoEF&CC, GOI, Coimbatore.** Pp 34.

Bacher … Atkore V… (2023). **Impact of invasive alien species on nature, nature's contributions to people and good quality of life.** IPBES Report. Contributing authors: https://www.ipbes.net/document-library-catalogue/ chapter-4-impacts-invasive-alien-species-nature-natures-contributions.

TECHNICAL REPORTS

Jayapal R, Gupta D, Panda BP (2023). **State Action Plan for conservation of avian diversity, their ecosystems, habitats and landscapes in Madhya Pradesh.** Sálim Ali Centre for Ornithology and Natural History, Coimbatore. Pp 146. *Technical Report* No. PR-262.

Kumara HN, Babu S, Kishore R, Aravindan BK (2024). **Assessing human- peafowl conflict and developing an action plan to reduce the conflicts in select zones of Tamil Nadu. SACON.** Submitted to Forest Division, Tamil Nadu. Report No. PR-269.

Kumara HN, Praphul G (2023). **State Action Plan - Karnataka. SACON, Coimbatore.** *Technical Report* No. PR-263.

Kumara HN, Venugopal N (2023). **Population status and post-sterilization behaviour of Rhesus macaque, Macaca mulatta in Himachal Pradesh. SACON.** The report was submitted to the Forest Department, Himachal Pradesh. *Technical Report* No. PR-242.

Mukherjee A, Singh GS, Biswas S (2023). **State Action Plan for conservation of avian diversity, their ecosystems, habitats & landscapes in Rajasthan.** Sálim Ali Centre for Ornithology and Natural History, South India Centre of Wildlife Institute of India, Coimbatore, MoEFCC, Government of India. Pp 187. *Technical Report* No. PR-256.

Mukherjee S, Biswas S and Chowkekar M (2023). **State Level Action Plan for the conservation of avian diversity, their ecosystems, habitats & landscapes in Maharashtra. Sálim Ali Centre for Ornithology and Natural History (SACON) (South India Centre of Wildlife Institute of India, Ministry of Environment, Forest and Climate Change).** Pp 211. Technical Report No. PR-259.

Mukherjee S, Biswas S and Neema A (2023). **State Level Action Plan for the conservation of avian diversity, their ecosystems, habitats & landscapes in Gujarat.** Sálim Ali Centre for Ornithology and Natural History (SACON) (South India Centre of Wildlife Institute of India, Ministry of Environment, Forest and Climate Change). Pp 187. *Technical Report* No. PR-260.

Mukherjee S, Nandini R. and Khanolkar N. (2023). **Genomic studies on Rusty- spotted Cat.** Sálim Ali Centre for Ornithology and Natural History, South India Centre of Wildlife Institute of India, Coimbatore, Tamil Nadu. Pp 20. *Technical Report* No. PR-246.

Singh A, Narayanappa Y, Amruth K, Gautam A (2023). **Genetic diversity and phylogeographic patterns of House Sparrow, Passer domesticus from select landscapes in India.** Salim Ali Centre for Ornithology and Natural History, South India Centre of Wildlife Institute of India, MoEF&CC, GOI, Coimbatore. Pp 34. *Technical Report* No. PR-241.

Singh A, Thapa A (2023). **State Action Plan for conservation of avian diversity, their ecosystems, habitats & landscapes in the Meghalaya.** Salim Ali Centre for Ornithology and Natural History, South India Centre of Wildlife Institute of India, MoEF&CC, GOI, Coimbatore - Pp 201. *Technical Report* No. PR-244.

WORKSHOP/ SEMINAR PROCEEDINGS

Atkore V, Kavin D, Choudhary K, Johnson JA (2023). **Monitoring freshwater fish population in Moyar river of the Western Ghats: The Long-term Ecological Observatory (LTEO) project initiative**. Proceedings of 2nd Annual Research Conference (A Udayan, Nihar Ranjan, MG Ganesan, A Manimozhi, K Shankar, A Pradeep, D Vsaanthakumari, G Gabriel Paulraj and TT Shameer, Eds). Hosted by Advance Institute of Wildlife Conservation (Research, Training & Education), Tamil Nadu Forest Department, Vandalur, Chennai. Pp 62-76.

Gautam A, Kushwaha S, Dubey S, Singh A, Ramesh R (2023). Three decades of remote sensing applications in avian ecological studies in India: A review and future directions in avian monitoring. 59th Annual Meeting of Association for Tropical Biology and Conservation, Coimbatore, 2-6 July 2023.

Singh A, Narayanappa Y, Amruth K, Gautam A, Ramesh R (2023). **Challenges for occurrence and existence in urban ecosystem for House Sparrow.** In Bernat-Ponce, S., Bernat-Ponce, E & Gil-Delgado, J.A. (Eds.). Book of Abstracts Working Group Urban Sparrows Meeting, Valencia, Spain. 27-28 October 2023.

Sabat B, Holeyachi BS, Kanwar A, Pradeeshwar RJ, Riddhika R, Singh A (2024). **Feather and molecular characteristics of Indian Peafowl, Pavo cristatus for forensic implications.** National Symposium on Avian Biology and 5th Annual Meeting of Association of Avian Biologists in India. Graphic Era (Deemed to be University), Dehradun. 23-25 February 2024.

Gautam A, Kushwaha S, Bhatt D, Dubey S, Singh A, Ramesh R (2024). **Applications of remote sensing in avian monitoring, understanding ecology and planning future direction: A review of three-decade of Indian studies.** National Symposium on Avian Biology and 5th Annual Meeting of Association of Avian Biologists in India. Graphic Era (Deemed to be University), Dehradun. 23-25 February 2024.

ABSTRACTS PUBLISHED

Gautam A, Kushwaha S, Dubey S, Singh A, Ramesh R (2023). **Three decades of remote sensing applications in avian ecological studies in India: A review and future directions in avian monitoring.** 59th Annual Meeting of Association for Tropical Biology and Conservation, Coimbatore, 2-6 July 2023.

Vasudeva V, Atkore V, Innes J, Krishnamurthy R (2023). **Exploring multi-taxa based ecological indicators to inform riparian integrity in a tropical watershed.** International Association of Landscape Ecologists (IALE), 11th World Congress, Nairobi, Kenya. 10-15 July 2023.

Sabat B, Holeyachi BS, Kanwar A, Pradeeshwar RJ, Riddhika R, Singh A (2024). **Feather and molecular characteristics of Indian Peafowl, Pavo cristatus for forensic implications.** National Symposium on Avian Biology and 5th Annual Meeting of Association of Avian Biologists in India. Graphic Era (Deemed to be University), Dehradun. 23–25 February 2024.

Gautam A, Kushwaha S, Bhatt D, Dubey S, Singh A, Ramesh R (2024). **Applications of remote sensing in avian monitoring, understanding ecology and planning future direction: A review of three-decade of Indian studies.** National Symposium on Avian Biology and 5th Annual Meeting of Association of Avian Biologists in India. Graphic Era (Deemed to be University), Dehradun. 23-25 February 2024.

Atkore V, Kavin D, Francis AP (2024). **Environmental correlates of stream fish assemblages in Eastern Himalaya Biodiversity Hotspot, India.** 9th World Fisheries Congress, Seattle, USA. (Abstract published online). 3-7 March 2024.

Neema A, Amrutha R, Meera MR, Mukherjee S and Robin VV (2023). **"Using bio-acoustics to detect and resurvey the Endangered Forest Owlet".** 59th Annual Meeting of Association for Tropical Biology and Conservation, Coimbatore, 2–6 July 2023.

Khan ZZ, Sushma HS, Antony PB, Koli K, Neema A, Meera MR, Arasumani M, Robin VV, Jayapal R, Mukherjee S (2023). **"Habitat determinants of species occupancy and niche partitioning among sympatric owlets: Role of agricultural lands for the Endangered Forest Owlet".** 59th Annual Meeting of Association for Tropical Biology and Conservation, Coimbatore, 2–6 July 2023.

Kavitha UKK, Udayraj S, Reva T, Kadam D, Bhujwala J, D'Souza S, Aashritha S, Mukherjee S, Nandini R. (2023). **"Co-occurrence of sympatric carnivores across a matrix of habitat types".** 59th Annual Meeting of Association for Tropical Biology and Conservation, Coimbatore, 2–6 July 2023.

Kodiyan JX, Thatte P, Vanak AT, Mukherjee S, Nandini R (2023). **"Comparative study of Jungle cat (Felis chaus) diet inside and outside Protected Areas (PA) of central India".** 59th Annual Meeting of Association for Tropical Biology and Conservation, Coimbatore, 2–6 July 2023.

PAPERS PRESENTED

Kumar H, Ramesh T, Kalle R (2023). **Disentangling the functional role of vertebrate scavengers in the Western Aravalli Hill Ranges of Haryana.** Poster presentation at Understanding Behaviour conference held at the Indian Institute of Science Education and Research, Kolkata, 27-30 June 2023.

Athira S, Kalle R, Ramesh T (2023). **Identification of avian conservation threats in Andhra Pradesh.** The 59th Annual Meeting of the Association for Tropical Biology & Conservation was held in Coimbatore, India and organised by The Association for Tropical Biology & Conservation from 2-6 July 2023.

Barik S, Ramesh T, Kalle R, Ashish K, Ramesh KP (2023). **Habitat assessment of Gaur with reference to forest fire and invasive species in Bandipur Tiger Reserve, Karnataka.** The 59th Annual Meeting of the Association for Tropical Biology & Conservation was held in Coimbatore, India and organised by The Association for Tropical Biology & Conservation from 2-6 July 2023.

Behera AK, Kumar PR, Priya MM, Zollner PA, Ramesh T, Kalle R (2023). **Land use changes shaping habitat use and activity patterns of wild mammals in the Ballari district, India.** At the 59th Annual Meeting of Association for Tropical Biology & Conservation held in Coimbatore, India and organised by The Association for Tropical Biology & Conservation, from 2-6 July 2023.

Gautam A, Kushwaha S, Dubey S, Singh A, Riddhika R (2023). **Three decades of remote sensing applications in avian ecological studies in India: A review and future directions in avian monitoring.** Oral presentation at the 59th Annual Meeting of Association for Tropical Biology and Conservation, Balancing Science, Conservation and Society, Coimbatore, India, 2-6 July 2023.

Kavin D, Atkore V (2023). **Understanding the current practice of three indigenous communities of Changlang and Lohit districts of Arunachal Pradesh.** Workshop on 'Himalayan Freshwaters: Assessing the Service and Vulnerability of Freshwater Ecosystems of the Himalayas' at IIT Roorkee, Uttarakhand. 6 June 2023.

Milda D, Ashish K, Ramesh T, Kalle R (2023). **Patterns of large mammal occupancy patterns across anthropogenic gradients of the Western and Eastern Ghats in Southern India.** The 59th Annual Meeting of the Association for Tropical Biology & Conservation was held in Coimbatore, India and organised by The Association for Tropical Biology & Conservation from 2-6 July 2023.

Saleevan A, Riddhika R, Ramesh T (2023). **Identification of avian conservation threats in Andhra Pradesh**. Oral presentation at the 59th Annual Meeting of Association for Tropical Biology and Conservation, Balancing Science, Conservation and Society, Coimbatore, India, 2-6 July 2023.

Sandeep P, Sharief MU, Karunakaran PV, Kumara H N and Babu S (2023). **Does the past management regime of the community reserves influence the structure and composition of the vegetation**? 59th Annual Meeting of the Association for Tropical Biology and Conservation Balancing Science, Conservation, and Society Coimbatore, Tamil Nadu, India. 2-6 July 2023.

Ramesh K, Parabita B, Karunakaran PV (2023). **Landscape approach to wildlife management in India: A review and where do we go from here?** Panel discussion at the 11th IALE 2023 World Congress held in Nairobi, Kenya, organized by Kenyatta University from 10-15 July 2023.

David M, Ashish K, Ramesh T, Kalle R, Thanikodi M (2023). **Living amidst anthropogenic pressure: A large mammal conservation Perspective**. Oral presentation under Technical Session 17 (Wildlife Management) at the 13th International Mammalogical Congress & 102nd Annual Meeting of the American Society of Mammalogists, Dena'ina Convention Center, Anchorage, Alaska 14–20 July 2023.

Ashish K, Ramesh T, Kalle R, Arumugam R (2023). **Decision tree-based cognitive models are efficient tools to assess the vulnerability of a non- inimical species prone to the threats of over generalization.** Oral presentation under the session "Community engagement in animal behaviour and conservation" at Behaviour Conference 2023, Bielefeld University, Germany, 18 August 2023.

Sanyukta P, Kasbekar, Bhor SS, Honnavalli NK, Babu S, Karunakaran PV (2023). **Importance of community reserves in the conservation of Western Hoolock Gibbon, Hoolock hoolock in Meghalaya, India.** Poster presented in the Joint Meeting of the International Primatological Society (IPS) and the Malaysian Primatological Society (MPS), co-organized by Sarawak Forestry Corporation (SFC), held in Kuching, Sarawak, Malaysian Borneo. 19-25 August 2023.

Kavin D, Atkore V (2023). **The status of habitat quality and prey of White- bellied heron, ardea insignis in Eastern Arunachal Pradesh.** 16th Internal Annual Research Seminar (online). 12-14 September 2023.

Atkore V, Kavin D, Vaishali V (2023). **Assessment of fish diversity in Moyar River, Tamil Nadu.** 16th Internal Annual Research Seminar (online). 12-14September 2023.

Streicher JP, Ramesh T, Downs CT (2023). **Response of mammalian communities to environmental and landscape variables in Northern KwaZulu - Natal Game Parks, South Africa.** At the 40th Zoological Society of Southern Africa Conference held in KwaZulu-Natal, South Africa and organised by The Zoological Society of Southern Africa. 25–29 September 2023.

Suresh A, Bhave S, Gurjarpadhye P, Gupta SK, Quadros G (2023). **Seasonal variation in the Meiobenthos abundance from stormwater holding pond of Belapur, Navi Mumbai.** The abstract was submitted for paper presentation at the two-day National Conference on Reviving Wetlands organized by KSCSTE- CWRDM, Kozhikode, Kerala. Pp 19. 11-13 October 2023.

Bhave S, Somani V, Quadros G (2023). **Structure and composition of plankton variation in the Rocky tide pool ecosystem, Sindhudurg, Maharashtra: A seasonal approach. Abstract.** National Conference on Reviving Wetlands, recent development in wetland research. KSCSTE-CWRDM. Pp 32. 11-13 October 2023.

Gupta SK, Gurjarpadhye P, Bhave S, Tiwari M, Quadros G (2023). **Avifauna diversity of Udhwa Lake Bird Sanctuary: A potential Ramsar site from Jharkhand.** The abstract was submitted for paper presentation at the two-day National Conference on Reviving Wetlands organized by KSCSTE-CWRDM, Kozhikode, Kerala. Pp 33. 11-13 October 2023.

Gurjarpadhye P, Gupta SK, Bhave S, Quadros G (2023). **Constructed wetland and its bird diversity: A case study of stormwater holding pond from Belapur CBD, Navi Mumbai.** The abstract was submitted for paper presentation at the two- day National Conference on Reviving Wetlands organized by KSCSTE-CWRDM, Kozhikode, Kerala. Pp 64. 11-13 October 2023.

Singh A, Narayanappa Y, Amruth K, Gautam A, Ramesh R (2023). **Challenges for occurrence and existence in the urban ecosystem for house sparrow.** In Bernat-Ponce S, Bernat-Ponce, E & Gil-Delgado JA (Eds.). 2023. Book of Abstracts Working Group Urban Sparrows Meeting, Valencia, Spain. 27-28 October 2023.

Kumara HN (2024). **Refuge for lion-tailed macaque and slender loris: Population, ecology and conservation – stories.** AIP 2nd Conference, Mysuru, 9-11 February 2024.

Sreeja R, Ramesh T, Kalle R (2024). **Characterization of wetland habitat in a breeding range of Spot-billed Pelican.** At the 3rd Annual Research Conference of Tamil Nadu Forest Department held in Chennai, Tamil Nadu, and organised by Advanced Institute of Wildlife Conservation, from 15-16 February 2024.

Barik S, Ramesh KP, Ashish K Ramesh T, Kalle R (2024). **Impact of floral invasion on habitat selection of Indian gaur in Bandipur Tiger Reserve, Karnataka.** The IRALE Conference was held in Murti, West Bengal, India and organised by The Indian Regional Association for Landscape Ecology on February 21-23, 2024.

Kumara HN, Babu S, Kishore R, Aravindan BK (2024). **Assessing human- peafowl conflict and developing an action plan to reduce the conflicts in select zones of Tamil Nadu.** Annual Research Conference 2024, AIWC, Chennai, 15-16 February 2024.

Sreeja R, Ramesh T, Riddhika R (2024). **Characterization of wetland habitat in a breeding range of spot-billed pelican.** Oral Presentation at the 3rd Annual Research Conference at Advanced Institute for Wildlife Conservation by the Tamil Nadu Forest Department, Vandalur, Chennai, 15-16 February 2024.

Barik S, Ramesh Kumar P, Kumar A, Ramesh T, Kalle R (2024). **Impact of floral invasion on habitat selection of Indian gaur in Bandipur Tiger Reserve, Karnataka.** Indian Regional Association of Landscape Ecology (IRALE) Conference 2024, Sustaining Landscapes in the Anthropocene, Murti, West Bengal, 21–23 February 2024.

Adam Peck-Richardson, Alexa Piggot… Mahendiran M.… Rachael Orben (2024). **Cormorant oceanography project: Insights from cormorant movement ecology and ocean observing opportunities.** Presented in the 51st Annual Meeting of Pacific Seabird Group Conference, held in Seattle WA, USA on 21-23 February 2024.

Somani B, Quadros G (2024). Avian diversity in a small urban habitat, Thane, Maharashtra. **National Symposium on Avian Biology was organized by the Department of Environmental Science, Graphic Era (Deemed to be University), Dehradun, Uttarakhand, India.** Pp 65. 23–25 February 2024.

Bhave S, Somani V, Quadros G (2024). **Seasonal variation in the diversity and abundance of macrobenthos in two different seaweeds from the Rocky shore tide pools.** Abstract submitted for The Blue Voyage, an International Conference on Coastal and Marine Conservation. Dept. Of Zoology, Mithibai College in collaboration with Mangrove and Marine Biodiversity Conservation Foundation of Maharashtra. Pp 15. March 2024.

ABSTRACTS OF TALKS AND POSTERS

Atkore V, Mohammed Farhaan, Kavin D (2023). **An ecohydrological assessment of Ranganadi River, Arunachal Pradesh.** Workshop on 'Himalayan Freshwaters: Assessing the Service and Vulnerability of Freshwater Ecosystems of the Himalayas' at IIT Roorkee, Uttarakhand. 6 June 2023.

Neema A, Amrutha R, Meera MR, Mukherjee S and Robin VV (2023). **"Using bio- acoustics to detect and resurvey the endangered forest owlet".** Poster presented at the 59th Annual International Conference of the Association for Tropical Biology and Conservation (ATBC), 2–6 July 2023.

Khan ZZ, Sushma HS, Antony PB, Koli K, Neema A, Meera MR, Arasumani M, Robin VV, Jayapal R, Mukherjee S (2023). **Habitat determinants of species occupancy and niche partitioning among sympatric owlets: Role of agricultural lands for the endangered forest owlet.** Poster presented at the 59th Annual International Conference of the Association for Tropical Biology and Conservation (ATBC), 2–6 July 2023.

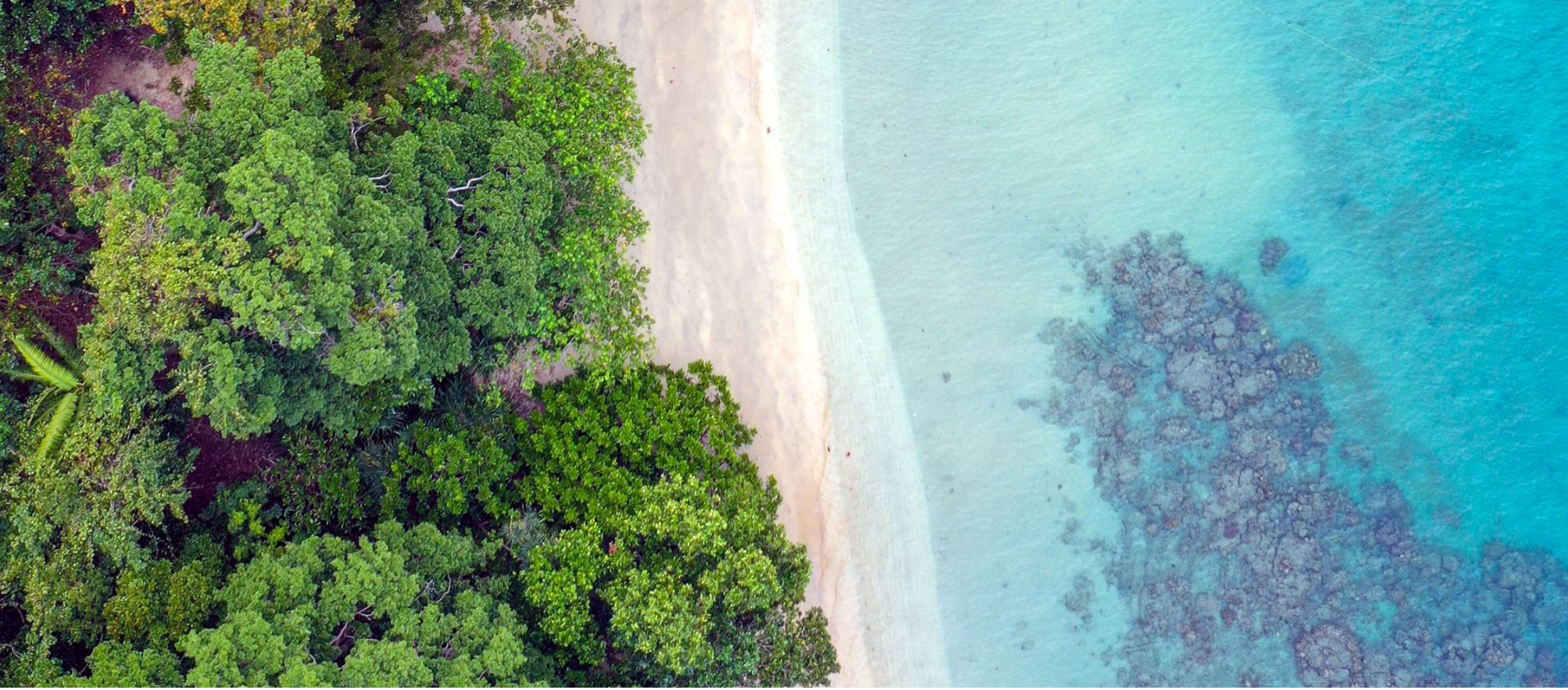
Kavitha UKK, Udayraj S, Reva T, Kadam D, Bhujwala J, D'Souza S, Aashritha S, Mukherjee S, Nandini R. (2023). **"Co-occurrence of sympatric carnivores across a matrix of habitat types".** Poster presented at the 59th Annual International Conference of the Association for Tropical Biology and Conservation (ATBC), 2–6 July 2023.

Kodiyan JX, Thatte P, Vanak AT, Mukherjee S, Nandini R (2023). **"Comparative study of Jungle cat, Felis chaus diet inside and outside Protected Areas (PA) of central India".** Speed Talk delivered at the 59th Annual International Conference of the Association for Tropical Biology and Conservation (ATBC) 2–6 July 2023.

Vaishali Vasudeva, Vidyadhar Atkore, John L. Innes and Ramesh Krishnamurthy (2023). **"Exploring Multi-taxa based Ecological Indicators to inform Riparian integrity in a Tropical Watershed".** Poster presented at the 11th International Association for Landscape Ecology (IALE) 2023 World Congress. 9-14th July 2023. Awards

Dr T. Ramesh was awarded the SIRE Fellow in the Max Planck Institute of Animal Behavior, Germany from 11 September 2023 to 08 March 2024 by Anusandhan National Research Foundation (ANRF), Government of India in September 2023.

Dr T. Ramesh was awarded the Honorary Research Fellow in the School of Life Sciences,University of KwaZulu-Natal from 01 December 2023 to 30 November 2023 by the University of KwaZulu-Natal, South Africa in December 2023.



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Accounts

Separate Audit Report on Accounts of the Wildlife Institute of India, Dehradun and Salim Ali Centre for Ornithology and Natural History, Coimbatore for the year 2023-24

1. We have audited the attached Balance Sheet of the Wildlife Institute of India, Dehradun (WII) as on 31st March 2024 and the Income and Expenditure Account and Receipt and Payment Account fo the year ended on that date under Section 20 (1) of the Comptroller and Auditor General's (Duties, Powers and Conditions of Service) Act 1971. These financial statements include the accounts of Salim Ali Centre for Ornithology and Natural History Coimbatore, Our responsibility is to express an opinion on these financial statements based on our audit.
2. This separate audit report contains the comments of the Comptroller and Auditor General of India (CAG) on the accounting treatment only with regard to classification, conformity with the best accounting practices, accounting standards and disclosure norms, etc. Audit observations on financial transactions with regard to compliance with the Laws, Rules and regulations (Propriety and Regularity) and efficiency-cum-performance aspects, etc. if any, are reported through Inspection Reports/ CAG's Audit Reports separately.
3. We have conducted our audit in accordance with auditing standards generally accepted in India. These standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatements. An audit includes examining, on the test basis, evidences supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of financial statements. We believe that our audit provides a reasonable basis for our opinion.
4. Based on our audit, we report that:
   - i) We have obtained all the information and explanations, which to the best of our knowledge and belief were necessary for the purposes of our audit.
   - ii) The Balance Sheet, Income and Expenditure Account and Receipt and Payment Account dealt with by the report are drawn up in the format as prescribed by the Ministry of Finance, Government of India.
   - iii) In our opinion, proper books of accounts and other relevant records have been maintained by WII in so far as it appears from our examination of such books.
   - iv) We further report that:

A. Balance Sheet

-

B. Income and Expenditure Account

1. Expenditure: Rs. 6693.79 lakhs

1.1 Other Administrative Expenses (Shcedule-21) : Rs. 1557.58 lakhs

1.1.1 Overstatement of Expenditure

i. WII had taken the following loans from its various projects to meet the expenses under Grants-in- Aid during the period 2019-23. However, instead of showing them as loans from projects, WII had booked these expenditures amounting to Rs. 116.39 lakh (as detailed below in table) while returning the loans during the financial year 2023-24. This has resulted in overstatement of expenditure and understatement of prior period expenditure by Rs.116.39 lakh.

(Amount in Rs)

Sl No.	Voucher No/ (Date)	Amount	Loan taken from	Loan taken to	Expenditure pertains to	Expenditure booked during
1	717 (08.02.2024)	7,11,613.89	A/c No 55293- Campa Dolphin Project	A/c No 0001- Grant in aid	2022-23	2023-24
2.	83 (05.06.2023)	20,15,625,00	-do-	-do-	2019-22	2023-24
3.	84 (05.06.2023)	23,11,354.00	A/c No. 55292 CAMPA GIB Project	-do-	2022-23	2023-24
4.	869 (12.03.2024)	25,00,000.00	A/c No. 54189- Guest House	-do-	2019-20	2023-24
5.	870 (12.03.2024)	10,00,000,00	A/c No 53911- Forensic Cell	-do-	2019-20	2023-24
6.	941 (26.03.2024)	31,00,000.00	A/c No 59568-MSc Course	-do-	2019-20	2023-24
	Total	**116,38,592.89**				

C. Receipt and Payment Account

-

D. Accounting Policies

-

E- General

WII:

1. Static Balances

(Amount in Rs)

Sl. No.	Schedule / Head	Balance as on 31.03.2024	Amount lying since year
1.	Sch.7 - Current Liabilities and Provision- Hostel Caution Money	22,000.00	2020-21
2.	Sch. 11- Current Assets, Loans and advances- Loan for World Environment Day (MoEF & CC)	2,80,984.00	2011-12
3.	Sch. 11 Current Assets, Loans and Advances- TDS to be refunded by the ITO (Pension Fund)	43,89,787.00	2017-18
4.	Sch. 11-Current Assets, Loans and Advances - TDS to be refunded by the ITO (GPF)	22,77,757.00	2017-18
5.	Sch. 11- Current Assets, Loans and Advances - TDS to be refunded by the ITO (Corpus fund)	31,76,544.00	2017-18

These static balances are long standing in the accounts. As these amounts were required to be released/ recovered (as the case may be), efforts may be made by the Institute to settle these balance that were kept pending without any justification. Similar observation was pointed out in previous years' reports also, but no remedial action was taken.

2. WII has booked many items as 'Misc. Receipts and Misc. Expenditure' in its accounts for the year 2023-24 (as detailed below), the same needs to be specified properly. Further, from the table below it could be seen that amount booked as Misc. Receipts and Misc. Expenditure is very high, therefore the same must be booked under concerned head.

Sl. No.	Schedule / Head	Head	Misc. Receipts	Misc. Expenditure
1.	Receipts and payments Accounts- Pension Fund	Misc. Receipts	18,00,06,187.70	
2.	Receipts and payments Accounts- Corpus Fund	Misc. Receipts	13,39,21,129.86	
3.	Receipts and payments Accounts- Corpus Fund	Misc. expenses		7,55,09,656.69
4.	Receipts and payments Accounts-Training Account	Misc. Receipts	6,30,000.00	
5.	Receipts and payments Accounts- Training Account	Misc. Expenses		3,46,728.00
6.	Receipts and payments Accounts-Consultancy Project	Misc. Expenses		20,25,057.28
7.	Receipts and payments Accounts-Consultancy Project		Misc. Receipt	3,73,85,697.75
8.	Receipts and payments Accounts-Misc. Receipts Account	Misc. Receipt		27.09,055.28
9.	Receipts and payments Accounts-Misc. Receipts Account	Misc. Expenses		15,95,482.00
10.	Schedule 14		Misc. Receipts (GIA)	29.000.00
11.	Schedule 18		Misc. Receipts	3,83,39,055.28
12.	Schedule 21		Misc. Expenses	15,95, 689.49

3. Employees Provident Fund:

In Receipt & Payment A/c (General Provident Fund), WII has shown an amount of Rs. 176.85 lakh as GPF contribution for the year 2023-24, however, it has been found that it includes GPF contribution of Rs 158.70 lakh and Employees Contribution Provident Fund of Rs 18.15 lakh. Depiction of GPF contribution and ECPE together in GP Fund account is not in order. Further, WII is deducting ECPF contribution of 27 employees (as on 31.03.24), however instead of depositing the same of Employees Provident Fund Organization (EPFO) keeping the amount in its bank account.

F. Grant-in-aid:

WII received Grants in Aid of Rs 4510.00 lakh besides opening balance of Rs 3.16 lakh and other receipts of Rs.425.22 lakh. Out of total available amount of Rs.4938.38 lakh, WII made payments of Rs 4937.59 lakhs and an amount of Rs. 0.79 lakh was closing balance as on 31 March 2024.

G. Effect of revision of Account:

Due to revision of account at the instance of audit, the understatement of both assets and liability has been rectified and increased by Rs. 2386.00 lakh {Rs. 19655.26 lakh (Revised Account)- Rs. 17269.26 lakh (Original Account)}.

(v) Subject to our observations in the preceding paragraphs, we report that the Balance sheet, Income & Expenditure Accounts and Receipts & Payments Account dealt with by this report are in agreement with the books of accounts.

(vi) In our opinion and to the best of our information and according to the explanations given to us, the said financial statements read together with the Accounting Policies and Notes on Accounts, and subject to the significant matters stated and other matters mentioned in Annexure to this Audit Report give true and fair view in conformity with accounting principles generally accepted in India.

a. In so far it related to the Balance Sheet, of the state of affairs of the Wildlife Institute of India, Dehradun (WII) & Salim Ali Centre for Ornithology and Natural History, Coimbatore as on 31st March 2024 and

b. In as fas as it is related to Income & Expenditure Accounts, of the deficit for the year ended on the date.

For and on behalf of the C&AG of India

Place: New Delhi
Date: 05-12-2024

Director General of Audit, Central Expenditure
(Environment & Scientific Departments)

ANNEXURE-1

1. Adequacy of internal audit system

WII & SACON are audited by the Internal Audit Wing of Ministry of Environment, Forest & Climate Change. The last internal audit of WII was conducted for the period 2021-24.

The last internal audit of SACON-WII was conducted for the period 2018-22 and internal audit of SACON is pending for the period 2022-2024.

2. Adequacy of internal control system

WII:

a. Non-adherence of rules and regulations related to Imprest

As per GFR 2017, Rule 322 Permanent Advance or Imprest for meeting day-to-day contingent and emergent expenditure may be granted to a government servant by the Head of the Department in consultation with Internal Finance Wing, keeping the amount of advance to the minimum required for smooth functioning . Procedures for maintenance of permanent advance or Imprest are available in para 10.12 of the Civil Accounts Manual. As per 10.12 of the Civil Accounts Manual Permanent Advances is normally granted to officers who have to make payment before they can place themselves in funds by drawing money from the Pay and Accounts Office.

WII had sanctioned Rs. 86.81 lakh as forest advance during 2023-24 to its three employees (Sh. Mahesh Tyagi Rs. 68.34 lakh (retired on 31.01.2024), Ms. Anushka Uniyal Rs 14.60 lakh and Sh. Mahesh Rawat Rs.3.87 lakh) for repair and maintenance, minor civil work etc. incurring such as huge expenditure through advance payment is not in the line of rules and regulations in this regard.

b. The signatures of the cashier had not been made on any of the entry in the Cash book. This has been pointed out in previous years' reports also, however, no remedial action has been taken by the Institute.

c. Non-marking of identification marks on fixed items: For proper accounting, inventorization, physical verification, location, write off/auction etc., identification mark on each fixed item is a necessary requirement. However, it has been observed that identification marks have not been done by WII on its fixed assets. This has been pointed out in previous years' reports also, however, no remedial action has been taken by the Institute. Further, it may please be explained how in absence of identification mark on fixed assets, WII conducted physical verification of such huge numbers of fixed assets satisfatorily.

SACON:

The signatures of the cashier had not been made on any of the entry in the Cash book.

3. System of physical verification of fixed assets.

WII:

a. The Physical verification of fixed assets of WII was conducted for the period 2023-24.

b. WII bought laptop and scanner of Rs. 7.89 lakh under the project 'Humpback Whale Project' in September 2023. However, no entry in this regard was found in the fixed asset register maintained by WII.

SACON:

a. The physical verification of fixed assets of SACON-WII was conducted for the period 2022-23. Physical verification for the period 2023-24 is in process and yet to be completed.

b. The register of fixed assets was not maintained by SACON-WII in GFR prescribed format (FORM GFR- 22 [Rule 211 (ii) (a)].

4. System of physical verification of inventory.

WII:

a. Physical verification of consumable stores of WII was conducted for the period 2023-24.

b. WII in Feb. 2022 conducted physical verification of books up to 31 December 2021.

SACON:

a. The register of consumables was not maintained by SACON-WII as per FORM GFR 23 [Rule 211 (ii) (b).

b. Physical verification of consumable stores of SACON-WII was conducted for the period 2023-24.

c. Physical verification of library of SACON-WII was conducted for the period 2023-24.

5. Regularity in payment of statutory dues

WII:

(i) Mismatch of Tax Deducted at Source with Income Tax Authority

Income tax related documents of WII revealed that there is an outstanding demand amounting to Rs.3465.42 lakh from Income tax authorities for the assessment years 2014-15, 2017-18 to 2019-20 as detail below:

(Amount in Rs)

Assessment year	Outstanding demand amount	Interest	Total outstanding demand	Date of last response by WII
2019-20	145179240.00	22049265.00	167228505.00	17.06.2022
2018-19	4261760.00	-	4261760.00	17.06.2022
2017-18	10688000.00	-	1068800.00	17.06.2022
2014-15	86937920.00	87045505.00	173983425.00	03.07.2023
Total	**237447720.00**	**109094770.00**	**346542490.00**	

From the above, it could be seen that as per Income tax authorities demands on account of income tax amounting to Rs. 3465.42 lakh (original demand amounting to Rs.2374.48 lakh and interest amounting to Rs.1090.95 lakh) is outstanding, however, in its annual accounts WII had shown an amount of Rs. 117.94 lakh receivable from Income tax authority on account of TDS refund. WII needs swift and firm action to resolve the matter as delay in this matter may result in avoidable payment of interest which has reached to Rs. 1090.94 lakh as on 31.03.2024. Action taken and outcome in this regards would be awaited in audit. Further, it is stated that WII had not pursued the matter after June 2022 (in three cases) and July 2023 (one case). Other than this, there are no statutory dues pending/outstanding for the financial year 2023-24.

SACON:

There are no statutory dues pending/outstanding for the financial year 2023-24.

Dy. Director (EA)

ANNEXURE-A

i. WII has shown an amount of Rs 11.29 lakh on account of Earnest Money Deposits received under 'Schedule 7 Current Liabilities and Provision', line item 'Others-EMD Misc. receipts', however, detail of Earnest Money Deposits revealed that as on 31st March 2024 the Institute had a balance of Rs 28.94 lakh received from various agencies/ firms on account of Earnest Money Deposits/ Security Deposits. This had resulted in understatement of current liabilities and overstatement of cash and bank balances both by Rs. 17.65 lakh.

ii WII in its accounts had depicted current liability of Rs 2.69 lakh on account of caution money, however, records related to caution money revealed closing balance amounting to Rs.7.21 lakh for caution money as on 2023-24. This has resulted in understatement of current liability and overstatement of bank balance both by Rs.4.52 lakh.

iii. WII booked depreciation amounting to Rs.56.76 lakh on line item 'Building' which includes expenditure of Rs. 4.02 lakh (addition during the year 2023-24) under line item 'Building Complex (Sch-8)', however, the correct depreciation works out to be Rs.54.95 lakh. This had resulted in understatement of assets and overstatement of expenditure both by Rs. 1.81 lakh.

iv. Non-disclosure of contingent liability related to ongoing legal cases on service matters Documents related to legal cases ongoing related to WII revealed that there are nine cases pending in court wherein various service matters viz. pay fixation, regularization of service, consequential service benefits and revision of pay fixation. However, no contingent liability has been shown by WII in this regard.

v. Non-disclosure of Income tax registration No. 12AA in Annual Account.

As per form of financial statement any income tax registration should be disclosed in note of account under schedule 25. During the scrutiny the record of income tax certificate audit observed that institute obtained Income Tax Registration Certificate No. 12AA on 2006 and renewed in 2022-23 and valid till Assessment Year 2026-2027. However, institute had not disclosed above mentioned registration in schedule 25. Salim Ali Centre for Ornithology and Natural History.

vi. Two theft cases wherein Camera trap Moultrie involving total cost of Rs. 29,500.00 (two cameras) from projects were reported by SACON, it has been further stated that the cases are under process by the condemnation committee. Settlement of above cases would be awaited in audit.

vii There are three cases pending in court wherein various service matters viz. death cum monetary benefits, CPF and leave pay gratuity and recover from monthly pension etc. However, no contingent liability has been disclosed by SACON in this regard.

viii. SACON has shown an amount of Rs. 870.94 lakh on account of Statutory Liabilities under 'Schedule 7 Current Liabilities and Provision' line item ' Contributory Provident Fund', however, audited report of CPF revealed that there was a mismatch of Rs. 24,955 in the closing progressive subscription balance as on 31st March 2024. So, the same may be verified and necessary corrective entries may be done.

ix. SACON has shown an amount of Rs. 43.84 lakh as 'Earnest Money Deposit Misc. Receipts' (Schedule 7- Current Liabilities and Provisions). However, the said amount includes amounts of various heads viz. Earnest Money Deposit, Security Deposit, Performance Security and caution money etc. Further, these records are maintained in tally software only. No physical records containing details of these figures has been maintained by SACON-WII.

x. SACON-WII had mentioned an amount of Rs 84.68 lakh under bank Balance GPF A/c instead of CPF A/c its Schedule 11.

Item	Cost at the beginning of the year	Addition (up to 30 Sep)	Addition (after 30 Sep)	Rate of depreciation	Depreciation charged by WII	Correct calculation of depreciation	Difference
Building Complex	54752944.90	0		10%	4676312	5475294.49	
			402036*	1/2 of 10%		20101.80*	
				Total	**5676312.00**	**5495396.29**	**180915.71**

* 10%/2 (addition after 30th Sep)

xi. There are many short forms used by SACON-WII in its accounts viz. expenses written as 'exp.' , 'Advance written as 'Adv', maintenance written as 'Maint', miscellaneous written as 'misc', vehicle insurance written as 'Veh. Ins.' and electricity written as 'Elect' etc.

xii. SACON is maintaining its annual accounts in tally software and was charging depreciation at straight line method up to the financial year 2022-23. However, after merger with WII, Dehradun, SACON charged depreciation as per written down value method during 2023-24. Although, SACON depicted depreciation on Written Down Value in its accounts, however, tally data still calculating depreciation in straight line methods, the same may needs to be rectified in tally software.

xiii. on the direction of the Ministry of Environment and Forest Climate Change, SACON-WII had transferred its land and building to the Ministry in 2022-23. however, during the year 2023-24 SACON has incurred an expenditure of Rs. 25.18 lakh on repair and maintenance of buildings in its complex. No Legal document such as Memorandum of Understanding/Agreement etc. regarding usage, repair and maintenance etc. has been entered/signed.

xiv. Fixed assets procured from Endowment Funds (Schedule 3), Under line-item ' plant machinery & equipment', SACON had showed an addition of Rs. 25.65 lakh (Rs 5.71 lakh- before 30th September and Rs. 19.94 lakh-after 30th September) procured from endowment funds during the year 2023-24 and charged depreciation amounting to Rs. 9.73 lakh. However, the correct depreciation needs to be charge as Rs. 10.21 lakh as detailed below:

Item	Cost at the beginning of the year	Addition (up to 30 Sep)	Addition (after 30 Sep)	Rate of depreciation	Depreciation charged by SACON	Correct calculation of depreciation	Difference
Plant Machinery & Equipment	5241641	571165	1993901	15	973011	15% of (52.41, 641+57, 116) = 8,71,920.90 7.5% of 19,93,901 (being bought after 30th September)= 1,49,542.58	48,452.48
						Total = 10,21, 463.48	

xv. There were static balances pertaining to various externally aided/ sponsored projects (pertaining to Schedule 3- Earmarked/Endowment Funds) outstanding since a long time as detailed below:

(Amount in Rs)

Sl No.	Schedule/Head	Balance as on 31.03.2024	Amount lying since year
1.	Schedule II - Current assets, Loans and Advances (Advance for expense-Research Projects)	72857	2011
2.	Schedule II- Current assets, Loans and Advances	84158	Out of this, Rs. 14158.00 is outstanding since 2011
3.	Schedule 7- Current liabilities and provisions (EMD misc. receipts)	10110	2013

These static balances are long standing in the accounts. As the amounts were required to be released/ recovered (as the case may be) made by
the Institute to settle these balances that were kept pending without any justification.

xvi. The following static balances amounting to Rs.4.66 lakh pertaining to sponsored projects undertaken by SACON are long standing in the accounts.

(Amount in Rs)

Sl. No.	Name of Project	Details	Balance as on 31.03.2024	Amount lying since year
1.	EIA- Diamond Harbour Project	Receivable from Executive Engineer Diamond Harbour	94968	2022
2.	Spatio Temporal Burrow Project	Payable to Dr. H.N. Kumara	118295	2016
3.	Pertains to various projects	Tax Deducted at Source on interest received from bank related to AY 2010-11 and prior years	252721	2010
	Total		**465984**	

Reasons for these static balances may please be furnished, further, efforts may be made by the Institute to settle these balances that were kept pending without any justification.

Dy. Director (EA)

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

RECEIPT					PAYMENT				
Particulars	Plan	Non Plan	Total	Previous Year	Particulars	Plan	Non Plan	Total	Previous Year
(A) GRANT-IN-AID (General)	Amount in Rs.		Amount in Rs.	Amount in Rs.	Expenses	Amount in Rs.		Amount in Rs.	Amount in Rs.
To Opening Balance					By Honorarium	-	-	-	96,343.00
Cash in Bank	316,406.67	-	316,406.67	802.32	By Leave encashment & Gratuity	-	-	-	164,970.00
Cash In Hand	-	-	-	-	By Vehicle insurance	184,425.00	-	184,425.00	247,704.00
					By Estate Management	32,056,155.00	-	32,056,155.00	31,613,349.00
To Grant in Aid (Revenue)	140,000,000.00	-	140,000,000.00	57,500,000.00	By POL, Hiring of Veh (R/Proj)	-	-	-	79,995.00
To Interest on Saving A/c	254,107.00	-	254,107.00	824.00	By Fellowship & Wages (R/Proj)	412,734.00	-	412,734.00	-
To Miscellaneous Receipts	29,000.00	-	29,000.00	-	By Contingencies (Res Proj)	-	-	-	-
To Loan:- D/WII-A/c No. 58146	-	-	-	25,000.00	By Travel Expenses (Res. Proj)	-	-	-	-
To Land Acquisition Charges-Deposit					By Laboratory Expenses- Genetic &				
in High Court	-	-	-	18,000,000.00	Wildlife Health	774,601.00	-	774,601.00	22,539.00
To Loan for WCF W/shop	-	-	-	30,253.00	By M.Sc. Expenditure	3,100,000.00	-	3,100,000.00	24,900.00
To TDS	-	-	-	616.00	By Elect and Water Charges	11,664,335.00	-	11,664,335.00	7,794,766.00
To Expenses for Capitals	1,015,973.00	-	1,015,973.00	29,741.00	By Hospitality/Entertainment	3,208,225.00	-	3,208,225.00	437,570.00
To Advance payment CPWD	-	-	-	17,830,008.00	By POL of WII Vehicle	339,177.00	-	339,177.00	363,376.00
To Advance Payment CCU	-	-	-	15,271,531.00	By Postage & Telegram	-	-	-	91,206.00
To Advance for Vehicle Insurance	-	-	-	31,574.00	By Repair & Maintenance of Vehicle	863,457.00	-	863,457.00	290,837.00
To Account Officer PAG (Audit) N. Delhi	299,163.00		299,163.00		By Sport	85,874.00	-	85,874.00	79,030.00
To GST	818,422.00		818,422.00		By Stationery & Consumables	370,782.00	-	370,782.00	54,682.00
To Medical Health Ins.- Claim	246,742.00		246,742.00		By Telephone & Trunk Calls	2,065,969.00	-	2,065,969.00	917,305.00
To Purchase Fixed Assets	-		-		By Legal Expenses	734,611.00	-	734,611.00	635,913.00
To Advance payment for Expenses-Research Project	190,237.00			190,237.00	By Operational expenses	-	-	-	4,468,487.65
To Advance payment for Expenses-Staff	7,528,125.00		7,528,125.00		By Printing & Binding	234,194.00	-	234,194.00	63,896.00
To Tax Deduction Source	-		-		By Maintenance of WII Campus	65,018.00	-	65,018.00	6,947.00
					By Computer AMC & Consumable	2,092,224.85	-	2,092,224.85	995,331.00

Amount in Rs.

RECEIPT			PAYMENT				
To WII Publication/ Product	298,412.00	298,412.00	By Travel Expenses	904,457.00	-	904,457.00	977,532.00
To Miscellaneous/ Contingencies	-	-	By Library Expenses	791,537.00	-	791,537.00	287,560.00
To CGEGIS	-	-	By Forensic Laboratory	1,000,000.00	-	1,000,000.00	-
			By CGEGIS	-	-	-	46.00
			By Strategic Marketing	920,046.00	-	920,046.00	-
			By GST	807,022.00	-	807,022.00	1,172.00
			By Medical Health Insurance Claim	208,593.00	-	208,593.00	-
			By Sundry Creditors	4,141,041.00	-	4,141,041.00	15,548.00
			By New Salary Account(wages)	-	-	-	25,000.00
			By Library Software AMC	-	-	-	226,265.00
			By Forest & Tour Advance-GIA	-	-	-	204,000.00
			By Advance for Civil Work to CPWD	18,181,290.00	-	18,181,290.00	4,975,303.00
			By Library Books	711,613.89	-	711,613.89	279,394.00
			By Furniture & Fixture	62,540.00	-	62,540.00	28,968.00
			By Computer/ Peripherals	8,431,987.00	-	8,431,987.00	508,221.00
			By Plant & Machinery Equipment	4,658,018.00	-	4,658,018.00	7,104,729.00

Amount in Rs.

RECEIPT					PAYMENT				
					By Office Building	-	-	-	25,019,016.00
					By Expenses Payable	-	-	-	1,495,841.00
					By Internal Loan	-	-	-	298,133.00
					By Prior Period Expenses	-	-	-	18,000,000.00
					By Other Specific Provision	787,991.00	-	787,991.00	-
					By Advance for Expenses-Staff	9,525,000.00	-	9,525,000.00	-
					By Advance Insurance Premium of Veh	84,556.00	-	84,556.00	-
					By Loan D/WII A/c No 8	100,000.00	-	100,000.00	-
					By Report Printing	567,309.00	-	567,309.00	-
					By SACON Grant Released	28,900,000.00	-	28,900,000.00	-
					By Annual Research Seminar-ARS	2,110,352.00	-	2,110,352.00	-
					By India International Centre, New Delhi	116,820.00	-	116,820.00	-
					By Repair of Office Furniture & Equipment	1,262,038.00	-	1,262,038.00	-
					By Advertisement	195,144.00	-	195,144.00	-
					By Miscellaneous Contingences	986,758.24	-	986,758.24	-
					By. The Indian Store	123,426.00	-	123,426.00	-
					By Security Deposit Electricity Connection	243,766.00		243,766.00	-
					In Bank	31,882.69	-	31,882.69	316,406.67
					In Hand	-	-	-	-
A' Total	**150,996,587.67**	**-**	**150,996,587.67**	**108,720,349.32**	**A' Total**	**150,996,587.67**	**-**	**150,996,587.67**	**108,720,349.32**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

General Provident Fund

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
(A) GRANT-IN-AID (General)	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
					By Maintenance Of Civil Work	-	-	-	2,294,527.00
To Opening Balance					By Advance for CED-II CCU,New Delhi	-	-	-	966,778.00
Cash in Bank	-	-	-	-	By Furniture Fixture	-	-	-	-
Cash In Hand	-	-	-	-	By Boundary Wall	-	-	-	837,729.00
					By Advance for CPWD	-	-	-	1,539,332.00
					By Miscellaneous Expenses	1.49	-	1.49	-
To Grant in Aid (Capital)	25,000,000.00	-	25,000,000.00	2,500,000.00	By CED-II CCU FRI	24,952,258.00	-	24,952,258.00	-
To Interest (Saving A/c)	32,251.00	-	32,251.00	-	By Campus Development	-	-	-	1,696,857.00
To Advance for CPWD -	-	-	4,829,113.00		By Interest (Saving A/c)	32,250.00	-	32,250.00	7,890.00
To Director WII A/c No. 01	-	-	-	14,000.00					
					In Bank	47,741.51	-	47,741.51	-
					In Hand	-	-	-	-
A' Total	**25,032,251.00**	**-**	**25,032,251.00**	**7,343,113.00**	**A' Total**	**25,032,251.00**	**-**	**25,032,251.00**	**7,343,113.00**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
(A) GRANT-IN-AID (Salary)					By Salary	165,739,373.00	-	165,739,373.00	175,842,941.00
To Opening Balance					By Salary (SACON)	68,310,000.00	-	68,310,000.00	-
Cash in Bank	-	-	-	-	By LTC	1,043,535.00	-	1,043,535.00	2,774,942.00
Cash In Hand	-	-	-	-	By Medical	5,205,312.00	-	5,205,312.00	7,094,889.00
	-				By Gratuity	32,216,263.00	-	32,216,263.00	26,912,661.00
To Grant in Aid (Salary)	286,000,000.00	-	286,000,000.00	246,000,000.00	By Honorarium	28,500.00	-	28,500.00	53,000.00
To Bus Charges	267,882.00	-	267,882.00	97,250.00	By GPF	16,128,612.00	-	16,128,612.00	-
To Electricity & Water	761,195.00	-	761,195.00	519,742.00	By Miscellaneous Expenses (Bank Charges)	206.00	-	206.00	538.00
To Interest from UBI (Flexy)	133,058.00	-	133,058.00	-	By Salary Payable	14,916,674.00		14,916,674.00	12,566,177.00
To House Licence Fee (HLF)	700,628.00	-	700,628.00	611,864.00	By NPS Expanse	14,023,561.00		14,023,561.00	
To Loan Dir. A/c No. 4032	-	-	-	69,000,000.00	By Loan Dir. A/c No. 4032	-	-	-	91,021,918.00
To LTC Advance	9,313.00	-	9,313.00	-	BY LTC Advance	75,284.00	-	75,284.00	-
To GPF	15,886,930.00	-	15,886,930.00	-	By CGEGIS	122,590.00	-	122,590.00	-
To NPS	13,933,779.00	-	13,933,779.00	32,625.00	In Bank	-	-	-	-
To CGEGIS	117,125.00	-	117,125.00	5,585.00	In Hand	-	-	-	-
A' Total	**317,809,910.00**	**-**	**317,809,910.00**	**316,267,066.00**	**A' Total**	**317,809,910.00**	**-**	**317,809,910.00**	**316,267,066.00**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

General Provident Fund

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
To Opening Bal (Bank)	5,443,480.00	-	5,443,480.00	5,766,203.00	By Final Payment	34,047,942.00	-	34,047,942.00	32,608,039.00
To Investment in Auto sweep	3,000,000.00	-	3,000,000.00	3,500,000.00	By Advance/Withdrawal	7,830,000.00	-	7,830,000.00	21,176,524.00
To General Provident Fund Contribution	17,684,966.00	-	17,684,966.00	19,795,292.00	By Investment of FDR	60,000,000.00	-	60,000,000.00	-
To Encashment of FDR	75,487,628.00	-	75,487,628.00	26,499,586.00	By Auto Sweep Investment	-	-	-	3,500,000.00
To Interest on saving a/c	237,520.00	-	237,520.00	213,888.00	By Miscellaneous Expenses	1.19	-	1.19	-
To Interest on FDR	1,194,330.00	-	1,194,330.00	1,997,548.00					
To Interest Accrued	-	-	-	4,955,526.00					
					By Closing Balance (Bank)	1,169,980.81		1,169,980.81	5,443,480.00
B' Total	**103,047,924.00**		**103,047,924.00**	**62,728,043.00**	**F' Total**	**103,047,924.00**		**103,047,924.00**	**62,728,043.00**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2022-23

Amount in Rs.

Pension Fund

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
To Opening Balance									
To Cash in Bank	18,111,801.28	-	18,111,801.28	6,188,212.00	By Investment in FDR	120,000,000.00	-	120,000,000.00	533,050,647.00
To Encashment of FDR	13,599,227.00	-	13,599,227.00	202,816,939.00	By Commuted Value of Pension	17,530,327.00	-	17,530,327.00	19,316,170.00
To Interest (Pension A/c)	597,083.00	-	597,083.00	2,647,434.00	By Pension/ Family Pension	59,543,617.00	-	59,543,617.00	46,006,388.00
To WII Contribution	-	-	-	289,854,992.00	By Auto sweep FD	-	-	-	-
To Interest on FDRs	309,942.00	-	309,942.00	5,267,214.00				-	
To Auto sweep FD	-	-	-	-	By Miscellaneous Expenses	5.92	-	5.92	-
To Miscellaneous Receipt	180,006,187.70	-	180,006,187.70	109,710,215.28	Cash in Bank	15,550,291.06	-	15,550,291.06	18,111,801.28
C' Total	**212,624,240.98**	**-**	**212,624,240.98**	**616,485,006.28**	**D' Total**	**212,624,240.98**	**-**	**212,624,240.98**	**616,485,006.28**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

Corpus Fund

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
To Opening Balance	27,376,186.85	-	27,376,186.85	33,147,139.85	By Investment in FDRs	-	-	-	50,500,000.00
To Auto sweep Investment	-	-	-	-	By Miscellaneous Expenses	75,509,656.69	-	75,509,656.69	
To Miscellaneous Receipts	133,921,129.86	-	133,921,129.86	3,934,665.00	By Investment in FDRs	-	-	-	-
To Interest on Saving A/c	1,352,204.00	-	1,352,204.00	1,209,461.00	By Auto sweep Investment	-	-	-	-
To Interests on FDR	25,459,600.00	-	25,459,600.00	8,240,023.00		-	-	-	-
To Encashment of FDR & Bond	50,836,586.00	-	50,836,586.00	312,887,491.00	By Transfer to Pension fund	111,400,000.00	-	111,400,000.00	303,295,194.00
To Loan A/c No. 57945	-	-	-	22,021,918.00	By TDS for FDR	-	-	-	269,317.00
					Closing Balance	52,036,050.02		52,036,050.02	27,376,186.85
D' Total	**238,945,706.71**	**-**	**238,945,706.71**	**381,440,697.85**	**F' Total**	**238,945,706.71**		**238,945,706.71**	**381,440,697.85**

(N.S. Chauhan)
Finance Officer

(Virendra R. Tiwari)
Director

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

Training Account

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
To Opening in Bank	8,208,499.94	-	8,208,499.94	20,626,667.85	By Office Equipment	19,774.00	-	19,774.00	24,780.00
To Grant Received	-	-	-	-	By Contingencies /Miscellaneous	346,728.00	-	346,728.00	559,854.00
To Interest Received	129,860.00	-	129,860.00	441,130.00	By Camping Gear	-	-	-	-
To Other Receipts		-	-	-	By Travelling Expenses	5,055,043.00	-	5,055,043.00	12,933,194.91
To Adv. for Expenses	53,078.00	-	53,078.00	-	By TA/DA & Honorarium	339,864.00	-	339,864.00	237,500.00
To Miscellaneous Receipts	630,000.00	-	630,000.00	3,000,000.00	By POL & Maint of Vehicle	203,092.00	-	203,092.00	634,889.00
To Loan D/WII-54272	-	-	-	-	By Boarding & Lodging	2,085,075.00	-	2,085,075.00	8,830,605.00
To Prepaid Vehicle Insurance	-	-	-	-	By Books & Stationery	32,385.00	-	32,385.00	500,008.00
To Training Cost Accrued But Not Received	-	-	-	-	By Salary & Wages	-	-	-	-
To Course Fees	387,200.00	-	387,200.00	13,355,000.00	By Other Advance	2,667,514.00	-	2,667,514.00	223,941.00
To Other Advances	3,234,001.00	-	3,234,001.00	147,632.00	By Corpus Funds	-	-	-	2,863,820.00
					By Maint of Vehicle	-	-	-	-
					By Sports Item	8,625.00	-	8,625.00	27,591.00
					By Advances for expenses	-	-	-	755,002.00
					By Manpower Expenses	318,404.00		318,404.00	-
					By Tuition Fee	1,225,000.00		1,225,000.00	-
					By Furniture & Fixture	-	-	-	-
					By Field Assistance	20,001.48	-	20,001.48	134,550.00
					By Tuition Fees	-	-	-	1,148,000.00
					By Training Material & Allowance	276,300.00	-	276,300.00	488,195.00
					By Closing in Bank	44,833.46	-	44,833.46	8,208,499.94
E' Total	**12,642,638.94**	**-**	**12,642,638.94**	**37,570,429.85**	**C' Total**	**12,642,638.94**	**-**	**12,642,638.94**	**37,570,429.85**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

Consultancy Project

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
To Opening Balance:									
at Bank	74,677,356.67	-	74,677,356.67	47,946,016.34	By Office Equipment	-	-	-	442,218.00
To Grant Received	16,403,229.40	-	16,403,229.40	10,298,873.00	By Training Course Materials		-	-	484,198.00
To Interest Saving A/c	799,200.00	-	799,200.00	1,005,117.00	By Contingencies/ Miscellaneous	2,025,057.28	-	2,025,057.28	787,618.80
To Miscellaneous Receipt	-	-	-	35,881,808.00	By Fellowship & Wages	866,218.00	-	866,218.00	811,094.00
To Advance for expenses	420,000.00	-	420,000.00	1,992,800.00	By Travel Expenses	1,468,830.40	-	1,468,830.40	1,409,348.00
To Loan D/WII-54272	-	-	-	-	By POL & Maint. of veh.	-	-	-	180,250.00
To Loan D/WII-57180	-	-	-	600,000.00	By Stationery items	112,877.00	-	112,877.00	-
	-	-	-	-	By Advance for expenses	-	-	-	220,000.00
					By Boarding & Lodging	2,011,279.00	-	2,011,279.00	3,928,918.00
					By TA /DA & Honorarium	201,645.00	-	201,645.00	719,615.00
					By Transf. To Corpus Fund	6,740,976.30	-	6,740,976.30	12,877,871.87
					By Training course fees	6,314,759.94	-	6,314,759.94	125,000.00
					By Report writing	-	-	-	306,057.00
					By advance of Other	200,000.00	-	200,000.00	200,000.00
					By Field Equipment	3,592,022.00	-	3,592,022.00	470,510.00
					By Refund of Unspent Amount	-	-	-	84,560.00
					By Miscellaneous Receipt-Payment	37,385,697.75	-	37,385,697.75	-
					By Interest Transfer to corpus	799,200.00	-	799,200.00	-
					By Unspent Balance transfer to corpus	2,951,573.00	-	2,951,573.00	-
					By Base Camp	50,000.00	-	50,000.00	-
					By Advance for Expenses	35,000.00	-	35,000.00	-
					Total Expenditure	64,755,135.67	-	64,755,135.67	23,047,258.67
					By Bank Balance	27,544,650.40	-	27,544,650.40	74,677,355.67
F' Total	**92,299,786.07**	**-**	**92,299,786.07**	**97,724,614.34**	**E' Total**	**92,299,786.07**	**-**	**92,299,786.07**	**97,724,614.34**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

Amount in Rs.

Misc Receipts A/c No. 518502010058146

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
To Opening Balance	34,143,857.07	-	34,143,857.07	31,553,284.57	By Contingencies/ Miscellaneous Expenses	1,595,482.00	-	1,595,482.00	18,113.00
To Caution Money	410,000.00	-	410,000.00	867,000.00	By EMD	1,540,000.00	-	1,540,000.00	596,000.00
To Miscellaneous Receipts	2,709,055.28	-	2,709,055.28	1,153,310.50	By Caution Money	484,000.00	-	484,000.00	546,000.00
To Interests on Saving A/c	1,353,031.00	-	1,353,031.00	932,170.00	By Hospitality & Ent.	-	-	-	16,020.00
To Admission Fee	114,000.00	-	114,000.00	537,000.00	By Land	-	-	-	645,575.00
To EMD	2,394,400.00	-	2,394,400.00	870,800.00	By FDR	20,000,000.00	-	20,000,000.00	-
To Internship Fee		-	-	52,000.00	By LCGS Life Science LLP (Advance)	9,439,769.00	-	9,439,769.00	-
To NGS Grant	35,000,000.00		35,000,000.00		By Bank A/c No. 58146	43,065,092.35	-	43,065,092.35	34,143,857.07
	76,124,343.35		**76,124,343.35**	**35,965,565.07**	**Closing Balance**	**76,124,343.35**		**76,124,343.35**	**35,965,565.07**

RECEIPT & PAYMENT ACCOUNTS FOR THE YEAR 2023-24

WII Contribution of Gratuity A/c No. 518502010055326

RECEIPT					PAYMENT				
Particulars	**Plan**	**Non Plan**	**Total**	**Previous Year**	**Particulars**	**Plan**	**Non Plan**	**Total**	**Previous Year**
	Amount in Rs.		**Amount in Rs.**	**Amount in Rs.**	**Expenses**	**Amount in Rs.**		**Amount in Rs.**	**Amount in Rs.**
To Opening Balance	7,013,981.31	-	7,013,981.31	5,659,599.47	By Miscellaneous Expenses	17.12	-	17.12	70.16
WII Project Officials Contribution	2,847,023.00	-	2,847,023.00	1,178,340.00	By Final Payments	1,800,154.00	-	1,800,154.00	-
To Interests on Saving A/c	318,892.00	-	318,892.00	176,112.00	By Investment in FDRs	21,000,000.00		21,000,000.00	-
To Encashment of FDR	16,993,074.00	-	16,993,074.00	-				-	-
		-	-	-					
		-	-	-					
		-	-	-	By Bank A/c No. 58146	4,372,799.19	-	4,372,799.19	7,013,981.31
	27,172,970.31	**-**	**27,172,970.31**	**7,014,051.47**	**Closing Balance**	**27,172,970.31**	**-**	**27,172,970.31**	**7,014,051.47**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
BALANCE SHEET AS ON 31 MARCH 2024

(Amount in Rs.)

CORPUS /CAPITAL FUND AND LIABILITIES	Schedule	Current Year	Previous Year
CORPUS /CAPITAL FUND	1	(1,278,309,026)	(1,108,994,358)
RESERVES AND SURPLUS	2	43,050,626	61,320,913
ENDOWMENT/EARMARKED FUND	3	506,025,965	1,022,459,359
SECURED LOANS AND BORROWINGS	4	-	-
UNSECURED LOANS AND BORROWINGS	5	-	-
DEFERRED CREDIT LIABILITIES	6	389,579	2,413
CURRENT LIABILITIES AND PROVISION	7	2,694,368,713	2,322,585,362
TOTAL (A)		**1,965,525,857**	**2,297,373,689**
ASSETS			
FIXED ASSETS	8	242,132,236	257,285,465
INVESTMENTS- FROM EARMARKED / ENDOWMENT FUNDS	9	3,131,016	2,900,000
INVESTMENTS- OTHERS	10	955,837,043	857,377,024
COURANT ASSETS, LOANS, ADVANCES ETC.	11	764,425,562	1,179,811,200
MISCELLANEOUS EXPENDITURE (to the extent not written off or adjusted)			
TOTAL (B)		**1,965,525,857**	**2,297,373,689**
SIGNIFICANT ACCOUNTING POLICIES	24	-	-
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS	25	-	-

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 1 : CORPUS/CAPITAL FUND		Current Year	Previous Year
Balance as at the Beginning of the year		-1,272,576,298.36	197,276,138.57
Add: Contribution towards Corpus/ Capital fund		-	31,553,284.57
Add: Contribution towards Corpus/ Capital fund		18,909,382.89	35,795,043.00
Add: Merger Reserve Related to SACON			
Add/(Deduct) : Balance of net income (expenditure) transferred from the Income and Expenditure Account		(190,823,915.16)	(1,555,794,067.50)
TOTAL	**A**	**-1,444,490,830.63**	**(1,291,169,601.36)**
Corpus Fund			
Opening Balance		182,175,243.51	434,156,900.31
Add: Received during the year		63,779,419.21	35,325,355.00
Add: Accrued Interest		-	442,264.00
Add Interest Earned		6,167,543.00	7,305,895.20
Intt. On FDR		25,459,600.00	8,240,023.00
Less: Pension (Actuarial Valuation Report 2023)		-	-
Less : Paid to Pension Funds		(111,400,000.00)	(303,295,194.00)
Total	**B**	**166,181,805.72**	**182,175,243.51**
Total A+B (Balance as at the year end)		**(1,278,309,024.91)**	**(1,108,994,357.85)**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 2: RESERVES AND SURPLUS:	Current Year	Previous Year
1. Capital Reserves :		
As per last Account	33,221,080.00	32,898,064.00
Addition during the year	-	-
Less : Deductions during the year	-	-
2. Revaluation Reserves :		
As per last Account	-	-
Addition during the year	-	-
Less : Deductions during the year	-	-
3. Special Reserves :		
As per last Account	-	-
Addition during the year	-	-
Less : Deductions during the year	-	-
4. General Reserves :		
As per last Account	9,829,546.00	28,422,849.00
Addition during the year	-	-
Less : Deductions during the year	-	-
TOTAL	**43,050,626.00**	**61,320,913.00**

(N.S. Chauhan)
Finance Officer

(Virendra R. Tiwari)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 3: EARMARKED/ ENDOWMENT FUNDS		Current Year	Previous Year
a)Opening Balance of the Funds		**1,019,572,009.00**	**780,083,511.71**
Opening Balance of the Project Funds		**-**	**2,234,215.53**
b) Addition to the Funds			
i	Grants Received	660,522,116.24	1,010,161,895.34
ii	Interest Received	23,880,978.50	31,459,026.59
iii	Other for Expenses	101,607,249.30	36,598,032.47
iv	Loans	42,263,573.00	7,367,473.00
v	Other Income	116,032,495.11	127,358,445.04
vi	Encashment of FDR	2,900,000.00	31,522,260.00
	Total	947,206,412.15	1,244,467,132.44
	TOTAL (A+B)	**1,966,778,421.15**	**2,026,784,859.68**
Utilisation/ Expenditure towards objectives of funds			
c) i	**Capital Expenditures (Fixed Assets)**		
	Camp/Field Equipment	181,307,456.33	56,842,188.77
	Office Equipment	57,165,838.09	21,748,593.00
	Computer & Accessories	6,974,734.00	1,875,751.00
	Furniture & Fixture	843,647.00	463,538.00
	Porta cabin	3,122,305.00	-
	Building	61,615,711.00	-
ii	**Revenue Expenditure**		
	Contingencies/Miscellaneous	163,976,663.44	76,088,572.82
	Fellowship & Wages	294,024,992.40	286,890,704.00
	Travel Expenses	83,819,320.71	67,406,546.46
	POL & Maintenance Of Vehicle	21,239,546.00	22,385,606.25
	Advance for Expenses	17,341,615.00	36,351,372.30
	Boarding & Lodging	25,736,243.08	10,830,794.00
	Miscellaneous Receipt - Payment (Previous Year)	219,301,650.19	109,535,378.37
	Report Writing	-	169,270.00
	Corpus fund	83,201,810.28	79,740,929.34
	TA/DA & Honorarium	2,915,107.00	2,308,528.00
	Training Course Materials	6,326,909.94	614,740.00
	Loan to Director WII Other Project	34,615,819.00	21,648,000.00
	Refund of Unspent Amount	7,306,895.00	14,322,363.65

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 3: EARMARKED FUNDS	Current Year	Previous Year
Advance for other Firm	10,928,829.00	62,416,047.87
Establishment Expenses	21,447,981.00	30,302,700.00
Operational Expenses	151,753,507.28	98,829,063.20
Printing and Publication	5,785,875.22	3,554,814.00
TOTAL-C	**1,460,752,455.96**	**1,004,325,501.03**
NET BALANCE AS AT THE YEAR-END (A+B-C)	**506,025,965.19**	**1,022,459,358.65**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amt. Rs.)

SCHEDULE 4 : SECURED LOANS AND BORROWINGS	Current Year	Previous Year
(1) Central Govt.	-	-
(2) State Govt.(Specify)	-	-
(3) Financial Institutions		
(a) Term Loans	-	-
(b) Interest accured and due	-	-
(4) Banks		
(i) Term Loans		
- Interest accured and due	-	-
(ii) Others Loans (specify)		
- Interest accured and due	-	-
(5) Other Institutions and Agencies	-	-
(6) Debentures and Bonds	-	-
(7) Others (specify)	-	-
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 5 : UNSECURED LOANS AND BORROWINGS	Current Year	Previous Year
(1) Central Govt.	-	-
(2) State Govt.(Specify)	-	-
(3) Financial Institutions	-	-
(4) Banks		
(i) Term Loans	-	-
(ii) Others (specify)		-
-		
(5) Other Institutions and Agencies	-	-
(6) Debentures and Bonds	-	-
(7) Fixed Deposits	-	
(8) Others (Specify)		-
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 6 : DEFERRED CREDIT LIABILITIES:	Current Year	Previous Year
(A) Acceptances secured by hypothecation of capital equipment and other assets		
(B) Others	389,579.00	2,413.00
TOTAL	**389,579.00**	**2,413.00**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 7 : CURRENT LIABILITIES AND PROVISION	Current Year	Previous Year
(A) CURRENT LIABILITIES		
(A) CURRENT LIABILITIES		
(1) Acceptances	-	
(2) Sundry Creditors		
(1) For Goods	-	-
(2) For Others	-	-
Other Payments outstanding (Grant in Aid) (2022-23)	-	3,847,518.00
Other Payments outstanding (Grant in Aid) (2023-24)	5,594,600.00	-
(3) Advances Received		
Hostel Caution Money (GIA A/c 22000-Miscellaneous A/c 74000)	269,000.00	343,000.00
Security Refund with Interest (High Court)	19,648,610.00	19,648,610.00
EMD Miscellaneous Receipts A/c No. 58146	1,129,200.00	274,800.00
(4) Interest accrued but not due on		
(1) Secured Loans/Borrowings	-	-
(2) Unsecured Loans/Borrowings	-	-
(5) Statuary Liabilities		
(1) Overdue	-	-
(2) Others (Specify)	-	-
Pension Fund	684,470,687.06	536,581,361.28
General Provident Fund	118,581,660.81	134,505,722.00
WII-Contribution of Gratuity	25,372,799.19	19,113,981.31
TIER-I (NPS)	(89,782.00)	
CPF Fund	87,093,802.13	76,100,066.43
(6) Others (Specify)		
EMD Miscellaneous Receipts	4,384,175.00	5,665,430.00
Loan:- D/WII A/c No. 57945	46,625.00	46,625.00
Welfare Fund	-	-
TOTAL (A)	**946,501,377.19**	**796,127,114.02**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE 7 : CURRENT LIABILITIES AND PROVISIONS	Current Year	Previous Year
(B) PROVISIONS -		
(1) For Taxation		
TDS- Grant in Aid	-	616.00
GST-Grant in Aid	11,400.00	11,688.00
(2) Gratuity -	-	
(3) Superannuation/ Pension	-	-
(4) Accumulated Leave Encashment	-	-
(a) Retirement Benefited (Commutation, Gratuity)	82,224,396.00	81,105,573.00
(b) Retirement Benefited (Leave Encashment)	79,794,166.00	81,745,008.00
(c) Retirement Benefited (Pension)	1,563,970,839.00	1,342,668,118.00
(5) Trade Warranties/ Claims	-	
(6) Others (Specify)		
TDS refund paid to GPF, Pension & Corpus	-	-
CGEGIS	74.00	5,539.00
GPF-CDL	(238,782.00)	2,900.00
Sub. of ECPF	-	-
Salary Payable	21,664,062.00	19,829,423.00
Other Payable	265,173.00	1,089,385.00
Medical Health Insurance Claim-GIA	38,149.00	-
GST TDS Payable under ENVIS	137,859.00	-
Fellowship (Arrear)	-	-
TOTAL (B)	**1,747,867,336.00**	**1,526,458,250.00**
TOTAL (A+ B)	**2,694,368,713.19**	**2,322,585,364.02**

(N.S. Chauhan)
Finance Officer

(Virendra R. Tiwari)
Director

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 2020-24
SCHEDULE 8 : FIXED ASSETS

(Amount in Rs.)

PARTICULARS	GROSS BLOCK				DEPRECIATION					NET BLOCK	
Net Block		Addition during the year									
	Cost as at the beginning of the year	Upto 30 Sep.	After 30 Sep.	Cost as at end of the year	As at the beginning of the year		For the year	Deduction during the 2023-24	At the end of the year	At the end of the year	As at the Previous year end
LAND											
BLOCK: 0%											
Land	16,252,789.58	-	-	16,252,789.58	-		-	-	-	16,252,789.58	16,252,789.58
TOTAL	**16,252,789.58**	**-**	**-**	**16,252,789.58**	**-**		**-**	**-**	**-**	**16,252,789.58**	**16,252,789.58**
BUILDINGS											
BLOCK: 10%											
Arch. & Sprvson Fee	980,719.41	-	-	980,719.41	230,046.00	0.10	98,072.00	-	98,072.00	882,647.41	980,719.41
Auditorium	1,468,598.47	-	-	1,468,598.47	344,486.00	0.10	146,860.00	-	146,860.00	1,321,738.47	1,468,598.47
Boundary Fencing	89,497.23	-	-	89,497.23	20,993.00	0.10	8,950.00	-	8,950.00	80,547.23	89,497.23
Boundary Wall	158,242.79	-	-	158,242.79	37,118.00	0.10	15,824.00	-	15,824.00	142,418.79	158,242.79
Boundary Wall-Capital	3,873,843.00	-	-	3,873,843.00	763,886.00	0.10	387,384.00	-	387,384.00	3,486,459.00	3,873,843.00
Building Complex	54,752,944.86	-	402,036.00	55,154,980.86	16,105,369.00	0.10	5,676,312.00	-	5,676,312.00	49,478,668.86	54,752,944.86
Campus Develop	38,010,343.70	-	-	38,010,343.70	9,156,350.00	0.10	3,801,034.00	-	3,801,034.00	34,209,309.70	38,010,343.70
Campus Develop Capital	1,612,014.00	-	-	1,612,014.00	84,843.00	0.10	161,201.00	-	161,201.00	1,450,813.00	1,612,014.00
Tennis Court	58,084.51	-	-	58,084.51	13,625.00	0.10	5,808.00	-	5,808.00	52,276.51	58,084.51
Sports Complex	80,198.46	-	-	80,198.46	18,812.00	0.10	8,020.00	-	8,020.00	72,178.46	80,198.46
Road & Culvert	1,427,735.48	-	-	1,427,735.48	797,897.00	0.10	142,774.00	-	142,774.00	1,284,961.48	1,427,735.48
TOTAL	**102,512,221.91**	**-**	**402,036.00**	**102,914,257.91**	**27,573,425.00**	**-**	**10,452,239.00**	**-**	**10,452,239.00**	**92,462,018.91**	**102,512,221.91**
BLOCK: 5%											
Staff Quarters	5,339,769.71	-	-	5,339,769.71	796,172.00	0.05	266,988.00	-	266,988.00	5,072,781.71	5,339,769.71
TOTAL	**5,339,769.71**	**-**	**-**	**5,339,769.71**	**796,172.00**	**-**	**266,988.00**	**-**	**266,988.00**	**5,072,781.71**	**5,339,769.71**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 2020-24
SCHEDULE 8 : FIXED ASSETS

(Amount in Rs.)

PARTICULARS	GROSS BLOCK				DEPRECIATION					NET BLOCK	
Net Block		Addition during the year									
	Cost as at the beginning of the year	Upto 30 Sep.	After 30 Sep.	Cost as at end of the year	As at the beginning of the year		For the year	Deduction during the 2023-24	At the end of the year	At the end of the year	As at the Previous year end
PLANT MACHINERY & EQPT											
BLOCK: 15%											
Vehicle	5,291,850.10	-	-	5,291,850.10	5,983,435.00	0.15	793,777.00	-	793,777.00	4,498,073.10	5,291,850.10
Elect Equipment `	3,230,003.00	-	107,876.00	3,337,879.00	3,228,832.00	0.15	492,591.00	-	492,591.00	2,845,288.00	3,230,003.00
Forensic Laboratory	8,274,538.66	-	1,216,870.00	9,491,408.66	3,174,754.00	0.15	1,332,446.00	-	1,332,446.00	8,158,962.66	8,274,538.66
Training Equipment	710,769.80	-	-	710,769.80	272,995.00	0.15	106,615.00	-	106,615.00	604,154.80	710,769.80
Camp Equipment (Project)	53,786.80	-	-	53,786.80	20,659.00	0.15	8,068.00	-	8,068.00	45,718.80	53,786.80
DG Set	4,656,098.39	-	-	4,656,098.39	3,295,861.00	0.15	698,415.00	-	698,415.00	3,957,683.39	4,656,098.39
EPABX	23,219.86	-	221,000.00	244,219.86	8,919.00	0.15	20,058.00	-	20,058.00	224,161.86	23,219.86
Lab Equipment	1,201,242.98	-	878,168.00	2,079,410.98	461,377.00	0.15	246,049.00	-	246,049.00	1,833,361.98	1,201,242.98
Office Equipment	88,894,457.07	167,850.00	5,395,046.00	94,457,353.07	47,612,064.00	0.15	13,763,975.00	-	13,763,975.00	80,693,378.07	88,894,457.07
Trg Equipment (Trg A/c)	702,236.01	-	-	702,236.01	269,717.00	0.15	105,335.00	-	105,335.00	596,901.01	702,236.01
Office Equipment (Trg A/c)	1,281,229.99	19,774.00	-	1,301,003.99	485,154.00	0.15	195,151.00	-	195,151.00	1,105,852.99	1,281,229.99
Office Equipment (Project)	2,626.97	323,016.00	-	325,642.97	1,008.00	0.15	48,846.00	-	48,846.00	276,796.97	2,626.97
Office Equipment (R/Proj)	1,554,567.62	-	-	1,554,567.62	597,082.00	0.15	233,185.00	-	233,185.00	1,321,382.62	1,554,567.62
Gas Fire Suppressions Systems	2,819,290.00	-	-	2,819,290.00	1,542,180.00	0.15	422,894.00	-	422,894.00	2,396,396.00	2,819,290.00
Camp Equipment (R/Proj)	3,008,253.85	-	-	3,008,253.85	1,155,419.00	0.15	451,238.00	-	451,238.00	2,557,015.85	3,008,253.85
TOTAL	**121,704,171.10**	**510,640.00**	**7,818,960.00**	**130,033,771.10**	**68,109,456.00**		**18,918,643.00**	**-**	**18,918,643.00**	**111,115,128.10**	**121,704,171.10**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 2020-24
SCHEDULE 8 : FIXED ASSETS

(Amount in Rs.)

PARTICULARS	GROSS BLOCK				DEPRECIATION					NET BLOCK
Net Block		Addition during the year								
	Cost as at the beginning of the year	Upto 30 Sep.	After 30 Sep.	Cost as at end of the year	As at the beginning of the year		For the year	Deduction during the 2023-24	At the end of the year	At the end of the year	As at the Previous year end
AC Plant :											
BLOCK : 10%											
AC Plant	295,183.46	-	-	295,183.46	69,240.00	0.10	29,518.00	-	29,518.00	265,665.46	295,183.46
TOTAL	295,183.46	-	-	295,183.46	69,240.00	-	29,518.00	-	29,518.00	265,665.46	295,183.46
FURNITURE, FIXTURES : BLOCK : 10%											
Furniture's & Fixtures-GIA	6,869,561.73	-	129,740.00	6,999,301.73	6,092,373.00	0.10	693,443.00	-	693,443.00	6,305,858.73	6,869,561.73
Furniture's & Fixtures-Capital A/c	393,043.00	-	-	393,043.00	92,195.00	0.10	39,304.00	-	39,304.00	353,739.00	393,043.00
Furniture & Fixture (Trg)	220,377.59	-	-	220,377.59	50,638.00	0.10	22,038.00	-	22,038.00	198,339.59	220,377.59
TOTAL	7,482,982.32	-	129,740.00	7,612,722.32	6,235,206.00		754,785.00	-	754,785.00	6,857,937.32	7,482,982.32
COMPUTER/PERIPHERALS : BLOCK : 40%											
Comp. and Peripherals	458,588.73	757,499.00	8,402,817.00	9,618,904.73	10,341,367.00	0.40	2,166,999.00	-	2,166,999.00	7,451,905.73	458,588.73
Comp. & Accessories	1,633,693.71	-	-	1,633,693.71	2,392,174.00	0.40	653,477.00	-	653,477.00	980,216.71	1,633,693.71
E Governance	49.42	-	-	49.42	2,014,141.00	0.40	20.00	-	20.00	29.42	48.42
TOTAL	2,092,331.86	757,499.00	8,402,817.00	11,252,647.86	14,747,682.00		2,820,496.00	-	2,820,496.00	8,432,151.86	2,092,330.86
BOOKS : BLOCK : 40%											
Journals & Periodicals	774,153.26	-	-	774,153.26	1,376,273.00	0.40	309,661.00	-	309,661.00	464,492.26	774,153.26
LIBRARY BOOK:-BLOCK : 40%											
Library Books	831,863.19	-	887,690.89	1,719,554.08	16,208,955.00	0.40	510,283.00	-	510,283.00	1,209,271.08	831,863.19
TOTAL	1,606,016.45	-	887,690.89	2,493,707.34	17,585,228.00	0.80	819,944.00	-	819,944.00	1,673,763.34	1,606,016.45
GRAND TOTAL	257,285,466.38	1,268,139.00	17,641,243.89	276,194,849.27	135,116,409.00		34,062,613.00	-	34,062,613.00	242,132,236.29	257,285,465.38

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE : 9 INVESTMENTs FROM EARMARKED/ENDOWMENT FUNDS	Current Year	Previous Year
(1) In the Govt. Securities	-	-
(2) Other approved Securities	-	-
(3) Shares	-	-
(4) Debentures and Bonds	-	-
(5) Subsidiaries and Joint Ventures	-	-
(6) Others (Specify) Fixed Deposit - HOSTEL	3,131,016.00	2,900,000.00
TOTAL	**3,131,016.00**	**2,900,000.00**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2024

(Amount in Rs.)

SCHEDULE : 10 INVESTMENT - OTHERS	Current Year	Previous Year
(1) In the Govt. Securities	-	-
(2) Other approved Securities	-	-
(3) Shares	-	-
(4) Debentures and Bonds		
Investment in RBI Bond (Corpus Fund)	-	42,000,000.00
(5) Subsidiaries and Joint Ventures	-	-
(6) Others (Specify)		
Investment in FDR (GPF)	107,796,857.00	118,328,959.00
Investment in FDR (CPF)-SACON	72,881,333.00	59,995,388.00
Auto sweep FDR-GPF	500,000.00	3,500,000.00
Investment in FDR (Pension Fund)	620,480,546.00	510,119,655.00
FDR Corpus Fund	107,602,000.00	104,779,299.00
FDR (WII-Contribution of Gratuity)	21,000,000.00	12,100,000.00
Miscellaneous Receipts FDR	25,576,307.00	6,553,723.00
TOTAL	**955,837,043.00**	**857,377,024.00**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
SCHEDULES FORMING PART OF BALANCE SHEET FOR THE YEAR ENDED 31 MARCH 2023

		(Amount in Rs.)
SCHEDULE : 11 CURRENT ASSETS, LOANS, ADVANCES ETC.	**Current Year**	**Previous Year**
(A) CURRENT ASSETS		
(1) Inventories		
Closing Balance of (Grant in Aid)	349,922.63	16,464.56
Closing Balance of WII Publication	-	298,412.00
(2) Sundry Debtors		
(1) Debts Outstanding for a period exceeding six months	-	-
(2) Others (Specify) - Outstanding advance to Dr.T.Ramesh	29,851.00	-
(3) Cash balances in hand (including cheques/drafts and imprest)		
Grant-in-Aid A/c	-	-
Training A/c	-	-
Pension Fund A/c	-	-
GPF A/c	-	-
Corpus Fund	-	-
(4) Bank Balances		
(1) With Scheduled Banks		
Capital A/c	47,741.51	
Grant-in-Aid A/c	112,822.93	2,393,606.88
Training A/c	44,833.46	8,208,499.94
Pension Fund A/c	15,550,291.06	18,111,801.28
GPF A/c	1,169,980.81	16,723,056.43
GPF A/c-Sacon	8,468,178.13	-
Corpus fund No 4032	52,545,287.72	27,850,627.51
Endowment Funds	503,002,956.84	1,019,559,358.65
WII- Contribution of Gratuity A/c No. 518502010055326	4,372,799.19	7,013,981.31
Miscellaneous Receipts A/C NO. 518502010058146	43,324,703.02	34,522,851.13
TOTAL (A)	**629,019,368.30**	**1,134,698,659.69**

(B) LOANS, ADVANCES AND OTHER ASSETS	**Current Year**	**Previous Year**
(1) Loans		
(1) Staff		
Advance for expenses (Staff)	315,296.00	235,434.00
Advance for expenses (Research Projects)	72,857.00	256,570.00
LTC Advance (Salary)	75,284.00	
Advance for expenses (Training Account)	2,000.00	880,000.00
Advance for IIT kanpur	-	1,239,000.00
Advance for Capital A/c	920,046.00	-
Advance for Vehicle Insurance	84,556.00	74,091.00
(2) Other entities engaged in activities /objectives similar to		
(3) Others (Specify)		
Advance for civil work to CPWD	19,730,110.00	4,975,303.00
Loan to SACON Conference A/c	200,000.00	-
Loan for World Environment Day (MoEF)	280,984.00	280,984.00

Advance payment to CCU and others	940,000.00	-
Loan:- D/WII A/c No. 54189	-	-
Loan:- D/WII A/c No. 58146	1,318,436.00	1,318,436.00
Loan:- D/WII A/c No. 08	100,000.00	-
India International Centre, New Delhi	116,820.00	
The Indian Store, Dehradun	123,426.00	-
LCGS Life Science LLP (Adv.)	9,439,769.00	-
Advance Payment-Training Account	-	563,089.00
CED-II CCU FRI	24,952,258.00	-
CED-II CCU, New Delhi	47,083.00	966,778.00
Ex. Eng. Civil-II CPWD, Dehradun	1,589,920.00	2,823,487.00
(2) Advances and other amounts recoverable in cash or in kind or		
(1) On Capital Accounts		
(2) Prepayments	1,399,205.00	1,143,139.00
(3) Others (Specify)		
Security Deposit for Electricity Connection	1,390,944.00	1,147,178.00
TDS to be refunded by the ITO (Pension Fund)	4,389,787.00	4,389,787.00
TDS to be refunded by the ITO (GPF)	2,277,757.00	2,277,757.00
TDS to be refunded by the ITO (Corpus fund)	3,379,432.00	3,286,330.00
Advance to Staff - CPF	2,097,740.00	1,751,569.00
TDS to be refunded F.Y. 2023-24	1,950,010.64	
(3) Income Accrued		
(1) On Investments from Earmarked / Endowment Funds		
(2) On Investments -Others		
Interest Accrued on FDR (GIA)	4,144,677.00	3,260,559.00
Interest Accrued on FDR (GPF)	6,837,066.00	4,955,526.00
Interest Accrued on FDR (Pension Fund)	44,050,063.00	3,960,118.00
Interest Accrued on FDR (Corpus Fund)	2,557,243.00	4,305,792.00
(3) On Loans and Advances	-	
(4) Others (Specify)		
(4) Expenses payable towards capital/fixed Assets		
(4) Expenses Payable Capitalised (2022-23)	-	732,599.00
(5) Expenses Payable (2022-23)	-	283,374.00
(6) Grant in Aid (2023-24)	623,424.00	-
(7) Grant in Aid (2020-21)	-	5,640.00
TOTAL (B)	**135,406,193.64**	**45,112,540.00**
TOTAL (A+B)	**764,425,561.94**	**1,179,811,199.69**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2022-24

(Amount in Rs.)

INCOME	Schedule	Current Year	Previous Year
Income from Sales/Services	12	-	-
Grants/Subsidies	13	432,090,617.11	360,204,957.00
Fees/Subscriptions	14	864,310.00	14,175,054.00
Income from Investments (from earmarked/endowment Funds Transferred to funds)	15	-	-
Income from Royalty, Publication etc.	16	1,729,705.00	1,228,856.00
Interest Earned	17	2,127,565.00	1,951,629.00
Other Income	18	41,743,110.92	4,796,691.50
Increase/decrease) in stock of Finished goods and works-in-progress	19	-	-
TOTAL (A)		**478,555,308.03**	**382,357,187.50**
EXPENDITURE			
Establishment Expenses (Plan & Non Plan)	20	513,620,244.00	1,665,901,948.00
Other Administrative Expenses (Plan & Non Plan)	21	155,758,979.19	144,250,471.00
Expenditure on Grants, Subsidies etc.	22	-	-
Expenditure on Grants, Subsidies etc.	23	-	-
Significant account Polices (notes on Accounts)	24	-	-
CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS (Illustrative)	25	-	-
Total (B)		669,379,223.19	1,810,152,419.00
Balance being excess of Income over Expenditure (A-B)		(190,823,915.16)	(1,427,795,231.50)
Prior period items (Depreciation & High Court Security Refund with Intt.)	-	-	37,998,836.00
BALANCE BEING SURPLUS (DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**(190,823,915.16)**	**(1,465,794,067.50)**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2022-24

(Amount in Rs.)

SCHEDULE : 12 INCOME FROM SALES/SERVICES	Current Year	Previous Year
1. Income from Sales		
(a) Sale of Finished Goods	-	-
(b) Sale of Raw Material	-	-
(c) Sale of Scraps	-	-
2. Income from Services		
(a) Labour and Processing Charges	-	-
(b) Professional/Consultancy Services	-	-
(c) Agency Commission and Brokerage	-	-
(d) Maintenance Services (Equipment/Property)	-	-
(e) Other (Specify)	-	-
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2022-24

		(Amount in Rs.)
SCHEDULE : 13 GRANTS/SUBSIDIES	**Current Year**	**Previous Year**
(1) Central Government		
Grant -in- Aid from MoEF	451,000,000.00	396,000,000.00
Amount Capitalized (-)	18,909,382.89	35,795,043.00
Total 432,090,617.11	360,204,957.00	
(2) State Governments (s)	-	-
(3) Government Agencies	-	-
(4) Institutions/Welfare Bodies	-	-
(5) International Organisations	-	-
(6) Others (Specify)	-	
WII Contribution (Pension A/c)	-	-
TOTAL	**432,090,617.11**	**360,204,957.00**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2022-24

		(Amount in Rs.)
SCHEDULE : 14 FEES/ SUBSCRIPTIONS	**Current Year**	**Previous Year**
(1) Entrance Fees		
M.Sc. Course Fee	-	-
(2) Annual Fees/ Subscriptions		-
(3) Seminar/ Program Fees		
Seminar/ Workshop Fees		-
(4) Consultancy Fees		
Consultancy Refund		-
(5) Others (Specify)		
Other Receipt (Training)	677,200.00	13,355,000.00
Miscellaneous Receipts (GIA)	29,110.00	194,554.00
Other Project Grant	-	-
Pre-receipted bill issued but not received	-	-
Internship Fees	44,000.00	88,500.00
Admission Fee	114,000.00	537,000.00
TOTAL	**864,310.00**	**14,175,054.00**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 15 INCOME FROM INVESTMENTS	Investment from Earmarked fund		Investment-Other	
(income on Investment from Earmarked/Endowment funds transferred to Funds)	Current Year	Previous Year	Current Year	Previous Year
1. Interest				
(a) On Govt Securities	-	-	-	-
(b) Other Bonds/Debentures	-	-	-	-
2. Dividends:				
(a) On Shares	-	-	-	-
(b) On Mutual Fund Securities	-	-	-	-
3. Rents	-	-	-	-
4. Others (Specify)	-	-	-	-
TOTAL	**-**	**-**	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 16 INCOME FROM ROYALTY, PUBLICATION ETC.	Current Year	Previous Year
(1) Income from Royalty	-	-
(2) Income from Publications	-	-
(3) Others (Specify)	-	-
Genetic Laboratory	-	-
Miscellaneous Receipts	-	-
UBI Building Rent	-	-
Miscellaneous Income	-	-
WII Products	-	-
House Licence Fee	700,628.00	611,864.00
Bus Charges	267,882.00	97,250.00
Electricity & Water Charges	761,195.00	519,742.00
Telephone	-	-
TOTAL	**1,729,705.00**	**1,228,856.00**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 17 INTEREST EARNED	Current Year	Previous Year
(1) (1) With Scheduled Banks		
Int. on Bank Deposit	-	-
Interest on FDR	-	-
Interest on Investment	-	-
(2) With Non-Scheduled Banks	-	-
(3) With Institutions	-	-
(4) Others (Specify)	-	-
Int. on Investment (Training)	-	-
Interest (Training)	129,860.00	441,130.00
Interest on HBA	-	-
(2) On Savings Account	-	
(1) With Scheduled Banks	-	
Int. on Savings Account	1,594,350.00	1,242,521.00
Interest on FDR A/c	403,355.00	267,978.00
Interest on Saving A/c (Training A/c)	-	-
(2) With Non-Scheduled Banks	-	-
(3) Post Office Savings Account	-	-
(4) Others (Specify)		-
-		
(3) On Loans	-	-
(1) Interest on Loan & Advance	-	-
(2) Others	-	-
(4) Interest on Debtors and Other Receivables	-	-
TOTAL	**2,127,565.00**	**1,951,629.00**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2022-24

(Amount in Rs.)

SCHEDULE : 18 OTHER INCOME	Current Year	Previous Year
(1) Profit on Sale/Disposal of Assets		
(1) Owned Assets	-	-
(2) Assets acquired out of grants, or received free of cost	-	-
(2) Export Incentives realized	-	-
(3) Fees for Misc. Services	-	-
(4) Others (Specify)		
Miscellaneous Receipts	39,793,100.28	4,796,691.50
Miscellaneous Income related to TDS	1,950,010.64	-
TOTAL	**41,743,110.92**	**4,796,691.50**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 19 INCREASE/DECREASE IN STOCK OF FINISHED GOODS	Current Year	Previous Year
1. Closing Stock		
1) Finished Goods		
Closing Stock of WII Publication	-	-
2) Work-in-progress	-	-
2. Less : Opening Stock		
1) Finished Goods	-	-
2) Work-in-progress	-	-
TOTAL	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 20 ESTABLISHMENT EXPENSES	Current Year		Previous Year	
	Plan	Non Plan	Plan	Non Plan
(1) Salaries and Wages	282,018,329.00	-	181,326,219.00	-
Salary & Wages (Training A/c)	-	-	-	-
Honorarium	28,500.00	-	149,343.00	-
Medical	4,597,227.00	-	7,702,974.00	-
Fellowship & Wages	412,734.00	-	25,000.00	-
(2) Allowances and Bonus	-	-	-	-
LTC 1,041,668.00	-	10,210,685.00	-	
(3) Others (Specify)				
Miscellaneous Expenses	-	-	2,540,447.00	-
(4) Contribution to Other Fund (Specify)			7,231,692.00	
(5) Staff Welfare Expenses				
Uniforms	-	-	-	-
(6) Expenses on Employees Retirement and Terminal Benefits	-			
Leave Encashment & Gratuity	-	-	164,970.00	-
Leave Encashment	1,100,242.00	-	54,667,510.00	-
Gratuity	3,118,823.00	-	59,214,990.00	-
Pension	221,302,721.00	-	1,342,668,118.00	-
(7) Others (Specify)		-	-	-
-				
Camp Expenses (Research Project)	-	-	-	-
TOTAL	**513,620,244.00**	**1,665,901,948.00**	**-**	

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 21 OTHER ADMINISTRATIVE EXPENSES	R&P	Committed	Current Year		Previous Year	
			Plan	Non Plan	Plan	Non Plan
AMC of Computers	-	-	2,933,819.85	-	995,331.00	-
Purchases	-		-	-	366,655.00	-
Annual Research Seminar	-	-	2,110,352.00	-	-	-
Contingencies/Miscellaneous (Training Account)	-	-	594,638.48	-	-	-
Contingencies/ Miscellaneous	-	-	1,765,787.40	-	578,505.00	-
Expenses for Library	-	-	1,231,895.29	-	513,825.00	-
Electricity and Water Charges	-	-	13,883,180.00	-	10,082,971.00	-
Maintenance Of WII Campus	-	-	2,942,109.00	-	6,947.00	-
Estate Security	-	-	34,587,881.00	-	33,434,667.00	-
Laboratory Expenses (WII Health)	-	-	183,680.00	-	16,963.00	-
Laboratory Expenses (Forensic Lab)	-	-	-	-	22,539.00	-
Laboratory Expenses (Genetic Lab)	-	-	590,921.00	-	-	-
Legal Expenses	-	-	1,031,749.00	-	1,677,735.00	-
M.Sc. Course Expenditure	-	-	3,100,000.00	-	24,900.00	-
Operational Expenses	-	-	4,989,731.24	-	22,914,997.65	-
Corpus Fund Transfer (Training Account)	-		-	-	2,863,820.00	-
POL & Maintenance of Vehicle (Training Account)	-		329,309.00	-	634,889.00	-
POL for Vehicles	-		1,277,299.00	-	403,415.00	-
Postage & Telegrams	-		92,438.00	-	1,211,943.00	-
Printing & Binding	1,714,307.00		-		263,981.00	-
Boarding & Lodging (Training Account)	2,384,813.00	-	8,830,605.00	-		
Repair & Maintenance of Vehicles	-		894,707.00	-	1,381,719.00	-
Vehicle Insurance	-		338,349.00	-	343,157.00	-
Repair of Vehicle (Training Account)	-		242,382.00	-	23,773.00	-
Repair & Maintenance furniture & Fixture	-		2,570,371.00	-	-	-
Sports	85,874.00		-	79,030.00	-	
Hospitality/ Entertainment	-		3,418,161.00	-	5,110,209.00	-
Sport Goods (Training Account)	-		103,125.00	-	27,591.00	-
Stationery	-		821,841.93	-	717,795.44	-
Training Allowance	-		144,000.00	-	488,345.00	-
Telephone & TC	-		3,492,301.00	-	1,079,525.00	-
Stationery (Training Account)	-		4,845.00	-	167,455.00	-
SACON Cost Expenditure	-		-	-	-	-
Travel Expenses (Grant in Aid)	-		1,901,111.00	-	2,818,755.00	-
Travel Expenses (Research Project)	-		1,239,000.00	-	79,995.00	-
Travelling Expenses (Training Account)	-		5,178,303.00	-	12,933,194.91	-
Maintenance of civil work	-		13,428,581.00	-	2,978,095.00	-
TA/DA & Honorarium (Training Account)	-		339,864.00	-	237,500.00	-
Books (Training Account)	-		27,540.00	-	332,553.00	-
Field Assistance (Training Account)	-		176,700.00	-	341,050.00	-
Manpower	-		9,483,127.00	-	-	-
Advertisement Expenses	-		365,567.00	-	-	-
Tuition Fee (Training Account)	-		1,225,000.00	-	1,148,000.00	-
Refund of Unspent Amt/Interest	-		471,706.00	-	291,925.00	-
Written off of PY Income (Training Account)	-		-	-	660,000.00	-
Depreciation during the year	-		34,062,613.00	-	28,166,115.00	-
TOTAL -	**-**		**155,758,979.19**	**-**	**144,250,471.00**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 22 EXPENDITURE ON GRANTS, SUBSIDIES ETC...	Current Year		Previous Year	
	Plan	Non Plan	Plan	Non Plan
(a) Grants given to Institutions/Organisation	-	-	-	-
(b) Subsidies given to Institution?Organisations	-	-	-	-
TOTAL	**-**	**-**	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

SCHEDULE : 23 - INTEREST	Current Year		Previous Year	
	Plan	Non Plan	Plan	Non Plan
(a) On Fixed Loans	-	-	-	-
(b) On other Loans (including Bank Chargs)	-	-	-	-
(c) Other (Specify)	-	-	-	-
TOTAL -	**-**	**-**	**-**	**-**

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

1 ACCOUNTING CONVENTION

The financial statement are prepared on the basis of historical cost convention, unless otherwise stated and on the accrual method of accounting.

2 INVENTORY VALUATION

2.1 Stores and spares (including machinery spares) are valued at cost.

2.2 Nil

3 INVESTMENTS

3.1 Investments classified as Long term investments are carried at cost. Provision for decline, other than temporary, is made on carrying cost of such investments.

3.2 Investments classified as current are carried at lower of coast and fair value. Provision for shortfall In the value of such investments is made for each investment considered individually and not on a global basis.

3.3 Cost includes acquisition expenses like brokerage, transfer stamps.

4 RECLASSIFICATION OF PRIOR YEAR PRESENTATION

Prior year amounts have been reclassified for consistency with the current year presentation. These reclassifications had no effect on the reported results of operations. An adjustment has been made to due to merger of SACON with WII w.e.f. 01.04.2023 vide order issued from F.No. FC-11/172/2022-DGF dated 25.04.2023.

5 FIXED ASSETS

5.1 Fixed assets are stated at cost of acquisition inclusive of inward freight, duties and taxes and incidental and direct expenses related to acquisition. In respect of projects involving construction, related pre-operational expenses (including interest on loan for specific project prior to its completion), form part of the value of the assets. Capitalized

5.2 Fixed assets received by way of non-monetary grants, (other than towards the Corpus Fund), are capitalized at values stated by corresponding credit to capital Reserve.

5.3 The assets is recognized on the date of making payment to the supplier.

6 DEPRECIATION

6.1 Depreciation is provided on "Written Down Value method" as per specified in the Income-tax, 1961 except depreciation on cost adjustments arising on account of conversion of foreign currency, liabilities for acquisition of fixed assets, which is amortized over the residual life of the respective assets. However SACON followed SLM Method and same is incorporated in

financial statements.

6.2 In respect of additions to/deductions from fixed assets during the year, depreciation is considered on pro-rata basis.

6.3 Nil

7 MISCELLANEOUS EXPENDITURE

Nil

8 REVENUE RECOGNITION

8.1 Income of the Centre is recognized in the books of Accounts on Cash basis.

8.2 Interest Income on Fixed Deposits is recognized on accrual basis taking into account the amount outstanding and rates applicable.

9 GOVERNMENT GRANT/SUBSIDIES

9.1 Government grants of the natures of contribution towards capital cost of setting up projects are treated as Capital Reserve

9.2 Government grants in respect of specific assets acquired are shown as a deduction from the cost of the related assets.

9.3 Government grants /subsidy are accounted on realization basis.

10 FOREIGN CURRENCY TRANSACTION

10.1 Transaction denominated in foreign currency are accounted at the exchange rate prevailing at the date of the transaction.

10.2 Current assets, foreign currency loans and current liabilities are converted at the exchange rate prevailing as at the year end and the resultant gain/loss is adjustment to cost of fixed assets, if the foreign currency liability related to fixed assets, and in other cases is considered to revenue

11 LEASE

Lease rentals are expensed with reference to lease terms.

12 RETIREMENT BENEFITS

The pension scheme followed in the institute is based on CCS Pension Rules, for the employees appointed prior to 01 Jan 2004. The New Pension Scheme(NPS) is in operation for the employees recruited on or after 01 Jan 2004

(a) The Institute maintains a separate Bank Account for contribution / subscription (Employer & Employee's) towards, General Provident Fund, Pension Scheme.

Accordingly, separate financial statement showing the total fund balance of GPF, Fixed Deposits/ Investments/Bank Balance made out of G.P.F. A/c, representing the same fund balance have separately been added with the Institute's Balance Sheet as at 31 st March 2024.

(b) Gratuity: Liability towards Gratuity is recognized as per the provisions of "Accounting Standard-15.However SACON Provision of Rs. 60,18,249/- towards accrued Gratuity liability for the year ended 31.03.2024 has been made in the books of accounts.

(c) Pension: Liability towards pension is recognized as per the provisions of "Accounting Standard-15.

(d) Leave Encashment: Liability towards leave encashment is recognized as per the provisions of "Accounting Standard-15.However SACON Provision of Rs. 58,68,702/- towards accrued leave encashment liability for the year ended 31.03.2024 has been made in the books of accounts.

(e) As per the provisions of "Accounting Standard-15 obligation for the employee's post-employment benefits is recognized in the financial statements on accrual basis based on actuarial techniques.

Liability for the current year charge has been debited to the Corpus Fund.

Account as per the provisions of "Accounting Standard-15".

13 PRIOR PERIOD ITEMS

13.1 Prior period items, Extra ordinary items and changes in Accounting Polices are accounted in accordance with Accounting Standard-5.

13.2 Prior period items, Extra ordinary items and changes in Accounting Polices are accounted in accordance with Accounting Standard-5.

13.3 Prior period items, Extra ordinary items and changes in Accounting Polices are accounted in accordance with Accounting Standard-5.

FORM OF FINANCIAL STATEMENTS(NON-PROFIT ORGANISATIONS)
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amt. Rs.)

SCHEDULE :25 - CONTINGENT LIABILITIES AND NOTES ON ACCOUNTS :	Plan	Non Plan	Plan	Non Plan
1 CONTINGENT LIABILITIES				
1.1 Claims against the Entity not acknowledged as debts	-		-	-
1.2 In respect of :				
Bank guarantees given by/on behalf of the entity	-		-	-
Letters of Credit opened by Bank on behalf of the Entity	-		-	-
Bills discounted with banks	-		-	-
1.3 Disputed demands in respect of :				
Income Tax-Related to SACON , a penalty order under section 270A of the Income Tax Act ,1961 was passed against the Institution thereby raising a demand of				

		Rs.70,79,364/-. The Institute was filed appeal before the Commissioner of Income Tax (Appeals), NFAC. The matter is still pending for disposal by the appellate authority and no liability is brought in the books of accounts in this regard.	-	-	-
		WII Income Tax Liability as per Income Tax Portal			
		Assessment Year — Amount (Rs.)			
		2014-15 — 173,983,425.00			
		2017-18 — 1,068,800.00			
		2018-19 — 4,261,760.00			
		2019-20 — 167,228,505.00			
		Sales-Tax	-	-	-
		Municipal Taxes	-	-	-
	1.4	In respect of claims from parties for non-execution of orders, but contested	-	-	-
2	**CAPITAL COMMITMENTS**				
		Estimated value of contracts remaining to be executed on capital account and not provided for (net of advance)	-	-	-
3	**LEASE OBLIGATIONS**				
		Future obligations for rentals under finance lease arrangements for Plant and Machinery amount to	-	-	-
4	**CURRENT ASSETS, LOANS AND ADVANCES**				
		In the opinion of the Management, the current assets, loans and advances have a value on realization in the ordinary course of business, equal at least to the aggregate amount shown in the Balance Sheet.	-	-	-
5	**TAXATION**				
		In view of there being no taxable income under Income-tax Act 1961, no provision for income tax has been considered necessary.	-	-	-
6	**FOREIGN CURRENCY TRANSACTIONS**				
	6.1	Value of Imports calculated on C.I.F. Basis :			
		Purchase of finished Goods	-	-	-
		Raw Materials & Components (including in transit	-	-	-
		Capital Goods	-	-	-
		Stores, Spares and Consumables	-	-	-
	6.2	Expenditure in foreign currency:			
		a) Travel	-	-	-
		b) Remittances and Interest payment to Financial Institutions/ Banks in Foreign Currency	-	-	-
		c) Other expenditure:			
		Commission on Sales	-	-	-
		Legal and Professional Expenses	-	-	-
		Miscellaneous Expenses	-	-	-
	6.3	Earnings:			
		Value of Exports on FOB basis	-	-	-
	6.4	Remuneration to auditors			
		As auditors			
		Taxation Matters	-	-	-
		For Management Services	-	-	-
		For certification	-	-	-
		other	-	-	-
7		Corresponding figures for the previous year have been regrouped/rearranged, wherever necessary	-	-	-
8		Schedules 1 to 25 are annexed to and form an integral part of the Balance Sheets as at 31 Mar 2024 and the Income and Expenditure Account for the year ended on that date.	-	-	-
TOTAL			**-**	**-**	**-**

GENERAL PROVIDENT FUND ACCOUNT NO. 518502010001297
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

Income			Expenditure		
Particulars	**Current Yr Amount**	**Prev. Yr Account**	**Particulars**	**Current Yr Amount**	**Prev. Yr Account**
Opening Balance	5,443,480.00	5,766,203.00	Final payment of GPF	34,047,942.00	32,608,039.00
Interest Received on Saving Account	237,520.00	213,888.00	Advance/Withdrawal paid	7,830,000.00	21,176,524.00
GPF Contribution	17,684,966.00	19,795,292.00	Auto sweep Bank Bal.	-	3,500,000.00
Encashment of FDR	75,487,628.00	26,499,586.00	Investment in FDR	60,000,000.00	-
Interest on FDR	1,194,330.00	1,997,548.00		1.19	-
Interest Accrued	-	4,955,526.00			
Auto sweep Bank Bal.	3,000,000.00	3,500,000.00	Bank Balance	1,169,980.81	5,443,480.00
Total	**103,047,924.00**	**62,728,043.00**	**Total**	**103,047,924.00**	**62,728,043.00**

PENSION FUND ACCOUNT NO. 518502010000018
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

Income			Expenditure		
Particulars	**Current Yr Amount**	**Prev. Yr Account**	**Particulars**	**Current Yr Amount**	**Prev. Yr Account**
Opening Balance	18,111,801.28	6,188,212.00	Investment in FDR	120,000,000.00	533,050,647.00
Interest Received on Saving Account	597,083.00	2,647,434.00	Commuted Value of Pension	17,530,327.00	19,316,170.00
Interest Earned on FDR	309,942.00	5,267,214.00	Family Pension/ Pension	59,543,617.00	46,006,388.00
WII Contribution	-	289,854,992.00	Mis. Expenses	5.92	-
Encashment of FDR	13,599,227.00	202,816,939.00			
Misc. Receipt	180,006,187.70	109,710,215.28			
			Bank Balance	15,550,291.06	18,111,801.28
Total	**212,624,240.98**	**616,485,006.28**	**Total**	**212,624,240.98**	**616,485,006.28**

WII CONTRIBUTION OF GRATUITY ACCOUNT NO. 518502010055326
WILDLIFE INSTITUTE OF INDIA, CHANDRABANI, DEHRADUN
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

Income			Expenditure		
Particulars	**Current Yr Amount**	**Prev. Yr Account**	**Particulars**	**Current Yr Amount**	**Prev. Yr Account**
Opening Balance	7,013,981.31	5,659,599.47	Misc. Expenses	17.12	70.16
Interest Received on Saving Account	318,892.00	176,112.00	Final Payment	1,800,154.00	-
WII Officials Contribution	2,847,023.00	1,178,340.00	Investment in FDR	21,000,000.00	-
Interest Received on FDR	16,993,074.00	-			
			Bank Balance	4,372,799.19	7,013,981.31
Total	**27,172,970.31**	**7,014,051.47**	**Total**	**27,172,970.31**	**7,014,051.47**

FORM OF FINANCIAL STATEMENTS (NON-PROFIT ORGANISATIONS)

ANNEXURE - 1

Wildlife Institute of India, Dehradun

Fixed Assets Purchased from Funds reflected in Schedule-3

ACCOUNT FOR THE YEAR ENDED 2023-24

(Amount in Rs.)

Particulars	Gross Block					Description				Net Block	
	Cost as at the beginning	Addition during the year		Deduction during the Year	Cost as at the end of the year	As at the beginning of the year	For the year	Deduction during the year	At the end of the year	As ast the current year-end	As at the previous year-enf
		Upto 30-Sep.	After 30-Sep.								
BUILDINGS											
Building			61,615,711.00		61,615,711.00		4,621,178.33		4,621,178.33	56,994,532.68	-
Porta Cabin		2,087,105.00	1,035,200.00		3,122,305.00		390,705.75		390,705.75	2,731,599.25	-
TOTAL	-	2,087,105.00	62,650,911.00	-	64,738,016.00	-	5,011,884.08	-	5,011,884.08	59,726,131.93	-
PLANT MACHINERY & EQPT											
BLOCK: 15%											
Office Equipment	27,536,217.00	13,055,183.50	43,898,660.59	-	84,490,061.09	-	9,381,109.62	-	9,381,109.62	75,108,951.47	27,536,217.00
Camp Equipment	59,447,030.67	-	-	-	59,447,030.67	-	8,917,054.60	-	8,917,054.60	50,529,976.07	59,447,030.67
Field Equipment		102,281,456.78	76,309,149.55		178,590,606.33		21,065,404.73		21,065,404.73	157,525,201.60	
TOTAL	**86,983,247.67**	**115,336,640.28**	**120,207,810.14**	**-**	**322,527,698.09**	**-**	**39,363,568.95**	**-**	**39,363,568.95**	**283,164,129.14**	**86,983,247.67**
FURNITURE'S & FIXTURES											
BLOCK : 10%											
Furniture's & Fixtures	443,697.81	120,655.00	722,992.00	-	1,287,344.81	-	92,584.88	-	92,584.88	1,194,759.93	443,697.81
TOTAL	**443,697.81**	**120,655.00**	**722,992.00**	**-**	**1,287,344.81**	**-**	**92,584.88**	**-**	**92,584.88**	**1,194,759.93**	**443,697.81**
BOOKS : BLOCK : 40%											
Books	961.28	-	-	-	961.28	-	384.51	-	384.51	576.77	961.28
TOTAL	961.28	-	-	-	961.28	-	384.51	-	384.51	576.77	961.28
COMPUTER/PERIPHERALS :											
BLOCK : 40%											
Comp. & Accessories	1,875,751.00	4,063,042.00	2,911,692.00	-	8,850,485.00	-	2,957,855.60	-	2,957,855.60	5,892,629.40	1,875,751.00
GRAND TOTAL	**89,303,657.76**	**121,607,442.28**	**186,493,405.14**	**-**	**397,404,505.18**	**-**	**47,426,278.02**	**-**	**47,426,278.02**	**349,978,227.16**	**89,303,657.76**

(N.S. Chauhan)
Finance Officer

(Virendra R. Tiwari)
Director

LIST OF WII PERMANENT EMPLOYEES

Sl. No.	Name of Official	Designation
1.	Shri Virendra R Tiwari, IFS	Director
2.	Dr. Ruchi Badola	Scientist-G
3.	Dr. S. Sathyakumar	Scientist-G
4.	Sh. Qamar Qureshi	Scientist-G
5.	Dr. B.S. Adhikari	Scientist-G
6.	Dr. Bivash Pandav	Scientist-G
7.	Dr. Parag Nigam	Scientist-G
8.	Dr. Bilal Habib	Scientist-F
9.	Dr. K. Ramesh	Scientist-F
10.	Dr. G.H. Talukdar	Scientist-F
11.	Dr. Gopi G.V.	Scientist-F
12.	Dr. J.A. Johnson	Scientist-F
13.	Dr. S.K. Gupta	Scientist-F
14.	Dr. R. Suresh Kumar	Scientist-F
15.	Dr. Samrat Mondal	Scientist-F
16.	Dr. Sutirtha Dutta	Scientist-E
17.	Dr Salvador Lyngdoh	Scientist-E
18.	Dr. Abhijit Das	Scientist-E
19.	Dr. C Ramesh	Scientist-E
20.	Dr. Malvika Oniyal	Scientist-D
21.	Dr. Vishnupriya Kolipakam	Scientist-D
22.	Dr. Amit Kumar	Scientist-D
23.	Dr. Navendu Page	Scientist-D
24.	Dr. Lallianpuii Kawlni	Scientist-D
25.	Dr. Nehru Prabhakaran	Scientist-D
26.	Dr. Anukul Nath	Scientist-C
27.	Ms. Chinmaya Deepak Ghanekar	Scientist-C
28.	Shri Varun Shriniwas Kher	Scientist-C
29.	Shri Ritesh Kumar Gautam	Scientist-C
30.	Shri Ashish Jha	Scientist-C
31.	Shri Prasant Mahajan	Scientist-C
32.	Shri K.K. Shrivastava	Principal Technical Officer
33.	Dr. Panna Lal	Principal Technical Officer
34.	Smt. Baljeet Kaur	Deputy Registrar
35.	Shri Rajnish Sharma	IAO (deputation)
36.	Shri Narendra Singh Chauhan	Finance Officer (on deputation)
37.	Shri Mohit Kumar Gupta	Assistant Director (OL)
38.	Smt. Anita Pahwa	Academic Officer

Sl. No.	Name of Official	Designation
39.	Shri M.P. Aggarwal	Principal Private Secretary
40.	Dr. C.P. Sharma	Principal Technical Officer
41.	Shri Lekh Nath Sharma	Sr. Technical Officer (3)
42.	Shri Dinesh Singh Pundir	Sr. Technical Officer (2)
43.	Smt. Alka Aggarwal	Sr. Technical Officer (2)
44.	Shri Narinder Singh Bist	Sr. Technical Officer (2)
45.	Shri Harendra Kumar	Sr. Technical Officer (2)
46.	Smt. Sunita Agarwal	Sr. Technical Officer (2)
47.	Shri M.M. Uniyal	Sr.Technical Officer (2)
48.	Smt Vikreshwari Dangwal	Sr.Technical Officer (2)
49.	Shri Manohar Pathak	Sr. Technical Officer (2), Librarian
50.	Shri Sanjay Kumar Bharti	Section Officer
51.	Smt. Sadhana Verma	Section Officer
52.	Smt. Padma Rani	Section Officer
53.	Shri Padam Singh Dhamanda	Section Officer
54.	Shri Balbeer Singh Chauhan	Sr. Technician (2)
55.	Shri A Madhan RajSenior	Technical Officer (1)
56.	Shri Virendra Kumar Sharma	Technical Officer
57.	Smt. Shashi Bala, Uniyal	Technical Officer
58.	Sh. Rakesh Sundriyal	Sr. Technician (2)
59.	Ms. Anushka Uniyal	Technical Assistant (Field)
60.	Shri Nitin	Technician
61.	Shri Deepak kavi	Technician
62.	Shri Gaurav Uniyal	Technician
63.	Shri Ompal Singh	Technician
64.	Shri Gyanesh Chhibber	Junior Stenographer
65.	Shri Kuldeep Chauhan	Junior Stenographer
66.	Shri Vinay Kumar Sharma	Stenographer Grade II
67.	Shri Neeraj Kumar Gupta	Stenographer Grade II
68.	Shri Vijay Prasad	Assistant Grade (I)
69.	Shri G. Muthu Veerappan	Assistant Grade (II)
70.	Shri Pyar Chand Singh Aswal	Assistant Grade (II)
71.	Shri Hari Krishan Gupta	Assistant Grade (II)
72.	Shri Ummed Singh	Assistant Grade (II)
73.	Shri Sunil Sundriyal	Assistant Grade (III)
74.	Shri Naved Ali	Assistant Grade(III)
75.	Shri Ashu	Assistant Grade (III)
76.	Shri Rajeev Kumar Gambhir	Driver (Special Grade)
77.	Shri Anwar Ali	Driver Grade-I
78.	Shri Vinod Singh Bisht	Driver Grade-I
79.	Shri Dharam Singh	Driver Grade-I

Sl. No.	Name of Official	Designation
80.	Shri Kheema Nand Bhatt	Cook
81.	Shri Jabbar Singh Rawat	Cook
82.	Shri Devender Prasad Kothari	Lab. Assistant
83.	Shri Rajender Singh Rawat	Lab. Assistant
84.	Shri Birender Singh Rawat	Lab. Assistant
85.	Shri Kishan Singh	Lab. Assistant
86.	Shri Narender Singh Aswal	Lab. Assistant
87.	Shri Rampal Maurya	Lab. Assistant
88.	Shri Ramu Kumar	Lab. Assistant
89.	Shri D.P. Chamoli	Lab. Assistant
90.	Shri Sanjay Chouniyal	Lab. Attendant
91.	Smt. Sarita Rani	MTS
92.	Shri Mukti Prasad Sharma	MTS
93.	Shri Jitender Singh Rawat	MTS
94.	Smt. Anju Rawat	MTS
95.	Shri Hira Lal Sharma	MTS
96.	Shri Om Prakash Pun	MTS
97.	Shri Ishwar Bahadur Rana	MTS
98.	Shri Niranjan Prasad	MTS
99.	Shri Vasudev	MTS
100.	Shri Ram Singh Gurung	MTS
101.	Shri Prakash Bardeva	MTS
102.	Smt. Anita Devi	MTS
103.	Shri. Kishan Singh Bisht	MTS
104.	Shri Poroma Boro	MTS
105.	Shri Chitrapal Singh Bisht	MTS
106.	Shri Lalit Singh Negi	MTS
107.	Smt Ganeshwari	MTS
108.	Ms. Shricha Pathak	MTS

SACON

1.	Dr. S. Muralidharan	Senior Principal Scientist
2.	Dr. P. Pramod	Senior Principal Scientist
3.	Mr. V. Vaidiyanathan	PA to Director
4.	Mr. M. Manoharan	Library Assistant
5.	Mrs. R. Rajalakshmi	Office Assistant
6.	Mr. M. Eanamuthu	Stenographer
7.	Mrs. M. Jayageetha	Lower Division Clerk (Reception)
8.	Mr. R. Ravi	Driver
9.	Mrs. V. Santhalakshmi	Office Attendant

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