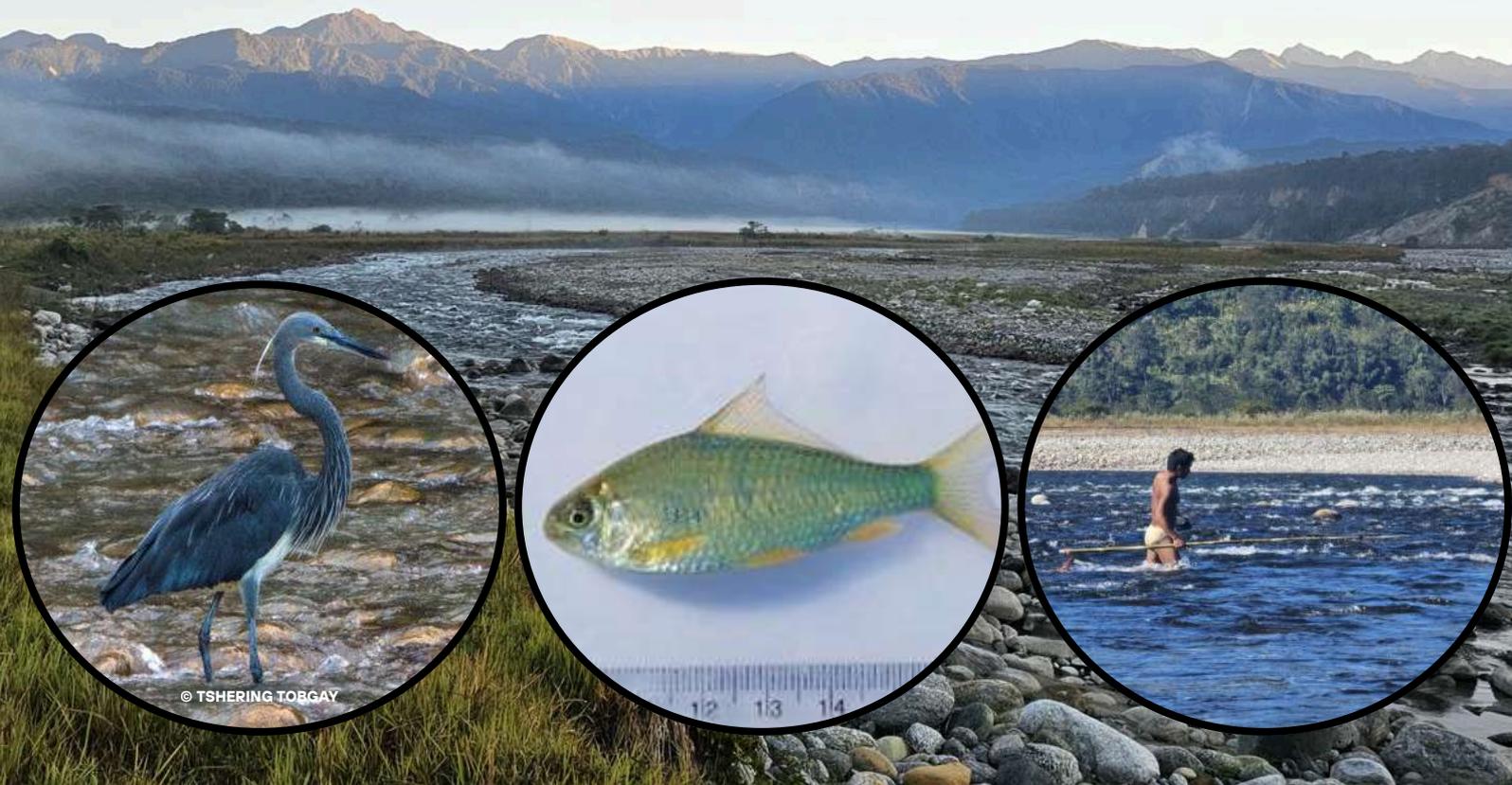


# ASSESSING THE ANTHROPOGENIC PRESSURE ON THE CRITICALLY ENDANGERED WHITE BELLED HERON ARDEA INSIGNIS, ITS HABITAT, AND PREY IN EASTERN ARUNACHAL PRADESH

## FINAL REPORT

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# TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	13
<b>1. RATIONALE</b> .....	19
<b>2. STUDY AREA</b> .....	2
<b>2.1. Site Descriptions</b> .....	25
<b>2.1.1. Sites in the Non-Protected Area (NTR)</b> .....	26
<b>2.1.2. Sites within the Protected Area (NTR)</b> .....	32
<b>2.1.3. Sites within the Protected Area (KTR)</b> .....	40
<b>2.1.4. Sites in the Non-Protected Area (KTR)</b> .....	40
<b>3. MATERIALS AND METHODS</b> .....	48
<b>3.1. Quantitative Methods</b> .....	48
<b>3.2. Qualitative Methods</b> .....	52
<b>3.3. Statistical Analyses</b> .....	54
<b>4. RESULTS</b> .....	56
<b>4.1. White-bellied Heron, its Habitat and Abundance</b> .....	56
<b>4.2. Biotic and Abiotic Drivers of WBH Distribution</b> .....	58
<b>4.2.1. Fish Diversity</b> .....	58
<b>4.2.2. Relationship Between WBH Occurrence and                 Environmental Variables</b> .....	58
<b>4.2.3. The body size class distribution of White-bellied Heron's Prey                 Base (Fish)</b> .....	60
<b>4.2.4. Fish Diversity Estimation</b> .....	62
<b>4.2.5. Relationship between Fish Diversity (richness and abundance)                 and Environmental Variables</b> .....	64
<b>4.2.6. Variation in the Body-size Across Seasons</b> .....	68
<b>4.3. Anthropogenic Pressures Influencing WBH and Fish Populations</b> .....	72
<b>4.4. Dependencies and Perceptions of Local Communities                 on Fish Resources</b> .....	76
<b>4.4.1. Dependencies on Fish Resources</b> .....	76
<b>4.4.2. Perceptions on Fish Resources</b> .....	80
<b>5. DISCUSSION</b> .....	85
<b>5.1. White-bellied Heron</b> .....	85
<b>5.2. Fish Diversity and Environment</b> .....	86
<b>5.3. Fish Body Length relationship with Environmental Variables</b> .....	87
<b>5.4. Anthropogenic Pressure</b> .....	87
<b>5.5. Illegal Fishing Practices</b> .....	88
<b>6. CONSERVATION RECOMMENDATION</b> .....	90
<b>6.1. White-bellied Heron Conservation</b> .....	90
<b>6.2. Fish Habitat and Diversity Conservation</b> .....	91
<b>7. CONCLUSION</b> .....	93
<b>8. STAKEHOLDER AND EDUCATIONAL WORKSHOPS</b> .....	94
<b>9. REFERENCES</b> .....	101
<b>10. Appendix I</b> .....	107
<b>11. Appendix II</b> .....	109
<b>12. Appendix III</b> .....	111
<b>13. Appendix IV</b> .....	112

# EXECUTIVE SUMMARY

## **Introduction:**

Rivers are essential ecosystems that sustain livelihoods through agriculture, fisheries, and drinking water while offering habitats, breeding grounds, and resources to aquatic and terrestrial species. Additionally, they provide vital ecosystem services like water filtration and nutrient cycling. Threats like pollution, habitat fragmentation, and over-extraction, however, are deteriorating river health, which affects biodiversity and the well-being of communities.

There are less than 60 White-bellied Herons left in the world, mostly in protected regions like Arunachal Pradesh's Namdapha and Kamlang Tiger Reserves. This makes it one of the rarest herons in the world. Its existence as a top predator and ecosystem indicator is threatened by decreased fish diversity, habitat degradation, and destructive fishing.

Arunachal Pradesh has a distinctive sociocultural background where inhabitants rely significantly on natural resources. With this background, we aimed to **i.** understand biotic, abiotic factors determining the White-bellied Heron (*Ardea insignis*), its distribution, prey-base, **ii.** Evaluate the impacts of anthropogenic pressures on WBH prey (fish) and, **iii.** assess the local dependencies of three ethnic communities such as Chakma, Lisu and Miju Mishmi in NTR and KTR.

## **Key Findings:**

This study offers an in-depth exploration of the ecological, anthropogenic, and socio-cultural factors influencing fish diversity, the habitat of the White-bellied Heron *Ardea insignis*, and the dependencies of local communities in Arunachal Pradesh.

## **White-bellied Heron Observations and Habitat:**

- The Critically Endangered White-bellied Heron *Ardea insignis* was recorded four times across five sampling cycles from Nov 2023 to Jan 2025. Observations highlighted that WBH presence is strongly linked to undisturbed habitats with high fish richness and abundance, optimal water quality, and minimal anthropogenic pressures.
- The WBH largely preferred hill-stream habitats characterized by riffle-run habitat sequence and relatively higher dissolved oxygen, fast to medium stream flow and low disturbance regime.

## **Fish Diversity and Habitat:**

- A total of 73 fish species were documented across seven orders and 12 families, with the Cyprinidae family dominating. Among these, 19 species were endemic to the Eastern Himalaya, emphasizing the region's ecological significance.
- Fish richness and abundance were consistently higher in protected areas (PAs) than in



- non-protected areas (NPAs), with riffle habitats supporting more diverse and abundant fish populations compared to run habitats.
- The rarefaction and extrapolation curves validated the adequacy of sampling efforts, with species accumulation curves nearing asymptote in certain cycles. Scatter plots revealed positive correlations of fish richness with water temperature (~18°C) and pH (~8.3) but a negative correlation with dissolved oxygen.

### **Fish Body Size Dynamics:**

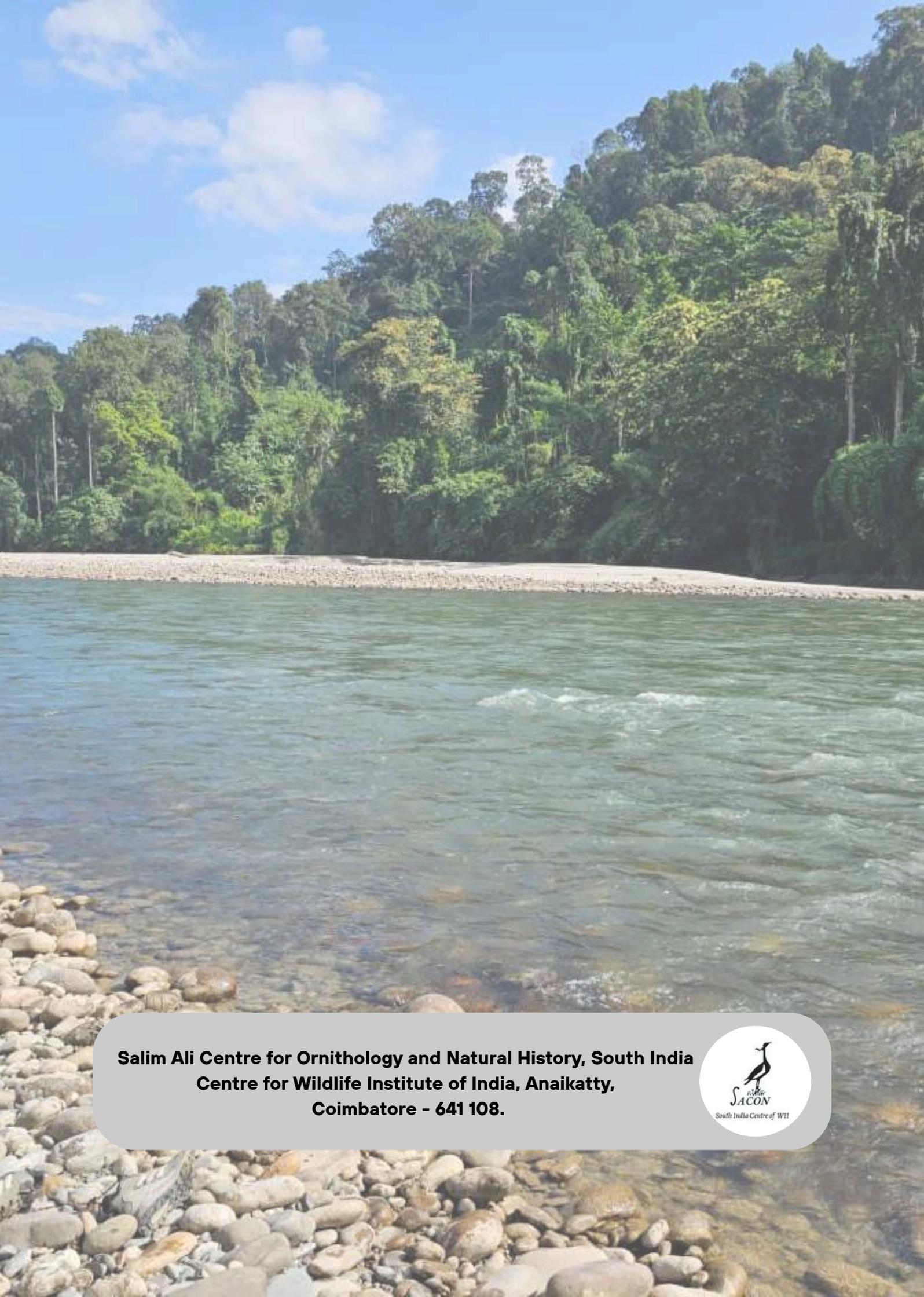
- Seasonal variations in fish body size were observed, with the largest mean body length recorded during the monsoon season in Cycle 3. Fish size and weight distributions indicated a dominance of smaller fish (<10 cm in length and <500 g in weight) in both Kamlang Tiger Reserve and NTR, with larger fish being scarce due to natural trends or anthropogenic pressures.

### **Anthropogenic Pressure:**

- Illegal fishing practices such as electrofishing, dynamite fishing, and gillnetting were frequently observed, particularly in non-protected areas. These practices significantly impacted fish populations and reduced WBH sightings.
- Grassland fires likely disturbed WBH habitat by altering vegetation structure.

### **Community Dependency and Conservation:**

- The Chakma, Lisu, and Miju Mishmi communities residing in and around the study areas depend primarily on agriculture, horticulture, livestock rearing and less on fisheries. However, fish forms a vital component in their rituals, and also consumption.
- The Miju Mishmi community demonstrated a unique cultural relationship with fish, incorporating specific species into traditional rituals. This reliance has heightened their sensitivity to declining fish populations.
- Conservation efforts in villages varied, with stricter adherence to rules in protected areas. Villages like M Pen II and Ngwazakha exhibited stronger conservation practices, while M Pen I and Kamja showed frequent violations of fishing regulations.



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