ZOO'S PRINT

Communicating science for conservation

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40 years zooreach Zoo Outreach Organisation

Cover photo: Red-billed Blue-Magpie captured in Chamba, Himachal Pradesh. © Amrin Ansari.

CITSCI WITH TNFJU

Report : Citizen Science Workshop, Tuticorin, Tamil Nadu

The citizen science workshops are a part of 1OCEAN initiative run by Zooreach and this component of the project known as 'Conservation of Critically Endangered Hammerhead sharks of India via Participatory Science' is funded by WCT-Biodiversity, Ecosystems and Endangered Species Grants Programme (WCT-BEES Grants). The aim is to train students belonging to fisheries or zoology background in documentation of sharks and bycatch species in nearby harbours and to collect data from fisher community, which would then be uploaded on the Citizen Science website developed.

In such series of workshops, this one was the 8th and final one, in terms of project duration. The intention is to make the students aware of the scenario the sharks are facing in the oceans and why it is important to conserve these groups. This workshop was conducted in Tuticorin District, Tamil Nadu, on 26 June 2025, at Tamil Nadu Dr. J. Jayalalitha Fisheries University (TNJFU).

Theory of the Workshop

The workshop started with the inauguration speech by the head of the Department of Fisheries Biology and Resource Management, R. Durairajah, who introduced the workshop to the students and enlightened them about citizen science and its usage. He then handed over the session to, T. Ravikumar, assistant professor, who also welcomed the participants.

The theory started with the introduction of Zooreach and the various projects under it. dived into relevant topics which consisted of an attitude survey, to warm up into the workshop, where various pictures were presented to the students and were asked how they feel about it. The responses were varied, with some liking the pictures and other being mostly neutral in their responses. After a series of pictures came the information on the shark fisheries in India. The trade drivers in India and international markets were mentioned. Followed by a small activity to visualize the decline of total shark populations

Citizen Science

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in the oceans. Even though the students were hesitant to participate at first, they circled back to this point and mentioned the visual representation was an important tool to use to create an impact of the said information. Usha then slowly moved the topic of various threats to the sharks – such as slow reproduction, fishing pressures and demands, habitat destructions, and lower prey base.

The next part in the workshop was to explain the various body parts of the cartilaginous fishes, which the sharks and rays belongs to (elasmobranchs). Explanations weren't necessary as the students were already familiar with a fish's anatomy due to their course subject.

In the next part photographic guides were given, points to remember while taking a species' photograph, use of a scale and must have body parts of the fish in a photograph for it to be accurately identified. Especially in the context of sharks – to photograph the fins, teeth, and gills. Then the workshop moved on to hammerhead sharks, which are the focal species of the project.

This part of the workshop was conducted by P. Kritika, where she explained the different types of hammerhead sharks found in Indian waters and their different morphological features, which can be used to identify the species, if witnessed in field.

The head shapes and other identifying characteristics such as dorsal fin shape & length and anal fin shape & length. Following which, Usha continued with the workshop. Then, an observation exercise was done with pictures from various harbours of fish landing and asking the students what they see in those different pictures, done to show how and what could be the observations that can be made in the field.

With that the workshop ended, R. Durairaja presented the end notes and the vote of thanks was given by K. Karuppasamy, assistant professor.

Harbour Visit

Along with two professors from the college staff and five students, we went to the Tuticorin Fishing Harbour, where the landing starts at 8:30 PM and then continues till midnight or beyond, if the catch is on the greater side.

There weren't any sharks witnessed in the harbour that night, but a number of bony fishes and cephalopods were landed, which were fresh. And a lot of by-catch was also landed which on one look, seemed like a single species bycatch (mainly consisting of anchovies). From the sources, the fishermen here go for one day fishing.

The students were given instructions on how to take picture of sharks, for accurate identification after which they scanned the harbour for an hour, observing the species present. A discussion with the students was conducted at the end of the visit to learn their observations, and points to remember when visiting a harbour. With that ended the final workshop of the citizen science project. Given below is a list of species documented by the team during the harbour visit.

Acknowledgments

I would like to express my sincere gratitude to Dr. B. Ahilan, dean and Dr. R. Durairajah, head of the Department of Fisheries Biology and Resource Management, Tamil Nadu Dr. J. Jayalalitha Fisheries University (TNJFU), for making this workshop possible. I am also thankful to Mr. K. Karuppasamy, assistant professor, for his valuable assistance in the identification and verification of the fish species documented in this report.

	Common name	**Scientific name**	**Family**
1	Giant Trevally	*Caranx* cf. *ignobilis*	Carangidae
2.	Grouper	*Epinephelus* cf. *undulosus*	Serranidae
3.	Common Ponyfish	*Leiognathus* cf. *equula*	Leiognathidae
4.	Yellowfin Surgeonfish	*Acanthurus* sp.	Acanthuridae
5.	Sand Lance	*Bleekeria* cf. *murtii*	Ammodytidae
6.	Flute Fish	*Fistularia* sp.	Fistulariidae
7.	Scrawled Filefish	*Aluterus* cf. *scriptus*	Monacanthidae
8.	Unicorn Leatherjacket	*Aluterus* cf. *monoceros*	Monacanthidae
9.	Barracuda	*Sphyraena* cf. *flavicauda*	Sphyraenidae
10.		*Lethrinus* cf. *nebulosus*	Lethrinidae
11.	Angel Fish	*Pomacanthus* cf. *imperator*	Pomacanthidae
12.		*Xyrichtys* sp.	Labridae
13.	Stipenose Guitarfish	*Acroteriobatus* cf. *variegatus*	Rhinobatidae
14.	Yellow-striped Scad	*Selaroides* cf. *leptolepis*	Carangidae
15.	Diamond Trevally	*Alectis* cf. *indica*	Carangidae
16.	Sweetlips	*Plectorhinchus* sp.	Haemulidae
17.	Short-nosed Tripodfish	*Triacanthus* cf. *biaculeatus*	Tricanthidae
18.	Cresent Grunter	*Terapon* cf. *jarbua*	Terapontidae
19.	Blue-spotted Stingray	*Neotrygon* cf. *kuhlii*	Dasyatidae
20.	Pilot Fish	*Naucrates* cf. *ductor*	Carangidae
21.	Snakefish	*Trachinocephalus* cf. *myops*	Synodontidae
22.	Commerson's Sole	*Synaptura* cf. *commersonnii*	Soleidae
23.	Tenpounder	*Elops* cf. *machnata*	Elopidae
24.		*Pardachirus* sp.	Soleidae
25.	Cobia	*Rachycentron* cf. *canadum*	Rachycentridae
26.	Seer Fish	*Scomberomorus* cf. *commerson*	Scombridae
27.	Freckled Goatfish	*Upeneus* cf. *tragula*	Mullidae

Kritika P, Researcher at 1OCEAN initiative & Zoo Outreach Organisation.

Zooreach Activity Update


[1] *Acanthurus* sp.


[1] *Acroteriobatus* sp.


[1] *Alectis* sp.


[1] *Aluterus* cf. *scriptus*


[2] *Aluterus* sp.


[1] Bycatch crates


[1] Cephalopods


[2] *Elops machanata*


[1] *Leiongathus* sp.


[1] *Naucrates ductor*


[1] *Rachycentron canadum*


[1] *Scomberomorus commersoni*


[1] *Synaptura* sp.


[1] *Terapon* sp.


[1] *Trachinocephalus myops*


[1] *Upeneus* sp.

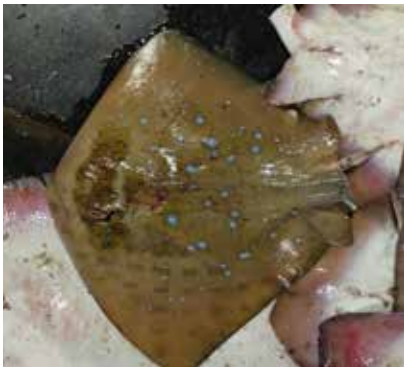
[1] ***Bleekeria murtii***

[2] ***Caranx ignobilis***

[2] ***Epinephelus* sp.**

[2] ***Fistularia* sp.**

[2] ***Lethrinus* sp. (on the right)**



[1] ***Neotrygon* sp.**

[2] ***Pardachirus* sp.**

[1] ***Plectorhinchus* sp.**

[2] ***Pomacanthus imperator***

[1] ***Selaroides leptolepis***

[1] ***Sphyraena* sp.**

[2] ***Triacanthus* sp.**

[1]© Kritika P; [2] © Usha Ravindra

Citation: Kritika P (2025). CITSCI with TNFJU. Report: Citizen Science Workshop, Tuticorin, Tamil Nadu. In: *Zoo's Print* 40(7): 01–06.

A month of faunal investigations and habitat restoration in Chamba.

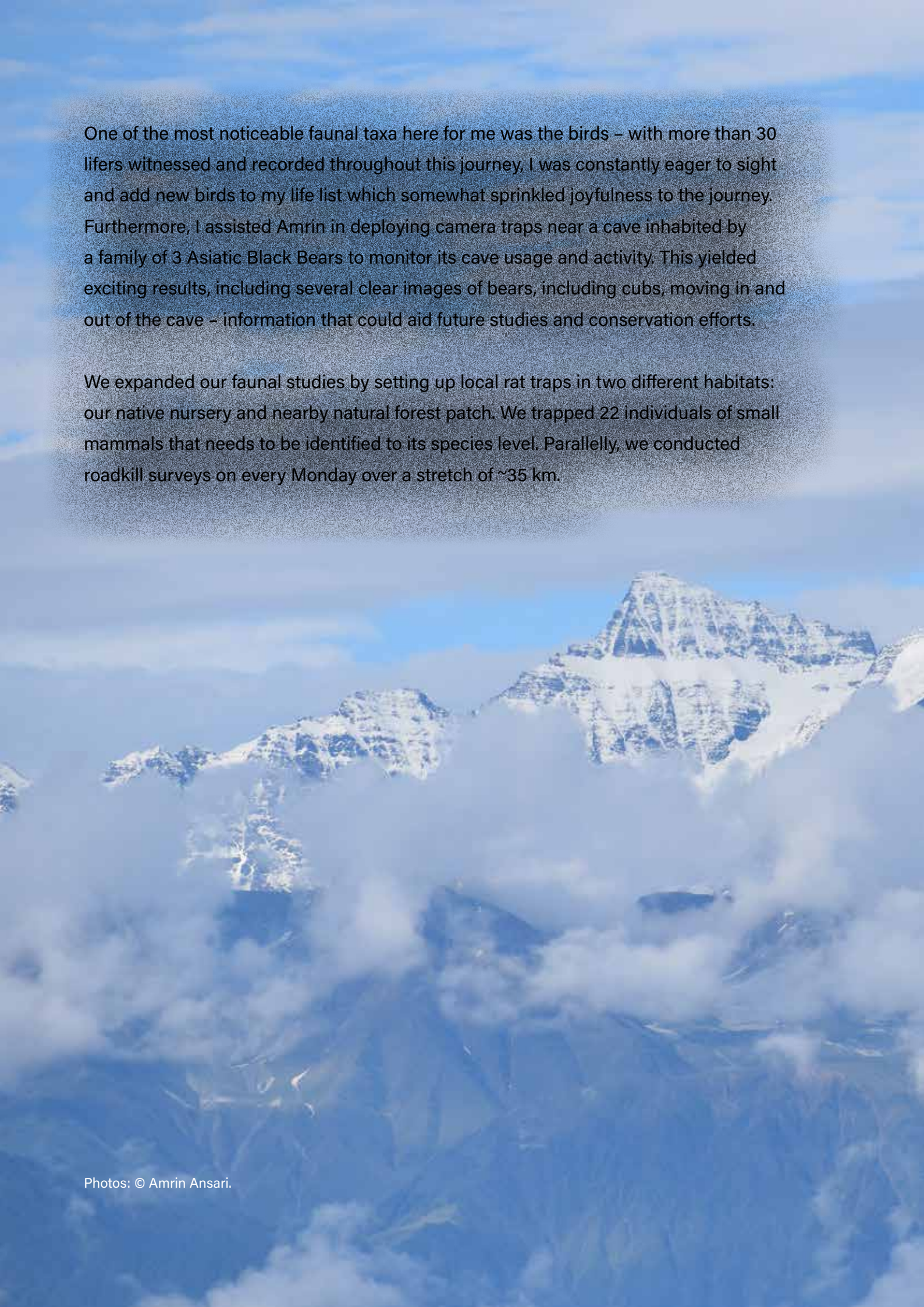
Spending more than a month in Chamba, Himachal Pradesh, located within the western Himalayan region was profoundly eye-opening experience for me. Coming from Karnataka, India with prior experience only in the Western Ghats region, this was my first time venturing into the Himalayan landscape for the purpose of work/research because of which everything felt completely new. The foremost thing that captivated me was its scenic and breathtaking landscape of enormous rocky-mountains with its heavily undulating terrain. As an aspiring wildlife researcher and conservationist, I was excited to document and learn about the region's wildlife while contributing to the Himalayan Restoration Project (HRP) run by Zoo Outreach Organisation.

Primarily, this journey started at the native nursery in Dugli Village, which currently nurtures about 10,000 saplings belonging to 15 species. This nursery along with the forest department has been a pivotal source for the ongoing restoration work here. Throughout the journey, together we planted over 500 saplings at different community people's land who partnered in Zooreach's restoration efforts.

Restoration efforts: sowing seeds in the nursery.

One of the most noticeable faunal taxa here for me was the birds – with more than 30 lifers witnessed and recorded throughout this journey, I was constantly eager to sight and add new birds to my life list which somewhat sprinkled joyfulness to the journey. Furthermore, I assisted Amrin in deploying camera traps near a cave inhabited by a family of 3 Asiatic Black Bears to monitor its cave usage and activity. This yielded exciting results, including several clear images of bears, including cubs, moving in and out of the cave – information that could aid future studies and conservation efforts.

We expanded our faunal studies by setting up local rat traps in two different habitats: our native nursery and nearby natural forest patch. We trapped 22 individuals of small mammals that needs to be identified to its species level. Parallelly, we conducted roadkill surveys on every Monday over a stretch of ~35 km.



Photos: © Amrin Ansari.

During this, we recorded over 30 individuals of roadkills belonging to all the four terrestrial taxa. An absolute surprise was the encounter of a Siberian Weasel. It was a fascinating brief and clear 5-minute sighting, where the first thing that caught my eye was its beautiful rufous coat which made the animal pop out in the midst of lush, grassy and rocky forested background. I could also properly observe its natural instincts, how it moved quickly & quietly without even making a slight sound.

Altogether, this whole Chamba journey incorporated with these rookie research activities, deepened my understanding to Himalayan diversity. More importantly, not only just revealed and offered what all this area & landscape harbours but also enlightened me and laid the groundwork for deeper scientific work in future, by not only expanding my knowledge but also sparked numerous new ideas and a strong motivation to continue by being a part of the HRP in this remarkable region, which has lit this blazing number of ideas.

S. Sushanth, PhD Student, Zoo Outreach Organisation, Coimbatore, Tamil Nadu 641006.

Himalayan skyline view from Chamba.

Citation: Sushanth, S. (2025) A month of faunal investigations and habitat restoration in Chamba. In: *Zoo's Print* 40(7): 07–10.

Zooreach Activity Update

Wedge-tailed Green-Pigeon *Treron sphenurus.*

Red-billed Blue-Magpie *Urocissa erythrorycha.*

Siberian Weasel *Mustela sibirica.*

Asiatic black bear *Ursus thibetanus.*

Understanding Bycatch Fisheries at Dhakke

Introduction

Bycatch is the incidental catch of non-target species during fishing operations. Bycatch can be the wrong species, the wrong size or juveniles of the target species. It can also include species that are not commercially valuable or are protected under conservation laws. Trawling, an important commercially used method to catch fishes which also includes fish that are not consumed but are used economically. Trawls are operated from surface to bottom intending to target specific groups of organisms, but being the most destructive non-selective gear catches everything that come across its towing path.

Karnataka has a coastline of 300 km with 96 fish landing centres among which Mangalore in Dakshina Kannada, Malpe in Udupi and Karwar in Uttara Kannada are the major landing centres. Mangalore is the largest marine fish landing centre with a wide continental shelf. It contributes about 44% of total marine landings of the state (CMFRI 2024). Bottom trawling in Mangalore was introduced in 1961 with an objective to exploit the fishing grounds and to target high valued prawns, squids, cuttle fishes, threadfin breams, ribbon fishes etc. (Dineshbabu et al. 2009).

The high demand for fishmeal in the poultry industry has intensified bottom trawling practices, leading to excessive bycatch of juvenile and low-value fish in centres like Mangalore. This not only threatens marine biodiversity but also undermines the livelihoods of small-scale fishers dependent on sustainable fish stocks (Lobo et al. 2012).

This situation highlights the urgent need for continuous monitoring of bycatch species, evaluate the scale of unselective fishing practices that bulk capture species, understand its impact on benthic fauna, identify & prioritize vulnerable species that are impacted by such fishing practices for conservation, and to understand the drivers of such exploitative fisheries.

Therefore, the present study, although a short one, provides glimpse into bycatch situation at Dhakke covering aspects on bycatch composition, and its market trends to understand the following- which species are landed, how many of these are non-consumption uses, and where are they sold to and for what prices.

Methodology

Mangalore fishing harbour is one of the major landing centres of coastal Karnataka. Our survey involved visiting the harbor during fish landing time, recording species landed, and interviewing the fishermen & boat owner on fishing methods and trade information of the species. The study was conducted for a whole month of May with survey frequency of three days a week. On an average, two boats were surveyed each day, starting around 6:30 in the morning. Boats to

interview was identified based on huge number of crates loaded with putrid, not-iced fishes with an assumption that these were most likely used for non-consumption purposes. Pictures of species were taken with a scale as a reference for species total length measurements.

A customized questionnaire was prepared and was asked among fishermen. Few of the questions asked are listed below.

- ✓ What is the time of landing?
- ✓ What was the fishing duration?
- ✓ What fishing gears were used?
- ✓ Was the boat mechanized or motorized?
- ✓ What was the fishing depth and the distance traveled from the shore?
- ✓ What were the abundant and major catches in the boat?
- ✓ How many crates per species were caught?
- ✓ What is the cost of fish per kg?
- ✓ Where it is sold to and for what purpose?

Data Compilation

Out of many surveys conducted four cases are described below.

Case 1: On 13 May 2025 around 6:30 in the morning, we surveyed 2 boats. The time of landing of one boat was 3:00 in the morning with the fishing duration of 11 days. When interviewed, we got to know that variety of fishing methods were used depending on the depth and the population of the species. The boats used were mechanized. They had traveled a distance of 60 nautical miles. The fishes were sold to mills in and around Mangalore for cutting and preparation of fish meat. The major catches and its price are listed below.

Major Catches	No. of crates	Sold for (in Rs per Kg)
Pink Perch	51	65
Chilli	45	32
Rafale Fish	41	24
Aarol	6	60

Case 2: Two boats were surveyed on 14 May 2025 around 6:30 in the morning. We surveyed for about 3 hours. Out of the 2 boats, one boat was landed at 4:00 in the morning after 10 long days of fishing. Trawling and gillnets are the majorly used fishing methods. The boats used were mechanized. They travelled a distance of about 700 kilometers and fishing depth of 120 meters. The bycatch fishes were mainly sold for poultry, as fertilizers and to make fish oil. They were mainly sent to Kerala. The major catches and their prices are listed below.

Major catches	No. of crates	Sold for (In Rs per Kg)
Pink Perch	54	65
Cuttle fish	32	280
Rafale fish	35	23
Ball Fish	16	20
Aarol	7	23

Case 3: On 17 May 2025 we surveyed 2 boats at the harbour. One of the boats had a fishing duration of 10 days. The landing time was observed as 3:30 in the early morning. The fishing depth and the distance travelled were not available. The catches were sent to factory for cutting and to make fish meat. They were later exported to Europe. The major catches and its prices are listed below.

Major Catches	No. of crates	Sold for (In Rs per Kg)
Pink Perch	33	55
Chilli	15	33
Cuttle Fish	8	400
Ball Fish	40	7

Case 4: Another survey was conducted on 23 May 2025. We headed to Dhakke around 6:30 in the morning. After 10 days of fishing, the fish landing was done at 3:00 in the morning. The fishing depth was 120 meters and the distance of fishing from the shore was 40 nautical miles. The fishes were sent to Kerala for cutting, extraction fish oil and as food in the poultry.

The fishes observed and its price per kilogram is noted below.

Major catches	No. of crates	Sold for (in Rs per Kg)
Pink Perch	46	70
Siidi	18	15
Ball Fish	36	12

Analysis

Table 1. Price (in Rs per Kg) variation for different species across each day in Dhakke.

Species	Pink Perch/ Rani	Chilli Fish /Arane	Rafale / Flying Fish	Puffer Fish / Thonde	Carrot Fish	Siidi
06/05/25 Boat 1	75		30		25	
07/05/25 Boat 1				15		
13/05/25 Boat 1	65	32	24			
13/05/25 Boat 2	68	33	24			
14/05/25 Boat 1	65		23			
14/05/25 Boat 2	65		23	20		
17/05/25 Boat 1	70	33		35		
17/05/25 Boat 2	55		23			
23/05/25 Boat 1	70					15
23/05/25 Boat 2	66	30				

Species	Aarol / Eel	Nullu	Cuttlefish	Ball Fish	Ribbon Fish / Pam-bal	Mixed Crate
05/05/25 Boat 1						13
13/05/25 Boat 1	60				110	
13/05/25 Boat 2		24				
14/05/25 Boat 1	22					
14/05/25 Boat 2	23		280			
17/05/25 Boat 1			400	7	95	
23/05/25 Boat 1				12		
25/05/25 Boat 1						12
26/05/25 Boat 1						25
26/05/25 Boat 2						22

Species found in mix crates:

Crab	Pucchae
Kalamkayi	Takate
Kollethar / Silver Fish	Prawns
Kurchi / Silver Belly Fish	Needle Fish

Table 2. Length of species recorded in Dhakke

Species	Length ranging from
Aarol	14 cm – 22 cm
Carrot Fish	7 cm – 15 cm
Chilli	6 cm – 13 cm
Crab	3 cm – 7 cm
Kalamkayi	7 cm – 14 cm
Kollethar	2 cm – 8 cm
Kurchi	2 cm – 10 cm
Needle Fish	15 cm – 30cm
Nullu	17 cm – 30 cm
Pink Perch	7 cm – 15 cm
Prawns	3 cm – 7 cm
Pucchae	9 cm – 13 cm
Puffer Fish	7 cm – 17 cm
Rafale Fish	8 cm – 20 cm
Ribbon Fish	20 cm – 35 cm
Siidi Fish	5 cm – 10 cm
Takate	5 cm – 10 cm

Findings

Pink Perch: It is also known as 'Rani'. The analysis indicates that Pink Perch catch is the highest among all the species. They have high demand in the market and are sold extensively. They are often sold to mills and factories for cutting, poultry, fish feed and are also exported. These are commercially used and not for consumption. The length recorded indicates that juvenile to adult fish were caught and sold. Pink Perch landed were observed from 7–15 cm, of which 13 cm dominated the most. They were sold for price ranging from 55–75 rs/kg.

Chilli Fish: They were sold for reasonable price ranging from 30–35 rs/kg , and there was not much variation in the selling price over the month. Their length varied from 6–13 cm, of which 13 cm dominated the most. They were sold for mills and factories where they were powdered and used in making fish meat, poultry, fish oil etc. They were not sold for consumption.

Rafale Fish: Rafale fish is also known as 'Flying Fish' because of the presence of wing like structure. Rafale fish landed was observed in huge number of crates. It was sold for price ranging from 23–30 rs/kg. Not much fluctuation is seen in selling price over a month. The length of the Rafale Fish recorded was from 8–20 cm, of which 14–15 cm dominated the most. Again they were not consumed, but sold to factories and mills and later exported.

Puffer Fish: Its local name is 'Thonde'. The price of Puffer Fish ranges from 15–35 rs/kg. Slight variation was observed. It indicates that it was in demand after a couple of days. The length recorded was from 7–17cm. The most dominated was of 15 cm. It was sold to mills and factories and also were exported to Kerala and not used for consumption.

Siidi: Siidi fish were mostly found in mixed crates, and it was observed that only one boat had a whole crate of Siidi Fish. They were sold for price ranging from 15 rs/kg. This indicates that it had low market value. The length range of Siidi Fish was from 5–10 cm, of which 7 cm dominted the most. Instead of being consumed, the goods were processed through factories and mills before being shipped abroad.

Carrot Fish: It was observed only once. It was sold for 25 rs/kg. Carrot Fish landed were observed within 7–15 cm, of which 12 cm dominated the most. Instead of being consumed, the goods were processed through factories and mills before being shipped abroad.

Aarol: On most days, it was observed that 5-10 crates of Arol Fish were caught and sold. Arol fish were observed within 14–22 cm in length, of which the fish with 20–22 cm length dominated the most. It was observed that on May 13, it was sold for 60 and on May 14, it was sold for 22–23 rs/kg. A sudden depletion in price was noted. They were not used for consumption, but instead sold to factories and mills for export.

Nullu: Nullu fish was only observed on one day, which indicates a lack of demand. It was sold for 24 rs/kg. The length recorded was from 17–30 cm, of which 20–22 cm dominated the most. They were mostlty sold to mills and factories for cutting, poultry, fish oil, and fertilizers rather than for consumption.

Cuttlefish: Cuttlefish landings were observed on few days. It was observed that they were sold for price ranging from 280–400 rs/kg. Their high market price suggests strong demand. It was mostly exported to Kerala, China and Thailand. Cuttle fish which belongs to adult group are usd for consumption, while juveniles and damaged ones are sold to factories and even exported.

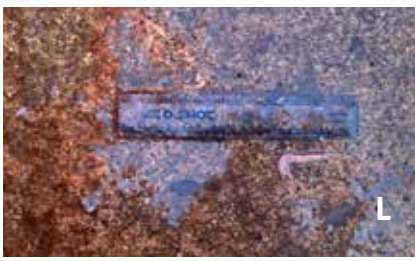
Ball Fish: Huge number of Ball Fish landing were observed. It was also observed that around 6–10 crates of Ball Fish were sold. They were sold for low prices ranging from 7–12 rs/kg. Ball Fish are poisonous fish and were sold to mills and factories where they were powdered for making fertilizers and not for consumption.

Ribbon Fish: It was onserved that Ribbon Fish were sold for good prices ranging from 90–110 rs/kg. The Ribbon Fish landed were observed within 20–35 cm in length, of which the fidh with 25–30 cm in length dominated the most. The products weren't consumed but were directed to factories and mills, then exported.

Mixed Crate: Carrot Fish, Siidi, Kalamkayi, Crab, Kollethar, Kurchi, Needle Fish, Prawns, Pucchae, Takate and many other fish were found in huge number. Most groups like Prawns and Crabs which are usually consumed were found in the bycatch crate because they were either damaged or juvenile. They were sold for price ranging from 12–25 rs/kg.

Table 3. List of few species (Image 1) identified by Karuppasamy, Assistant Professor at Fisheries College & Research Institute, Thoothukudi, TN from photographs.

Local name of species (as referred by fishers)	Scientific name
Aarol	*Opichthys sp.*
Ball fish	*Diodon sp.*
Carrot fish	-
Chilli fish	*Saurida cf. tumble*
Kalamkayi	*Terapon cf. puta*
Kollethar	*Stolephorus cf. indicus*
Kurichi	*Gaza cf. minuta*
Needle fish	*Fistularia cf. petimba*
Nullu	*Acanthocephala cf. indica*
Rani/Pink perch	*Nemipterus bipunctatus*
Pucchae	-
Puffer fish	*Lagocephalus sp.*
Rafale fish	*Dactyloptena cf. orientalis*
Ribbon fish	*Trichurus cf. lepturus*
Siidi	*Mene cf. maculata*
Takate	*Atule cf. mate*



Photographs of Bycatch Fish at Dhakke. A—Aarol | B—Ball Fish | C—Carrot Fish | D—Chilli Fish | E—Crab | F—Kalamkayi | G—Kollethar | H—Kurichi | I—Needle Fish | J—Nullu | K—Pink Perch | L—Prawn | M—Pucchae | N—Puffer Fish | O—Rafale Fish | P—Ribbon Fish | Q—Siidi | R—Takate. © Authors.

Conclusion

The survey revealed a rich species diversity with over 18 species identified in the landing site. Among these, Pink Perch, Chilli Fish, Rafale (Flying Fish), Ball Fish, and Puffer Fish were the most abundantly landed, underscoring their ecological and economic significance. High-value species such as Cuttle Fish, Pink Perch, and Ribbon Fish consistently fetched premium prices, reflecting strong market demand. These fish were sold to the fish meal industry and not for consumption.

The fish marketing system was found to be highly complex, involving multiple layers of traders, middlemen, and informal networks that influence both pricing and accessibility. Interviews with fishers revealed that bycatch—non-target species caught due to the non-selective nature of fishing gear—is now rarely discarded. Instead, it is commonly processed into fish food, oil, fertilizer, and other products, which are then distributed domestically and exported to countries such as China, Thailand, and those in Europe.

Some bycatch is also consumed within Indian states like Kerala and Tamil Nadu. While this has increased the economic value of bycatch, it has also led to more indiscriminate and unregulated fishing practices, including intensive trawling of seabed. The findings highlight growing pressure on marine biodiversity, particularly as vulnerable species are increasingly caught unintentionally.

GIS based mapping of bycatch hotspots could help identify critical zones of concern, aiding in targeted management efforts. Overall, the survey underscores the urgent need for regulatory oversight and sustainable fisheries management to mitigate biodiversity loss and ensure long-term ecological and economic resilience.

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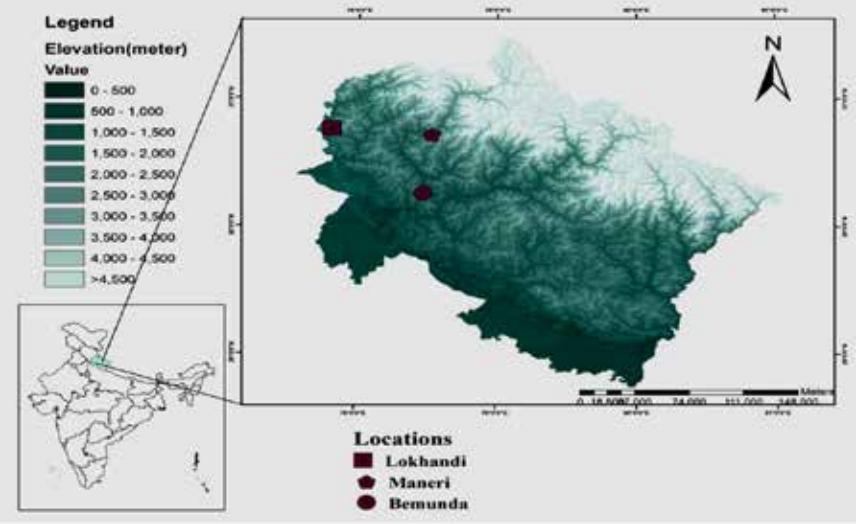
Photo record of the Red Giant Gliding Squirrel from the Garhwal Himalaya region of Uttarakhand

Worldwide, there are 45 known species of gliding squirrels, from which 17 are reported from India (Thorington et al. 2012; Thorington & Hoffmann 2005). Past studies reveal the distribution of Red Giant Gliding Squirrel RGGS (Least Concern species) throughout Indian Himalaya, southern part of China, and southeastern Asia (Chetia et al. 2024; Duckworth 2016). In this article we are reporting the photographic evidence of RGGS (*Petaurista petaurista albiventer*) presence in western Garhwal region (adjacent to Himachal Pradesh boundary) of Uttarakhand Himalaya, although the photographic presence recently reported from far eastern Kumaun division of Uttarakhand (Chetia et al. 2024).



Photographs of Red Giant Gliding Squirrel taken in Garhwal region of Uttarakhand. © Devendra Singh.

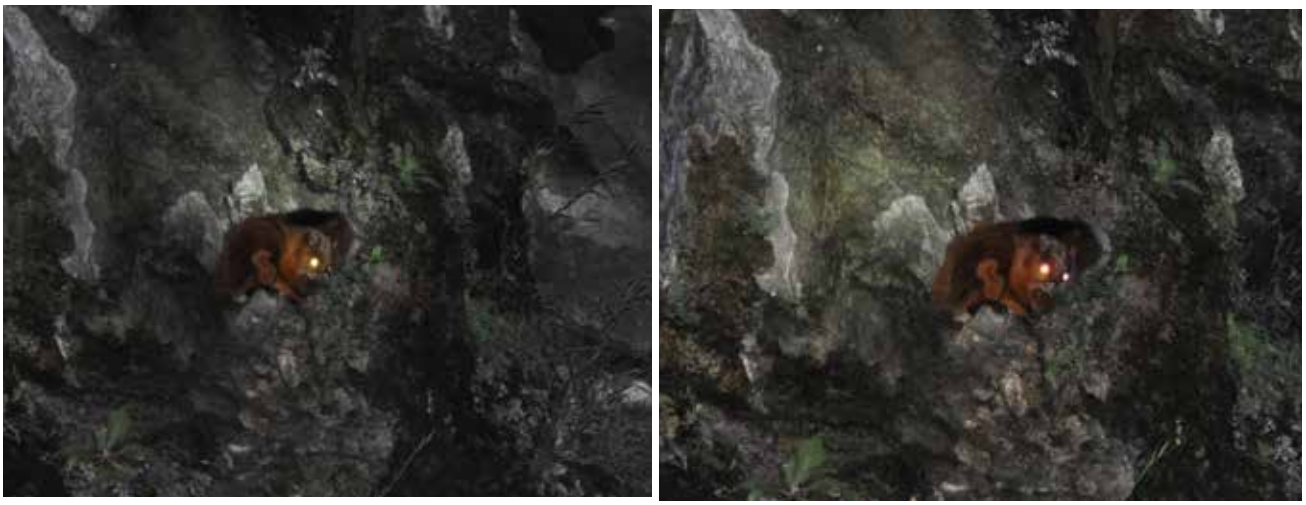
Red Giant Gliding Squirrel at Lokhandi, Dehradun, Uttarakhand. © Devendra Singh.

During present study we captured the photographs of this mammal from three different sites, namely, Lokhandi (Dehradun), Maneri (Uttarkashi) and Bemunda (Tehri Garhwal). Lokhandi (30.7650°N, 77.8131°E) situated at the elevation of 2,481.21 m and this temperate site having dense Deodar *Cedrus deodara* forest forming the suitable habitat for RGGS to nest and forage. Maneri (30.7222°N, 78.5331°E) and Bemunda (30.2628°N, 78.3564°E) sites are located at the elevation of 1,640.99 m and 935.94 m, respectively. These both sites are having lower-temperate and sub-tropical climatic condition respectively, in which Maneri

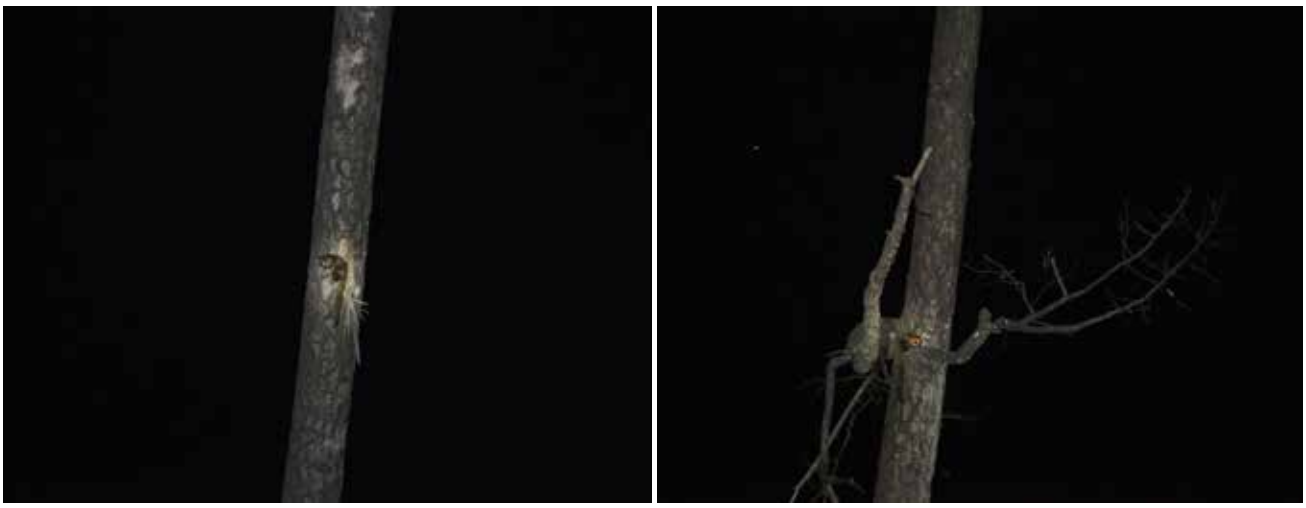
with mixed forest dominated by Pine *Pinus roxburghii* and Bemunda with Sal *Shorea robusta* and Pine *Pinus roxburghii* trees. Due to habitat degradation, shifting cultivation, forest-fires, increased human settlement, accidental mortality from vehicle collisions and other anthropogenic disturbances the RGGS's population in India is declining (Koli 2016).

Sighting of *Petaurista petaurista albiventer* were recorded on the trail using foreclaz head lamps. The photographs of RGGS were taken using Nikon D90 Camera through opportunistic sampling. The first individual was recorded from Lokhandi in the month of September 2024 at 2330 h on the cliff which may be associated with opportunistic feeding or surprise attacks on small insects or bird nests.

While other two individuals were recorded from two different sites of Garhwal Himalaya, namely, Maneri and Bemunda during the October 2024 at dusk time and mid-night, respectively. In Bemunda, the length of walked trail range was between 1.8 km. The RGGS observation site (Maneri and Lokhandi) is located close to road in between a mixed temperate evergreen forest.



Red Giant Gliding Squirrel at Bemunda, Tehri Garhwal, Uttarakhand. © Devendra Singh.



Red Giant Gliding Squirrel at Maneri, Uttarkashi, Uttarakhand. © Devendra Singh.

Morphologically, these squirrels have thin body, are arboreal, and have long, furred tails. It uses its elastic skin, stretched between the wrist and the ankles for gliding (Choudhury 2013; Menon 2023). The squirrel has pale orange fur near the base of the patagium and a reddish-brown dorsal colour. It also has a greyish-white ventral surface (Prater 1971; Chetia et al. 2024).

Although there was no visual proof (photographs) from earlier research reports of RGGS distribution throughout the Garhwal Himalaya region. These are the first photo evidences of distribution from the Garhwal Himalayan region. So, the present effort provides valuable insights about variety of habitat use by RGGS.

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Apparent depredation of an egg of Pheasant-tailed Jacana by a House Crow

Magarmudian Wetland (32.0920 N, 75.3757 E) is a small wetland near a village of the same name, to the north of Gurdaspur, Punjab. On 24 August 2024, during a birdwatching visit there, at about 0800 h, the second author noticed a Pheasant-tailed Jacana *Hydrophasianus chirurgus* chasing a House Crow *Corvus splendens*. The crow circled back, to be again chased away by the jacana.

The observers suspected that the crow was trying to snatch eggs from a jacana nest. This was confirmed, as after a few more unsuccessful attempts, the crow was able to take one egg. It held the egg in the bill and was again being chased by the jacana. There were two jacanas at the nest site and the nest was continuously being guarded by one, while the other kept chasing the crow. However, the crow was able to escape with the egg which it presumably consumed.

As we became busy in observing other birds, it was seen that the House Crow made repeated attempts to steal more eggs that must have been there in the jacana's nest. The jacana repeatedly chased away the crow. As the bird-watching session concluded around 0900 h, the interaction was still continuing.

Generally, Pheasant-tailed Jacana can be sexed using some visual cues. For instance, females are heavier than males (Dunning 2007) and females have longer wing spurs (Rand 1954). However, in the present case, we were unable to assign a sex. Males do not incubate eggs all the time, but

Pheasant-tailed Jacana chasing a House Crow with Jacana's egg in the bill.
© Manish Goyal.

Pheasant-tailed Jacana again chasing the House Crow away.
© Manish Goyal

mostly by night and during the hottest period of the day (1100–1500 h), while attending the nest for egg turning at other times (Thong-aree et al. 1995). However, as per Fernando et al. (2021), males undertook most defence against all intruder types, with the exception of aerial predators, for which females defended more. Thus, we presume that in the present case, the jacana chasing the crow was possibly a female as the crow was making aerial attacks.

The House Crow is an opportunistic feeder. As per Ali & Ripley (1987), its diet is all embracing; practically everything that can be eaten (including eggs). In a study by Suratissa et al. (1998) egg depredation by crows was recorded as the highest in case of Pheasant-tailed Jacana. Fazili et al. (2013) also reported predation of eggs of Pheasant-tailed Jacana by House Crow (and other predators). The present observation further confirms that House Crows, at least sometimes, prey upon the eggs of the Pheasant-tailed Jacana.

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Migratory raptor diversity in Jhargram District, West Bengal

The presence of raptors in the wild serves as an indicator for ecological health. They play a crucial ecological role by keeping the balance. Six-hundred species of raptor are present all over the world, out of them 106 species can be found in India alone. There are primarily two kinds of raptors – diurnal (day flying) and nocturnal (night flying) (Mandal et al. 2022).

Jhargram (22.45° N, 86.98° E, 81 m) District is part of the Chota Nagpur Plateau which gradually slopes down towards the east; hilly terrain occurs in the northwestern part. The Kakrajhore area has the highest elevation of about 300 m. The weather much as of Bengal, is extremely humid and tropical. Temperature can reach as high as 46°C (115°F) in the hot and dry in summer months but can plummet to 8°C (46°C) in the chilly nights of December and January. During our continuous survey from 2023 to February 2025, we photographed all 10 migratory raptors. We used a binocular (Olympus 10×50) along with Canon DSLR and Nikon P900 for photography. We consulted literatures for the proper identification of the birds (Naoroji 2006; Grimmett et al. 2016; Praveen et al. 2018).

Oriental Honey-Buzzard is the largest Pernis in the world, a long-distance migrant, it breeds in southern Siberia, northern Mongolia, northeastern China, North Korea, Japan and winters mainly in southeastern Asia, Indonesia, and the Philippines (Wells 1999).

It can be identified by the pigeon-like grey head with a dark eye, thick black trailing edge to the wing and dark primary tips, and the boldly barred tail and its six primary fingers. We found it in forest areas which are located near water

Birds of prey from Jhargram District and their conservation status.

Sl. No.	Family	Common name	Scientific name	IUCN Red List status
1	Accipitridae	Oriental Honey-buzzard	*Pernis ptilorhynchus*	LC
2		Long-legged Buzzard	*Buteo rufinus*	LC
3		White-eyed Buzzard	*Butastur teesa*	LC
4		Crested Serpent-Eagle	*Spilornis cheela*	LC
5		Black Kite	*Milvus migrans*	LC
6		Black-eared Kite	*Milvus migrans lineatus*	LC
7		Pied Harrier	*Circus melanoleucos*	LC
8		Shikra	*Tachyspiza badia*	LC
9		Black-winged Kite	*Elanus caeruleus*	LC
10	Falconidae	Peregrine Falcon	*Falco peregrinus*	LC


White-eyed Buzzard


Black-winged Kite


Crested Serpent Eagle


Shikra


Black-eared Kite


Peregrine Falcon


Oriental Honey-buzzard


Black Kite


Long-legged Buzzard

bodies but most of the time they are seen before entering the human settlement.

Long-legged Buzzard is a medium-sized bird of prey and has a large range from northern Africa, Europe from Hungary to the Balkans, Ukraine. Also recorded in Russia, from Turkey through Iran, Afghanistan to and central Asia to north-western China, Pakistan and north-western India (Snow & Perrins 1998; Friedemann et al. 2021). It is a rare winter visitor in this region. It hunts all sizes of preyind . We found the bird sitting on a sand dune in the middle of the river.

White-eyed Buzzard is a medium-sized raptor. It is easily identified by their squared tail, long yellow leg, yellow cere, white eyes, yellow bill with a black tip. We spotted the bird in river side forest, and in agricultural lands.

Crested Serpent-Eagle or Snake Eagle is medium-sized bird of prey. It is primarily a snake hunter but a variety of other small animals have also been reported as part of its diet, including lizards, amphibians (frogs and toads), insects, and birds (Smythies 2001). It is found in all kinds of forests in India. They were also found in hilly terrain, near agricultural fields and even near villages. It is identified by its white belly with dark streaks on both side of body. The upperparts are brownish or blackish on the head, a prominent crest is found.

Black Kite is a medium-sized bird of prey. It is easily identified by their dark brown body parts with angled wing and forked tail. It is a common resident and passage migrant (Grimmett et al. 2014). It is mostly found in urban ecosystem. It is commonly seen collecting food from garbage.

Black-eared Kite is a subspecies of Black Kite. It is very difficult to distinguish from Black Kite. It mostly looks the same, has some white patch in the lower body. All kinds of small and medium size prey belong in its diet. It can be seen gliding and soaring in the sky over agricultural lands and forests, searching for prey.

Pied Harrier is a medium-sized bird of prey. It is identified by white underparts with black colour from back to neck and edge of the wing and black band across the upperparts of the body, yellow cere and eyes. It is mostly found in open areas, like agricultural land, swamps, and near water bodies. All kinds of prey in its diet. It is mostly a winter visitor in this region.

The Shikra is a small bird of prey. It is distributed throughout the Indian sub-continent. The Shikra prefers relatively various types of habitats: open wooded, dry to moist-deciduous and degraded tropical evergreen forest biotope, hills, and cultivated plains, including villages and cities also, rarely found in desert but common in semi-arid areas (Grimmet et al. 2006; Naoroji 2006). We found it mostly in forest and paddy field areas.

Black-winged Kite is a small bird of prey. It was found through out the year in India. It is easily identified by the black wing in bright white underparts, gray or ashy toned in the upper body with red eye. Juveniles have scaly striped black and brownie breast. it is mostly found in agricultural land. It hunts its prey precisely, able

to stay fixed in the sky for a periods of time. In our survey we sighted the Black-winged kite highest in number.

Peregrine Falcons is the key falcon over most of the continent, with long, pointed wings and a long tail. Long primary feathers give the Peregrine a long-winged shape; males are smaller than females.

Healthy habitats, tolerable weather, good food sources, attract all migratory birds to the Jhargram District.

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Yellow-throated Sparrow feeding on Mahua flowers in Madhya Pradesh

Yellow-throated Sparrow *Gymnoris xanthocollis* is widespread inhabitant in Indian sub-continent (Ali & Ripley 1987). Globally, it is known to be from western, southern, and southeastern Asia (Summers-Smith 2020).

On 13 April 2025, I came across an interesting observation of the species at Halali dam area (23.495° N, 77.549° E), Raisen District, Madhya Pradesh. The location is on the bank of the Halai Dam, on the trijunction of Bhopal, Raisen, and Vidisha districts with dry deciduous forests. At 0715 h, about six sparrows were noted chirruping on a Mahua tree *Madhuca longifolia* (L.) J.F. Macbr. (Sapotaceae).

They were feeding on the flowers by nectar sipping, plucking the petals and carrying the petals to nearby perch and feeding on it. Next four hours, the presence of sparrows was noted. Other species such as Red-vented Bulbul *Pycnonotus cafer* and Plum-headed Parakeet *Psittacula cyanocephala* also visited but spent relatively less time. The parakeets got attracted to Jarul *Lagerstroemia speciosa* (L.) Pers. and started feeding on the fruits.

Yellow-throated Sparrow feeding on Mahua flower. © Sachin Ranade.

The Mahua flowers are rich in sugars, essential amino acids and oils (Heuze et al 2017). As February to May, the summer season is breeding season for the species, the flowers provide essential nutrients in abundance.

Similar observations had been noted by Bharos (1992) describing the method of the flower consumption. Santharam (1996) enlisted a few examples of flower-consumption by birds and mentioned rightfully that very few records are available. This note provides additional record as well as the photographic record of flower consumption by the Yellow-throated Sparrow.

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Training and outreach activities of BNHS Bird Migration Study Centre, Point Calimere, Tamil Nadu

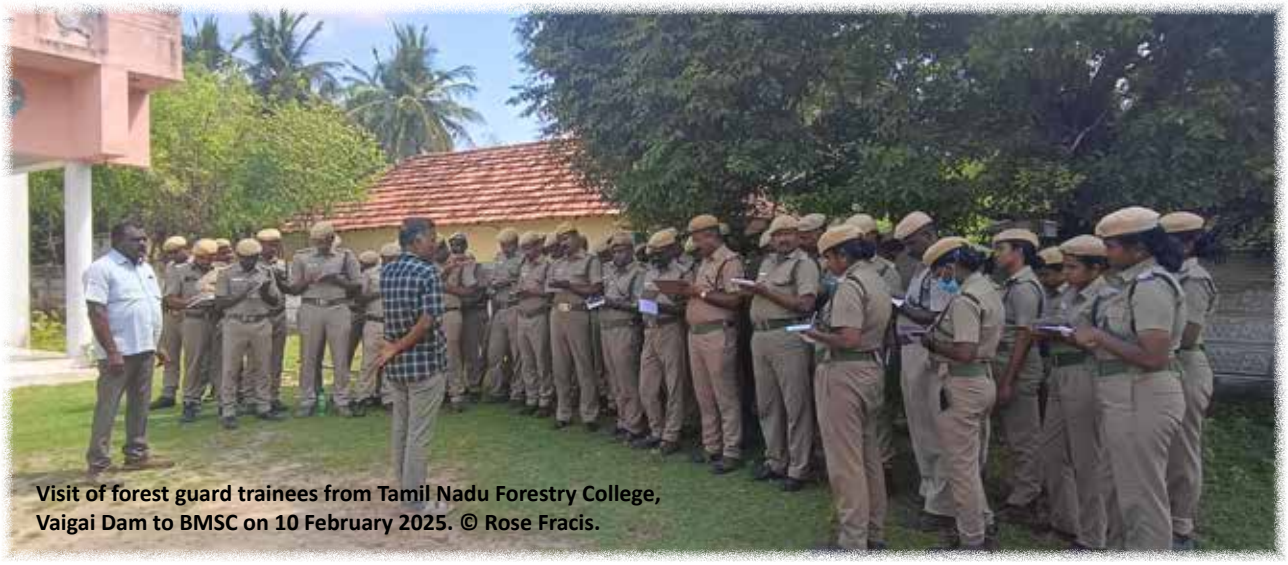
The BNHS Bird Migration Study Centre (BMSC) at Point Calimere (Kodiakkarai) is a research facility dedicated to the study of migratory patterns of birds along India's east coast. Established by the Bombay Natural History Society (BNHS) in 2008, the centre is strategically located at a critical stopover/wintering site for millions of migratory birds traveling along the central Asian and east Asian–Australasian Flyways.

Since its establishment, the centre has been actively involved in providing first-hand training on bird migration study techniques to various stakeholders from India and its neighbouring countries. Though BMSC was established in 2008, BNHS has its presence, studying bird migration and avian ecology since early 1960s. Its research has significantly contributed to understanding migration patterns, habitat use, and transboundary connectivity of birds across continents.

Training and outreach programmes at BMSC

From July 2024 to March 2025, the BNHS Bird Migration Study Centre at Point Calimere conducted extensive training programs, hosting 401 officer trainees from various forestry cadres, including assistant conservator of forests (ACF) trainees, range officer trainees, and in-service foresters. These participants came from renowned institutions across southern India, such as the Central Academy for State Forest Service (CASFOS) and the Tamil Nadu Forest Academy (TNFA). A week-long intensive training programme for four forest guards (in service) from the Bhagalpur and Jamui Division, Bihar, from 27 February 2025 to 5 March 2025 was also conducted.

In addition to forestry professionals, the centre also engaged with 217 students, comprising 40 school students and 177 college students from institutions across Tamil Nadu. These student-focused training sessions were conducted,



Visit of forest guard trainees from Tamil Nadu Forestry College, Vaigai Dam to BMSC on 10 February 2025. © Rose Fracis.

offering young learners a unique opportunity to understand bird migration research and conservation.

Training sessions and key highlights

The training programs provided participants with an insightful overview of BNHS's history in nature conservation, emphasizing its research-driven approach. Sessions covered, included: bird migration research and conservation; bird marking procedures (ringing and colour-flagging); The global significance of Point Calimere for migratory shorebirds; and Broader conservation challenges, habitat protection, and long-term monitoring.

A major highlight of the training was the bird-marking studies conducted by BNHS. Trainees received hands-on exposure to shorebird and terrestrial bird ringing through live demonstrations of bird ringing technique and equipment used in migration studies. Also provided practical insights into shorebird conservation efforts and the significance of long-term monitoring programmes.

Through these training initiatives, the BNHS Bird Migration Study Centre at Point Calimere continues to play a pivotal role in fostering awareness, capacity building, and scientific research in bird migration and conservation.

Basic course in field ornithology & bird migration studies

For the year 2024–2025, seven batches of the "Basic course in field ornithology and bird migration studies" were carried out successfully at Point Calimere from November 2024 to January 2025. A total of 96 participants took part in these three-day capsule courses, comprising almost equal participation of males (51%) and females (49%). Participants ranged in

Participants viewing waterbirds during one of the basic ornithology courses. © S. Sivakumar.

Participants of the forest department trainees, schools and colleges during 2024–2025

	Date	Institution	Participants / cadres	Details		
				Male	Female	Total
1	12.vii.2024	Tamil Nadu Forest Academy (TNFA), Coimbatore	52nd batch of the In-Service Training Course for Foresters	57	3	60
2	28.vii.2024	Central Academy for State Forest Service (CASFOS), Coimbatore	ACF trainees	-	-	42
3	09.ix.2024	Kundal Forest Academy in Maharashtra	Forest Range Officer trainees	30	3	33
4	16.xii.2024	Karnataka State Forest Academy, Dharwad	Forest Range Officer trainees	25	16	41
5	16.xii.2024	Tamil Nadu Forest Academy (TNFA), Coimbatore	Foresters in-service	60	-	60
6	19.xii.2024	Karnataka State Forest Academy, Dharwad	Forest Range Officer trainees	26	10	36
7	10.ii.2025	Tamil Nadu Forestry Training College, Vaigai Dam	Forest Guard trainees	52	10	62
8	16.ii.2025	Tamil Nadu Forestry Training College, Vaigai Dam	Forest Guard trainees	53	10	63
9	27.ii.2025	Bhagalpur Division, Bihar	Forest Guard (In-service)	4	-	4
	School and College Students					
1	19.ix.2024	Agriculture and Research Institute, Tamil Nadu Agricultural University	B.Sc. (Hons) Agriculture	8	23	31
2	19.x.2024	Forest College and Research Institute, Mettupalayam	B.Sc. (Hons) Forestry	48	42	90
3	20.x.2024	Babaji Vidhyashram Senior Secondary School, Chennai	8th grade	9	10	19
4	07.xi.2024	Vanavil Trust, Nagapattinam	Second and fourth grades	14	7	21
5	27.xii.2024	Arignar Anna Government Arts and Science College, Karaikal	B.Sc. & M.Sc. Zoology	10	31	41
6	11.iii.2025	Sálim Ali Centre for Ornithology and Natural History (SACON)	M.Sc. Wildlife and Ornithology	6	9	15

age from a few 18-year-olds from Bangalore and Chennai to a youthful 71-year-old retired French professor from Agra, reflecting a diverse group united by their passion for birds and nature. Participants came from across the country, spanning the length and breadth of India– from Kargil in the north to Kollam (Kerala) in the south. The westernmost representation was from Mumbai, while the easternmost was from Kolkata. Notably, Bangalore accounted for the highest number of participants (37%), followed by Mumbai (21%). Interestingly, 25% of the participants were members of the BNHS. Among them were some who have been deeply

connected to the organisation for decades, with involvement in BNHS courses and fieldwork dating back to the late 1980s and early 1990s. The camps provided a unique platform for participants to deepen their understanding of field ornithology focused on bird migration studies, understanding bird populations, and promoting habitat preservation.

Participants learned major bird migration study techniques, including bird trapping, and explored the rich biodiversity of Point Calimere's diverse ecosystems. They observed various critical habitats, including natural and human-made wetlands, tropical dry evergreen forests, grasslands, saltpans and tidal mudflats-each a critical habitat for various migratory as well as resident bird species.

As part of the camp, participants visited key sites in Point Calimere and Great Vedaranyam Swamp. The classroom and practical sessions included introduction to birds of Point Calimere, bird migration study techniques, bird ringing and different tools used to capture wild birds, etc. Our in-house experts delivered case studies on conservation efforts, including "Helping the Skimmers Skim!" and "Vulture Breeding Programme", online.

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ZOO'S PRINT

Communicating science for conservation

ZOO'S PRINT Publication Guidelines

We welcome articles from the conservation community of all SAARC countries, including Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and other tropical countries if relevant to SAARC countries' problems and potential.

Type — Articles of semi-scientific or technical nature. News, notes, announcements of interest to conservation community and personal opinion pieces.

Feature articles — articles of a conjectural nature — opinions, theoretical, subjective.

Case reports: case studies or notes, short factual reports and descriptions.

News and announcements — short items of news or announcements of interest to zoo and wildlife community

Cartoons, puzzles, crossword and stories

Subject matter: Captive breeding, (wild) animal husbandry and management, wildlife management, field notes, conservation biology, population dynamics, population genetics, conservation education and interpretation, wild animal welfare, conservation of flora, natural history and history of zoos. Articles on rare breeds of domestic animals are also considered.

Source: Zoos, breeding facilities, holding facilities, rescue centres, research institutes, wildlife departments, wildlife protected areas, bioparks, conservation centres, botanic gardens, museums, universities, etc. Individuals interested in conservation with information and opinions to share can submit articles ZOOS' PRINT magazine.

Manuscript requirements
Articles should be typed into a Word document with no more than 800 words of text and 10 key References (Tables, Images with copyright information, and Videos are encouraged) and emailed to zp@zooreach.org. Include the names of one or two potential reviewers when submitting a publication.

Articles which should contain citations should follow this guideline: a bibliography organized alphabetically and containing all details referred in the following style: surname, initial(s), year, title of the article,name of journal, volume, number, pages.

E**ditorial details**
Articles will be edited without consultation unless previously requested by the authors in writing. Authors should inform editors if the article has been published or submitted elsewhere for publication.

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ZOO'S PRINT magazine is informal and newsy as opposed to a scientific publication. ZOO'S PRINT magazine sometimes includes semi-scientific and technical articles which are reviewed only for factual errors, not peer-reviewed.

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Zoo Outreach Organisation

Addressing Climate Emotions (ACE)

T.H.E

An Initiative of Halcyon Experience LLP

Navigating climate emotions with care, connection and practical tools.

Date: 2nd August, 2025 | 3-5pm

Venue: The Circular Square
(350m from Doddakallasandra metro station)

Registration: INR 300 (includes refreshments)

This workshop is open to people 18 & above.

A series of workshops exploring emotional responses to the climate crisis through climate psychology and arts-based approaches will be held in Bangalore starting 2nd August. For more information and to register: **https://forms.gle/gF1i3zx9yLYVYMWB6**