

STANDARD OPERATING PROCEDURE FOR Annual Waterbird Census



S. SUDHAKAR



बिहार सरकार



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BANDANA PREYASHI, I.A.S.
Secretary
Environment, Forest & Climate Change
Government of Bihar



MESSAGE

It gives me immense pleasure to introduce the Standard Operating Procedure (SOP) for the Asian Waterbird Census (AWC) in Bihar, developed through a collaborative effort between the Department of Environment, Forest & Climate Change (DEF&CC), Government of Bihar, and the Bombay Natural History Society (BNHS). This document provides a well-structured and standardized approach for the monitoring and conservation of waterbird species and wetlands across the state.

Bihar is home to a rich diversity of wetland ecosystems, which play a vital role in supporting migratory waterbird species. The Asian Waterbird Census (AWC) is a significant initiative that enables us to assess the health of these ecosystems and monitor the changing patterns in bird populations, both of which are key indicators of ecological well-being. This SOP is a critical step towards enhancing our efforts to conserve waterbirds and protect the invaluable wetlands of Bihar.

In recent years, Bihar has made remarkable strides in the field of bird conservation. Our continued commitment to the AWC in the years 2022, 2023, and 2024 through organised citizen science project has significantly

contributed to national and global waterbird monitoring efforts. Additionally, the International Workshop on Illegal Poaching of Wild Birds, held in February 2024 at Patna, underscored our commitment to addressing the threats posed by poaching and illegal trade, further strengthening enforcement mechanisms to protect our avian wildlife.

The SOP outlined in this document will ensure the systematic collection of high-quality data, align with global best practices, and help guide future conservation strategies. It will be an important tool in safeguarding our wetlands and the waterbird species that depend on them.

I express my sincere gratitude to all those involved in preparing this SOP, and I look forward to its successful implementation in the upcoming AWC cycle. Together, we can continue to preserve Bihar's biodiversity and contribute meaningfully to national and international conservation efforts.

BANDANA PREYASHI



बिहार सरकार

PRABHAT KUMAR GUPTA, I.F.S.
Principal Chief Conservator of Forest-cum-
Chief Wildlife Warden
Bihar



FOREWORD

The Standard Operating Procedure (SOP) for the Asian Waterbird Census (AWC) in Bihar, is conceptualised and drafted by the Department of Environment, Forest & Climate Change (DEFCC), Govt of Bihar with scientific and technical advisory of Bombay Natural History Society (BNHS), Mumbai. This SOP provides a comprehensive and standardized framework for the monitoring of waterbird species and wetlands across the state of Bihar.

The AWC has proven to be a vital tool for assessing wetland health and understanding the migratory patterns of waterbirds, which are key bio-indicators of wetland ecosystems. In line with our ongoing conservation efforts, this SOP outlines essential protocol to ensure systematic and effective data collection, covering key aspects such as:

1. **Site Selection:** Prioritizing wetlands across Bihar, including protected areas, Ramsar sites, and potential Important Bird and Biodiversity Areas (IBAs), to ensure comprehensive coverage.
2. **Field Protocol:** Providing standardized guidelines for conducting accurate waterbird counts, species identification, and documentation of habitat conditions.

3. **Data Management:** Utilizing uniform data collection formats and ensuring consistency in reporting, enabling efficient analysis and contribution to state and national reports.
4. **Capacity Building:** Conducting training programs to equip field staff, local communities, and volunteers with the necessary skills for accurate and reliable data collection.
5. **Partnership and Coordination:** Encouraging collaboration with various stakeholders, including forest officials, local communities, academic institutions, and NGOs.
6. **Alignment with International Protocols:** Ensuring compliance with global standards such as the Ramsar Convention and the East Asian-Australasian Flyway Partnership (EAAFP).

Bihar has consistently contributed high-quality data to the national and international waterbird monitoring efforts through these successful AWC cycles, showcasing a growing commitment to wetland and bird conservation.

International Workshop on Illegal Poaching of Wild Birds held at Patna, Bihar (February 2024) brought together national and international experts to discuss strategies for curbing illegal poaching and trafficking of wild birds. The workshop raised awareness and strengthened Bihar's conservation enforcement network, making the state a key player in the global fight against wildlife crime.

Adopting the newly developed SOP will further enhance Bihar's capacity to effectively monitor its wetlands and waterbird populations. By maintaining a standardized approach, we will be able to generate reliable, high-quality data that will contribute to long-term conservation planning and policy-making.

I thank everyone involved in this project for your continued support and contribution towards advancing wildlife and wetland conservation in Bihar.

PRABHAT KUMAR GUPTA

ACKNOWLEDGEMENT

We extend our sincere thanks to the Department of Environment, Forest and Climate Change (DEF&CC), Bihar, for permission, resource allocation, and their unwavering support and guidance in conducting the Asian Waterbird Census (AWC). Their commitment to biodiversity conservation and waterbird protection has been instrumental in the creation of this document.

We would like to give special thanks to Mr. Prabhat Kumar Gupta, PCCF-cum-CWLW, for his exceptional leadership and invaluable support. His dedication to the cause has been a driving force behind this initiative.

We also extend our heartfelt appreciation to Mr. S. Sudhakar, CF, Gaya, and State Nodal officer for AWC for his significant contributions and insights, which have greatly enriched the development of this SOP. We are also grateful to all the RCCFs, CFs, and DFOs involved in the AWC, Bihar.

Our heartfelt appreciation goes to the dedicated field researchers, volunteers, and ornithologists whose invaluable insights and field experiences have significantly influenced this SOP. Their commitment to monitoring and conserving waterbird populations is truly commendable. We are also thankful to all the frontline staff of the forest department for their support.

We thank all stakeholders for their continuous support and involvement. Your collective efforts have made this SOP a reality.

PREFACE

Birds play a crucial role in maintaining ecological balance by acting as pollinators, seed dispersers, and pest controllers, making them essential for healthy ecosystems. The key role of birds as bio-indicators of environmental health is to help detect pollution in the environment such as water, air, soil, noise, and heavy metal contamination. Many studies have proved that the birds are useful in detecting forest recovery which ultimately helps forest management. Birds have many useful roles in detecting global warming and climate change. Some birds help to detect biodiversity hotspots. Therefore, many problems according to environmental health and habitat destruction can be measured cost-effectively and easily with the help of birds as bio-indicators.

Lots of conservation and management measures are taken at local, national, and international levels as many birds are declining globally. The flyway level initiatives are one such to protect and conserve the birds and their habitats along their migratory routes. India lies in the Central Asian Flyway (CAF) which covers a large area of Eurasia between the Arctic and Indian Oceans. This flyway comprises several important migration routes of waterbirds, including the breeding grounds in the Russian Federation (Siberia) to the southernmost non-breeding grounds in West and South Asia. Geographically, the flyway region covers 30 countries. The East Asian-Australasian Flyway (EAAF) and East African and West Asian Flyway overlap in the eastern and western parts of India respectively. All these Asian Flyways are critical for the conservation of migratory birds and provide opportunities for a coordinated approach to protect birds and their habitats and ensure safe migratory routes for birds.

India has been actively involved in fostering flyway cooperation. It has also organized many inter-governmental meetings that have been critically important in developing and taking forward agreements and plans at the flyway level. Nationally, India has taken several initiatives for the conservation of birds such as India's National Action Plan for Conservation of Migratory Birds and their Habitats along CAF, Protected Area Network, and Species-specific Action Plans are some of them to mention here.

Initiatives for monitoring waterbirds are vital for understanding and conserving waterbird populations and their habitats at regional, national, and international level. The International Waterbird Census (IWC), coordinated by Wetlands International is one such initiatives that provide important data on waterbird species distribution and abundance, informing conservation strategies and policies. The Asian Waterbird Census (AWC), part of the IWC, is a significant effort that takes place annually across Asia. It stands as a beacon of dedication and collaboration in the realm of avian conservation. Thousands of volunteers and experts in 27 Asian Countries, including India, conduct synchronized counts of waterbirds and assess wetland health. Since its inception in 1987, the AWC has achieved significant milestones, including the identification of key wetland sites for conservation, contribution to the Ramsar Convention on Wetlands, and enhancement of regional collaboration in waterbird and wetland conservation.

The AWC embodies the collective efforts of a diverse array of stakeholders, ranging from governmental agencies to local communities and conservation organizations. This citizen science initiative helps track changes in waterbird numbers and wetland health and aids in the implementation of national and international conservation strategies. By generating comprehensive data, the AWC has been instrumental in driving policy changes and conservation actions, ensuring the protection of vital wetland ecosystems and the diverse waterbird species they support across Asia. The AWC also plays a key role in raising awareness about waterbirds and their habitats, and fosters community engagement in waterbird conservation.

Bihar, a state in eastern India, has an extensive network of wetlands and river systems that play a crucial role in its ecological and socio-economic landscape. The total area of Bihar is 94,163 sq. km. The 3,856.27 sq. km area is covered with wetlands, including two declared Ramsar Site. The state's wetlands, including oxbow lakes, floodplains, freshwater marshes, and man-made reservoirs, are vital habitats for a rich diversity of flora and fauna. Major river systems, such as the Ganges, Kosi, Gandak, and Son, traverse Bihar, creating fertile floodplains supporting wildlife and agriculture.

It is proven that robust monitoring is needed to take necessary and appropriate actions and develop a policy framework to protect, manage, and conserve the avian wonders. Because, in recent years, conservation measures are more pressing than ever because of rapid environmental changes and anthropogenic pressures.

In 2022, the Department of Environment, Forest and Climate Change (DEF&CC), Government of Bihar, in collaboration with BNHS, launched a pioneering initiative for state-level bird monitoring through the AWC. This Asian event involved volunteers, researchers, experts, research organizations, universities, other educational institutions, and local communities to conduct counts of waterbirds in various water bodies across Bihar by using standard scientific methods.

During 2022, a total of 67 wetlands in 23 districts were covered. The number of wetlands covered was increased in subsequent years. A total of 76 wetlands in 26 districts and 84 wetlands in 28 districts were covered during 2023 and 2024 respectively. The number of birds reported also increased in proportion to the number of sites. A total of 45,173; 39,937; and 80,246 birds were reported during 2022, 2023, and 2024 respectively. The AWC being conducted in a big way in Bihar is a testament to our unwavering commitment to the conservation of waterbirds and their habitats in the state.

This Standard Operating Procedure (SOP) has been developed based on meticulous planning, consultation, and experience garnered from years of dedicated field work and stakeholder engagement in Bihar for conducting the AWC and taking bird conservation to the next level. We believe that the procedures followed in the AWC in Bihar would be helpful for other states to develop the procedures that are best suited for them by referring to the Bihar experience or replicating this SOP to conduct the AWC for taking comprehensive management and conservation measures for birds in the states. We hope that this SOP will be a guiding light for all stakeholders involved in the census activities.

Authors

STANDARD OPERATING PROCEDURE FOR ANNUAL WATERBIRD CENSUS OF BIHAR

SCOPE OF THE STANDARD OPERATING PROCEDURE

- Understand the procedure of bird census
- Guide to conducting the Asian Waterbird Census in an organized way in the state
- Guide to replicate the procedure elsewhere in the country or region

This SoP covers all aspects of the Asian Waterbird Census conducted in Bihar. The processes involved are

1. Official notification for the Asian Waterbird Census

The official notification for conducting the Annual Waterbird Census (AWC) is issued by the Chief Wildlife Warden during the Wildlife Week Celebration or afterward to prepare for the AWC. The CWLW also issues a letter for the formation of a committee to oversee and ensure the successful execution and management of the AWC in the state.

2. Committee

All the Regional Chief Conservators of Forests (RCCFs), Conservator of Forests (CFs), and Divisional Forests Officers of all forest divisions are informed through the above-said letter and be part of the committee. This committee will coordinate various activities during the census by arranging and managing logistics, identifying the ornithologically important wetlands from their jurisdiction / collecting information about the site that is proposed for the census, site-specific planning for execution of the census, the deployment of frontline staff to guide the census team, and also participating in the census operation, media management and overall coordination with the census team.

Committee Structure:

Chairperson: The Principal Conservator of Forests (Wildlife) and Chief Wildlife Warden of the state is the chairperson and leads the committee to ensure that all activities are aligned with the objectives of the AWC and the activities are executed within the timelines.

Members: RCCFs, CFs, and DFOs of all the forest divisions of the state. The roles of the members are given above

Nodal Officer: A Nodal Officer is appointed in consultation with all the members of the committee. The nodal officer will be the member secretary of the committee and act as the single point of contact for all AWC-related matters, coordinating between different teams and ensuring smooth communication. The nodal officer will schedule the preparatory meetings with other members, coordinators, and AWC participants and share the decisions taken during each meeting. He/she will update the progress of the AWC to ensure transparency. He/she will be responsible for collecting datasheets, photos, media coverages, participant lists, reports, and issuing certificates to the census participants.

Census coordinators: Experts in bird identification, ornithologists, and researchers will be assigned as coordinators to lead a team, conduct the AWC, and submit datasheets, photos, and media coverage of the given wetland.

Expert Agency: The agency that works in the field of ornithology will act as a technical partner for the AWC. DEF&CC with the technical support of BNHS established the Bird Ringing and Monitoring Station (BRMS) in Bhagalpur, Bihar. The BNHS scientists and the researchers in the BRMS (hereinafter BRMS) are involved in the following process. Prepare and maintain records of all meetings, listing of wetlands to be covered for the census, fixing the dates for the census by following the national and international guidelines, training the volunteers, collecting hard and soft copies of the datasheets from the nodal officer / key focal points/coordinators, data compilation, data verification, data analysis, and report preparation.



S. SUDHAKAR

Ruddy Shelduck *Tadorna ferruginea*

MEETINGS

A series of meetings are scheduled to discuss and finalize the following.

Wetlands to be covered: Nominate, evaluate, and select the potential wetlands and river stretches. Discuss the accessibility and logistical feasibility for conducting the census.

Census Participants and team building: Birdwatchers, trained bird guides, researchers, college/school students, and wildlife photographers, will be identified, listed, and communicated through the Census Coordinators and Committee Members. They will play the role of a spotter, documenter, photographer, and birder. The roles of these AWC team members will be discussed and decided.

- 🦅 Spotter: Tasked with identifying and locating bird species within the designated survey area.
- 🦅 Documenter: Responsible for recording bird species, numbers, behaviours, and other relevant observations.
- 🦅 Photographer: Captures high-quality images of birds and their habitats for documentation and reporting purposes.
- 🦅 Birder: Expertise in bird identification and assists with species verification and documentation.
- 🦅 Guide: The person who knows the local landscape shall take the team safely from one point to another point of the census route. It is mainly done by the concerned frontline forest staff

Training to the AWC participants: Training sessions are organized during the meetings for bird experts and volunteers on the aim and objectives of the census, bird census techniques, and data collection procedures. Guide on filling out datasheets accurately and efficiently, usage of the dedicated mobile application developed for Bihar for the census participants. Further field training are conducted by the coordinators before the onset of the census.

Discussion on the datasheets - both bird count and habitat assessment: The standard Asian Waterbird Census datasheets are customized to the Bihar perspective by the expert agency with the consultation of the committee members. The datasheets are translated into the local language (Hindi) to facilitate a better understanding of the team members.

Rules and guidelines: Rules, guidelines, and best practices for ensuring the smooth and effective execution of the census activities are discussed and decided. These discussions highlight the dos and don'ts to be followed by all participants involved in the AWC.

1. **Survey Protocols:** The survey strategies, and protocols given in the standard guides and international standard documents are compiled and informed to the participants to adhere strictly to the protocols in the training sessions. Further reminded to the participants during the on-site training before the census

2. **Accurate Data Collection:** The guidelines and protocols best suited for Bihar are discussed and informed to ensure precise recording of bird species, counts, locations, and environmental and habitat conditions on the provided data sheets.
3. **Safety Measures:** Prioritize safety during field surveys, including adherence to local safety regulations and protocols.
4. **Mapping of the survey area and routes:** The census participants shall mark the census routes including the starting and end points by using the hand-held GPS or standard mobile app
5. **Timely Reporting:** The census participants shall reach the census location as per the decided survey time and plan. The data collected shall be submitted in the prescribed datasheets within the specified deadlines to facilitate the timely processing of data.
6. **Data submission:** The coordinator of the group or the team member nominated by the coordinator shall submit the datasheets. This is to avoid multiple datasets of the same area and possible discrepancies
7. **Communication:** Census participants shall maintain regular communication with coordinators, key focal persons, and the Nodal Officer regarding survey progress and any challenges encountered.

Don'ts

1. **Disturbance of Wildlife:** Avoid actions that may disturb waterbirds or their habitats during surveys.
2. **Unauthorized Data Alteration:** Refrain from altering or manipulating data without proper authorization or justification.
3. **Neglecting Equipment:** Ensure all survey equipment is properly maintained and used as per instructions to prevent inaccuracies in data collection.
4. **Non-compliance:** Avoid deviating from established survey methods or neglecting assigned responsibilities without valid reasons.
5. **Unauthorized Data Sharing:** Do not share confidential, unconfirmed or sensitive data outside authorized channels without prior approval.

Equipment to be arranged: Discuss and finalize arrangements for necessary equipment and gadgets required for the census. Arrangements are made by the census coordinators and committee members to ensure all teams have access to binoculars, spotting scopes, GPS devices, and data recording tools. The nodal officer guides the coordinators and committee members to overcome any shortcomings through resource mobilization.

Train bird experts on habitat evaluation procedures and adherence to established protocols. Ensure consistency in habitat assessments across different sites

Administrative Procedure: Administrative requirements such as permits to enter into any restricted areas, supporting documents for getting necessary permissions from the competent authorities for the census participants, and reimbursement for the census participants who incur the expenses for travel, food, and other logistics during the census. These activities are carried out by Nodal Officer and Committee Members in consultation with the Chariman.

Logistic planning: Strategies for logistics including transportation, accommodation, and food arrangements for teams during the census period are worked out by the coordinators and committee members.

Census strategies: Bihar is an important state for birds following the Central Asian Flyway and East Asian-Australasian Flyway (EAAF); the state is situated on the floodplain of the River Ganges and as such, is rich in wetlands. Not only it is home to several resident land birds but it is also an important stopover site for migratory birds of CAF and EAAF.

Therefore, to know their arrival, stay, and departure time, the census is conducted thrice in the migratory season. As per the decision taken, the pre-census shall be conducted during the arrival time (November – December), AWC shall be during winter (January – February), and the post-census will be during the return migration period (March – April).

Finalization of the dates for the census: As discussed in the series of preparatory meetings, the pre-census shall be conducted between 15th November and 15th December. This timeframe was carefully chosen due to

considerations regarding weather conditions and local cultural customs in Bihar.

Similarly, the dates for the main AWC and post-census shall be from the last week of January to the second week of February. The timeframe for AWC has been chosen due to considerations regarding weather conditions in Bihar. Late December typically sees onset of fog, which prevails till the third week of January every year. If the census is taken during that period, the poor visibility could potentially lead to an underestimate of birds.

The post-census activities will be from the end of March to the beginning of April as the habitats in Bihar supports for birds during the return migration as well.

State-specific AWC mobile application: A mobile app has developed by the Information and Technology Cell of DEF&CC, Bihar with the technical support of the BNHS to achieve the following goals:

- To get the data directly
- Easy validation
- Instant analysis and getting reports

Further, the app compiles observation data automatically and develops an excel sheet in the prescribed format. Thus, it minimizes the efforts for the need for a manual compilation of count data. This mobile application has been finalized with input from all census participants and is updated yearly by fixing operational errors. Training is given to the census participants every year for using this mobile application.

CENSUS OPERATIONS: The census operations are conducted in three phases.

Pre-census: The previous year's census data are analysed carefully and the top 10 key wetlands which supported the highest number of migratory birds are selected for the pre-census. The coordinators of the particular sites and their teams as decided during the preparatory meetings are deployed to do the pre-census.

Asian Waterbird Census: AWC is carried out in all the wetlands finalized during the preparatory meetings. Diverse potential bird habitat, which include river stretches, lakes, ponds, dams, reservoirs, and other water bodies crucial for supporting waterbird populations are selected for AWC. The wetlands are selected based on the basic information gathered through the coordinators, local birdwatchers and committee members. By analyzing the previous year's census fewer potential sites are deleted and the other newer potential wetlands are added for the AWC. The selected wetlands are covered by the respective teams during the stipulated period as decided during the preparatory meetings.

Post-census: Post-census are planned and conducted in the sites where the highest bird counts reported during the pre-census & AWC. This approach ensures that high-priority sites receive continued attention and monitoring, helping to maintain a comprehensive understanding of waterbird populations and their habitats.

Coverage: A total of 4416 wetlands have been identified in Bihar. It is tried to cover the maximum number of potential bird areas every year by strengthening the team sizes and voluntary efforts. Based on the area and the accessibility, the coverage area of each wetland is decided by the respective team. Guidelines are given to cover a minimum of 50% to a maximum of 100 % of each wetland. For the bigger wetlands, the team is advised to track their route by using GPS or a mobile application.

Mode of surveys: The total count method to record the birds

- Vantage Points: Vantage points are selected in the wetlands and the observers record all birds seen or heard from the vantage point (s)
 - Transect Method: In the possible areas, the observers walk along a predetermined path in the selected wetland and record all birds sighted on both sides of the transect.
 - Boat Surveys: In large wetlands, boats are used for bird surveys.
- ❖ Bird count and habitat assessment

The census coordinator shall ensure the noting of the habitat parameters given in Annexure – I recorded during all three phases (Pre-census, AWC, and Post-census) of the census.

All the birds encountered during the census are noted including the wetland dependant and land birds. The enumerator of the team shall follow the standard census techniques given in the AWC (Asian Waterbird Census 2022, 2023 & 2024) guide while counting the birds. The team members enter bird count data in the notebook. The coordinator ensures getting of photos of each flock for further verification. Observers shall note the state of threats observed during the census.

DATA SUBMISSION:

The data sheets appended at I & II are filled by the coordinator himself/herself or any experienced member of the survey team under the supervision of the coordinator. The team is encouraged to complete the data entry process in the given format as soon as the count is completed to avoid any loss of data. The photos taken are processed and scanned for any new species missed out in the count and entered in the count form. All the participants of the group signed in both forms. The soft copies of the filled forms are submitted to



Indian spot-billed duck *Anas poecilorhyncha*

the Nodal Officer and the Expert Agency by WhatsApp and dedicated mail. The hard copies of the datasheets are sent to the nodal officer through the Committee Members [District Forest Officers (DFOs)] of respective wetlands or sent directly to the Nodal Officer by post. The DFO Bhagalpur is the key contact for receiving and verifying all the datasheets. and finally hand over to the Bird Ringing and Monitoring Station (BRMS) for processing. All the data datasheets (both soft and hard copies) are kept in the repository of BRMS. The copies of the datasheets are kept in the respective.

DATA COMPILATION:

All data are entered in the master spreadsheets. The data received in the mobile application are also verified for any discrepancies in the data.

In the coming years, the data received through mobile applications will be cross-verified directly in the back-end datasets to save time and make reports quickly as it is well equipped now. More training will be organized at the site level for the census participants to familiarize themselves with the mobile app. The volunteer base is developed to support the expert agency and DEF&CC to verify the submitted datasets.

DATA VERIFICATION AND VALIDATION:

After data compilation, a thorough verification process is initiated in coordination with the respective coordinators of each wetland site. This process involves

- Verification of any doubtful figures,
- Gaps in the data compilation
- Interesting or new or rare records
- Evidence for the new or rare records
- Additional records by verifying the photos and videos taken in the field during the census.

The compiled data with photographic evidence to ensure accuracy and reliability.



GANESH PALLELA

Graylag goose *Anser anser*

The verification occurs in three stages :

Coordinator level: The coordinators shall cross-check the data entered by himself/herself or compiled by the team members. This is to avoid any wrong entries, duplications, mismatches, gap areas, and records

Researchers of the BRMS: The researcher associated with the BRMS shall scrutinize the data for any wrong entries, duplications, mismatches, gap areas, and any interesting, rare, and new records. The researchers shall rectify any gap areas, and collect the evidence (photos/videos) for interesting or rare or new records in consultation with the respective coordinators and the nodal officer. In this way, discrepancies, errors, inconsistencies, or missing information are identified and promptly addressed.

Validation by the bird experts: Finally, the scientists who are leading the BRMS shall verify and validate the bird records and the counts in consultation with experienced birdwatchers and other bird experts in this region.

It is followed to verify and validate the bird count and habitat records collected during all three phases of the census (Pre-census, AWC, and Post-census).

DATA ANALYSIS:

The validated data of the pre-census, AWC, and post-census are analysed in detail by researchers and scientists of the BRMS. The analysis process involves several key components:

1. **Mapping:** Geo-coordinates of the wetlands surveyed are compiled and mapped by using QGIS or Arc-GIS.
2. **Categorization of Birds:** Birds reported are categorized into various groups such as waterbirds, wetland dependant, and land birds. Migratory (long-distance migrant, local migrant, and resident) and IUCN status (Endangered, Threatened, Vulnerable, Near-Threatened, and Least Concern) are also noted for a complete understanding of the avian diversity and its status in the state. The overall population status of the birds in the state is calculated by compiling group-wise data from

all teams. The total checklist of the birds is prepared by including bird species reported during all three phases of the census. The status of the threatened species and their numbers are also analysed by adding the threatened bird records reported from each site.

3. **District-wise status:** The number of wetlands covered and the type of wetlands are analysed. The bird counts data collected from each wetland in a particular district are pooled together to obtain the number, species, categories, and status of birds district-wise. The exercise is to understand the role of wetlands in the district for the birds.
4. **Status of species prioritized in India's National Action Plan:** Twenty species have been prioritized in India's National Action Plan. The status of those 20 species in Bihar is analysed by separating the bird records and counts from all three phases of the census.
5. **Trend Analysis:** By compiling the available census data of the state and comparing those data with the current year bird census data, the trend in waterbird populations are assessed. Past census data is analysed to assess changes in population size, distribution, and habitat use over time. These analyses are to facilitate framing the conservation strategies and management actions in Bihar State.
6. **Habitat data:** The wetland-wise compiled habitat data are analysed to understand the Wetland and vegetation types, The nature of the wetland, permanent or temporary, the month of flooding, and the source of water are also analysed. The rainfall data for the particular year is obtained from the state meteorological department.
7. **Threat Assessment:** Threats observed during the census like fishing, poaching, pollution, cattle grazing, and other human activities which impact the integrity of the wetland are analysed. The weed cover areas of the wetlands, visible pollution records noted in the datasheets viz. dumping of solid wastes and plastics, open defecation, washing laundry, colourful foam, domestic waste, cremation wastes, and construction wastes are analysed qualitatively. Overall



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Red-crested Pochard *Netta rufina*

information obtained from all the surveyed wetland-wise and made available with the concerned site managers for planning of further actions through the Annual Plan of Operation (APO) for addressing those issues.

PRELIMINARY REPORT: Upon completion of data collection and analysis, a preliminary report giving the crux of the outcome of the census is prepared. It is shared with the nodal officer and the Chairman of the Committee by the BRMS. This report encapsulates all the findings, insights, and conclusions derived from the survey activities. The nodal officer further arranges a meeting with all the coordinators and census participants to sort out any issues or gaps in the data and final validation. The challenges faced, ways to mitigate the issues and maximize the efforts are discussed and noted.

FINAL REPORT: Compiling, analysing, and validating processes are done, and a comprehensive report is prepared with the following information

1. Summary, maps, and graphical representations of data such as charts, graphs, and trends,
2. Method followed, habitat parameters, threats, suggestions, preparatory, and pre and post-census meeting records.
3. Participants list, logos of the organizations that participated in the census (on receipt of the no-objection certificate from the organization), Media coverage, and supporting photographic evidence.

All this information is given in the final report for a better understanding to the managers and the stakeholders. Also, compilation of information to facilitate informed decision-making.

This report undergoes further cross-checking and revisions to ensure accuracy, completeness, and alignment with established standards and protocols. The review process is conducted at multiple levels, including:

1. **State Nodal Officer:** Assessment of the report's content, structure, and alignment with state-level objectives and priorities.



KHUSHBOO RANI

Kanwar lake, Begusarai

2. **Asian Waterbird Census State and National Coordinators:**
Evaluation of the report's consistency with national and international standards and requirements, as well as its contribution to broader research and conservation initiatives.
3. PCCF-cum-CWLW – chairman of the Committee: Verifying the accuracy of the data, assessing the coherence of the analysis, and ensuring compliance with relevant guidelines and regulations. Placing it for competent authorities for endorsements

REPORT RELEASE: Once the report is compiled and verified, it is released during any significant event or occasion. It is ensured that the report is release by Hon'ble Minister of DEF&CC or Secretary of DEF&CC.

Conclusion: At each stage of the census process, analysis and review process, feedback and suggestions are solicited from relevant people, including coordinators, experts, and site managers. This commitment to excellence strengthens the integrity of the census findings and enhances their utility for informing evidence-based conservation strategies and decision-making processes. This collaborative approach ensures that the final report reflects a consensus-based understanding of the survey findings and their implications for waterbird and habitat conservation.



बिहार सरकार

APPENDICES

Appendix I: Sample Bird Count data collection form (English and Hindi)

BIHAR ASIAN WATERBIRD COUNTS (AWC)

बिहार वार्षिक जलपक्षी गणना (ए.डब्ल्यू.सी)

Name of the wetland (आर्द्रभूमि का नाम): _____

Date (तारीख): _____

Time (समय): _____ Start (आरम्भ) _____ End (समाप्त) _____

Weather Condition (मौसम की स्थिति): GPS location of the wetland (आर्द्रभूमि का जीपीएस स्थान, निर्देशांक): N(उ) _____, E(पू) _____

Name of the Team Members (टीम के सदस्यों का नाम)

SI No (क्रमांक)	Name (नाम)	Designation (पद)	Contact Number (संपर्क)	Email ID (ई-मेल)	Signature (हस्ताक्षर)

Bird Count (पक्षी गणना)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
A. WATERBIRDS				
FAMILY: PODICIPEDIDAE (GREBES)				
1	Little Grebe	पनडुब्बी		
2	Great Crested Grebe	शिवहंस		

Appendix I: Sample Bird Count data collection form (English and Hindi) (Contd.)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
FAMILY: PELECANIDAE (PELICANS)				
3	Great White Pelican/ Rosy Pelican	सफेद हवासिल		
4	Dalmatian Pelican	डालमेशियन हवासिल		
5	Spot-billed Pelican/ Grey Pelican	चिती चोंच हवासिल		
FAMILY: PHALACROCORACIDAE (CORMORANTS)				
6	Little Cormorant	छोटा पनकौवा		
7	Indian Cormorant/ Indian Shag	भारतीय पनकौवा		
8	Great Cormorant	बड़ा पनकौवा या जलकाग		
FAMILY: ANHINGIDAE (DARTER)				
9	Oriental Darter	पनवा, तीरंदाज, सर्पपक्षी		
FAMILY: ARDEIDAE (HERONS, EGRETS & BITTERNS)				
10	Grey Heron	खैरा बगुला		
11	Purple Heron	लाल अंजन		
12	Great Egret/ Large Egret	बड़ा बगुला		
13	Intermediate Egret	मंझला बगुला		
14	Little Egret	छोटा बगुला, करछिया बगुला		
15	Cattle Egret	गाय बगुला		
16	Indian Pond Heron	अंधा बगुला		
17	Black-crowned Night Heron	चंद्रवाक, रात बगुला, तार बगुला		
18	Striated Heron/ Little Green Heron	काँचा बगुला		
19	Cinnamon Bittern/ Chestnut Bittern	जून बगुआ		
20	Black Bittern	काला जून बगुला		
21	Yellow Bittern	जून बगुआ		

Appendix I: Sample Bird Count data collection form (English and Hindi) (Contd.)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
FAMILY: CICONIIDAE (STORKS)				
22	Asian Openbill	घोंघिल		
23	Painted Stork	जांघिल, कठसारंग		
24	Greater Adjutant	बड़ा गरुड़		
25	Lesser Adjutant	छोटा गरुड़		
26	Black-necked Stork	लौह सारंग		
27	Wooly-necked Stork	हाजी लगलग		
28	Black Stork	कृष्ण महाबक, सुरमाल		
29	White Stork			
FAMILY: THRESKIORNITHIDAE (IBISES SPOONBILL)				
30	Red-naped Ibis	काला बुज़्ज़ा		
31	Glossy Ibis	छोटा बुज़्ज़ा, चमकीला बुज़्ज़ा		
32	White Ibis/ Black-headed Ibis	सफेद बुज़्ज़ा		
33	Eurasian Spoonbill	चमचा		
FAMILY: ANATIDAE (GEESE DUCKS)				
34	Large (Fulvous) Whistling Duck	बड़ा सिल्लिह		
35	Lesser Whistling Duck	छोटा सिल्लिह		
36	Bar-headed Goose	राजहंस, मोगली		
37	Greylag Goose	काज, कलहंस, खर हंस		
38	Brahminy (Ruddy) Shelduck	चकवा, सुर्खाब		
39	Common Shelduck	शाह चकवा बतख		
40	Cotton Teal/ Cotton Pygmy Goose	गिरीं		
41	Mallard	नीलसर, निलगई		

Appendix I: Sample Bird Count data collection form (English and Hindi) (Contd.)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
42	Northern Pintail	सींखपर, दीघोंच		
43	Common Teal	छोटी मुर्गाबी		
44	Indian Spot-billed Duck	बिरबा हंस		
45	Garganey	चैता बतख		
46	Marbled Teal	मरमरी बतख		
47	Common Pochard	बुरार नार, अरून		
48	Ferruginous Duck/ White-eyed Pochard	मंजिठा, कुरचिया		
49	Tufted Duck/Pochard	कलसिरा, मलका		
50	Comb Duck/ Knob-billed Duck	नकटा		
51	Eurasian Wigeon	अरून		
52	Gadwall	मैल		
53	Falcated Teal/ Falcated Duck	कटा सिंखुर बतख		
54	Northern Shoveler	सांखर तिदारी बतख		
55	Red-crested Pochard	लालसर		
56	Common Merganser	आरी बतख		
FAMILY: GRUIDAE (CRANES)				
57	Common Crane	कुंज, करकरा		
58	Sarus Crane	सारस		
FAMILY: RALLIDAE (RAILS, GALLINULES COOT)				
59	Water Rail	पनरेल, जल कुकड़ी		
60	Baillon's Crake	छोटा पन बटेर		
61	Purple Swampphen	खरीम, जामुनी जलमुर्गी		

Appendix I: Sample Bird Count data collection form (English and Hindi) (Contd.)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
62	Watercock	कोरा		
63	White-breasted Waterhen	वनमुर्गी		
64	Common Moorhen	जलमुर्गी		
65	Common Coot	सरार, ठेकरी		
FAMILY: JACANIDAE (JACANAS)				
66	Bronze-winged Jacana	जल पीपी, कटोइ		
67	Pheasant-tailed Jacana	पीहू, जलमोर		
FAMILY: BURHINIDAE (THICK-KNEES)				
68	Great Thick-knee/ Great Stone Plover	बड़ा कर्वानक		
69	Indian Thick-knee	कर्वानक		
FAMILY: CHARADRIIDAE (PLOVERS AND LAPWINGS)				
70	Pacific Golden Plover	छोटा बटन		
71	Grey Plover	बड़ा बटन		
72	Little Ringed Plover	झिरिया, मेरवा बाटन		
73	Kentish Plover	केंटिश बटन		
74	Lesser Sand Plover/ Mongolian Plover	बटन		
75	Northern Lapwing	हरी टिटहरी, उत्तरी टिटहरी		
76	Yellow-wattled Lapwing	पीली टिटहरी		
77	Red-wattled Lapwing	सामान्य टिटहरी		
78	River Lapwing	नदी टिटहरी		
79	Grey-headed Lapwing	धूसर सर टिटहरी		
FAMILY: ROSTRATULIDAE (PAINTED-SNIPE)				
80	Greater Painted-snipe	राज चाहा		

Appendix I: Sample Bird Count data collection form (English and Hindi) (Contd.)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
FAMILY: RECURVIROSTRIDAE (STILT AVOCET)				
81	Pied Avocet	कास्या चाहा		
82	Black-winged Stilt	गजपाँव		
FAMILY: GLAREOLIDAE (PRATINCOLES)				
83	Small Pratincole	पुर्बी धोबैचा		
FAMILY: SCOLOPACIDAE (SNIPES, SANDPIPERS, GREEN SHANK, REDSHANKS, CURLEWS)				
84	Black-tailed Godwit	श्याम पुच्छ आरामुखी		
85	Bar-tailed Godwit	गुडैरा		
86	Whimbrel	छोटा गुलिन्दा		
87	Eurasian Curlew	बड़ा गुलिन्दा		
88	Spotted Redshank	चित्रित चहबा		
89	Marsh Sandpiper	चौबाहा		
90	Wood Sandpiper	वन जलरंक		
91	Common Redshank	छोटा सुग्मा बटन, लाल सिकतार		
92	Common Greenshank	टिमटिमा		
93	Green Sandpiper	हरित जलरंक		
94	Common Sandpiper	सामान्य जलरंक, चौबाहा		
95	Pintail Snipe	सींकदुम चाहा		
96	Common Snipe	सामान्य चाहा		
97	Jack Snipe	छोटा चाहा		
98	Terek Sandpiper	टेरेक जलरंक		
99	Little Stint	छोटा पनलौवा		
100	Temminck's Stint	छोटा पनलौवा		

Appendix I: Sample Bird Count data collection form (English and Hindi) (Contd.)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
101	Dunlin	रुझनी पनलौवा		
102	Ruff	बगबद		
FAMILY: LARIDAE (GULLS, TERNS SKIMMER)				
103	Pallas's Gull	राजा गंगाचिली		
104	Black-headed Gull	कल सिर गंगाचिली		
105	Brown-headed Gull	भूरी गंगाचिली		
106	Whiskered Tern	कुरी		
107	Gull-billed Tern	कुरी		
108	Caspian Tern	केस्पियन कुरी		
109	Common Tern	कुरी		
110	Little Tern	छोटी कुरी		
111	River Tern	नदी कुरी		
112	Black-bellied Tern	कलपेटी कुरी		
113	Indian Skimmer	पनचिरा		
B. WETLAND DEPENDENT BIRDS				
FAMILY: ACCIPITRIDAE (EAGLES, HARRIERS KITES)				
114	Pallas's Fish Eagle	मछरंगा		
115	Western Marsh Harrier	दलदली पतई		
116	Pied Harrier	पहटई		
117	Brahminy Kite	ब्रह्मिनी चील, शंकर चील		
118	Greater Spotted Eagle	बड़ा चित्तिदार उकाब		
FAMILY: PANDIONIDAE (OSPREY)				
119	Peregrine Falcon	बहिरी बाज		

Appendix I: Sample Bird Count data collection form (English and Hindi) (Contd.)

SI No	Common English Name (सामान्य अंग्रेजी नाम)	Local Hindi Name (स्थानीय हिन्दी नाम)	Counts (गणना)	Total (कुल)
FAMILY: FALCONIDAE (FALCONS)				
	Osprey	मछलीमार बाज		
FAMILY: STRIGIDAE (OWLS)				
121	Brown Fish Owl	भूरा मछेरा उलू		
FAMILY: ALCEDINIDAE (KINGFISHERS)				
122	Common Kingfisher	सामान्य किलकिला, राम चिरैया		
123	Stork-billed Kingfisher	बड़ा किलकिला		
124	White-throated Kingfisher	श्वेतकंठ किलकिला		
125	Black-capped Kingfisher	कलसिर किलकिला		
126	Lesser Pied Kingfisher	कोरिल्ला किलकिला, अबलक किलकिला		
127	Greater Pied Kingfisher	ताजदार किलकिला		
FAMILY: MOTACILLIDAE (WAGTAILS PIPITS)				
128	White Wagtail	सफेद खंजन		
129	White-browed Wagtail	सफेद भौं खंजन		
130	Yellow Wagtail	पीला खंजन		
131	Citrine Wagtail	पीत सिर खंजन		
132	Grey Wagtail	स्लेटी या घुसर खंजन		

Appendix II: Sample Habitat datasheet (English and Hindi)

BIHAR ASIAN WATERBIRD COUNTS (AWC)

बिहार वार्षिक जलपक्षी गणना (ए.डब्ल्यू.सी)

NAME OF SITE (स्थल का नाम):		DISTRICT (जिला):
NEAREST LARGE TOWN/CITY (निकटतम बड़ा शहर):		STATE (राज्य):
ALTITUDE (ऊँचाई):	AREA (जो):	DATE (दिनांक):
GPS COORDINATES (जीपीएस निर्देशांक)	_____ deg (डिग्री) _____ min (मिनट) N (उत्तर) _____ deg (डिग्री) _____ min (मिनट) S(दक्षिण)	
STATUS (स्थिति) : (Please tick mark the relevant figures/ कृपया प्रासंगिक आंकड़ों को चिह्नित करें), National Park (राष्ट्रीय उद्यान) 2. Wildlife Sanctuary (वन्यजीव अभ्यारण्य) 3. Bird Sanctuary (पक्षी अभ्यारण्य), 4. Community Reserve (सामुदायिक रिजर्व), 5. Ramsar Site (रामसर साइट)		
Name of protected area (संरक्षित क्षेत्र का नाम):		
Name of Important Bird Area and Biodiversity Area (IBA) (महत्वपूर्ण पक्षी क्षेत्र और जैव विविधता क्षेत्र का नाम):		

WETLAND TYPE (आर्द्रभूमि प्रकार): (Please circle the relevant number/ कृपया संबंधित नंबर पर गोला बनाएं)

- | | |
|--|---|
| 0. Open seas, bays, straits (खुले समुद्र, खाड़ी, जलडमरूमध्य) | 6. Reservoirs, barrages, tanks (जलाशय, आड़, टैंक) |
| 1. Estuaries, tidal mudflats, salt marshes pools (मुहाना, ज्वार की मडफ्लैट्स, नमक दलदली ताल) | 7. Gravel pits, mineral workings, mining (बजरी के गड्ढे, खनिज कार्य, खनन) |
| 2. Brackish or saline lakes, lagoons, salt pans (खारे या खारे झीलें, लैगून, नमक के पान) | 8. Fish ponds, shrimp ponds (मछली तालाब, झींगा तालाब) |
| 3. Rivers, streams, canals, drains (नदियाँ, धाराओं, नहर, नालियों) | 9. Grassland, arable land (घास का मैदान, कृषि योग्य भूमि) |
| 4. Freshwater marshes, flooded areas (मीठे पानी के दलदल, बाढ़ वाले क्षेत्र) | 10. Mangrove, nipah (नमकीन जंगल, निपा) |

Appendix II: Sample Habitat datasheet (English and Hindi) (Contd.)

5. Freshwater lakes, ponds forest (मीठे पानी की झीलें, तालाब जंगल)

11. Freshwater swamp forest, Peat swamp (मीठे पानी का दलदली जंगल, पीट दलदल)

DESCRIPTION OF SITE: (Please circle the relevant figures/alphabets)

a. Months of maximum flooding (अधिकतम बाढ़ के महीने) _____

b. Annual rainfall (वार्षिक वर्षा) _____ mm (मिमी)

c. Source (स्रोत): 0. Unknown (अज्ञात) 1. local rains (स्थानीय वर्षा) 2. river/stream (नदी/धारा) 3. Sea (समुद्र) 4. Other (अन्य) _____

d. Maximum depth of water (in meters) & पानी की अधिकतम गहराई (मीटर में) _____

e. Tidal variation (ज्वारीय भिन्नता): 1. Present (उपस्थित) 2. absent (अनुपस्थित) 0. Unknown (अज्ञात)

f. Salinity (लवणता): 1. Freshwater (मीठे पानी) 2. Brackish (तुनखरा) 3. Saline (लवण) 4. Unknown (अज्ञात)

g. Is the site (स्थल): 1. Permanent (स्थायी) 2. Temporary (अस्थायी) 0. Unknown (अज्ञात)

h. Vegetation cover of wetland (आर्द्रभूमि का वनस्पति आवरण): 1. None (नहीं), 2. half area (आधा क्षेत्र), 3. complete (पूरा क्षेत्र), 4. recently cleared (हाल ही में साफ किया गया), 0. Unknown (अज्ञात)

i. Vegetation type (वनस्पति प्रकार): Unknown 0. अज्ञात: 1. growing on bank (किनारे पर) 2. submerged in water (पानी में डूबा हुआ) 3. free floating (मुक्त तैरता हुआ) 4. floating-leaved rooted (जड़ कीचड़ में और मुक्त तैराव पत्ते) 5. emergent (आकस्मिक) 0. Unknown (अज्ञात)

j. Fishing (मछली पकड़ना): 1. None (नहीं), 2. Little (बहुत कम), 3. Moderate (मध्यम), 4. large scale (बड़े पैमाने पर), 0. Unknown (अज्ञात)

k. Hunting/trapping/poaching of birds (पक्षियों का शिकार): 1. None (नहीं), 2. Little (बहुत कम), 3. Moderate (मध्यम), 4. large scale (बड़े पैमाने पर), 0. Unknown (अज्ञात)

l. Agriculture (कृषि): 1. None (नहीं), 2. Little (बहुत कम), 3. Moderate (मध्यम), 4. large scale (बड़े पैमाने पर), 0. Unknown (अज्ञात)

m. Cattle grazing (गाय, मवेशी चराई): 1. None (नहीं), 2. Little (बहुत कम), 3. Moderate (मध्यम), 4. large scale (बड़े पैमाने पर), 0. Unknown (अज्ञात)

n. Are there signs of pollution? If so with what (प्रदूषण के क्या संकेत हैं? यदि ऐसा है तो किस के साथ) (e.g. foam, coloured water, solid waste/ झाग, रंगीन पानी, ठोस अवशेष) _____

ADDITIONAL COMMENTS (अतिरिक्त टिप्पणियाँ):

PARTICIPANT(S) NAME(S), ADDRESS(ES), TEL. NO(S) AND EMAIL(S)

(प्रतिभागियों का नाम, पता, संपर्क नंबर और ईमेल):

Appendix III: List of survey sites for 2022, 2023 & 2024 (contd.)

Wetlands Covered in AWC Bihar in 2022, 2023 & 2024

S. No	District	S. No.	Name of the site	Wetlands covered during AWC		
				2022	2023	2024
1.	Araria	1.	Kajra Dhar		✓	
	Araria	2.	Dopahariya Pond			✓
	Araria	3.	Trishulia ghat			✓
2.	Aurangabad	4.	Indrapuri barrage	✓	✓	✓
3.	Banka	5.	Ohrni Dam	✓	✓	✓
4.	Begusarai	6.	Kanwar lake	✓	✓	✓
	Begusarai	7.	Pachaila Chaur	✓		✓
5.	Bhagalpur	8.	Athania	✓		
	Bhagalpur	9.	Bahatra	✓		
	Bhagalpur	10.	Gangaprasad lake	✓	✓	✓
	Bhagalpur	11.	Jagatpur lake	✓	✓	✓
	Bhagalpur	12.	Kataiya dhar		✓	✓
	Bhagalpur	13.	Dimaha wetland		✓	✓
	Bhagalpur	14.	Ganga river - Manik sarkar ghat to Barari ghat		✓	✓
	Bhagalpur	15.	VGDS- sultanganj to Mirzapur	✓	✓	✓
	Bhagalpur	16.	VGDS- Mirzapur to Barari ghat	✓	✓	✓
	Bhagalpur	17.	VGDS- Barari to Kahalgaon	✓	✓	✓
	Bhagalpur	18.	Ghatora wetland complex			✓
	Bhagalpur	19.	Bhagalpur bypass			✓
6.	Bhojpur	20.	Sunki Suhiya - Shahpur		✓	✓
	Arrah	21.	Ganga Mahuli ghat to Maner			✓
7.	Buxar	22.	Sewage marsh	✓		
	Buxar	23.	Ganga river (chausa-ahirauli)		✓	✓

Appendix III: List of survey sites for 2022, 2023 & 2024 (contd.)

Wetlands Covered in AWC Bihar in 2022, 2023 & 2024

S. No	District	S. No.	Name of the site	Wetlands covered during AWC		
				2022	2023	2024
	Buxar	24.	Ganga Buxer Ranighat Xhausabyasi Bridge			
	Buxar	25.	Gokul Jalashay		✓	✓
	Buxar	26.	Vayasi Ghat to Bihari Ghat (Arrah)			✓
8.	Darbhanga	27.	Kalma Jheel	✓		
	Darbhanga	28.	Kusheswar Asthan	✓	✓	✓
	Darbhanga	29.	Khiroli nadhi tat			✓
9.	East Champaran	30.	Chilraon Lake	✓		✓
	East Champaran	31.	Sarrota lake	✓	✓	✓
	East Champaran	32.	Basmanpur lake		✓	✓
	East Champaran	33.	Bhoraha lake		✓	
	East Champaran	34.	Gandak river		✓	✓
	East Champaran	35.	Sonbarsa lake		✓	✓
	East Champaran	36.	Burhi gandak			✓
10.	Gaya	37.	Barandih dam	✓	✓	✓
	Gaya	38.	Barwadih dam	✓	✓	✓
	Gaya	39.	Mohanpur reservior	✓		
	Gaya	40.	Sita dam	✓		
11.	Jamui	41.	Nagi dam	✓	✓	✓
	Jamui	42.	Nakti dam	✓	✓	✓

Appendix III: List of survey sites for 2022, 2023 & 2024 (contd.)

Wetlands Covered in AWC Bihar in 2022, 2023 & 2024

S. No	District	S. No.	Name of the site	Wetlands covered during AWC		
				2022	2023	2024
	Jamui	43.	Belatar	✓	✓	✓
	Jamui	44.	Pailbajan	✓	✓	✓
	Jamui	45.	Devanahar	✓	✓	✓
	Jamui	46.	Garhi dam		✓	✓
	Jamui	47.	Jhajha railway pond	✓	✓	✓
	Jamui	48.	Raja ahar		✓	✓
	Jamui	49.	Dhamna aahar			✓
	Jamui	50.	Gadhi pond	✓		
12.	Kaimur	51.	Durgawati dam	✓	✓	✓
	Kaimur	52.	Karkat waterfall			✓
	Kaimur	53.	Kohira dam			✓
	Kaimur	54.	Gokul dam	✓		
	Kaimur	55.	Dhrauli	✓		
13.	Katihar	56.	Bagarbeel	✓	✓	✓
	Katihar	57.	Baldiya Chaur	✓	✓	✓
	Katihar	58.	Gogabeel lake	✓	✓	✓
	Katihar	59.	Kathotia fish pond		✓	✓
	Katihar	60.	Kahalgaoan, bhagalpur to Manihari katihar		✓	
	Katihar	61.	Bhanwra kothi			✓
	Katihar	62.	Ganga river - Bateshwarsthan to Manihari ghat			✓
14.	Khagaria	63.	Pasraha Chaur		✓	✓
15.	Kishanganj	64.	Mahananda river			✓
16.	Madhubani	65.	Chapaniya lake	✓	✓	✓

Appendix III: List of survey sites for 2022, 2023 & 2024 (contd.)

Wetlands Covered in AWC Bihar in 2022, 2023 & 2024

S. No	District	S. No.	Name of the site	Wetlands covered during AWC		
				2022	2023	2024
17.	Munger	66.	Kharagpur lake	✓		
	Munger	67.	Kukurjhaph lake	✓		
	Munger	68.	Ganga (Munger to gangania)		✓	
	Munger	69.	Ganga river - kashtarni ghat to bariyarpur			✓
18.	Muzaffarpur	70.	Bramhpura lake	✓		
	Muzaffarpur	71.	Narsan Chaur	✓		
	Muzaffarpur	72.	Basaitha Chaur	✓		
	Muzaffarpur	73.	Batraulia Chaur	✓		
	Muzaffarpur	74.	Manika lake	✓	✓	✓
	Muzaffarpur	75.	Manikpur Chaur	✓		
	Muzaffarpur	76.	Rewa ghat (Gandak river)	✓		
	Muzaffarpur	77.	Bhoosara lake		✓	
	Muzaffarpur	78.	Bagmati river		✓	
	Muzaffarpur	79.	Jhapaha mann			✓
	Muzaffarpur	80.	Kanti mann			✓
19.	Nalanda	81.	Arm and Ammunition factory	✓		
	Nalanda	82.	Pawapuri lake	✓	✓	✓
	Nalanda	83.	Pushkarni lake	✓	✓	✓
	Nalanda	84.	Giddhi lake or Begampur	✓	✓	✓
	Nalanda	85.	Ghora katora		✓	
	Nalanda	86.	Sainik school		✓	
	Nalanda	87.	Gangaji Ragriha Jalashay		✓	✓
	Nalanda	88.	Panchane river			✓

Appendix III: List of survey sites for 2022, 2023 & 2024 (contd.)

Wetlands Covered in AWC Bihar in 2022, 2023 & 2024

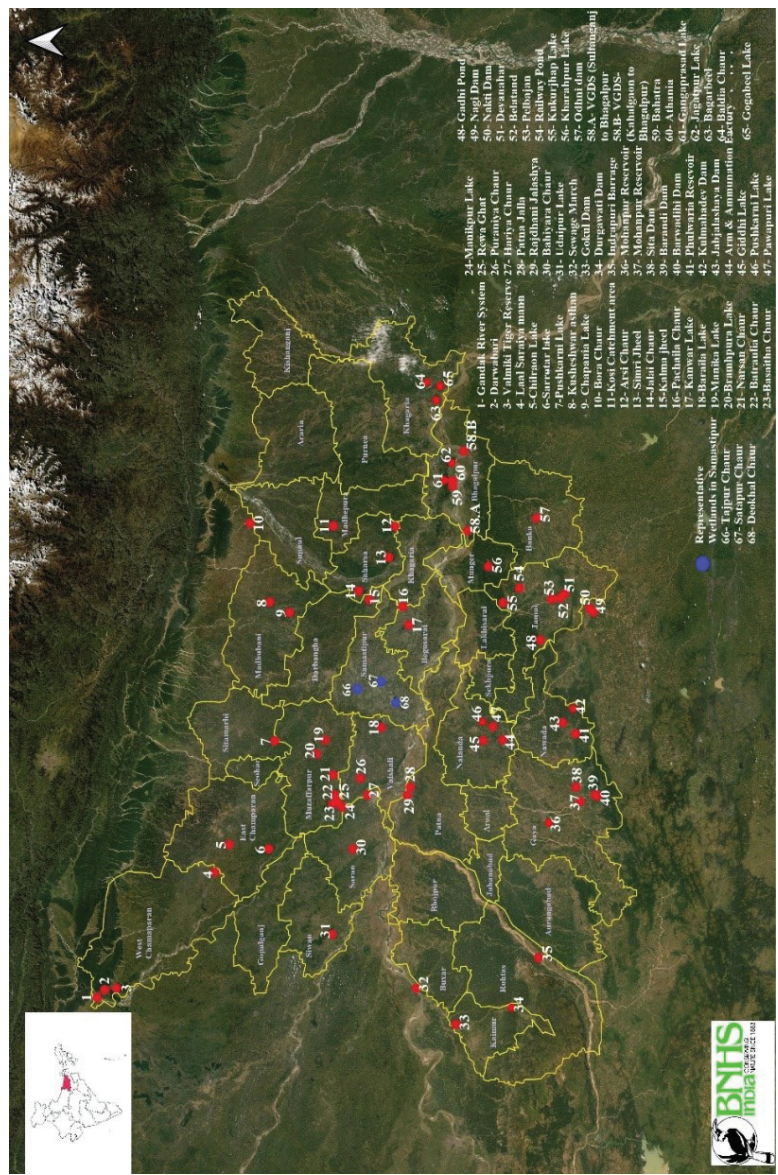
S. No	District	S. No.	Name of the site	Wetlands covered during AWC		
				2022	2023	2024
	Nalanda	89.	Ordnance factory			✓
20.	Nawada	90.	Hardiya dam (Phulwaria Reservoir)	✓	✓	✓
	Nawada	91.	Jabjalasaya dam	✓		
	Nawada	92.	Kulmahadev dam	✓		
21.	Patna	93.	Patna Jalla	✓		
	Patna	94.	Rajdhani Jalashay	✓	✓	✓
	Patna	95.	Ganga river - Maner to Fatuha			✓
22.	Saharsa	96.	Arsi chaur	✓	✓	✓
	Saharsa	97.	Bora Chaur	✓	✓	✓
	Saharsa	98.	Simri Jheel	✓	✓	✓
	Saharsa	99.	Kosi Catchment		✓	
23.	Samastipur	100.	Deokhal Chaur	✓	✓	✓
	Samastipur	101.	Satanpur Chaur	✓		
	Samastipur	102.	Tajpur Chaur	✓		
	Samastipur	103.	Goela chaur		✓	
	Samastipur	104.	Garuara chaur		✓	
	Samastipur	105.	Klayanpur Chaur		✓	
24.	Saran	106.	Bahiyara chaur	✓	✓	✓
	Saran	107.	Hariya chaur	✓	✓	✓
	Saran	108.	Atanagar		✓	✓
	Saran	109.	Phulwaria chaur		✓	✓
25.	Supaul	110.	Kosi catchment area	✓	✓	✓
	Supaul	111.	Kosi river survey (Raniganj to Kosi Mahasetu)		✓	

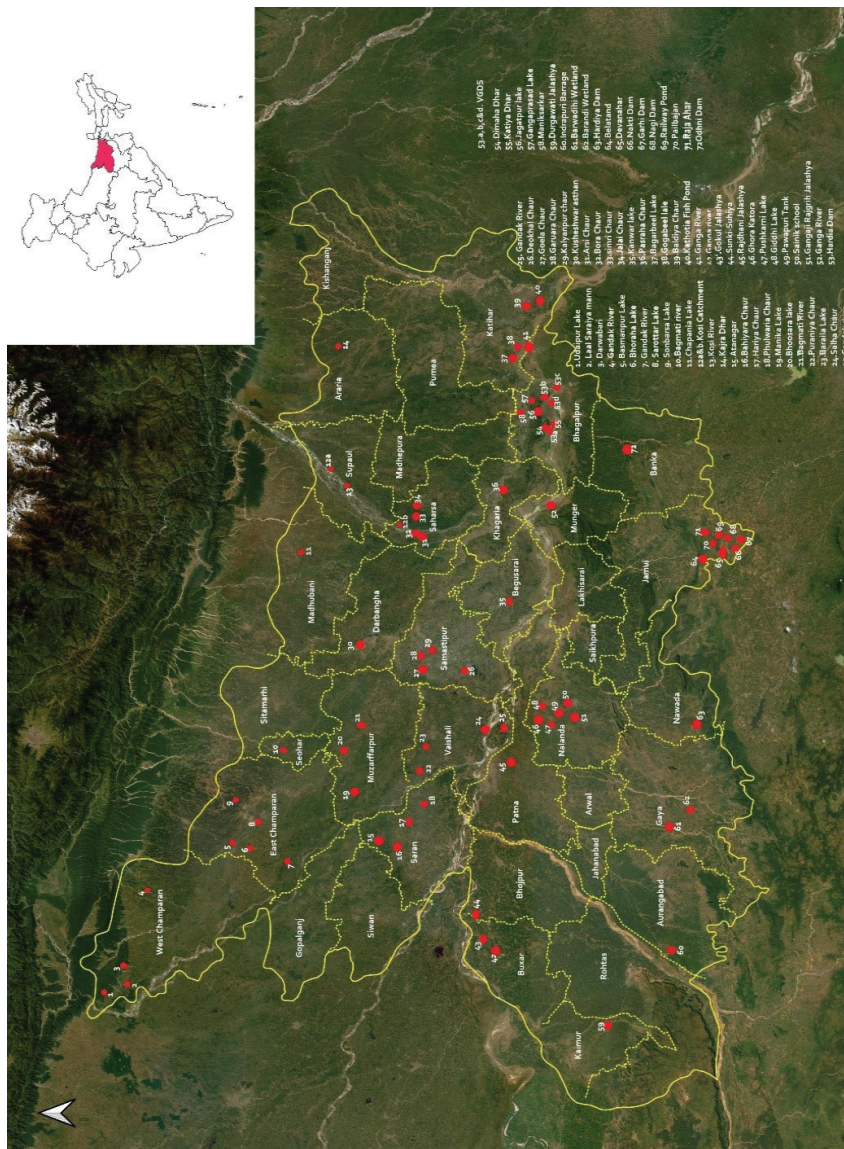
Appendix III: List of survey sites for 2022, 2023 & 2024 (contd.)

Wetlands Covered in AWC Bihar in 2022, 2023 & 2024

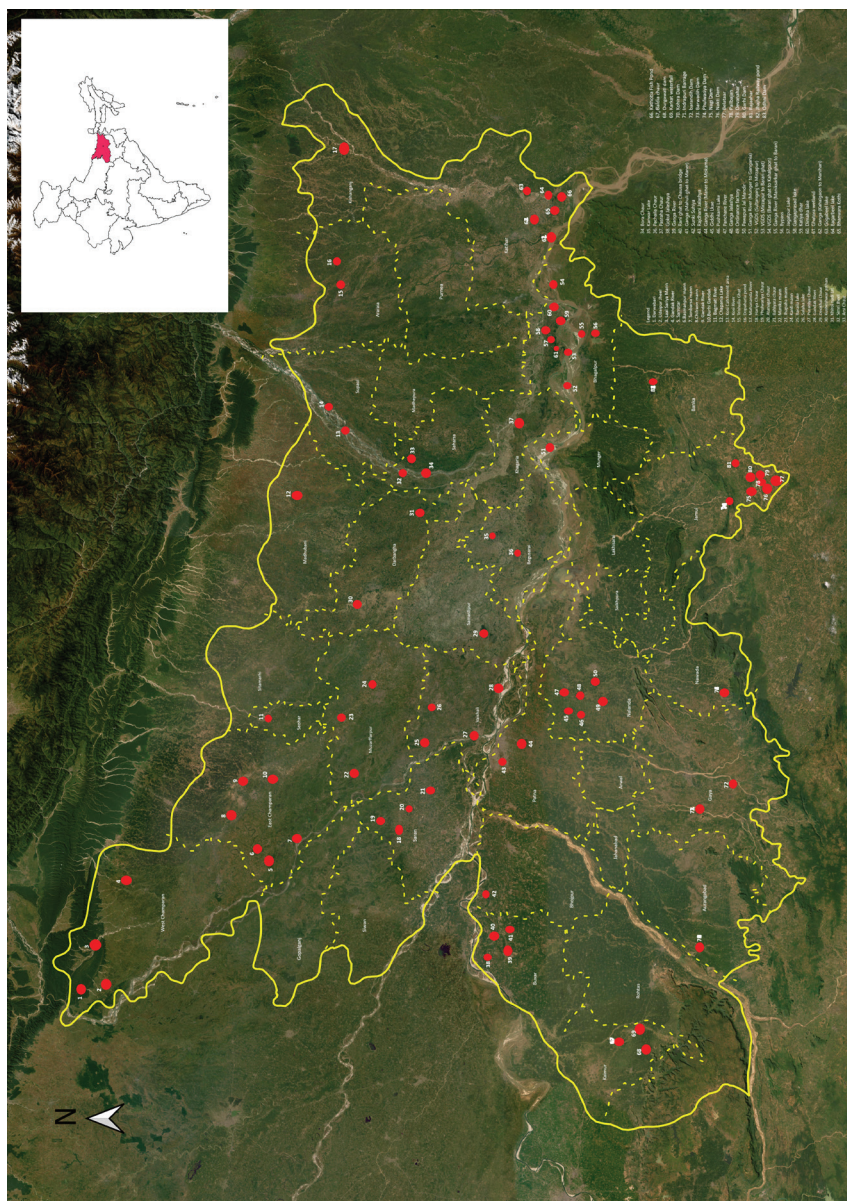
S. No	District	S. No.	Name of the site	Wetlands covered during AWC		
				2022	2023	2024
	Supaul	112.	Kosi river (Birpur Barrage to Kosi Mahasetu)			✓
26.	Sheohar	113.	Bagmati river		✓	✓
27.	Vaishali	114.	Baraila lake	✓	✓	✓
	Vaishali	115.	Puraniya Chaur	✓	✓	✓
	Vaishali	116.	Salaha Chaur		✓	✓
	Vaishali	117.	Gandak river		✓	✓
	Vaishali	118.	Barai Chaur		✓	
28.	West Champaran	119.	Darwabari	✓	✓	
	West Champaran	120.	Gandak River System	✓	✓	✓
	West Champaran	121.	Lal Saraiya Mann	✓	✓	✓
	West Champaran	122.	Udaipur Lake	✓	✓	✓
	West Champaran	123.	Valmiki Tiger Reserve	✓		✓
			Total No of Wetlands Covered	67	76	82

Appendix IV: Map of the AWC sites covered during 2022, 2023 & 2024





Map of wetlands covered during AWC 2023



Map of wetlands covered during AWC 2024



S. SUDHAKAR

Hardiya Dam Nawada



S. SUDHAKAR

Indrapuri Dam Aurangabad



Team photo



