

CALL OF THE DIVINE DUCK

Conservation Strategy and Action Plan
for the White Winged Duck in Assam



The Wildlife Trust of India (WTI) is a non-profit conservation organization committed to help conserve nature, especially endangered species and threatened habitats, in partnership with communities and governments.

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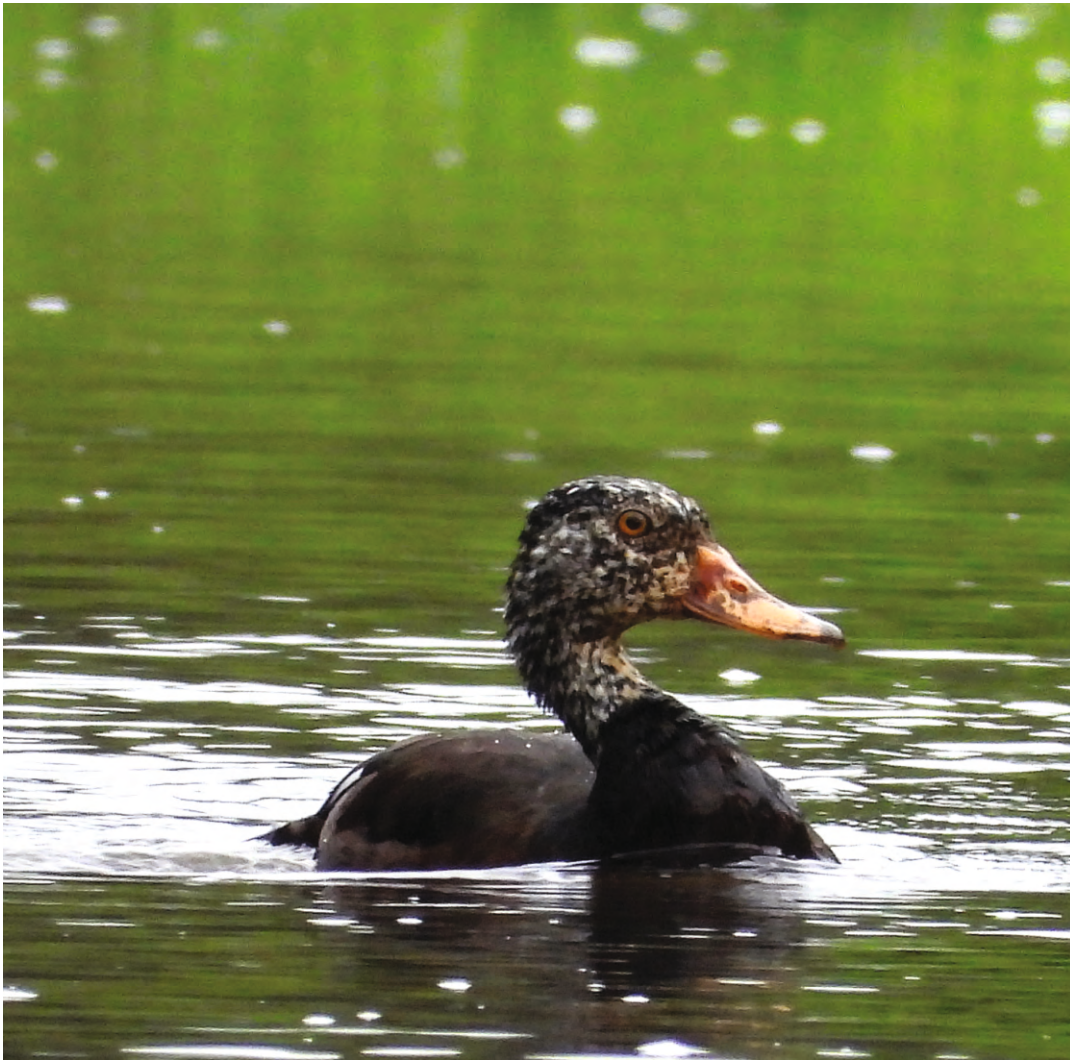
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CALL OF THE DIVINE DUCK



Conservation Strategy and Action Plan for the White Winged Duck in Assam

Dedicated to the late Mark Stanley Price, former Chair of
the Reintroduction Specialist Group of IUCN SSC
who helped kickstart this project



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White Winged Wood Duck in its habitats in Dihing Patkai National Park



White Winged Wood Duck in its habitats in Namdapha National Park



White Winged Wood Duck in its habitats in Nameri National Park



CMS. 7/2023/59

Dispur

29 Fagun, 1429 Bhaskarabad

14th March, 2023



MESSAGE

It is heartening to learn that the Forest Department of Government of Assam is contemplating protection of the White-winged Duck (Deo Hanh) through a meticulously prepared strategy document encompassing all aspects related to the question of securing/improving the preservation status of Assam's State Bird.

The forests and wetlands of Assam hold a special place within the Indian natural landscape owing to the rich biodiversity they represent. With more than 900 species of birds, the State's avian biodiversity is an important part of the Indian natural heritage. Unfortunately, the habitat and populations of these avian species are currently facing existential threats arising out of various anthropogenic activities. Keeping this in mind, the Government of Assam has been implementing a wide range of environmental programmes in collaboration with a range of national and international partners, aimed at mitigating the threats to the State's rich biodiversity.

"DeoHanh," or White-winged Duck, is honoured as the State Bird of Assam. This elusive duck species is an integral part of the evergreen forests of Assam and holds an important cultural significance for the people of the State. The Government of Assam has therefore undertaken a proactive initiative for conservation of this enigmatic duck species and its habitat. Over the last three years, local, national and international avian specialists have worked with the Government of Assam through a series of consultative meetings, workshops and field-surveys to develop various conservation measures to protect the duck species from extinction. The result of this collaborative initiative is the "White-winged Duck Conservation Strategy and Action Plan 2022". This strategy document shall serve as a base guideline for further conservation initiatives that are planned for protection and recovery of the White-winged Duck population of Assam.

The Government of Assam compliments the Forest Department and its partners for their dedication and hard work in bringing out this strategy document. This initiative of reviving our State Bird brings hope for a better future for the species and strength on our resolve to revive and protect the natural heritage of our State.

(Dr. Himanta Biswa Sarma)

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সংখ্যালঘু কল্যাণ বিভাগ, অসম



Chandra Mohan Patowary

Minister

Environment & Forests Department

Act East Policy Affairs Department

Welfare of Minorities Department

Government of Assam

Dispur

21.03.2023



MESSAGE

I am happy to know that Wildlife Trust of India (WTI) in association with Environment & Forest Department, Govt. of Assam has framed an action plan for conservation of white winged duck in Assam and is going to publish the same.

White winged duck, Deohah in Assamese, is Assam's state bird. In view of it being an endangered species, concerted efforts must be made to counter the challenges to the existence of white winged duck. I commend WTI for working towards bridging the information gap in this regard and executing a long-term recovery plan of the species in collaboration with Forest Department, local stakeholders and experts. It is also imperative to make young generation aware about the importance of this beautiful species.

I extend my best wishes to Wildlife Trust of India (WTI) and Environment & Forest Department, Govt. of Assam on this special occasion of publishing the action plan for conservation of white winged duck in Assam and hope it is able to achieve its desired goals.

(Chandra Mohan Patowary)

Ravi S. Prasad, IAS

Additional Chief Secretary, Government of Assam
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Dated Dispur, the 8th February, 2023



MESSAGE

The Government accords top priority to the Environment and Forest in the State. Our history of conservation of wildlife is more than 100 years old and Government of Assam is committed to protection of all flora and fauna.

I am extremely pleased that a Conservation Strategy and Action Plan for our State Bird "White winged Duck" has been prepared. I am informed that this plan was developed over a period of three years through field surveys and consultation with the experts, including international leaders in conservation of similar species.

I wish this strategy plan will serve as a guiding document for implementing various conservation activities in the state of Assam.

(Ravi S Prasad, IAS)



Shri Mahendra Kumar Yadava, IFS

Principal Chief Conservator of Forest and Head of Forest

Forces, Assam

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MESSAGE

The elusive 'White-winged Duck' is a unique species residing in the evergreen forests of Assam. Over the last several decades, the Assam Forest Department have worked proactively for protection of the species through creation of several protected areas namely Nameri National Park, Dihing Patkai National Park and Dibru-Saikhowa National Park. However, the lack of a formal conservation strategy and an action plan has limited the conservation initiatives for the species.

The Assam Forest Department has therefore developed this conservation strategy and action plan as a framework document to help in implementing systemic long-term conservation measures for protection of White-winged Duck in the forests of Assam. We hope that the strategy plan will serve as a guiding document for multiple stakeholders at various local, regional and international level building a coordinated initiative towards the common goal of conserving this enigmatic forest duck of north-east India.

Mahendra Kumar Yadava, IFS



Vivek Menon

Founder & Executive Director, Wildlife Trust of India

PREFACE

The White-winged Duck is both an enigma and an endangered species. Its soul-chilling drawn-out call during the monsoon may have been the spirit behind its name: Deoanh, the Spirit Duck. The State Bird of Assam, thus anointed for its cultural representations is today an endangered duck fighting to survive in small, evanescent forest pools. The species is so associated with forests that formerly it was called a Wood Duck, that name now taxonomically having gone to an American family. Yet it is in the dense woodlands of Assam and Arunachal Pradesh that the species has its last stronghold.

While attempts to conserve the duck have been made in the past, there has not been a comprehensive survey of both the states that make up the habitat for the species nor has there been an approved conservation action plan for the bird. At WTI, our Species Recovery team took this task on a few years ago and has finished the survey and the plan for the state of Assam. It is a sad story that the team could only find the duck in a few spots that were already known and that it was not seen in any new place within Assam. The survey in Arunachal continues and may yield a few more sites for conservation. But the story is more or less the same. The species has very small populations within India in very selected forest patches. If we do not intervene at this stage, the final bells may toll for the state bird of Assam.

This plan for Assam now being published is both a realisation of the endangerment of the species and a recognition by the state government of Assam that its conservation is imminent. We are committed to support the government in this measure, as for us at the Wildlife Trust of India, its recovery is both conserving a vanishing species and not allowing the call of this forest spirit of Assam to be stilled.

A handwritten signature in black ink, appearing to read 'Vivek', with a long, sweeping horizontal line extending to the right.

Vivek Menon

Founder & ED
Wildlife Trust of India

ACKNOWLEDGMENTS

This document was developed through a consultative workshop and field surveys for White-winged Duck in India. The authors of the document express their sincere gratitude to the participants of the workshop and their valuable inputs in formulating the conservation strategy plan. Special thanks to Dr. Mark S. Price for facilitating the workshop and reviewing the Conservation Strategy document. The authors are also grateful to Dr. Glyn Young, Dr. Asad Rahmani and Dr. Anwaruddin Choudhury for their guidance and feedbacks in the Strategy document. Also, special thanks to Dr. Goutam Narayan and Dr. Parag Jyoti Deka (Pygmy Hog Conservation Project) for hosting the conservation strategy workshop at their facility.

The authors take this opportunity to thank, Dr. Ranjana Gupta, PCCF (WL) of Assam Forest Department for providing the necessary permissions and guidance for carrying out the White-winged Duck surveys in Assam. We thank Mr. Pankaj Sharma (DFO, Nameri National Park), Mr. Atikur Rahman (DFO, Digboi FD), Late.

Mr. Bipul Bora (DFO, Digboi FD), Mr. Dilip Deka (DFO, Doomdooma FD), Mr. Rajendra Kr. Bharti (DFO, Dibru-Saikhowa NP), Mr. Pravakor Das (DFO, Dibrugarh FD) of Assam for their support and able guidance during the field surveys.

We also extend our sincere gratitude to the various officers and field staffs of Assam Forest Department for their invaluable support and guidance during the field surveys in their respective areas. We specially thank Mr. Debashish Buragohain, Mr. Amrit Doley of Nameri NP; Mr. Biraj Barman, Mr. Anuj Gogoi of Doomdooma FD; Mr. Lakhi Prasad Baruah, Mr. Dilip Phukan of Digboi FD; Mr. Jaganath Agarwal, Mr. Jadav Ch. Dutta, Mr. Santanu Phukan of Dibru-Saikhowa NP and Mr. Sharat Ch. Neog of Joypur RF. We are in debt to our field assistants and local guides who helped and supported us through the field surveys.

The authors also express their gratitude to Oil and Natural Gas Corporation Ltd. (ONGC) for their financial support to the workshop and field surveys.

EXECUTIVE SUMMARY

The White-winged Duck (Deohanh) is honoured as the “State Bird” of Assam. This forest-dwelling duck is a unique and rare avian species of the lowland evergreen forests of Brahmaputra valley. With less than 1000 individuals surviving worldwide, the species has been categorized as “Endangered” in the IUCN Red List since 1994. The state of Assam has been historically a stronghold of the species with a significant population residing in the region.

Assam has a long history of conservation efforts by various individuals and organizations pursuing to protect this enigmatic species. Atleast three protected areas (Dibru-Saikhowa National Park, Nameri National Park & Dihing-Patkai National Park) were established for preserving the duck and its habitat. Many short-term studies and awareness programmes were conducted regularly in the state promoting the conservation of the species. However, in absence of a formal conservation strategy and action plan till date, the conservation initiatives for the duck have been 'scattered' and 'isolated' without much impactful outcome.

Moreover, owing to widespread loss of forest habitats and severe hunting pressure during the last century, the species has declined drastically over the years and is now on the verge of local extinction in many of its ranging areas in Assam. Most of the White-winged duck's habitat are currently under severe threat from various anthropogenic activities such as encroachment for settlements and agriculture, deforestation, hunting, chemical pollution and large infrastructure developments.

This conservation strategy and action plan has been therefore developed to address the urgent need for a comprehensive formal guideline for conservation of White-winged Duck in Assam.

The '**Vision**' of the conservation strategy plan is stated as:

“White-winged Duck population restored and thriving in north-east India contributing to sustainable development of local communities and being a source of pride as the state bird of Assam”

The plan is categorized into four themes with respective '**Goals**' under each theme:

Theme 1. Habitat Protection

Goal: Preserve and maintain ecologically healthy habitats of White-winged Duck

Theme 2. Population Strengthening

Goal: Establish and sustain an ecologically viable population of White-winged Duck

Theme 3. Awareness

Goal: Involve communities, governments and regional stakeholders through education and awareness programmes in White-winged Duck conservation.

Theme 4. Research

Goal: To acquire scientific information useful to enable implementation of immediate measures to protect the species from further threats of extinction.

A series of '**Objectives**' have been set out to fulfilling each '**Goal**'. Respective to each '**Objectives**', a list of '**Actions**' are identified to be implemented by various stakeholders during the time period of 2023-2030. Tentative budgets and the timelines for each '**Action**' are also suggested in the action plan.

The strategy document is designed to serve as a guide to the decision-making authorities, conservationists, academic researchers and regional stakeholders for formulating and implementing effective action and measures for conservation of the species and its habitat in the north-eastern region of India. We hope the document will help in building a coordinated initiative towards the common goal of conserving this enigmatic forest duck of northeast India.

CHAPTER 1

INTRODUCTION

The White-winged Duck *Asarcornis scutulata* (WWD) is a rare and endangered duck species, endemic to the Indo-Malayan biogeographical realm. It is well-known for its conspicuous white patches on the wings and distinctive ghostly calls (Mackenzie & Kear, 1976). The species has a wide but fragmented distribution covering eight countries of south-east Asia including India, Bhutan, Myanmar, Thailand, Laos, Vietnam, Cambodia and islands of Sumatra of Indonesia (Birdlife International, 2001; Choudhury, 2007). The current worldwide population estimates range from 350 to 1500 ducks with 250-999 mature individuals (Birdlife International, 2019). The estimated population in India is about 300-400 individuals based on a survey in the early 1990s (Choudhury, 1996). However, the current population in India is unknown and is probably far less as the species has lost a significant part of its habitat in the last 25 years.

In India, WWD forms its western most population and is currently distributed in the north-eastern state of Assam and Arunachal Pradesh (Birdlife International, 2019; Rahmani *et al.*, 2012). The major population of the species in India is recorded from two protected areas of Assam: Nameri National Park and Dihing-Patkai National Park. Smaller fragmented populations are also confirmed from Namdapha National Park (Srinivasan *et al.*, 2010) and Pakke Tiger Reserve (Selvan *et al.*, 2013) in Arunachal Pradesh and Manas National Park (Choudhury, 2007), Hollongapar Wildlife Sanctuary (Sharma *et al.*, 2015), Dibru-Saikhowa National Park (Talukdar *et al.*, 2004), Doomdooma – Dangori Reserve Forest and Upper Dihing (East & West Block) Reserve Forest in Assam.

WWD is primarily a forest dwelling species inhabiting small forested wetlands, pools, swamps and slow-moving streams and channels (Green, 1992). The species appears to favour areas of contiguous undisturbed primary forest suitably interspersed with sluggish waterbodies (Mackenzie & Kear, 1976). As a habitat-specific species, the WWD has a restricted distribution range. Most of its ranging areas across its distribution range are currently under severe threat from various anthropogenic activities such as encroachment for settlements and agriculture, deforestation, hunting, chemical pollutions and large infrastructure developments (Rahmani *et al.*, 2012). In north-east India, the remote and pristine forests of the region harboured this shy and elusive ducks for centuries until the early 1900s when large scale hunting by colonial hunters and rapid destruction of forest habitats, began an era of decline for this unique species (Green, 1992). The last century saw human population advancing deeper into



the lowland tropical forests of Brahmaputra valley converting them into agricultural land and human habitations (Reddy *et al.*, 2016). Such rapid loss of forest cover served a severe blow to the WWD population of Assam valley. Here the species has declined to the present state in less than 50 years (Green, 1992). Other north-eastern areas have historically contained small populations of the species. With the loss of the Assam population especially in forest areas of eastern Assam, the Indian population of WWD is now almost obliterated with few hundred specimens present in a handful of forest areas of the region. Owing to such severe decline in the species population and distribution range, WWD has been categorised as 'Endangered' in the IUCN Red list categories since 1994 (BirdLife International, 2019). The species is also listed as Schedule I under Wildlife (Protection) Act, 1972 of India and is legally protected from hunting and collection in the country (Rahmani *et al.*, 2012).

The state of Assam, which has been the stronghold for White-winged Duck in India, has a long history of conservation efforts by various individuals and organisations pursuing to protect this enigmatic species. The duck was first granted protection from

hunting in 1937 when the Assam Government (then under British rule) restricted hunting of the ducks during the breeding season (April to September) and outside stipulated reserve forest areas of the state (Parsons, 1940). The duck was later placed under Special Protected List by the Indian Board of Wildlife in 1952 (Gee, 1958). In 1968, the World Wildlife Fund initiated a long-term conservation project for the species and was successful in establishing a captive population of the duck at a conservation breeding facility of Wildfowl & Wetlands Trust in Slimbridge, England (Mackenzie and Kear, 1976). A similar breeding programme was also attempted in India, notably at Guwahati Zoo, Kumsong Tea Estate, Bordubi Tea Estate and Miao Zoo (Mackenzie and Kear, 1976; Green, 1992) but all these attempts were unsuccessful. In the late 1990s, based on recommendations of various naturalists and conservationists, the Assam Forest Department established Dibru-Saikhowa National Park, Dihing-Patkai Wildlife Sanctuary (upgraded to National Park in 2021) and Nameri National Park in the state for conservation of WWD (Choudhury, 2000; Rahmani *et al.*, 2012). In 2003, the Government of Assam declared White-winged Duck as the

"State Bird of Assam," to encourage further conservation efforts.

Despite these interventions, the population of this duck has drastically declined over the years both in its numbers and the extent of occupancy (Green, 1992; Choudhury, 1996; Birdlife International, 2001; Rahmani *et al.*, 2012). Moreover, due to its cryptic nature, very little is known about the duck's biology and ecology in the wild which is a major limitation to plan concrete recovery strategies for the species. Further, in absence of a formal conservation strategy and action plan, conservation initiatives has been either 'scattered' or 'ad hoc' without much conservation outcome. Owing to such severe threats, and lack of any coordinated conservation action, a conservation strategy was urgently required for planning its recovery and securing its long-term conservation in Assam.

This document has been developed to address this need for a comprehensive formal guideline for conservation of White-winged Duck in Assam. The strategy document is designed to serve as a guide to the decision-making authorities (principally governments and their agencies), conservationists, researchers, academics and regional stakeholders for formulating and implementing effective action and measures for conservation of the species and its habitat in the north eastern region of India. The strategy is a result of a series of meetings, a planning workshop and a year-long survey in field (See 'Section 2. Planning Process' for more details).

The structure of the Conservation Strategy is based on recommendations in the SSC's 'Strategic Planning for Species Conservation: A Handbook' (IUCN/SSC, 2017).

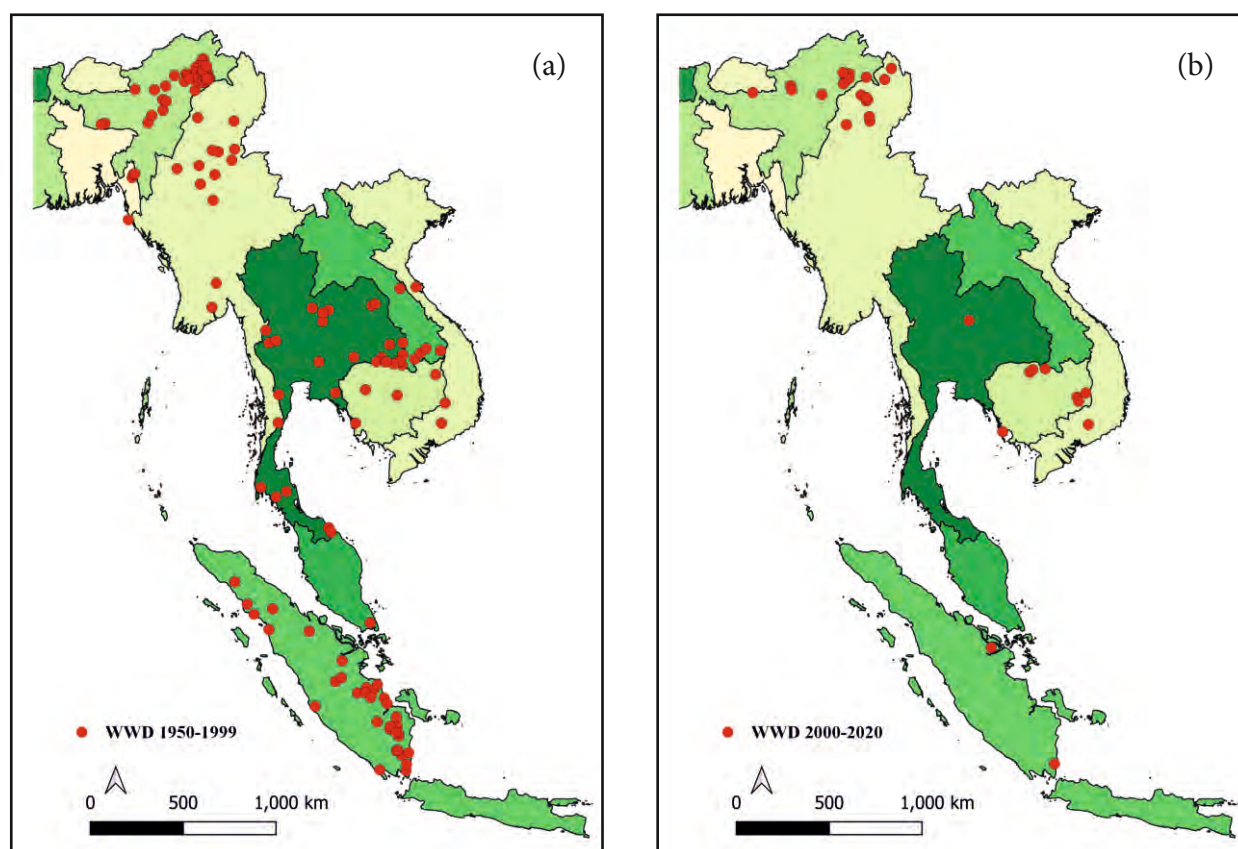


Fig 1 | Distribution of WWD in south-east Asia during (a) 1950-1999 and (b) 2000-2020 based on records from published literature and e-Bird database.

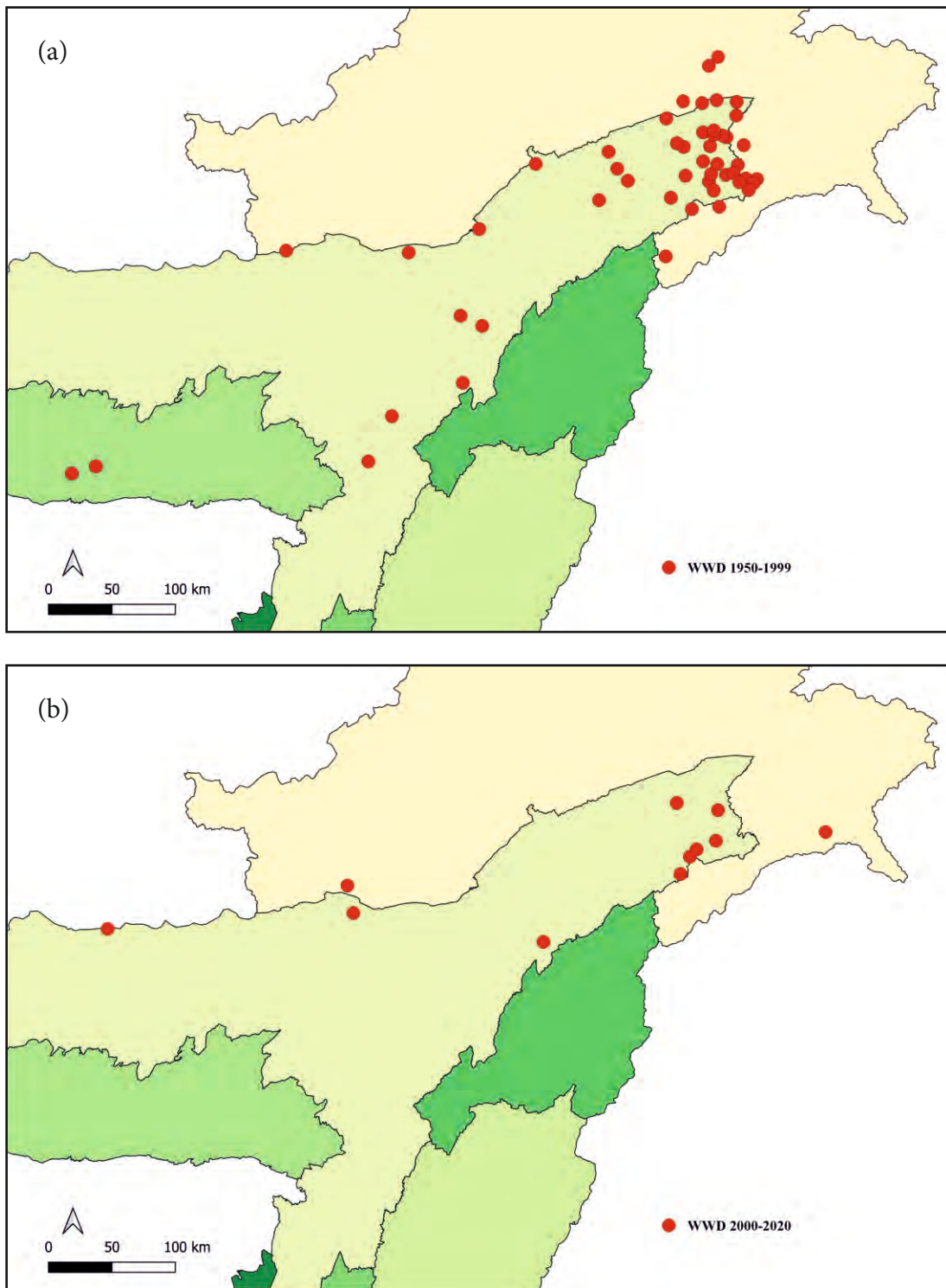


Fig 2 | Distribution of WWD in north-east India during (a) 1950-1999 and (b) 2000-2020 based on records from published literature and e-Bird database.

CHAPTER 2

PLANNING PROCESS

Origin | Project Deo Hanh

In October 2018, the Assam Forest Department (AFD) and Wildlife Trust of India (WTI) launched '**Project Deo Hanh**' (*White-winged Duck Recovery Project*) with the aim to revive the dwindling population of WWD in Northeast India. A planning workshop was conducted on February 2019 initiating the development of a conservation strategy plan for WWD. This was followed by a year-long survey and follow-up meetings further developing the strategy plan to its present final form.

2.1. Species Review

As an elusive and under studied species, information about WWD is sparse and scattered in various anecdotal notes and short studies. The project team therefore carried out a thorough literature review of all known published and unpublished records concerning the species to build an updated information base. In addition, sighting data from internet databases such as eBird and Birdlife International were used to produce spatial and temporal distribution maps of the species. Information on the breeding ecology, feeding habits, ranging pattern etc. were also gathered from the published documents. Historical threats and limitations were also identified for the species as described by various authors in its range countries. The collected information was used to prepare a species review document of WWD.

2.2. Planning Workshop

A conservation strategy planning workshop was organized in Guwahati, Assam on 28th February 2019 to formulate an effective conservation action plan for protecting the WWD in north-east India. The workshop was chaired by Mr. Vivek Menon (Executive Director WTI & Deputy Chair of IUCN SSC) and facilitated by Dr. Mark Stanley Price (Senior Advisor to IUCN SSC and Wild CRU, University of Oxford). Ornithologists and duck specialists from India and abroad attended the workshop and participated in planning the conservation strategy. Based on the species review and consultation from the participating experts, a draft conservation strategy document for WWD was produced as an

outcome of the workshop (*Processes of Planning Workshop in Box-2 and Minutes of the workshop in Appendix-1*).

2.3. 1st Conservation Strategy Meeting

As a follow up to the workshop, a conservation strategy meeting was held at the Office of the Principle Chief Conservator of Forest, Assam, on 1st March 2019 to present the draft conservation strategy and action plan for further review and suggestions. The meeting was chaired by Dr. Ranjana Gupta (CWLW & PCCF – Wildlife, Assam). Additional information and suggestions on the conservation strategy and action plan were incorporated during the meeting. The draft conservation strategy and action plan was finalized after completion of the planned field survey (2019-2020) and updating the current status of the species and its distribution (*Minutes of the meeting in Appendix-2*).

2.4. Field Survey

Based on the prepared conservation strategy document, a yearlong (March 2019- February

2020) field survey was conducted in Assam. Field work covered Nameri National Park, Dibru-Saikhowa National Park, Dihing Patkai Wildlife Sanctuary, Manas National Park, Hollongapar Wildlife Sanctuary, Joypur Reserve Forest and all Reserve Forests of Tinsukia district in Assam. (*See Fig 3 for locations of the areas and Box -3 for summary of the finding of the survey*).

2.5. 2nd Conservation Strategy Meeting

A second conservation strategy meeting was held on 27th January 2020 at the Office of the Principle Chief Conservator of Forest, Assam. The meeting was chaired by Mr. M.K. Yadav (CWLW & PCCF – Wildlife, Assam). The results of the field survey were presented and further discussions were carried out to firm up the draft conservation strategy (*Minutes of the meeting in Appendix-3*).

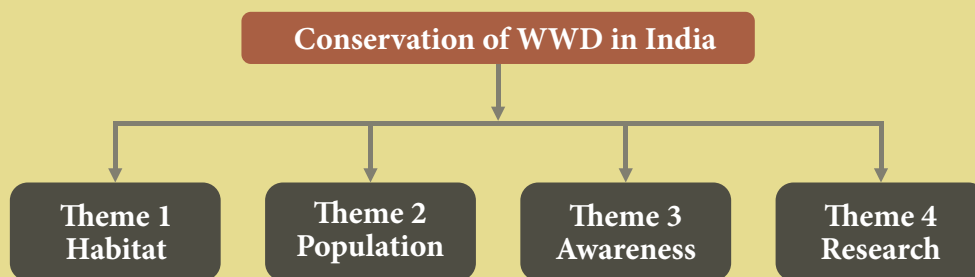
The Conservation Strategy and Action Plan for White-winged Duck in its present final form was thus developed incorporating all available information and expertise on the subject. The strategy is designed to be a pragmatic and effective plan forming the guiding document for conservation of this enigmatic duck in Assam.



Summary of key steps and outputs of the planning workshop:

1. The workshop started with the species review to update the participants on the current status of WWD, worldwide and in north-east India.
2. A set of conservation '**Goals**' for WWD were developed at this stage. The '**Goals**' are defined here as summaries of desired achievements to be accomplished for long-term conservation of WWD in India.
3. This was followed by a threat assessment exercise, identifying and ranking threats to the species from various factors in its distribution range in India. Working groups were formed among the participants based on four themes (**1. Habitat Protection; 2. Population Strengthening; 3. Awareness and 4. Research**) to analyse the threats and formulate mitigating measures. In each theme, threat ranks are developed based on two parameters, '**Risk**' (likelihood of the threat) and '**Impact**' (severity of the threat). Each category is ranked on a scale of 1-4 (1 being lowest rank and 4 being highest) and the product of the two parameters are considered the '**Threat Rank**' for each threat.
4. Based on the threat assessments, a set of '**Objectives**' were developed for each '**Goal**'. The '**Objectives**' were formulated to address the identified threats and constraints to the extent possible and therefore contribute to achieving the desired '**Goals**'. '**Objectives**' were kept precise, realistic and quantifiable.

The '**Objectives**' were further derived into a set of '**Actions**' to be executed in field. The '**Actions**' were developed to be specific, realistic, quantifiable and time-bound.



The findings of the 2019-2020 WWD survey:

- The survey recorded 24 individual WWD (in 39 sightings) from three forest areas of Assam; Nameri National Park, Upper Dihing (West Block) Reserve Forest and Doomdooma-Dangori Forest Complex. Breeding sites were confirmed in Nameri National Park.
- Major portion of the WWD population resides in Nameri – Pakke landscape and Dihing Patkai – Upper Dihing (East/West Block) - Joypur landscape, whereas small scattered population resides in Manas National Park and Doomdooma -Dangori Forests Complex.
- Other major areas with potential habitats for WWD were found in Dibru-Saikhowa National Park, Hollogaon Reserve Forest, Kukuramara Reserve Forest, Kundil-Kaliya Reserve Forest, Tarani Reserve Forest, Kakojan Reserve Forest, Burhi-Dihing Reserve Forest, Hollongapar Gibbon Wildlife Sanctuary, Nambor complex of sanctuaries, and Sonai-Rupai Wildlife Sanctuary, Assam.
- In most forest areas of eastern Assam and Arunachal Pradesh where the ducks were commonly sighted in early 1990s (Choudhury, 1996) have no record of the species in recent times. Forest areas such as Dibru-Saikhowa National Park and Doomdooma-Dangori Reserve Forests which had large population of WWD (Choudhury, 1996, Talukdar & Bhattacharjee, 1994) were found devoid of the ducks during the current survey. With the loss of these populations, it is apprehended that the species has decline drastically from the earlier estimated population of 300-400 ducks in India.
- All WWD areas face high anthropogenic disturbances such as fishing, draining of waterbodies, illegal firewood/timber extraction, NTFP collection, pesticide pollution etc. Lack of adequate number of forest staff and infrastructure also effects the protection of these areas.

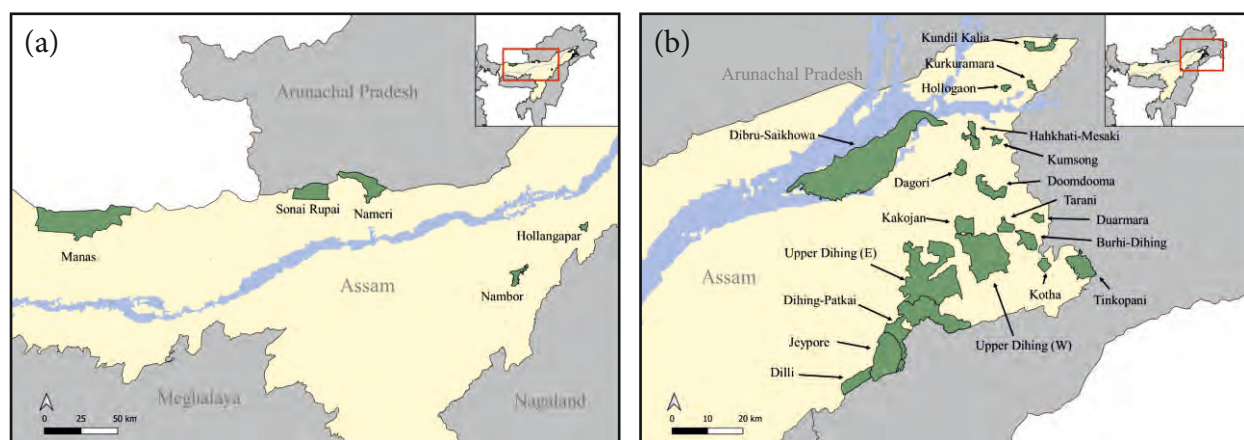


Fig 3 | Potential WWD areas in (a) Western–Central Assam (b) Eastern Assam

CHAPTER 3

THREAT ASSESSMENT

The methods used for assessing threats and constraints of WWD conservation are described in *Box 2 (Step 3)*. A brief review of the identified threats is present in *Appendix -4* while the relatedness and effects of key threats are presented in *Figure-4*.

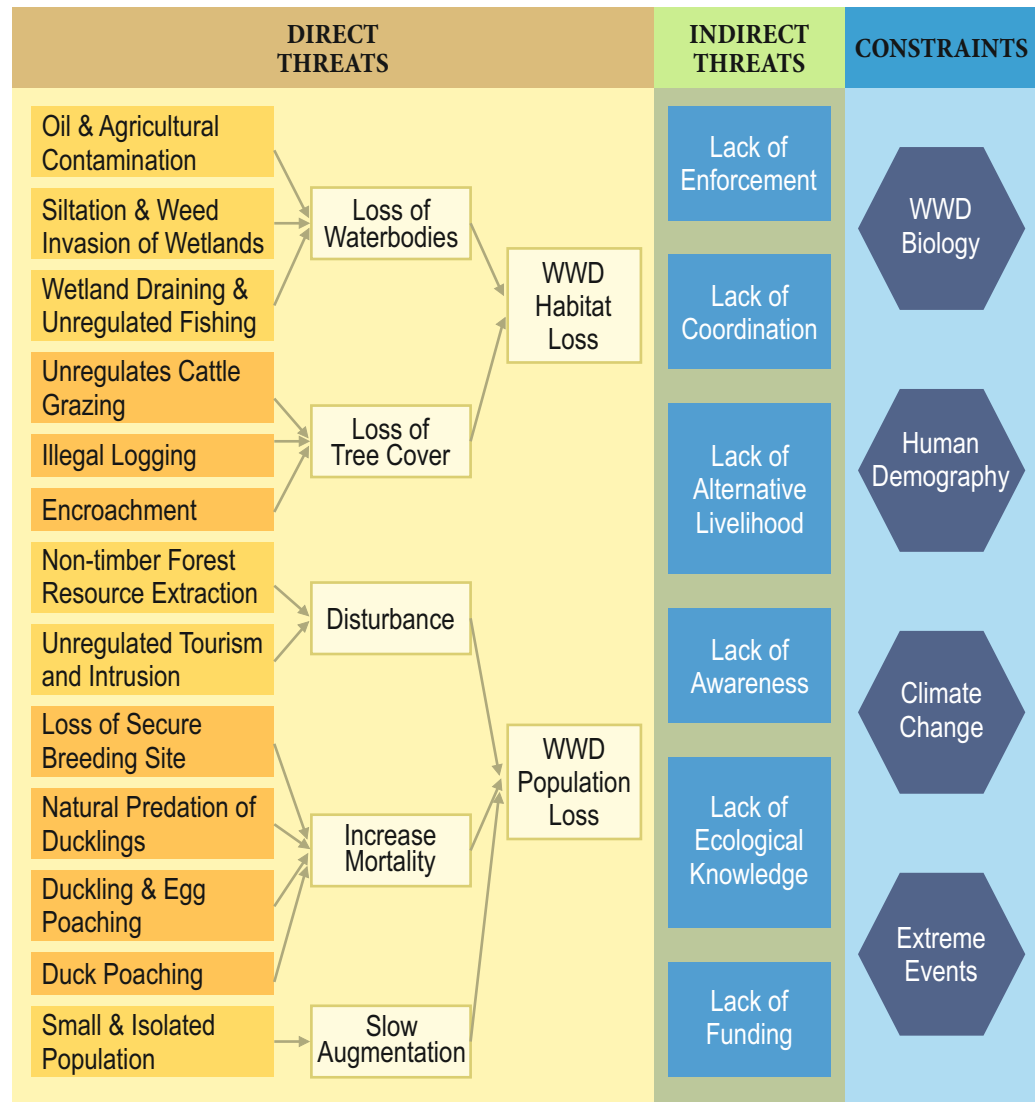


Fig 4 | Depiction of key threats to WWD in India

3.1. Theme 1: Habitat Protection

The threat ranks for “Habitat” theme for the WWD's habitat in Assam:

THREATS	RISK	IMPACT	THREAT RANK
DEFORESTATION			
Illegal Logging	04	04	16
Encroachment & settlement in forest land	04	04	16
Selective Logging (in Reserve Forests)	04	03	12
Cattle Grazing	2.5	04	10
Non-timber forest product collections	03	03	09
WATER REGIME CHANGES			
Wetland draining for fishing	03	04	12
Siltation & weed invasion of wetlands	02	04	08
Effects of hydropower projects	2.5	04	08
CHEMICAL POLLUTION			
Pollution from Oil fields and Tea plantations	01	04	04

Salient points

- Illegal clear felling of trees, selective logging of mature trees in reserve forests and encroachment of forest land is considered as highest threats as they cause permanent damage to the species habitat.
- Draining of major waterbodies for fishing especially during winter when the ducks need these waterbodies for feeding are also considered as a major threat.
- Hydropower projects are considered as moderate threat as they indirectly affect the habitat of the species.
- Pollution from oil and tea industry is considered as a moderate threat as they affect restricted areas of the duck's habitat.

3.2. Theme 2: Population Strengthening

The perceived threats to the WWD's population in Assam:

THREATS	RISK	IMPACT	THREAT RANK
HUNTING			
Duckling & Egg poaching	04	03	12
Hunting of adult ducks	01	04	04
BREEDING CONSTRAINTS			
Lack of secured nesting trees & breeding ponds	04	04	16
Duckling mortality due to natural predation	02	04	08
Small & Isolated population	04	04	16
DISTURBANCE			
Unregulated tourism & intrusion from fringe villagers	04	04	16

Salient points

- The WWD's population is considered vulnerable to loss mostly from duckling and egg poaching by local villagers. Hunting adult ducks is considered as low risk given that adults are rare to find and difficult to hunt.
- The low population size and fragmentation of the population in its distribution range is considered as a high threat to the population, as risk of local extinction increases with such isolations.
- Lack of secured nesting trees and breeding sites is considered as a high as these increases chances of duckling mortality and restrict population growth.
- Unregulated tourism and constant disturbances from intrusion of local villagers in the species' habitats are considered a major threat as the ducks are very shy and reclusive in nature.

3.3. Theme 3: Awareness

The threat ranks for awareness on WWD in Assam

THREATS	RISK	IMPACT	THREAT RANK
AWARENESS			
Lack of awareness among frontline forest staff	04	04	16
Lack of awareness in general people	04	04	16
Lack of awareness in government & policy makers	04	03	12

Salient points

- Lack of awareness and motivation for conservation of the species among frontline forest staff and local population is considered as the major threat to the species. The active participation among local forest personnel and fringe villagers in conservation efforts is considered crucial for the survival of the species.
- Lack of awareness and attention/commitment among government and policy makers is also considered as a shortcoming in the conservation of the species.



3.4. Theme 4: Research

The threat rank for research on WWD in Assam:

THREATS	RISK	IMPACT	THREAT RANK
RESEARCH			
Lack of information on current population & distribution of the species	04	04	16
Lack of information on ecology and biology of the species in wild	03	04	12
Lack of coordinated long-term research programme	03	03	09
Lack of coordinated long-term monitoring programme to detect change in the species population and distribution	03	03	09

Salient points

- Lacking of basic knowledge of the species' population status, distribution and ecology is considered as a major hindrance in developing any implementable conservation plan for the species.
- Lack of coordinated monitoring and long-term research programme is also considered a major constraint. The absence of such long-term programmes creates information gaps as short-term individual projects focus on study of specific areas within small time frame.

CHAPTER 4

CONSERVATION STRATEGY

4.1. Vision

“The White-winged Duck population restored and thriving in north-east India contributing to sustainable development of local communities and being a source of pride as the State Bird of Assam”

4.2. Goals & Objectives

Based on the four themes identified for the conservation of WWD, 'Goals' were set related to each of them. Further objectives were developed based on each 'Goal'.

Theme 1. Habitat Protection

Goal 1: Preserve and maintain ecologically healthy habitats of White-winged Duck.

Objectives:

- 1.1. Ensure protection to designated WWD areas and habitats from illegal firewood/timber extraction, wetland drainage, destructive fishing practices and other human disturbances.
- 1.2. Upgrade and enhance protection in reserve forest and non-protected forest areas with WWD habitats.
- 1.3. Restore degraded forest and water bodies through scientific restoration programmes.
- 1.4. Ensure pollution control from oil drilling sites and tea plantations in WWD habitat.

Theme 2. Population Strengthening

Goal 2: Establish and sustain an ecologically viable population of White-winged Duck in Assam.

Objectives:

- 2.1. Undertake strict implementation and enforcement of laws to curb hunting of adult WWD and poaching of eggs and ducklings.
- 2.2. Ensure protection of nesting trees, nests and breeding pools.
- 2.3. Ensure regulated tourism and ensure minimum disturbances in WWD breeding areas and during critical periods.
- 2.4. Establish a conservation breeding programme in India to augment the wild population.



Theme 3. Awareness

Goal 3: Involve communities, governments and regional stakeholders through education and awareness programmes in White-winged Duck conservation.

Objectives:

- 3.1. Establish baselines for knowledge, attitude and practices of people affecting WWD conservation.
- 3.2. Raise awareness on the importance of WWD and develop alternative livelihood options for local communities that are non-detrimental to the species.
- 3.3. Work with communities in critical areas to reduce exploitation on WWD habitat.
- 3.4. Ensure WWD conservation is mainstreamed in management policies of various Government agencies.

Theme 4. Research

Goals 4: To acquire scientific information useful to enable implementation of immediate measures to protect the species from further threats of extinction.

Objectives:

- 4.1. Implement a coordinated monitoring strategy of the identified population and their habitats ensuring early detection of emerging threats.
- 4.2. Initiate coordinated surveys in former historical range and current probable habitats of the species in north-east India.

4.3. WWD Recovery Sites in Assam

Based on the understanding from the field surveys and available literatures three WWD hotspots (Fig 5) in Assam with confirmed presence of the species is planned to be targeted for recovery of the WWD. These three sites are –

Site A: Nameri Forest Complex

(Nameri National Park and Sonai-Rupai Wildlife Sanctuary)

This site has the largest population of the species in the region and is a well-protected area. It forms a WWD source population in the region and therefore needs to be protected and monitored.

Site B: Dihing - Patkai Forest Complex

(Dihing Patkai National Park, Upper Dihing East/West Reserve Forests, Dilli Reserve Forest and Kakojan Reserve Forest)

This site supports a significant population of WWD in a large forest portion which is an integral part of a contiguous large forest. Therefore, it is a potential site for recovery and

building the second viable population of WWD in Assam.

Site C: Doomdooma Forest Complex

(Doomdooma Reserve Forest, Dangori Reserve Forest, Hahkhathi-Mesaki Reserve Forest, Kumsong Reserve Forest, Kotha Reserve Forest, Tinkopani Reserve Forest, Tarani Reserve Forest, Buridihing Reserve Forest and Duarmara Reserve Forest)

This site consists of a cluster of small fragmented forest patches, that had previous records of WWD presence and still supports few individuals. Revival of this degraded site, would further provide additional habitats to the species and a buffer protection to Dihing-Patkai forest complex.

Beside the selected sites, other potential sites in Assam including Dibru-Saikhowa National Park, Manas National Park, Hollongapar Wildlife Sanctuary, Hollogaon Reserve Forest, Kukuramara Reserve Forest, Kundil Kalia Reserve Forest, Nambor Reserve Forest and the Karbi Anglong hills also needs to be closely monitored to record the presence and status of WWD populations in these areas.



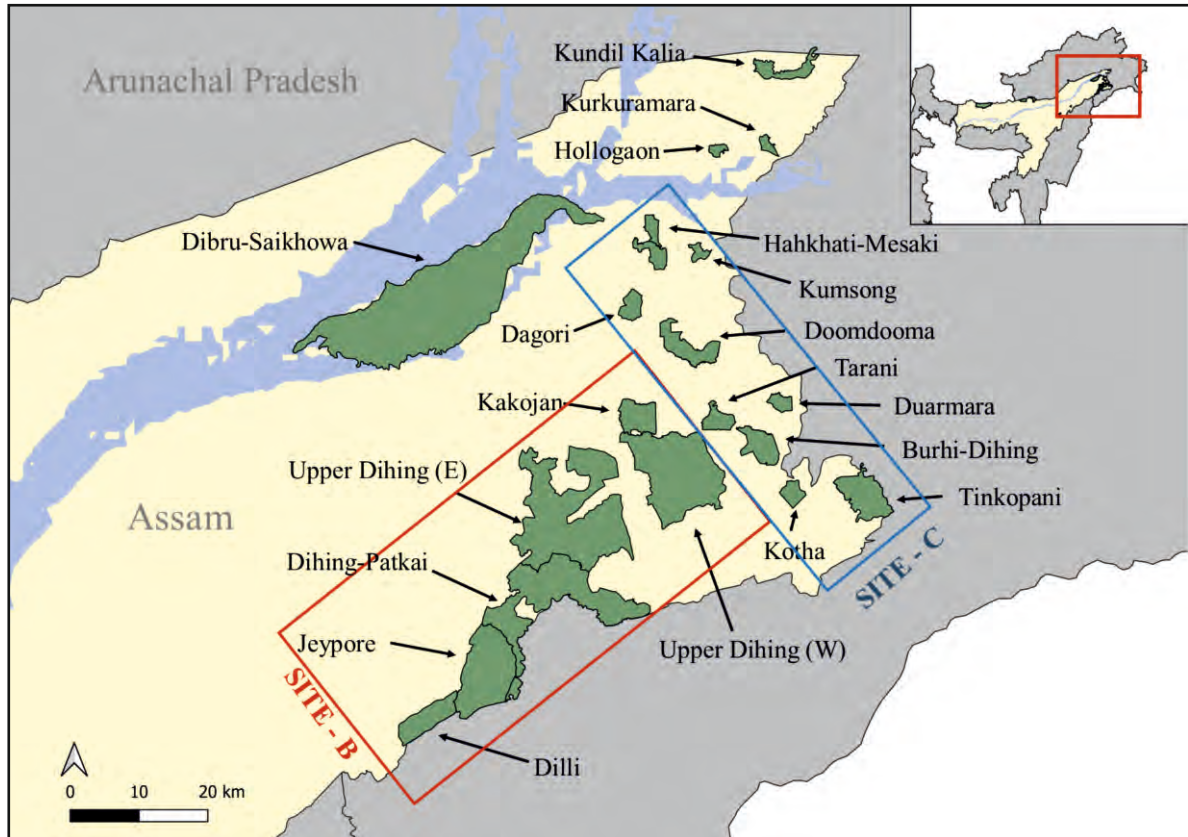
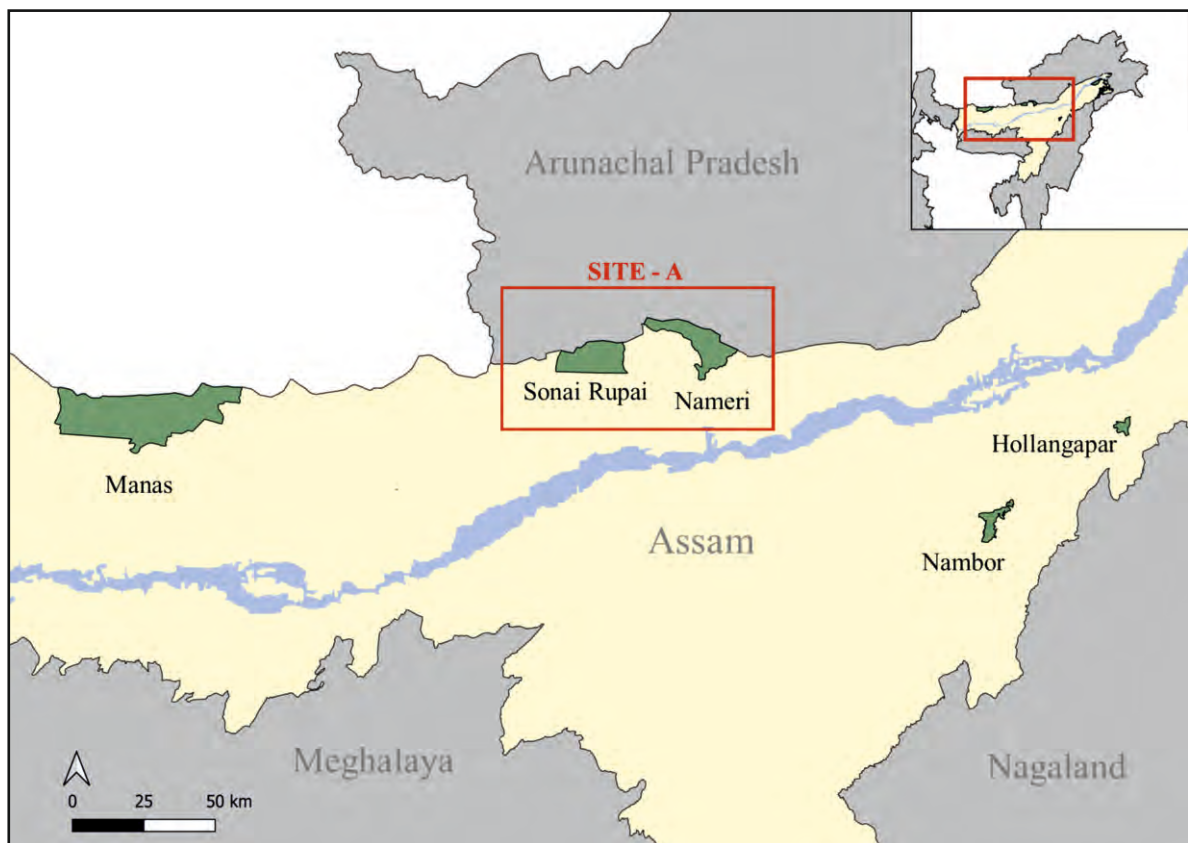


Fig 5 | WWD Hotspots in Assam: (a) Site A and (b) Site B and Site C.

PROJECT AND ACTIVITY TABLE

Vision | The White-winged Duck population restored and thriving in north-east India contributing to sustainable development of local communities and being a source of pride as the state bird of Assam.

Goal 1 | Preserve and Maintain Ecologically Healthy Habitat of WWD.

Objective 1.1: Ensure protection to designated WWD areas and habitats from illegal firewood/timber extraction, wetland drainages, destructive fishing practices and other human disturbances.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
1.1.1	Increase and strengthen forest staff in key WWD habitats to ensure better protection of the area.	All areas of Site 'A', Site 'B' & Site 'C'	2023-2028	1,00,00,000.00	Increase in number of forest staff in key WWD sites.
1.1.2	Enhance and develop infrastructure such as patrolling roads, guard towers, camps etc to secure WWD habitats.	All areas of Site 'A', Site 'B' & Site 'C'	2023-2028	1,00,00,000.00	Increase in number of patrolling roads, guard towers, camps etc.
1.1.3	Undertake orientation workshops for frontline forest staff to educate them on the need for conservation of the species.	All areas of Site 'A', Site 'B' & Site 'C'	2023-2025	10,00,000.00	Increase in awareness about WWD among frontline staffs.

Objective 1.2: Upgrade and enhance protection in reserve forest and non-protected forest areas with WWD habitats.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
1.2.1	Identify and prioritise protection of reserve forest and non-protected forest areas with potential WWD habitat.	Reserve forest areas in Site 'C'	2023-2029	10,00,000.00	At least two non-protected areas in Site 'C' upgraded

Objective 1.3: Restore degraded forest and waterbodies through scientific restoration programmes.

Action	Activities	Suggested Areas	Timeline	Cost (₹)	Indicators
1.3.1	Undertake de-siltation and weeding of forest wetlands based on scientific methods.	Gholajan wetland (Doomdooa RF), Lohali Wetland (Dangori RF), Wetlands in Kakojan, Tarani RF	2023-2028	50,00,000.00	At least 50% degraded wetland restored
1.3.2	Undertake reforestation of degraded forest areas based on scientific methods.	Kachijan block of Doomdooa RF, Upper Dihing (West) Block RF	2023-2029	50,00,000.00	At least 50% degraded forest restored
1.3.3	Undertake habitat creation for WWD by creating wetlands in secured secluded forested areas based on scientific methods.	Choraipung, Sukanjuri beat (Jeypore) of Dihing Patkai NP	2023-2028	50,00,000.00	At least 3 new habitats created in Site 'B'

Objective 1.4: Ensure pollution control from oil drilling sites and tea plantations in WWD habitat.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
1.4.1	Establish regular liaising channels with oil companies and tea planters to monitor and prevent oil leakage and pesticide runoff in WWD habitats.	Site 'B' & Site 'C'	2023-2025	2,50,000.00	Reduction in oil spillage and water pollution in WWD habitats.
1.4.2	Identify and map critical WWD habitat to restrict oil drilling and pipeline laying in those areas.	Site 'B'	2023-2025	2,50,000.00	Critical WWD habitat excluded from oil drilling activities.



Objective 2.1: Undertake strict implementation and enforcement of laws to curb hunting of adult WWD and poaching of eggs and ducklings.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
2.1.1	Strengthen law enforcement and build intelligence network to prevent hunting of ducks and poaching of eggs and ducklings.	Site 'B' & Site 'C'	2023-2028	50,00,000.00	Reduction in hunting and egg poaching of WWD
2.1.2	Ensure adequate communication with local communities to discourage accidental egg and duckling pick-ups and netting of adult ducks.	Site 'B' & Site 'C'	2023-2027	50,00,000.00	Increase in community awareness and reduction in accidental pick-ups

Objective 2.2: Ensure protection of nesting trees, nests and breeding pools.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
2.2.1	Identify and mark areas with nesting trees and breeding pools of WWD as restricted zones to prevent human interferences and disturbances in these areas.	Site 'A' & Site 'B'	2023-2025	10,00,000.00	All breeding areas of WWD marked and usages restricted.

Objective 2.3: Ensure regulated tourism and ensure minimum disturbances in WWD breeding areas and during critical periods.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
2.3.1	Establish tourism policies in the WWD's habitat that ensures minimum disturbances to the birds.	Site 'A' & Site 'B'	2023-2024	5,00,000.00	WWD friendly tourism policy established.
2.3.2	Establish concealed designated viewing areas for tourist in WWD's habitat for assuring tourist visits without disturbing the birds.	Site 'A' & Site 'B'	2023-2025	10,00,000.00	WWD friendly tourism facilities developed.

Objective 2.4: Establish a conservation breeding programme in Assam to augment the wild population.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
2.4.1	Undertake feasibility study in Assam to develop an implementable plan for establishing the conservation breeding programme.		2023-2025	20,00,000.00	An implementable conservation breeding plan developed.
2.4.2	Train resource personnel with help of avian breeding experts to develop human resources for the conservation breeding programme.		2024-2027	30,00,000.00	A team for captive breeding of WWD formed and trained
2.4.3	Set up and run a WWD conservation breeding centre.		2025-2030	2,50,00,000.00	WWD Breeding centre established

Goal 3 | Involve communities, governments and regional stakeholders through education and awareness programmes in WWD conservation

Objective 3.1: Establish baselines for knowledge, attitude and practices of people affecting WWD conservation.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
3.1.1	Undertake surveys in fringe villages of WWD's habitats to acquire knowledge on the perception attitudes of the people about the species and on destructive livelihood practices affecting WWD and its habitat.	Site 'A', Site 'B' & Site 'C'	2023-2025	5,00,000.00	Baseline information on community perception acquired.

Objective 3.2: Raise awareness on the importance of WWD and develop alternative livelihood options for local communities that are nondetrimental to the species.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
3.2.1	Undertake awareness campaign in fringe villages of WWD's area to educate people on the need for conservation of the species.	Site 'A', Site 'B' & Site 'C'	2023-2025	10,00,000.00	Increase in awareness about WWD among local community.
3.2.2	Encourage and develop village level resource persons to engage in WWD conservation activities.	Site 'A', Site 'B' & Site 'C'	2023-2027	30,00,000.00	Number of village level resource persons employed

Objective 3.3: Work with communities in critical areas to reduce exploitation on WWD habitat.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
3.3.1	Assist communities around critical WWD habitat to develop eco-friendly livelihood opportunities that reduce their dependency on the forest areas.	Site 'A', Site 'B' & Site 'C'	2023-2029	1,00,00,000.00	Increase in eco-friendly livelihood opportunities and reduction in forest dependency.
3.3.2	Employ Community based squads with approvals of the forest department to facilitate habitat & breeding site protection.	Site 'A', Site 'B' & Site 'C'	2023-2028	30,00,000.00	At least 3 community based squads created in Site 'B' and Site 'C' each.

Objective 3.4: Ensure WWD conservation is mainstreamed in management policies of various Government agencies.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
3.4.1	Encourage and advocate government agencies to include WWD conservation issues in various government plans and policies increasing conservation efforts for the species.		2023-2028	5,00,000.00	WWD conservation issues include in various government programmes.
3.4.2	Establish a "WWD Conservation Fund" to create a permanent resource pool for initiating and continuing WWD conservation activities in Assam.		2023-2025	1,00,00,000.00	A WWD conservation corpus fund established.

Goals 4 | To acquire scientific information useful to enable implementation of immediate measures to protect the species from further threats of extinction.

Objective 4.1: Implement a coordinated research and monitoring programme on the identified WWD population and their habitats ensuring early detection of emerging threats.

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
4.1.1	Establish a WWD monitoring programme in potential habitats to detect emerging threats to population such as instance of poaching, habitat disturbances etc.	Site 'A' & Site 'B'	2023-2025	30,00,000.00	Monitoring programme established and generates required field information.
4.1.2	Undertake study on WWD's ecology and biology using field-based observation and monitoring technologies such as ringing, remote cameras, radio-telemetry etc.	Site 'A' & Site 'B'	2023-2029	80,00,000.00	Updated research findings on ecology and biology of WWD.

Objective 4.2: Initiate coordinated surveys in former historical range and current probable habitats of the species in north-east India

Actions	Activities	Priority Areas	Timeline	Cost (₹)	Indicators
4.2.1	Update distribution map of WWD through multi-season surveys through it's known range.	Site 'A', Site 'B', Site 'C' & other potential areas.	2023-2026	10,00,000.00	Updated population & distribution map created.

**TOTAL ESTIMATED PROJECT BUDGET :
RS. 12,00,00,000.00 (Rupees Twelve Crores only)
TIMELINE OF PROJECT : 2023-2024 to 2029-2030**

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APPENDICES

Appendix – 1 | Minutes of the Conservation Strategy Workshop for WWD

Conservation Strategy Workshop for White-winged Duck (*Asarcornis scutulata*)

Venue: Pygmy Hog Conservation Breeding Programme Centre,
Basistha, Guwahati, Assam
28th February 2019

Chairperson: Mr Vivek Menon (Founder & Executive Director, WTI)

Facilitator: Dr Mark Stanley Price (Senior Advisor, IUCN SSC)

Background: The White-winged Duck is a rare species of duck, residing in the evergreen forests of northeast India. Despite being declared as the state bird of Assam and creation of special protected areas (Dibru-Saikhowa national park) for the species, the duck faces a severe threat of extinction due to various anthropogenic pressures. The lack of a conservation strategy for the species is a major limitation in implementing conservation measures for protecting the species. Therefore, to address these issues, a one-day conservation strategy workshop was held to discuss the current status of White-winged Duck in Northeast India and identify conservation needs of the species in the region.

Minutes:

- The meeting started with a welcome address from the chair and introduction of the participants.
- A status review of the species was presented with a series of presentations by the participants as follows:
 - *White-winged Duck - Global Perspective* by Dr Glyn Young
 - Global population of about 250-999 adult individuals
 - Distributed over an area of 4,120,000 km² in nine countries of southeast Asia.
 - Population declining in all range areas.
 - Not endemic to any areas and therefore no intensive conservation efforts implemented towards the species.

- Commonly mistaken with female muscovy duck as both are superficially similar and Muscovy ducks are more common in sighting which results in false sighting reports.

Additional points discussed:

- The species presence in Bangladesh is doubtful. Last recorded in 1996 in Chittagong hill tracts.
- Myanmar is considered to have a good population but no surveys have been carried out in the region in recent times.

□ *White-winged Duck - Indian Perspective* by Dr A. U. Choudhury

- Distributed in the state of Assam and Arunachal Pradesh of Northeast India.
- Population size about 350 individuals (as estimated from surveys in the early 1990s).
- Major stronghold in forests of Tinsukia district of Assam.
- No updated estimates in recent times. Most population and distribution data are from research work in the early 1990s.
- No major trade of the species recorded. However, several cases of egg and duckling poaching have been reported in past.

Additional points discussed:

- A new population has been recorded in Manas National Park as evident from recent sightings in the park. Change of river channels may have created new suitable habitats for the birds to thrive in the park.
- Dibru-Saikhowa national park is heavily degraded and probably the duck population in the park is now obliterated.
- Most of the other duck habitats in Assam is also vulnerable to habitat disturbance and destruction.

□ *White-winged Duck - Population, distribution & ecology* by Dr Rathin Barman

- A forest-dwelling crepuscular duck species.
- Pre-monsoon (March-May) breeding season, nesting in tree holes and old dead trees.
- Current major population in Nameri tiger reserve, Dehing-Patkai wildlife sanctuary, Dibru-Saikhowa national park, Pakke tiger reserve and Namdapha tiger reserve.
- The species faces various threats in all its distribution areas of India and population declining rapidly over the years.

Additional points discussed:

- A robust survey in the past and present distribution area in Northeast India is urgently required.
- Both stagnated forest ponds and forest streams need to be thoroughly checked for presence/absence of the species.
- A conservation breeding programme in Assam may be established to secure a captive population of the bird which can then be reintroduced into potential habitats of the region.

- Based on the currently available knowledge about the species, its habitats and threats, a conservation strategy plan was set to be drafted in the workshop. Dr Mark S Price took the lead in explaining the process of developing the conservation strategy plan for the species. He emphasized the urgent need for identifying conservation priorities for the duck and stressed on the formation of a pragmatic and actionable conservation plan for the species.
- A list of immediate threats to the species and its habitat were identified by the participants for further assessment. Three working groups were formed among the participants based on three themes (1. Habitat protection; 2. Population Strengthening; 3. Awareness) related to the conservation of the species. The working group analysed threats related to each theme and ranked them according to their risk and impact on the species. Knowledge gaps in each conservation theme were also identified. The groups also proposed mitigating measures to address the identified threats through a series of actionable objectives in each theme.
- A draft conservation strategy plan for White-winged Duck was thus developed as a result of the workshop.
- It was decided that the prepared document will be circulated among the experts and further information will be collected through field surveys on various aspects of the species' ecology and biology in Northeast India. The draft conservation strategy plan will be finalized after incorporating further information on the current status of the species in Northeast India.

Appendix – 2 | Minutes of the 1st Conservation Strategy Meeting for WWD

Conservation Strategy Meeting for White-winged Duck (*Asarcornis scutulata*)

Venue: Office of the Principal Chief Conservator of Forests,

Aaranya Bhawan, Guwahati, Assam

1st March 2019

Chairperson: Dr. Ranjana Gupta, IFS, PCCF (WL) & CWLW, Assam

Background: The White-winged Duck is a rare species of duck, residing in the evergreen forests of northeast India. Despite being declared as the state bird of Assam and the creation of special protected areas (Dibru-Saikhowa national park) for the species, the duck faces a severe threat of extinction due to various anthropogenic pressures. The lack of a conservation strategy for the species is a major limitation in implementing conservation measures for protecting the species. Therefore, to address these issues, a one-day conservation strategy meeting was held to discuss the current status of White-winged Duck in Northeast India and identify the conservation needs of the species in the region.

Minutes:

- The meeting started with a welcome address from the chair and introduction of the participants.
- A status review of the species was presented with a series of presentations by the participants as follows:

- *White-winged Duck - Global Perspective* by Dr. Glyn Young

- Global population of about 250-999 adult individuals
- Distributed over an area of 4,120,000 km² in nine countries of southeast Asia.
- Population declining in all range areas.
- Not endemic to any areas and therefore no intensive conservation efforts were implemented towards the species.
- Commonly mistaken with female muscovy duck as both are superficially similar and muscovy ducks are more common in sighting which results in false sighting reports.

- *White-winged Duck - Indian Perspective* by Dr. A. U. Choudhury

- Distributed in the state of Assam and Arunachal Pradesh of Northeast India.
- Population size about 350 individuals (as estimated from surveys in the early 1990s).
- Major stronghold in forests of Tinsukia district of Assam.
- No updated estimates in recent times. Most population and distribution data are from research work in the early 1990s.
- No major trade of the species recorded. However, several cases of egg and duckling poaching have been reported in past.

- *White-winged Duck - Population, distribution & ecology* by Dr. Rathin Barman

- A forest-dwelling crepuscular duck species.
- Pre-monsoon (March-May) breeding season, nesting in tree holes and old dead trees.
- Current major population in Nameri tiger reserve, Dehing-Patkai wildlife sanctuary, Dibru-Saikhowa national park, Pakke tiger reserve, and Namdapha tiger reserve.
- The species faces various threats in all its distribution areas of India and its population declining rapidly over the years.

- *White-winged Duck in Dehing- Patkai Wildlife Sanctuary* by Dr. Rajib Rudra Tariatang

- The ducks are found in oilfield areas near Dehing- Patkai wildlife sanctuary.
- Major threat to the species is from oil pollution in the wetlands of oil fields and radiation from explosive storage sites.
- Garbage dumping near the duck's habitat is also a threat.
- Lack of adequate forest personnel in Dehing-Patkai wildlife sanctuary is a limitation for the protection of the species.
- Tourism in Dehing-Patkai wildlife sanctuary is unregulated which disturbs the duck's habitat.

- Oil companies in the region need to be consulted, highlighting the problem of oil pollution in the duck's habitat, and encouraging the companies to take corrective measures.
- It is recommended that garbage dump sites and explosive storage sites need to be shifted from the duck's habitat.
- Few awareness programs have been initiated in fringe villages and education institutes of the area.

□ *White-winged Duck in Pakke Wildlife Sanctuary* by Mr. Tana Tapi

- The species has been recorded in Khari river and near West bank forest guest house of Pakke wildlife sanctuary.
- Mostly sighted in small forest streams and waterbodies.
- Plan of creating two artificial waterbodies is underway in the forest of Pakke wildlife sanctuary.

□ *White-winged Duck in D'ering Memorial Wildlife Sanctuary* by DFO

- No recent sightings in D'ering Memorial wildlife sanctuary.
- No research has been carried out for White-winged Duck in the sanctuary.

■ Dr. Rahul Kaul presented a draft conservation strategy for White-winged Duck in Northeast India. The following recommendations were suggested to be included in the conservation strategy:

- Encroachment of forest lands should be added as a threat to the species in the Conservation Strategy. The species' habitats in Dibru-Saikhowa national park and reserve forest in Tinsukia districts are most vulnerable to encroachments.
- Degraded habitats (mostly in reserve forests) need to be restored to make them suitable for the species.
- The White-winged Duck habitats are to be identified and excluded from selective logging areas in Working Plans of Assam Government.
- All protected areas where the duck is present should include a section for the conservation of the species in their respective management plan.
- A few specimens of the species may be displayed at the Guwahati Zoo to educate people on the importance of the species. Specimens may be acquired from captive population of Slimbridge, UK.
- A long-term conservation breeding program has been proposed. It was considered that a few specimens from the wild may need to acquire for the breeding program to maintain the genetic health of the captive population.

■ The chairperson highlighted the need for awareness about the species at all levels of government and the general populace. The need for an intensive research programme to understand the limiting factors and threats to the species was also emphasized.

■ The chairperson concluded the meeting by thanking the participants and further encouraging the members to take up necessary conservation efforts for the conservation of the species in northeast India.

Appendix -3 | Minutes of the 2nd Conservation Strategy Meeting for WWD

2nd Conservation Strategy Meeting for White-winged Duck (*Asarcornis scutulata*)

Venue: Office of the Principal Chief Conservator of Forests,
Aaranya Bhawan, Guwahati, Assam
27th January 2020

Following up from the “1st Conservation Strategy Meeting for White-winged Wood Duck” that was held on 1st March 2019 at the Office of the Principal Chief Conservator of Forests & Head of Forest Force, Assam, the present meeting was organized to update the current status of White-winged Duck in Assam based on the year-long survey carried out under White-winged Duck Conservation Programme by Forest Department, WTI, ONGC and to discuss further measures for conservation of the species in the state.

The meeting was chaired by Mr M. K. Yadava, IFS, Addl. PCCF (WL) & CWLW, Assam.

The meeting started with a welcome address from the chair and introduction of the participants.

A status review of the species was presented through a PowerPoint Presentation by the representative of WTI highlighting the following major points:

- The current White-winged Duck survey recorded the duck from only three forest areas of Assam; Nameri National Park, Dehing-Patkai Wildlife Sanctuary (Upper Dehing West Block) and Doomdooma-Dangori Reserve Forest. Breeding sites are confirmed in Nameri National Park and Dehing-Patkai Wildlife Sanctuary. Manas National Park is another potential area where the duck has been sighted recently.
- Based on the shrinkage of habitats and sighting records, it was inferred that the species have drastically decreased over the last 25 years. An approximate population size of 100-150 ducks was estimated which shows a population decline of 65% from the last estimated population of 350-400 ducks in 1995.
- Remarkable potential habitats for the species are still found in Dibru-Saikhowa National Park, Joypur Reserve Forest, Upper Dehing (East Block) Reserve Forest, Hollogaon Reserve Forest, Kuramara Reserve Forest, Kundil-Kalia Reserve Forest, Tarani Reserve Forest, Kakojan Reserve Forest, Buridehing Reserve Forest, Hollongapar Wildlife Sanctuary, Nambor Reserve Forest, and Sonai-Rupai Wildlife Sanctuary.
- These areas however under high anthropogenic disturbances such as fishing, draining of water bodies, illegal firewood/timber extraction, NTFP collection, pesticide pollution etc. Lack of an adequate number of forest staff and infrastructure including low awareness of the fringe communities makes protection of such areas difficult.
- Lack of secure breeding sites and high mortality in ducklings are considered major limiting factors to the population growth of the species.

- The presentation was followed by a discussion among the participants of the meeting on further strategies for the conservation of the species. Following are the major points highlighted during the discussions:

□ *Habitat management*

- The species has been observed to adapt to artificial water bodies which are present in secluded forested areas. This is evident from the presence of the species in old oilfield ponds in Upper Dehing (East & West Block) reserve forest. It is therefore suggested that more such water bodies may be created in forested areas of Dehing Patkai Wildlife Sanctuary in order to provide secure foraging and breeding areas for the duck.
- Wetland areas of Doomdooma Reserve Forest (especially the 'Gholajan' wetland) and Dangori Reserve Forest (especially the 'Lohali' wetland) which were once high suitable areas for the duck species are now drained and dry. The Gholajan wetland in Dangori RF has been converted into seasonal agricultural land by fringe communities. It was suggested to keep such areas free from human disturbances and restore as swallow wetlands (4-5 ft deep) by de-silting the area and building embankments to retain water around the year.
- Installation of Solar Power-Fencing in selective potential areas in the Reserve Forests was recommended to protect the habitats from human interferences.
- A separate Conservation plan for White-winged Duck needs to be prepared for Nameri National Park, Dibru-Saikhowa National Park and Eastern Assam Forest Area (including Dehing- Patkai Wildlife Sanctuary and potential habitats in Reserve Forests)

□ *Research*

- Intensive research on the habitat requirements of the species was recommended. Important parameters of water bodies such as pH value, water depth, phytoplankton communities, vegetation cover etc. to be studied to understand the habitat preferences of the duck. These will help in identifying more habitats for protection and creating new habitats. Limnologists and wetland experts should be consulted while designing such research studies.
- Changes in habitats of the species needs to be studied at the landscape level using remote sensing and GIS tools. Effects of climate change on the species as well as habitat need to be explored and studied too.
- An intensive study on the breeding ecology of the species needs to be carried out in Nameri National Park and Dehing-Patkai Wildlife Sanctuary. Camera traps (or similar recording devices) were recommended to be used in identified breeding ponds for recording and studying the duck's breeding and parenting behaviour. Threats to ducklings also need to be identified and managed.
- A Radio-telemetry study by fitting radio-tagging devices on rescued or opportunistically caught ducks was recommended.

- A monograph on White-winged Duck updating the last report of Dr Anwaruddin Choudhury (published in 1996) was recommended to be produced by October 2020. The latest monograph would include information from recent studies and up-to-date maps and photographs of the species.
- A possibility of establishing a long-term Conservation Breeding Programme for the species in Assam was recommended to be explored. An implementable plan for such a Conservation Breeding Programme needs to be prepared after consultation with Avian breeding experts.

□ *Awareness & Advocacy*

- Awareness among the local population is considered an important factor for the conservation of the duck species. A series of awareness campaigns were recommended to be carried out in the fringe villages of forest areas where the ducks are present. Local political and community leaders are suggested to be involved in such meetings. The members of local JFMC/EDC should also be involved in such programmes. The Forest Department with collaborating partners shall prepare the strategy for action.
 - Awareness materials such as posters, booklets, short-video clips, lapel pins, car stickers etc. to be produced for disseminating information about the species to the masses. Print and electronic media journalists to be encouraged to highlight the species and cover more stories on the need for conservation of the species. The Forest Department and the collaborating partners shall work together for the same.
 - It was recommended to publish a quarterly e-newsletter/journal by the Wildlife Wing of Assam Forest Department highlighting activities related to Wildlife of Assam. The Newsletter/Journal was suggested to be named “Deoanh” (Assamese name for White-winged Duck). It was suggested that the journal be launched during Rongali Bihu next April 2020.
 - White-winged Duck may be used as a logo in various Assam Forest Department activities for creating the duck species as a brand. A virtual model of the duck may be placed in the Assam state Zoo and other vintage sites across the state to highlight the species.
 - It was suggested that the monograph of White-winged Duck (see *research section*) should be released at a formal event involving important politicians, bureaucrats and journalists of the state. These will bring more coverage highlighting the species at regional and national levels.
- The chairperson emphasized that all planning regarding the conservation of the species should be pragmatic and implementable. Availability of funds and logistic feasibilities for each suggested measure also needs to be worked out by the collaborating partners soon.
 - The chairperson concluded the meeting by thanking the participants and further encouraging the members to take up necessary conservation efforts for the conservation of the species.

❑ *Deforestation*

Rapid changes in forest cover in the past decades were observed in north-east states of India with an estimated loss of 27000 km² of forest area between 1930 to 2013 (Reddy et al., 2016). The state of Assam and Arunachal Pradesh, which are the major distribution areas of the WWD, suffered the most, with each state, during this period, losing 15073 km² and 6115 km² of forest respectively (Reddy et al., 2016). The lowland forest areas of the plains which were prime habitats of the duck have suffered the heaviest losses owing to their easy access for exploitation and conversion into agricultural and other uses (Green, 1993). Deforestation and clear felling of trees in reserve forests of Tinsukia district and replacement of primary forest with fast-growing plantations caused a severe reduction in the species' range in eastern Assam (Green, 1992; Choudhury, 2000). Reserve forests like Kakojan, Kukurmara, Hollogaon, Burhi-Dihing, Tarani, Sadiya Station, Kotha, Namphai, Kumsong and Hahkhati-Mesaki which were once suitable habitat for the ducks are now heavily degraded while some reserve forest such as Namphai, Kundil Kaliya and Duarmara are encroached. In Dibru-Saikhowa National Park, which was an important protected habitat of the species, the inhabitants of two enclave villages (Laika and Dadhia) and peripheral villagers are engaged in forest encroachment, timber smuggling, and fuelwood collection, activities which pose a “real danger” to the remaining habitat of the park. High annual floods and the loss of large areas due to erosion by the Brahmaputra and Lohit River also pose a threat to the park. In Sonitpur district, between 1994-2001, about 232.2 km² of forest was cleared by logging and encroachment (Reddy et al., 2016). The species is now restricted only to Nameri Tiger Reserve of the district where it is well protected. Buffer areas of Nameri Tiger Reserve including Balipara Reserve Forest and Nauduar Reserve Forest are now heavily encroached and degraded. Moreover, most of these protected areas (especially reserve forests) suffer from insufficient infrastructure, inadequate manpower and a weak intelligence network and therefore struggle to sustain the forest areas from continuing anthropogenic pressure.

❑ *Water regime changes*

Swamps, marshes and other wetlands have been extensively drained throughout the species' range, primarily for agricultural use (BirdLife International, 2001). Drainage of wetlands inside forests as well as in fringe areas for fishing and irrigation is common in Assam. Siltation and closing of wetland areas are also considered a major factor for loss of water bodies in the duck's habitat. Major wetlands in Doomdooma-Dangori Reserve Forests, which was once a major stronghold of the species are now drained dry and converted into seasonal agricultural fields. Similarly, Dibru-Saikhowa National Park, another important habitat for the species, have lost most of its wetlands to siltation and invasion by exotic species such as *Eichhornia crassipes*.

Construction of a series of large hydropower projects are ongoing or planned in the upstream of major rivers in Arunachal Pradesh which will directly affect rivers and water channels downstream, eventually adversely effecting lowland forest and wetlands habitats of WWD in the

Brahmaputra valley. Flow fluctuations in rivers such as Lohit, Dibang, Siang and Subansiri in Arunachal Pradesh will seriously impact breeding sites of the WWD in Dibru-Saikhowa National Park (Vagholikar & Das, 2010). Similarly, dams in Kameng (Jia Bharali) river will affect Nameri National Park ("Impact assessment", 2017), another important habitat for the species. The construction of dams will also indirectly affect the duck's habitat with increased anthropogenic pressure in the forest areas owing to loss of agricultural and habitable lands for the people in the downstream of the rivers.

❑ *Pollution and pesticides*

Pesticides have been used persistently in large quantities in south-east Asian rice fields in recent decades. In Assam, the species occurs in forested areas adjacent to tea plantations where wetlands are polluted with pesticides used on the tea plantation exposing the ducks to potentially hazardous chemicals. Use of pesticide cocktails to kill fish in Dibru-Saikhowa National Park and Doomdooma river has also been reported. Toxicity in fishes, snails, aquatic insects and vegetation in the water bodies due to repeated use of harmful pesticides subsequently introduces these chemicals to the ducks through the food chain. Oil-drilling (e.g., near East and West blocks of Upper Dihing Reserve Forest and Digboi area) and open-cast coal mining occur in eastern Assam and other forested areas in the species' range and may cause significant pollution (Choudhury, 2000). In Upper Dihing (West block) Reserve Forest which is another major habitat of the species, petroleum drilling and a series of infrastructure development projects ("NGT notice", 2014) have created a serious threat to the habitats of the duck in the area.

❑ *Hunting & Disturbance*

The fragmentation and thinning of forests raise the threats of hunting on the WWDs, as the species habitats become more conspicuous and accessible (Green, 1993). In India, hunting of the species has been recorded with guns, bows and arrows, nets and traditional snares (Mukherjee, 1961; Choudhury, 1996). Collection of its eggs and ducklings have also been widely recorded from north-east India (Bhattacharjee & Saikia, 1993; Green, 1992). Individuals have been recorded caught with snares or beaten to death with sticks (Choudhury, 1996), presumably when they are flightless during the annual moult. Though, the ducks residing in protected areas are considered safe, illegal hunting of wildlife has been reported from Pakke (Aiyadurai, 2007), Namdapha (Datta et al., 2008) and D'Ering Wildlife Sanctuary ("D'Ering Memorial", 2018) in Arunachal Pradesh and Dibru-Saikhowa National Park (Choudhury, 2006) in Assam, posing a threat to the ducks. Areas outside protected areas are more prone to hunting as several tribal communities of northeast India practice traditional hunting and wildlife trapping (Hilaluddin et al., 2003; Aiyadurai, 2007). The collection of ducklings, which are easy to catch while flightless, is a serious threat. Ducklings collected from nests survive well under captive conditions in villages and are sold in markets.

Habitats of the species also suffers from intrusion by local people for extraction of logs or other forest products, hunting, grazing cattle, fishing etc. (Green, 1993). Whilst logging and hunting

have a direct impact on the species, other activities may cause harm through disturbance, preventing the birds from feeding or breeding effectively. The high incidence of fishing in small jungle pools, and other disturbance by local people (logging, grazing and turtle-hunting), reduce the availability of foraging areas and increase the likelihood of incidental chick collection (Choudhury, 1996). Most of the reserve forest of the states are vulnerable to poaching and disturbances owing to lower degree of legal protection and enforcement. Even in protected areas, non-timber forest collections, grazing and fishing are regularly carried out by fringe inhabitants as evident in buffer areas of Namdapha National Park (Datta et al., 2008), Dibru-Saikhowa National Park (Choudhury, 2006) and Hollongapar Gibbon Wildlife Sanctuary (Sharma et al., 2015) and Dihing-Patkai Wildlife Sanctuary. Removal of old trees and logs which are potential nesting sites for the species also decreases breeding success of the ducks. Loss of vegetation cover also increases chances of natural predation of ducklings and ducks.

❑ *Lack of Awareness*

Despite being an endangered species, the White-winged Duck has received very little attention from the general public and the government agencies of north-east India. In early 1990s, the duck was declared as the state bird of Assam and two dedicated protected areas (Dibru-Saikhowa National Park and Dihing-Patkai Wildlife Sanctuary) were created for protection of the species. Despite such efforts, the duck is still virtually unknown among the local population and is not generally included in the conservation policies of the government. A survey carried out around Dihing-Patkai Wildlife Sanctuary of Assam in 2018 found that 70% of the respondents were unaware of the fact that WWD is the state bird of Assam (Boruah 2018).

❑ *Research Gaps*

As an elusive and dense-forest dwelling species, very little information is available on the ecology and biology of the duck despite several researchers pursuing to understand the species over the years (See Gee, 1958; Mackenzie & Kear, 1976; Mukherjee, 1961; Talukdar & Bhattacharjee, 1994; Choudhury, 1996; Das & Deori, 2012; Saikia & Saikia, 2011; Boruah, 2018). This lack of basic information about the species possesses a great challenge in designing conservation strategy for the species. Moreover, lack of coordinated and collaborative research programme on the species restricts developing long-term research goals and in generating funds for intensive study and monitoring of the species and its habitats

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The White-winged Duck *Asarcornis scutulata* is an endangered species, found in Southeast Asia. The species has a global population of about 1000 individuals, of which, a large part (about 200-300 ducks) resides in two north-eastern states of India - Assam and Arunachal Pradesh. Owing to widespread loss of forest habitats and severe hunting pressure, the species has declined drastically over the years and is now on the verge of local extinction across a large part of its range.

The state of Assam has, historically, been a stronghold of the white-winged duck where the species is honoured as the "State Bird". Over the last few decades, several small-scale conservation initiatives have been undertaken to protect the duck and its habitat in the state. However, in the absence of a formal conservation action plan, the initiatives have been either 'scattered' or 'ad hoc' without many lasting conservation outcomes. This conservation strategy and action plan has been developed to address the need for a comprehensive formal guideline for conservation of this duck in the state of Assam. The document is designed to serve as a guide to various stakeholders for formulating and implementing effective actions for conservation of the species and its habitat in the state of Assam.



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