65th WILDLIFE WEEK, 2020

10 YEARS
WATER BIRDS ESTIMATION
LOKTAK WETLAND COMPLEX

Wildlife Wing, Forest Department, Government of Manipur

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AWANGBOW NEWMAI
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MESSAGE

I am delighted to present the Water bird Estimation Report conducted by the Manipur Forest Department on this occasion of the Wildlife Week which is celebrated to mark the importance of wildlife. I am happy to announce that Manipur Forest Department is also among the forerunners in the conservation of its rich biodiversity. This report is ample proof that our State is continuously engaged in making all efforts to conserve and protect its wildlife including the avifauna.

According to Ramsar convention, waterfowls or water birds are species of birds that are ecologically dependent on wetlands. Water bird estimation is carried out to obtain information on the water bird population in wetlands; to monitor on an annual basis the status and condition of wetlands; to encourage greater interest in water birds and wetlands amongst people, and thereby promote the conservation of wetlands and water birds in the region. Encouraging the migratory birds to visit Loktak lake is one of the major tasks in keeping the water body and wetlands in an ecologically healthy state.

I congratulate Manipur Forest Department for conducting such a laborious task in collaboration with the Indian Bird Conservation Network Manipur Chapter at the right time. I am confident that such estimations would be conducted in the coming years without failure with more figures of avifaunal diversity.

AWANGBOW NEWMAI

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MESSAGE

It is a great pleasure to learn that Manipur Forest Department is bringing out this report on water bird status of Manipur on the occasion of the Wildlife Week, 2020. Water birds provide important ecosystem services and are often considered as indicators of the health of aquatic ecosystems. Apart from their ecological importance, they are intricately embedded in our social and cultural ethos. In recent years, these birds are under threat due to poaching, loss and degradation of wetland habitats.

Manipur Forest Department conducts population estimation within Loktak lake and surrounding wetlands annually to assess the status and trends of the water birds, as an integral part of conservation. This report gives a brief information about the current population status and diversity of water birds in Manipur and will hopefully create a platform to enhance the understanding of water birds and its value to human existence.

I sincerely believe that this report will inspire all of us to be more proactive towards conserving the wetland and its water birds. My best wishes to all associated in preparing this Report, and success in their future endeavors.

(M H Khan)

Shri Kereilhouvi Angami IFS
PCCF & Head of Forest Force
Forest Department
Government of Manipur

सत्यमेव जयते

MESSAGE

On the occasion of the Wildlife Week-2020 celebration, the Manipur Forest Department is releasing a Report on Water Bird Status of Manipur. Consistent and persistent exercises and efforts by the Forest Department and other like-minded Civil Society Organizations, Institutions, Experts and individuals over a span of many years made it possible to assess the population and distribution of the water birds and their habitat in Loktak Lake and surrounding wetlands. The Report collates brief information of water birds and their lives in nature and the population of water birds in Manipur.

As Manipur falls in the Central and East Asian Migratory Flyway, our State is endowed with a rich diversity of water birds and Loktak Lake is an Important Bird Area (IBA). As these birds are markers of the wetlands, their diversity and congregation denote state of healthy aquatic ecosystem. However, over the last few decades, the annual visit of migratory birds in Manipur is showing a declining trend and various anthropogenic activities are the major drivers and reasons. It is high time for us to take scientific conservation actions for the species and their habitat.

I heartily appreciate the hard work of the frontline staff and other like-minded Civil Society Organizations, Institutions, Experts and individuals who are playing a major role in the field of conservation. I believe that this compilation of scientific findings will lead to a better understating of the status of waterbirds in Manipur and also convey the message to be more consistent and persistent in our endeavour for future conservation measures.

(Kereilhouvi Angami)

Dr. A.K. Joshi, IFS
APCCF (Wildlife) & CWLW
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PREFACE

Birds are one of the most fascinating creatures in nature. The freedom that birds have in the sky is a feature that has always endeared them to humans from time immemorial. Nature has not only given them wings to fly but also endowed them with some of the most captivating colors to display. For many, there is no pleasure greater than waking up to the sound of birds singing early in the morning. In the words of the famous poet John Keats:

"That thou, light-winged Dryad of the trees
In some melodius plot
Of beechen green, and shadows numberless,
Singest of summer in full throated ease"

Birds perform key functional roles in many aquatic ecosystems, as predators, herbivores and vectors of seeds, invertebrates and nutrients. Birds can also maintain the diversity of other organisms, control pests, be effective bio-indicators of ecological conditions, and act as sentinels of potential disease outbreak.

Wetlands are one of the most important ecosystems on earth and are a repository of biodiversity. The role of wetlands is enormous in maintaining environmental quality, control of floods, groundwater recharge and livelihood support. Water bird or aquatic bird is a term generally used to refer the birds that live on or near water bodies. The degradation of wetlands worldwide has adversely affected water birds, which depend on wetland habitats. Wetland Birds fall into three main categories: Colonial Nesting Wetland Birds, which breed and nest in colonies within wetlands - these include resident birds like egrets, ibises, pelicans, cormorants and herons; Non-Colonial Wetland Birds, including resident shorebird species, which are dependent on wetlands for nesting and feeding habitat like waterfowl, grebes, waterhens; and Migratory Wetland Birds, which use a range of wetlands to rest, feed and breed during their annual migration.

Come winter, the Loktak Wetland Complex becomes a bird watcher's paradise. Loktak Lake and the surrounding wetlands are inhabited by many resident water birds; and are also important stopover sites for many migratory water birds as the area falls within the Central Asian-Indian and East Asian-Australasia flyways. Water birds were found abundantly in these areas; however, their numbers and diversity are declining over the past few decades, due to habitat degradation and fragmentation, wetland loss, deforestation and alteration in water flow and water quality. Recent studies have indicated that effectively managed wetlands can provide alternative or complementary habitats for water birds and mitigate the adverse effects of wetland loss and degradation.

The main aim of the water bird estimation is to provide an evaluation of the occurrence, distribution and diversity of the water birds found in the Loktak Lake and surrounding wetlands. This booklet is being produced as a sequel to the water bird estimation conducted by the Manipur Forest Department during early 2020. The booklet also aims to provide information about the trend in population and diversity of the water birds over the years and the possible factors affecting their population and diversity. It is hoped that the report will be instrumental in creating awareness about the importance of wetland habitat and water birds and inspire future generations for their conservation.

(Dr. Aditya K. Joshi)

ACKNOWLEDGMENTS

The water bird population estimation is carried out to assess the number, diversity and distribution of the water birds of Loktak Lake and its surrounding wetlands which will reflect the health of a wetland.

At the outset, I express my sincere gratitude to Shri Awangbow Newmai, Hon'ble Minister of Forest & Environment, Government of Manipur for his moral support and heartening message. I would like to thank Shri M H Khan, Addl. Chief Secretary, Forest & Environment, Government of Manipur for his unceasing motivation and inspiring message. I express my gratitude to Shri Kereilhouvi Angami, Principal Chief Conservator of Forests & Head of Forest Force, Forest Department, Government of Manipur for his conscientious guidance and invaluable message.

I am extremely grateful to Dr AK Joshi, Chief Wildlife Warden, Manipur for not only conceptualising the idea of publishing this Report but also for his guidance and leadership in preparation and finalization of this Report.

I am extremely grateful to Dr. Kh. Shamungou Singh, Chairperson, Technical Committee, Manipur State Wetlands Authority, Shri K. Jugeshwor, Principal Kumbi College, Shri R.K Birjit, Principal, Mangolnganbi College and State Coordinator of Indian Birds Conservation Network, and Shri. N. Sony Meitei, Asst. Professor, Moirang College, who wholeheartedly supported and guided us during the population estimation, field work and other ancillaries activities.

I am very much thankful to the Wildlife Explorers (Manipur), Unique Wildlife Protection Committee, Environmental Social Reformation and Sangai Protection Forum, Pole Star Guardians Association, Toubul Youth Development Association, Global Science Club, Kumbi College Eco-Club, Local Clubs and Institutions for their spirited involvement in population estimation of water birds. I would also like to thank the Wildlife Institute of India, Dehradun for their all-important contributions, suggestions and recommendations during the exercise and preparation of the Report. I take this opportunity to thank all the selfless volunteers who participated during the population estimation study without whose participation the exercise would not have been a success.

I am sincerely thankful to all senior officers and colleagues of the Manipur Forest Department for their vital assistance and key inputs on the population estimation of water birds.

I give special thanks to Shri L. Joykumar Singh (Conservator of Forests), Shri N. Sarat Singh (Assistant Conservator of Forests), Shri N. Birachandra Singh (Range Forest Officer), Shri Th. Gyanic Singh (Deputy Ranger) and staff of the Keibul Lamjao National Park and Wildlife Wing, Forest Department for their logistic support throughout the exercise and preparation of the Report.

Last but not the least, I am indebted to all the lensmen who have shared their invaluable photographs, and credits to individual photographers is stated for their pictures used in the report.

Sanajaoba Khuraijam, IFS
Deputy Conservator of Forests (Park & Sanctuary)

INTRODUCTION TO WATER BIRDS

The State of Manipur is bestowed with rich biodiversity as it lies in the Indo-Burma biodiversity hotspot, and Central Asian-Indian Flyway and East Asia–Australasia Flyway and is an Endemic Bird Area (EBA). Wetlands are the most productive ecosystems of the world and harbour highly diverse biological communities and provide extensive ecosystem services such as water purification, flood abatement, habitat for wildlife and climate regulation (Zedler and Kercher, 2005). It has been estimated that over 50% of the total wetland surface has been lost during the last century (Mitsch and Gosselink, 2007).

Bird's adaptation to and use of wetland environments differs greatly from species to species; from using it as a breeding ground, to nesting, rearing young ones, source of drinking water, foraging, feeding, resting, shelter, and social interactions. Other birds use wetlands only for some of their needs, or they might use both wetland and upland habitats. Many migratory birds are wetland-dependent, using wetlands during their migration and breeding seasons, hence wetland degradation has a substantial effect on migratory birds. Water birds are a distinctive species and the key indicator of wetlands health.

Two–thirds of the geographical area of Manipur is hill tract covered with lush green forests; whereas the valleys of Manipur are diversified with seasonally or permanently flooded water bodies or wetlands, locally known as pats. There are more than 155 pats in Manipur, with an area of 47,020 ha, representing 2.1% of the total geographical area of the state (Jain et al., 2011). The Loktak Lake, a Ramsar site, is the largest freshwater lake in Northeast India and plays an important role in the social, cultural, ecological and economic life of the people of Manipur (Trishal and Manihar, 2004). The Lake is also home to a rich array of water birds, both resident and migratory.

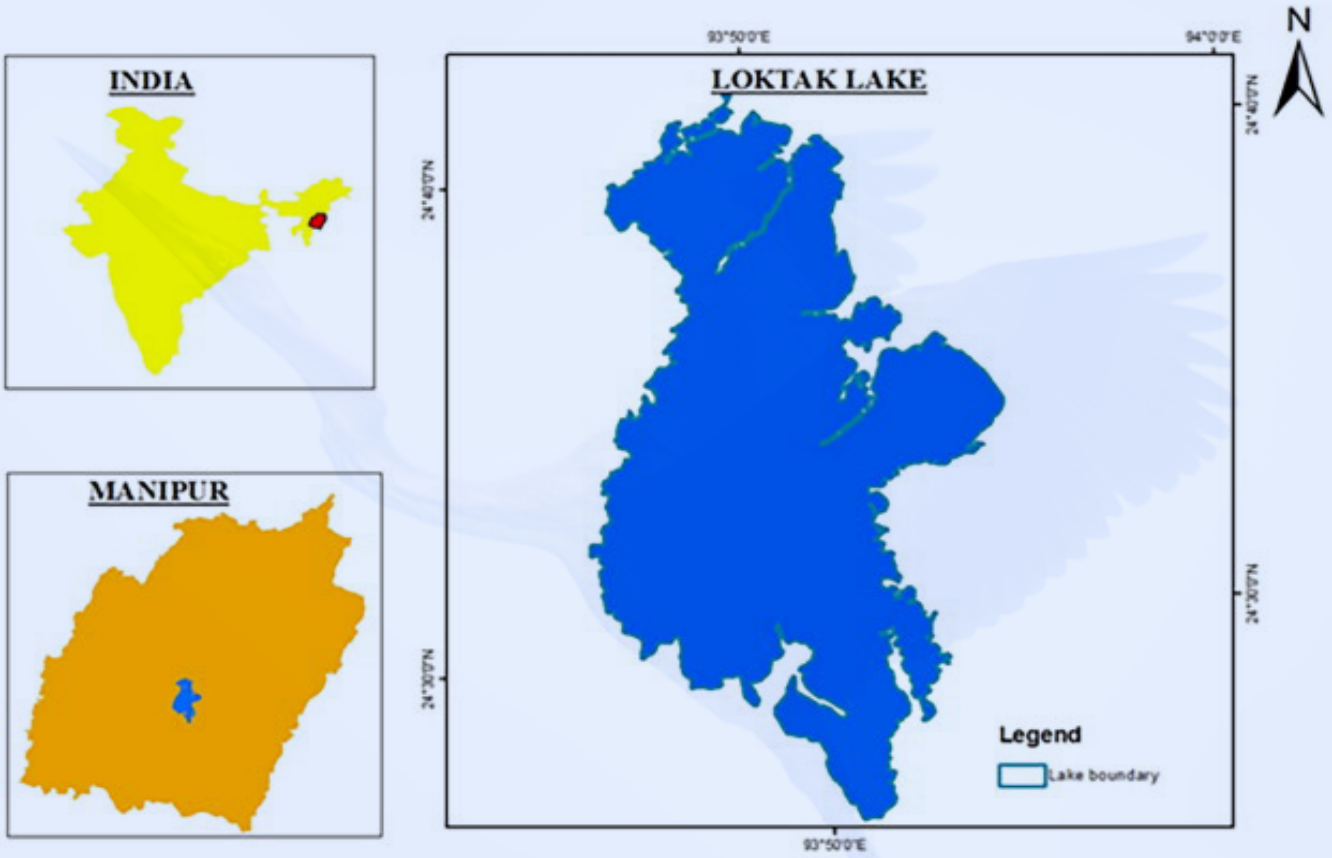
Loktak Lake is one of the nine Important Bird Areas in Manipur (Islam and Rahmani, 2004). The avifaunal diversity of Loktak Lake has witnessed a decrease in numbers of the annual migratory and resident avifauna species from the past two decades. Hunting and poaching of water birds including globally threatened migratory species by local people for their livelihood, changes in water regime due to the Ithai barrage, use of LED lights by fishermen, water pollution, overfishing, excessive use of fertilizer, pesticides, herbicides, and loss of vegetation cover in the catchment area are the major reasons for the decline of the number of waterfowls in the lake. A spurt in the use of LED lights by fishermen has been blamed for disrupting the nesting patterns, breeding period and foraging behaviours of the water birds of Loktak. The construction of Ithai barrage for a multipurpose hydroelectric and irrigation project has altered the Lake ecosystem by converting the fluctuating water level into a reservoir with more or less constant water level. This has brought about basic hydrological changes, which have resulted in many problems for the lake biota and the communities traditionally dependent on it. The alteration in hydrology and physicochemical characteristics of these ecosystems largely affect the life history stages of these water birds.

In spite of the disturbances, the Lake still supports a good number of avifauna species. The diversity of the water birds in the lake is high during the winter season compared to summer and monsoon season due to the visit of the winter migrants.

Avi-Fauna Estimation in Loktak Wetland Complex

Loktak Lake located between 93^{0}46′E and 93^{0}55’E Longitude and 24^{0}25′N and 24^{0}42′N, is the largest freshwater lake in the North Eastern region of India. The lake is considered as the life line of the people of Manipur owing to its importance in their cultural and socio-economic life.

The Lake is oval shaped with maximum length and width of 32 km and 13 km respectively. The average depth of the lake is 2.7 metre. The lake covers an area of 287 sq. km which is primarily determined by Ithai barrage maintaining water level at 768.5 metre above MSL.



Map: Loktak Lake (Sciencedirect.com)

Considering the ecological status and its rich biodiversity, the Loktak Lake has been designated as a Wetland of International Importance under Ramsar Convention on 23rd March, 1990. However, the construction of Ithai Barrage (1983) across the Manipur River has upset the once delicately balanced wetland ecosystem thereby threatening and depleting the rich and unique biodiversity of the lake including the water birds. In fact, noting the negative changes in its ecological system, Loktak was put under Montreux Record as a “Threatened Ramsar Site” on 16th June, 1993.

There are 14 hills located in the lake varying in size and elevation appearing as islands in the southern part of the Lake. The most prominent among these are Sendra, Ithing and Thanga island.

Loktak Lake has its unique characteristic feature due to the presence of floating biomass locally known as Phumdi. They are a heterogeneous mass of soil, vegetation and organic matter at various stages of decomposition which provides a magnificent vista of green floating islands all over the lake. The single isolated natural habitat of the endangered and endemic deer species, Brow antlered deer (*Rucervus eldii eldii*), locally called Sangai is found only at Keibul Lamjao National Park located at the South Eastern Park of the Loktak Lake. It is a unique floating National Park in the world covering an area of 40 Sq.Km.

As the Loktak Lake and its adjoining areas are located at the juncture of two Flyways, Central Asian-Indian Flyway and East Asian–Australasia Flyway, it welcomes a large number of migratory birds.

Map: Asian Migratory Bird Flyways (Wikipedia)

Water Bird Estimation:-

Brief History: Water bird Estimation is an annual event carried out for counting birds in Loktak Lake and surrounding wetlands, including both migratory and resident bird species, to estimate their population, distribution and diversity. It also helps to assess the trend over the years and identify the possible and potential threats for planning long term conservation measures.

Hume (1888), had done the first documentation of birds in Loktak, and recorded 57 (fifty-seven) species. Though sporadic estimation of bird counts were done, regular annual estimation of birds in Loktak started only from 2011.

The Wildlife Wing of the Forest Department, Manipur with active support from various NGOs/local clubs, birds watchers/experts, volunteers, forest officers and representatives of Bombay Natural History Society (BNHS) conducted the first systematic water bird population estimation in the year 2011 with funding from Loktak Development Authority (LDA) under Short Term Action Plan (STAP) and continued up to 2012. The estimate sites were restricted to 40 (forty) selected potential bird congregation spots.

The water bird estimation of Loktak Lake and its adjoining wetlands from the year 2013 has been taken up by the Wildlife Wing, Forest Department, Manipur. The identified potential bird congregation sites for estimation were increased to 50 (fifty) spots. The water bird estimation are generally done annually within the two weeks' time frame during the Asian Water Bird Census (AWC) recommended by the Wetlands International.

Water Birds Estimation

The main objectives of the water bird estimation are:-

- to obtain information on an annual basis of water bird population at wetlands in the region during the non-breeding period of most species (January), as a basis for evaluation of sites and monitoring of population.
- to monitor on an annual basis the status and condition of wetlands.
- to encourage greater interest in water birds and wetlands amongst citizens

Northern Pintail *(Anas acuta);* Image credit: Wildlife Explorers, Manipur

Estimation Methodology

- Prior identification of 50 (fifty) sites/spots including Tangjeng Pat, Kakching District, where there are congregation of migratory birds or Water birds.
- Two day's orientation programme on Water birds estimation programme to volunteers and forest staff.
- The method adopted for Water Birds Estimation is Water Bird Total Count Method (Bibby & Burgess, 2000; Salim& Rahul, 2002).
- Species are identified with the help of the (i) Hand Book of Indian Birds by Salim Ali and (ii) Birds of the Indian Subcontinent by Richard Grimmet, Carol Inskipp and Tim Inskipp.
- Minimum of 2 (two) individuals are stationed at each spot. The data/information of a particular spot gathered is entered in the prescribed format.
- The Data/Information collected are compiled, scrutinized and analysed to generate the bird count.

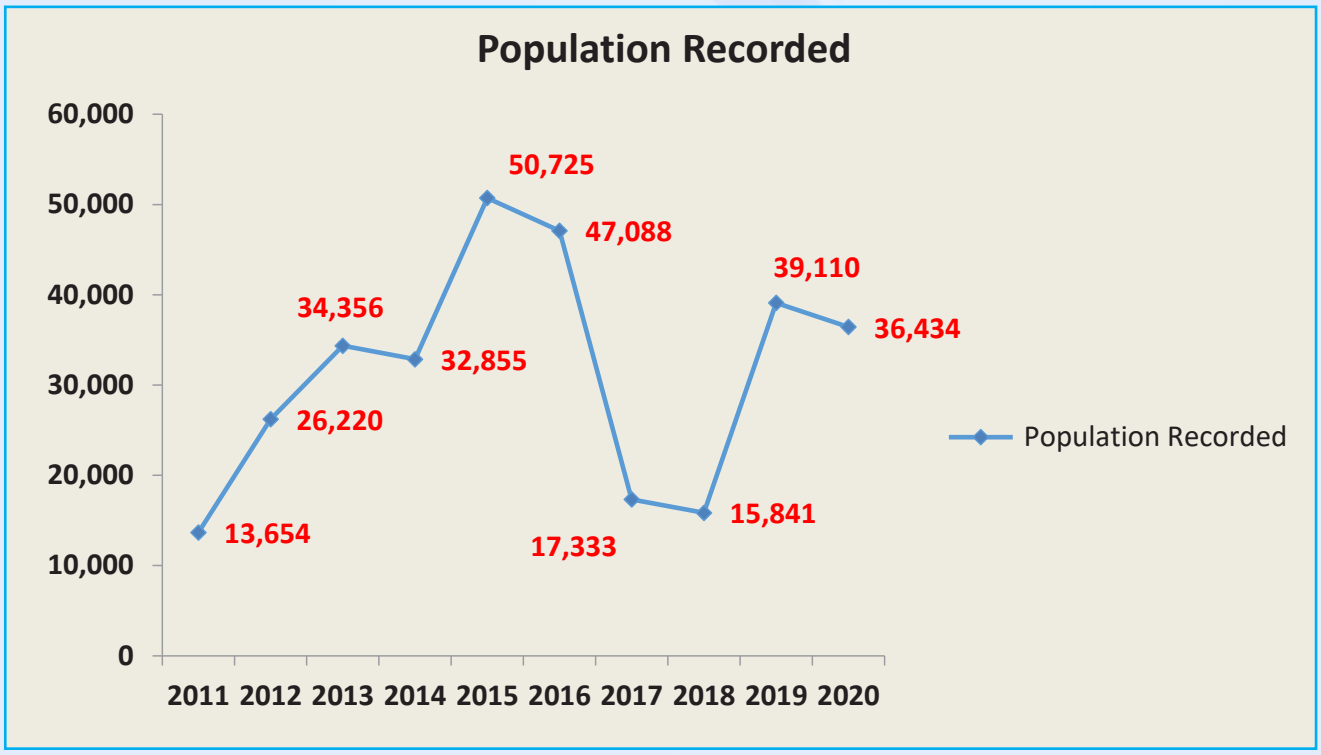
Selected Potential Sites of Bird Counts, 2020:

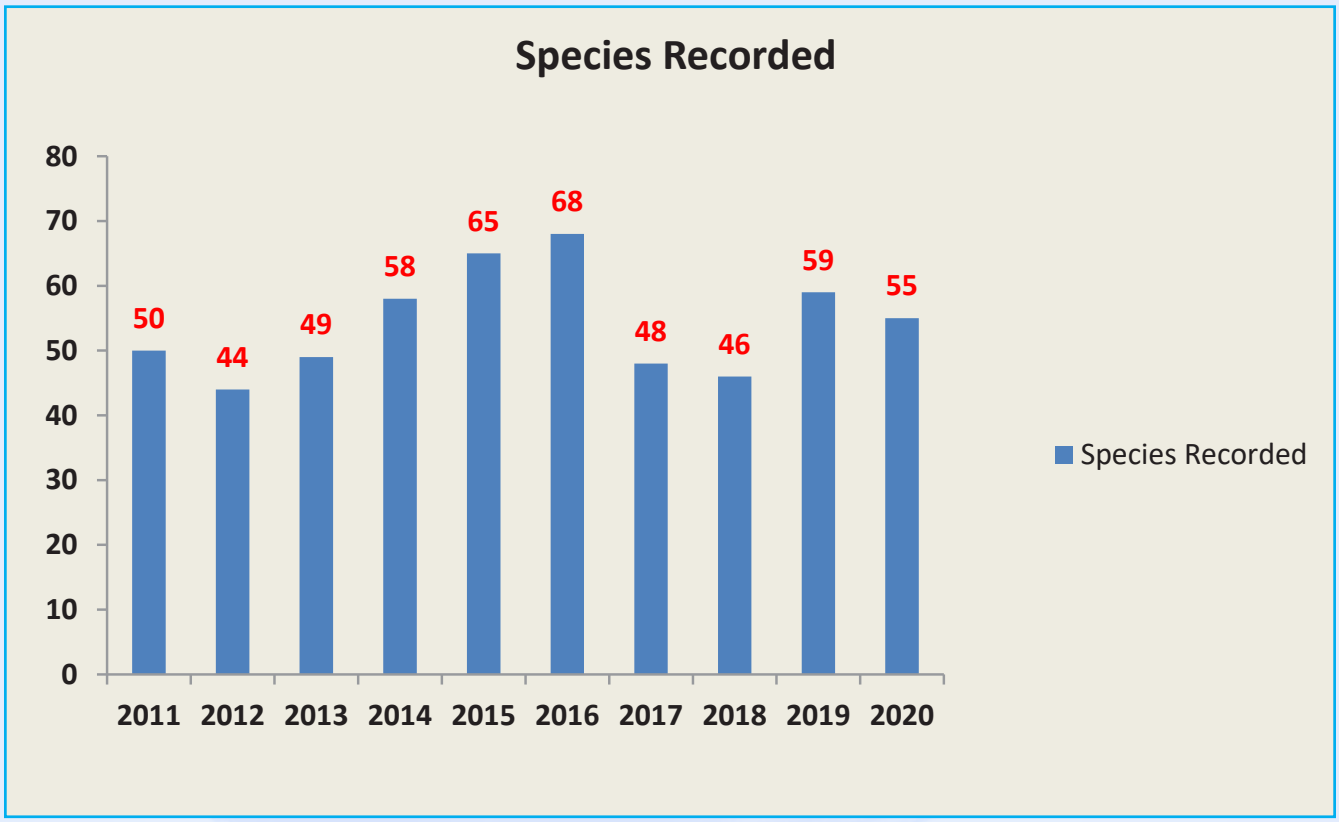
Spot	Name of Site	Spot	Name of Site
S1	Ishok	S26	Ungamen
S2	Keinou	S27	Nongmaikhong 1
S3	Ngaikhong	S28	Nongmaikhong 2
S4	Toubul 1	S29	Khordak
S5	Toubul 2	S30	Laphupat Tera
S6	Birahari Pat	S31	Salam Mamang
S7	Ningthoukhong 1	S32	Karang Irak 1
S8	Ningthoukhong 2	S33	Karang Irak 2
S9	Thinungei 1	S34	Ithing Mamang
S10	Thinungei 2	S35	Komlakhong 1
S11	Phubala	S36	Komlakhong 2
S12	Sunusiphai	S37	Phoubakchao 1
S13	Thamnapokpi	S38	Phoubakchao 2
S14	Chingnungshoi	S39	Sekmaijin Thongam
S15	Takmu 1	S40	Sekmaijin Hangoon
S16	Takmu 2	S41	Sekmaijin Hayel
S17	Hubidak	S42	Uchiwa 1
S18	Pabot Chingmang	S43	Uchiwa 2
S19	Hameiban	S44	Mayang Imphal Bengoon
S20	Ngakrakom	S45	Mayang Imphal Konchak
S21	Thangbrel Yangbi	S46	Mayang Imphal Anilongbi 1
S22	Chingmei Natal	S47	Mayang Imphal Anilongbi 2
S23	Keirenphabi	S48	Upokpi
S24	Thangalawai	S49	Tera
S25	Kumbi Pat	S50	Tangjeng

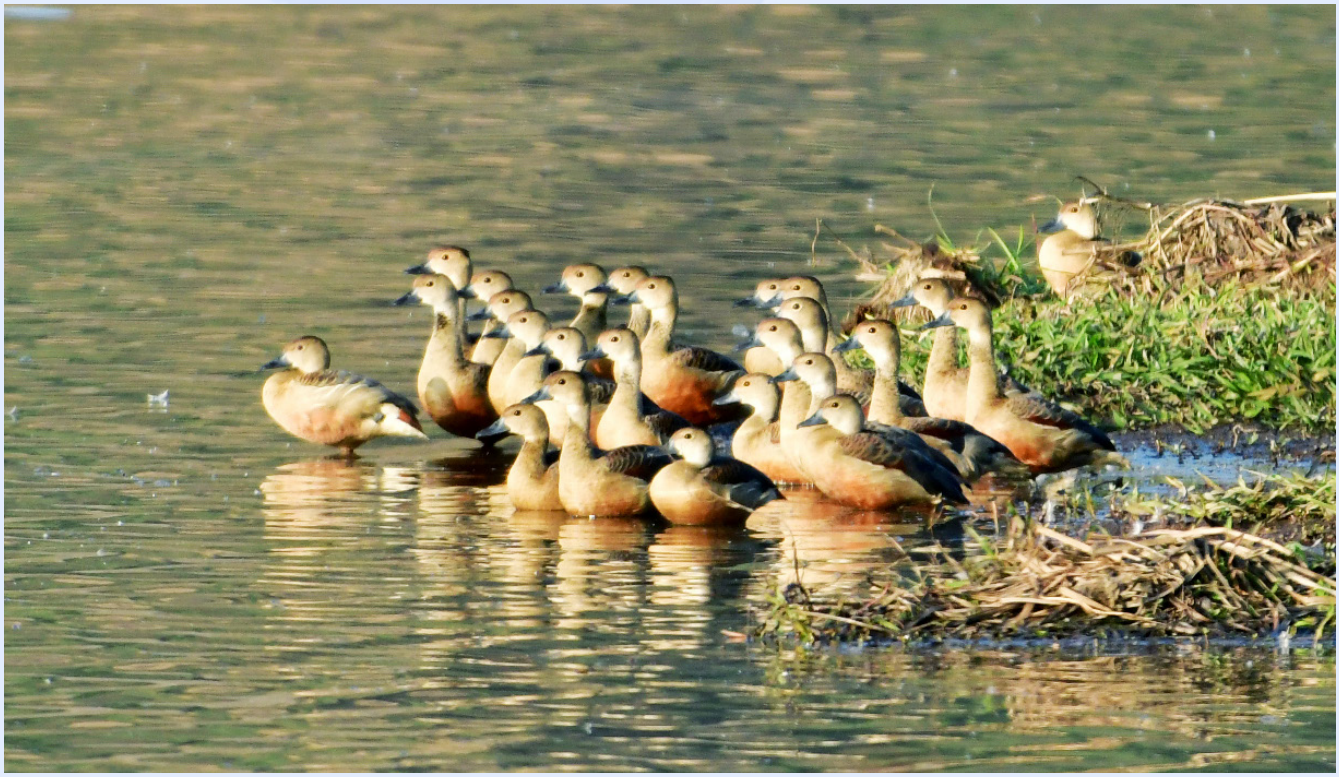
Summary of Bird Estimation (2011-2020).

Table 1: Number of Species, dominant species and population recorded in a particular year.

Sl.No.	Year	Species Recorded	Population Recorded	Dominant Species
1	2011	50	13,654	Lesser whistling duck (4731), Cattle Egret (3443), Common Moorhen (799)
2	2012	44	26,220	Lesser Whistling duck (14288), Cattle Egret (4188), Gadwall (2470)
3	2013	49	34,356	Lesser Whistling duck (14430), Gadwall (6144), Cattle Egret (2310)
4	2014	58	32,855	Lesser Whistling duck (14993), Cattle Egret (3554), Gadwall (3152)
5	2015	65	50,725	Common Coot (19888), Lesser Whistling duck (16648), Gadwall (4963)
6	2016	68	47,088	Lesser Whistling duck (18612), Common Coot (14545), Gadwall (6065)
7	2017	48	17,333	Lesser Whistling duck (9064), Common Coot (1602) , Gadwall (738)
8	2018	46	15,841	Lesser Whistling duck (7940), Common Coot (2124), Gadwall (1532)
9	2019	59	39,110	Lesser Whistling duck (18693), Common Coot (7020), Gadwall (5810)
10	2020	55	36,434	Lesser Whistling duck (12440), Common Coot (6568), Gadwall (4036)

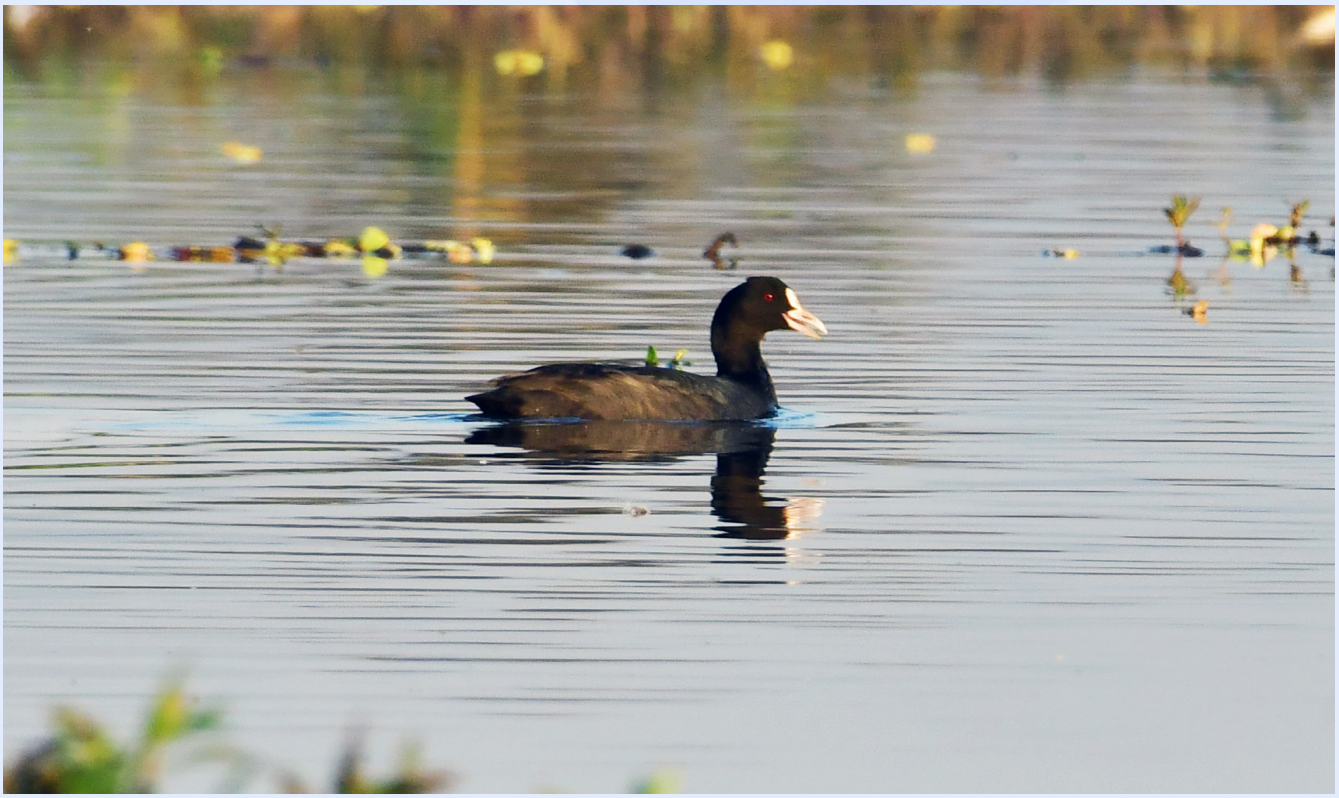






Lesser Whistling duck *(Dendrocygna javanica);* Image credit: Khoyumthem Brajesh Kumar

Gadwall *(Anas strepera)*; Image credit; Khoyumthem Brajesh Kumar



Common Coot *(Fulica atra);* Image credit: Khoyumthem Brajesh Kumar

A comparison between the bird counts of 2011 (13654) and 2012 (26220) indicates that the bird estimation of 2012 is almost double as compared to the preceding year. The reason may be attributed to decrease in human pressure owing to removal of floating huts and atha-phums from the Loktak Lake, maintaining the lake water level around 2-2.5m depth during the migratory season and active awareness campaign of the Wildlife Wing of Forest Department, Manipur.

The sharp decline in the overall population of water-birds during 2017 (17333) & 2018 (15841) estimates may be attributed to rough LED-bulb fishing methodology being carried out throughout the night in the Loktak Lake by local fisherfolk. In this method, the fisherfolk were catching even the fingerlings of different fish species disturbing the fish-breeding as well as depleting food sources of water-birds. The number of water-birds however, shows an increasing trend in the estimations done in 2019 and 2020 when the LED bulb fishing methodology had been controlled and stopped. Active support and cooperation from the local clubs & NGOs to the Wildlife Wing of the Forest Department in spreading awareness on the birds' importance, and citizens' role in their conservation, also helped to a great extent.

Observations on Waterfowl (geese & ducks):

When the first bird counts started in 2011, a total of 5281 waterfowl of 12 species were counted. This exercise was held just after the completion of removal of massive phumdi from the lake. Interestingly, in the following 5 years, i.e., 2012 to 2016, the population size of waterfowl remarkably increased to 16,720, 21,475, 19,672, 24,890 and 24,180 with species diversity of 11, 16, 18, 16 and 19 respectively. However, in 2017 and 2018 the population size had gone down to 10,467 and 9725, while the species diversity was 13 and 11 respectively. Again, in 2019 and 2020 the waterfowl population was 26,999 and 22,099 with an increase in species number to 18 and 17. (Geese & Ducks of Loktak, K. Jugeshor & Kh. Shamungou).

Flock of Water birds; Image credit: Wildlife Explorers, Manipur

Important findings of bird's estimation, 2020:

- Spotting of a pair of Mallard *(Anas platyrhynchos)* at Utra Pat (Nambol Naorem) a part of Spot No. 1 (Ishok). This was the first report of sighting the species during the last 10 years count, though, it had in the past visited the lake.
- Sighting of 12 specimens of Baer's Pochard *(Aythya baeri)* a very rare bird species which is globally listed as critically endangered by the IUCN at Yawa Lamjao a part of Spot No. 4 (Toubul). This was also the first sighting the species during the last 10 years count, though, it had in the past frequented our lake.
- Spotting of a flock of Ferruginous Pochard *(Aythya nyroca)* consisting of 270 individuals at spot No. 36 (Komlakhong-2) which is a Near Threatened species.
- Encountering of a moderate size congregation of water birds consisting of 21 species, mainly of ducks at Utra pat (Nambol Naorem). Surprisingly, out of the 17species of ducks reported in this year's count, from elsewhere in the lake, 14 species were found present at this site. They include- Lesser Whistling-duck *(Dendrocygna javanica)*, Northern Pintail *(Anas acuta);* Common Teal *(Anas crecca);* Spot-billed duck *(Anas poecilorhycha);* Mallard *(Anas platyrhychos);* Gadwall *(Anas strepera);* Falcated Duck *(Anas falcate);* Eurasian Wigeon *(Anas penelope);* Garganey *(Anas querquedula);* Northern Shoveller *(Anas clypeata);* Tufted Pochard *(Aythya fuligula)* and Cotton Teal *(Nettapus coromandelianus).*

Ferruginous Pochard *(Aythya nyroca);* Image credit: Khoyumthem Brajesh Kumar

Mallard *(Anas platyrhynchos);* Image credit: Khoyumthem Brajesh Kumar, Manipur

Northern Shoveler *(Spatula clypeata);* Image credit: Wildlife Explorers, Manipur

Table 2: Spot where (i) maximum species recorded and number of species; and (ii) maximum number of birds recorded and number of birds for the last five years (2016-2020)

Sl. No.	Year	Spot name where max. species recorded	No. of species recorded	Spot name where max. no. of birds recorded	No. of birds recorded
1.	2016	Thinungei Thangjingkom-1	39	Pabot Chingmang	4403
2.	2017	Thangalawai	18	Laphupat Tera	3195
3.	2018	Khordak	20	Toubul	1220
4.	2019	Thinungei Thangjingkom-2	42	Mayang Imphal Konchak	6110
5.	2020	Toubul 1	24*	Toubul 1	6458

* List of species (2020): Little grebe (*Tachybaptus ruficollis*), Cattle Egret (*Bubulcus ibis*), Great Egret (*Casmerodius albus*), Purple Heron (*Ardea purpurea*), Indian Pond Heron (*Ardeola grayii*), Chinese Pond Heron (*Ardeola bacchus*), Yellow Bittern (*Ixobrychus sinensis*), Asian Openbill-Stork (*Anastomus oscitans*), Glossy Ibis (*Plegadis falcinellus*), Lesser Whistling duck (*Dendrocygna javanica*), Gadwall (*Anas strepera*), Northern Shoveller (*Anas clypeata*), Common Pochard (*Aythya farina*), Ferruginous Pochard (*Aythya nyroca*), Common Teal (*Anas crecca*), Baer's Pochard (*Aythya baeri*), Tufted Duck (*Aythya fuligula*), Common Coot (*Fulica atra*), White breasted Waterhen (*Amauronis phoenicurus*), Ruddy-breasted Crake (*Porzana fusca*), Purple Moorhen (*Porphyrio porphyrio*), Common Moorhen (*Gallinula chloropus*), Pheasant-tailed Jacana (*Hydrophasianus chirugus*) and Pallas's Gull (*Ichthyaetus ichthyaetus*).

Importance of Water Birds Estimation

- The numbers and trends of water birds indicate the health and quality of the wetland which facilitates wetland planners and policy makers.
- Monitoring the population size, status, and trends of water birds is a key factor in identifying priorities of conservation during formulation of framework and policies for bird's conservation.
- The water bird's estimation enhances knowledge about habitat and habits of birds which helps in their protection and conservation.
- The water bird count makes the citizens aware of the values of natural resources and the need to protect and conserve wildlife and biodiversity.
- The information on water birds plays a crucial role in influencing State and National level programmes such as National Action Plan on Aquatic Ecosystems and National Action Plan for Conservation of Migratory Species.
- The Water bird's estimation fulfills international commitments like the Convention on Migratory Species and the Ramsar Convention on Wetlands.

Main threats to Water birds

- Rapid degradation of the lake, intense hunting pressure and, general disturbances, has led to the reduction of many resident and migratory bird species.
- Water pollution, excessive use of fertilizer, pesticides, herbicides, and loss of vegetation cover in the catchment area are the major reasons for the decline in the number of waterfowls in the lake.
- Illegal hunting and poaching of water birds for consumption and trade.
- Encroachment of the Loktak lake.
- Habitat loss or phumdi disturbances leading to reduction in nesting, feeding and roosting sites of Water birds.
- Overfishing causing decrease in food resources for the Water birds; use of LED lights for fishing at night time.
- The multipurpose hydroelectric and irrigation project has altered the Lake ecosystem by converting the fluctuating water level into a reservoir.
- Degradation of Water quality of the Loktak Lake, due to unchecked influx of pesticides, insecticides and pollutants from feeder channel/rivers.

Conservation Measures

- Conservation of the Loktak wetland is crucial as it is the prime source of feeding, nesting, resting and roosting site of the water birds.
- Regular monitoring of population size and species composition of migratory birds.
- Habitat loss, deterioration and fragmentation of habitat needs to be controlled.
- Education and awareness activities coupled with economic incentives to the local population to stop poaching of birds; and to enhance community living standards.
- During the migratory season of birds, regular patrolling of vulnerable sites with forest officials and NGOs with involvement of local community.
- Before undertaking developmental projects by any agencies/departments in the Loktak Lake, prior consultation and consensus with different stakeholders should be made mandatory.

Conclusion

The Loktak Wetland Complex bestows myriad benefits and services to the people besides harbouring rich biodiversity including birds. The Conservation of the Loktak Lake is vital not only for the survival of resident and migratory birds but also for communities which depend on it for their livelihood and wellbeing. Since migratory birds traverse oceans and continents, they belong to all mankind. The onus is on us to protect and nurture these extraordinary feathered guests during their momentary stop in our abode. If we fulfil our duties as a host, we will be exemplifying the true meaning of *"Atithi Devo Bhava"*.

YEAR-WISE LIST OF WATER BIRD SPECIES WITH POPULATION

2011 (Species: 50; Population: 13645)

Asian Openbill Stork (625), Black-headed Gull (38), Black-crowned Night Heron (127), Blue-breasted Rail (56), Bronze-winged Jacana (134), Brahminy duck (57), Brown-headed Gull (5), Cattle Egret (3443), Chinese Pond Heron (247), Comb Duck (1), Common Coot (302), Common Moorhen (799), Common Sandpiper (5), Common Snipe (156), Cotton Teal (36), Darter (4), Eurasian Wigeon (9), Ferruginous Pochard (89), Gadwall (208), Garganey (116), Glossy Ibis (48), Great Cormorant (126), Great Egret (113), Grey Heron (9), Grey-headed Lapwing (31), Indian Pond Heron (760), Indian Whiskered Tern (27), Jack Snipe (11), Large Whistling duck (2), Lesser Whistling Duck (4731), Little Cormorant (21), Little Egret (22), Little Grebe (237), Little Ringed Plover (14), Median Egret (66), Northern Pintail (9), Northern Shoveller (8), Pheasant-tailed Jacana (119), Pintail Snipe (31), Purple Heron (60), Purple Moorhen 513, Red-crested Pochard (8), Red-wattled Lapwing (19), Ruddy-breasted Crake (16), Solitary Snipe (20), Spot-billed Duck (18), Water Cock (8), Water Rail (50), White-breasted Waterhen (41) and Wood Sandpiper (59).

2012 (Species: 44; Population:26220)

Asian Openbill Stork (609), Bar headed Goose (3), Black-headed Gull (43), Black-crowned Night Heron (18), Blue-breasted Rail (4), Bronze-winged Jacana (154), Brahminy duck (80), Cattle Egret (4188), Chestnut Bittern (6), Common Coot (342), Common Moorhen (409), Common Pochard (57), Common Snipe (43), Common Teal (906), Cotton Teal (2), Darter (11), Eurasian Wigeon (50), Ferruginous Pochard (220), Gadwall (2470), Garganey (39), Glossy Ibis (80), Great Cormorant (159), Great Egret (6), Grey Heron (2), Grey-headed Lapwing (49), Indian Pond Heron (856), Indian Whiskered Tern (2), Large Whistling duck (2), Lesser Whistling duck (14288), Little Cormorant (5), Little Egret (18), Little Grebe (95), Median Egret (76), Northern Pintail (7), Northern Shoveller (5), Pheasant-tailed Jacana (82), Pintail Snipe (47), Purple Heron (147), Purple Moorhen (562), Spot-billed Duck (2), Water Cock (7), Water Rail (30), White-breasted Waterhen (31) and Yellow Bittern (8).

2013 (Species:49; Population: 34356)

Asian Openbill Stork (545), Bar headed Goose (9), Black-headed Gull (13), Black-crowned Night Heron (19), Blue-breasted Rail (13), Bronze-winged Jacana (291), Brahminy duck (60), Cattle Egret (2310), Chestnut Bittern (12), Common Coot (3951), Common Moorhen (1009), Common Pochard (197), Common Snipe (37), Common Teal (1247), Cotton Teal (37), Darter (29), Eurasian Wigeon (9), Ferruginous Pochard (439), Gadwall (6144), Garganey (30), Glossy Ibis (307), Great Cormorant (52), Great Egret (34), Grey Heron (18), Grey-headed Lapwing (71), Indian Pond Heron (679), Indian Whiskered Tern(7), Jack Snipe (16), Large Whistling duck (2), Lesser Whistling duck (14430), Little Cormorant (28), Little Egret (25), Little Grebe (116), Median Egret (43), Northern Pintail (15), Northern Shoveller (3), Pheasant-tailed Jacana (580), Pintail Snipe (45), Purple Heron (145), Purple Moorhen (1104), Red-crested Pochard (11), Red-wattled Lapwing (2), Solitary Snipe (14), Spot-billed Duck (20), Tufted Pochard (123), Water Cock (1), Water Rail (20), White-breasted Waterhen (36) and Yellow Bittern (8).

2014 (Species:58; Population:32855)

Asian Openbill Stork (586), Black-headed Gull (14), Black-crowned Night Heron (5), Blue-breasted rail (2), Bronze-winged Jacana (101), Brahminy duck (63), Brown-headed Gull (3), Cattle Egret (3554), Chestnut Bittern (10), Comb duck (2), Common Coot (1727), Common Crane (2), Common Moorhen (2283), Common Pochard (28), Common Shelduck (2), Common Snipe (63), Common Teal (1914), Cotton Teal (25), Darter (7), Eurasian Wigeon (10), Ferruginous Pochard (108), Gadwall (3152), Garganey (127), Glossy Ibis (443), Great Cormorant (200), Great Crested Grebe (16), Great Egret (110), Greater Painted-Snipe (3), Grey Heron (29), Greylag Goose (9), Grey-headed Lapwing (42), Indian Pond Heron (1243), Indian Whiskered Tern(12), Jack Snipe (6), Kentish Plover (32), Large Whistling duck (4), Lesser Whistling duck (14993), Little Cormorant

(44), Little Egret (100), Little Grebe (128), Little Ringed Plover (1), Mandarin Duck (2), Median Egret (251), Northern Lapwing (6), Northern Pintail (71), Northern Shoveller (12), Pheasant-tailed Jacana (291), Purple Heron (110), Purple Moorhen (712), Red-crested Pochard (57), Red-wattled Lapwing (4), Solitary Snipe (55), Spot-billed Duck (23), Tufted Pochard (23), Water Cock (14), Water Rail (10), White-breasted Waterhen (5) and Yellow Bittern (6).

2015 (Species: 65; Population: 50725)

Asian Openbill Stork (621), Bar headed Goose (1), Black headed Gull (9), Black- headed Ibis (16), Black Tail (3), Gadwall (4463), Black winged Stilt (2), Bronze-winged Jacana(110), Brahminy duck (61), Brown headed Gull (6), Cattle Egret (872), Chestnut Bittern(2), Common Coot (19888), Common Moorhen(551), Common Pochard (152), Common Redshank (11), Common Sandpiper (7), Common Shelduck (1), Common Snipe(25), Common Teal(1063), Cotton Teal (76), Darter(2), Eurasian Wigeon(2), Ferruginous Pochard (220), Gadwall (4963), Garganey (12), Glossy Ibis (1629), Great Cormorant (36), Great Crested Grebe(15), Great Egret (44), Grey Heron(8), Grey lag goose(3), Grey-headed Lapwing (33), Indian Pond Heron(786), Lesser Whistling duck (16648), Little bitten (2), Little Cormorant (29), Little Egret (57), Little Grebe (59), Little Ringed Plover (67), Median Egret (48), Night Heron (21), Northern Lapwing (62), Northern Pintail (224), Northern Shoveller (14), Pheasant-tailed Jacana (476), Pintail Snipe (4) Purple Heron (105), Purple Moorhen (1417), Red-crested Pochard (26), Red-wattled Lapwing (12), River Lapwing (3), River Tern (2), Ruff (4), Small Pratincole (18), Solitary Snipe (7), Spot-billed Duck (63), Spotted Redshank (8), Ternminck's Stint (2), Tufted Duck (5), Water Cock (10), Water Rail (12), Whiskered Tern (30), White-breasted Waterhen (18), Wood Sandpiper (27) and Yellow Bittern (15).

2016 (Species:68; Population:47088)

Asian Openbill Stork (564), Bar headed Goose (2), Black bellied Tern (4), Black headed Gull (16), Bronze-winged Jacana (178), Brahminy duck (50), Brown headed Gull (4), Cattle Egret (936), Chestnut Bittern (6), Chinese Pond Heron (13), Common Coot (14545), Common Crane (4), Common Moorhen (1378), Common Pochard (73), Common Sandpiper (1), Common Shelduck (2), Common Snipe (70), Common Teal (665), Cotton Teal (14), Eurasian Wigeon (4), Ferruginous Pochard (192), Falcated Duck (1), Fulvous Duck (2), Gadewall (6065), Garganey (6), Glossy Ibis (258), Great Cormorant (54), Great Crested Grebe (12), Great Egret (37), Greater Painted-Snipe (5), Grey Heron (12), Grey lag goose (2), Grey-headed Lapwing (16), Indian Pond Heron (810), Jack snipe (5), Kentish Plover (2), Lesser Whistling duck (18612), Little Bittern (2), Little Cormorant (71), Little Egret (27), Little Grebe (80), Little Ringed Plover (18), Median Egret (137), Night Heron (9), Northern Lapwing (23), Northern Pintail (48), Northern Shoveller (20), Pheasant-tailed Jacana (955), Pintail Snipe (10), Purple Heron (130), Purple Moorhen (726), Red-crested Pochard (40), Red-wattled Lapwing (29), River Lapwing (2), Ruddy-breasted Crake (7), Solitary Snipe (6), Spot-billed Duck (32), Ternminck's Stint (4), Tufted Duck (10), Water Cock (25), Water Rail (7), Whiskered Tern (3), White winged Tern (1), White-breasted Waterhen (14), Wood Sandpiper (3), Wood Snipe (2), Yellow Bittern (20), Yellow wattled Lapwing (7),

2017 (Species: 48; Population:17333)

Asian Openbill Stork (390), Black-crowned Night-heron (11), Black-headed Gull (8), Black-winged Stilt (5), Brahminy duck (16), Bronze-winged Jacana (46), Cattle Egret (893), Chinese Pond Heron (4), Common Coot (1602), Common Moorhen (325), Common Pochard (130), Common Sandpiper (5), Common Snipe (187), Common Teal (398), Cotton Teal (16), Darter (1), Eurasian Wigeon (10), Ferruginous Pochard (18), Gadwall (738), Gargeney (36), Glossy ibis (373), Great Cormorant (168), Great Egret (72), Grey Heron (2), Grey-headed Lapwing (166), Greylag Goose (22), Indian Pond Heron (803), Jack Snipe (5), Lesser Whistling duck (9064), Little Cormorant (101), Little Egret (31), Little Grebe (55), Little Ringed Plover (730), Median Egret (63), Northern Lapwing (11), Northern Pintail (5), Northern Shoveller (12), Pheasant-tailed Jacana (206), Pintail Snipe (50), Purple Heron (117), Purple Moorhen (388), Red-wattled Lapwing (13), Solitary Snipe (8), Spot-billed Duck (2), Water Rail (2), Watercock (4), White-breasted Waterhen (18), Yellow Bittern (3),

Water Birds Estimation

2018 (Species:46; Population:15841)

Asian Open bill Stork(321), Bar-headed Goose(8), Black-Crowned Night Heron(8), Black-winged Stilt (2), Brahminy duck (58), Bronze-winged Jacana (6), Cattle Egret (475), Chestnut Bittern (7), Chinese Pond Heron (11), Common Coot (2124), Common Moorhen(947), Common Pochard(71), Common Sandpiper (31), Common Snipe (45), Common Teal (43), Cotton Teal (26), Eurasian Wigeon (4), Gadwall (1532), Garganey (5), Glossy Ibis (16), Great Cormorant (75), Great Egret (66), Grey Heron (3), Grey-headed Lapwing (53), Indian Pond Heron (717), Lesser Whistling duck (7940), Little Cormorant (106), Little Egret (123), Little Grebe (77), Little Ringed Plover (31), Median Egret (164), Northern Lapwing (12), Northern Pintail (22), Pheasant-tailed Jacana (220), Pintail Snipe (4), Purple Heron (110), Purple Moorhen (246), Red-wattled Lapwing (3), m Ruddy-breasted Crake (6), Solitery Snipe (48), Spot-billed Duck (16), Water Cock (9), Water Rail (10), White-breasted Waterhen (21), Wood Sandpiper (13), Yellow Bittern (9).

2019 (Species:59; Population: 39110)

Asian Openbill Stork (487), Bar-headed Goose (8), Black-crowned Night-Heron (13), Black-headed Gull (32), Black-winged Stilt (62), Brahminy duck (74), Bronze-winged Jacana (100), Cattle Egret (417), Chestnut Bittern (10), Chinese Pond-Heron (2), Common Coot (7020), Common Greenshank (8), Common Moorhen (721), Common Pochard (88), Common Redshank (12), Common Sandpiper (11), Common Shelduck (1), Common Snipe (42), Common Teal (1908), Cotton Teal (30), Eurasian Wigeon (71), Falcated Duck (16), Ferruginous Pochard (83), Gadwall (5810), Garganey (25), Glossy Ibis (430), Great Cormorant (85), Great Egret (147), Grey Heron (6), Grey-headed Lapwing (7), Greylag Goose (11), Indian Pond-Heron (472), Lesser Whistling duck (18693), Little Cormorant (138), Little Egret (120), Little Grebe (68), Little Ringed Plover (100), Median Egret (261), Northern Lapwing (38), Northern Pintail (84), Nothern Shoveller (18), Oriental White Ibis (8), Pheasant-tailed Jacana (413), Pintail Snipe (26), Purple Heron (113), Purple Moorhen (632), Red-crested Pochard (49), Red-wattled Lapwing (7), Ruddy-breasted Crake (12), Solitary Snipe (5), Spot-billed Duck (7), Swinhoe's Snipe (12), Ternminck's Stint (5), Tufted Pochard (23), Water Rail (10), Watercock (8), White-breasted Waterhen (16), Wood Sandpiper (10) and Yellow Bittern (25),

2020 (Species:55; Population: 36434)

Asian Openbill Stork (563), Baer's Pochard (12), Black-crowned Night Heron (17), Bronze-winged Jacana (239), Brahminy duck (17), Cattle Egret (864), Chestnut Bittern (15), Chinese pond heron (19), Common Coot (6568), Common Moorhen (942), Common Pochard (692), Common Sandpiper (3), Common Snipe (135), Common Teal (3443), Cotton Teal (43), Darter (1), Eurasian Wigeon (153), Falcated Duck (2), Ferruginous Pochard (858), Gadwall (4036), Garganey (14), Glossy Ibis (631), Great Cormorant (38), Great Crested Grebe (14), Great Egret (158), Greater Painted-Snipe (2), Grey Heron (7), Grey-headed Lapwing (4), Indian Pond Heron (870), Lesser Whistling duck (12440), Little Cormorant (176), Little Egret (28), Little Grebe (93), Little Ringed, Plover (176), Mallard (2), Median Egret (254), Northern Lapwing (7), Northern Pintail (268), Northern Shoveller (16), Pallas's Gull (2), Pheasant-tailed Jacana (1067), Pintail Snipe (6), Purple Heron (155), Purple Moorhen (1129), Red-crested Pochard (42), Red-wattled Lapwing (23), Ruddy-breasted Crake (15), Solitary Snipe (7), Spot-billed Duck (14), Tufted Duck (47), Water Cock (4), Water Rail (11), White-breasted Waterhen (58), Wood Sandpiper (12), Yellow Bittern (22)

References:-

1. Bibby, CJ & Burgess ND, 2000: Bird Census Techniques – Academic Press, London, 2nd edition
2. Geese & Ducks of Loktak, K.Jugeshor & Kh.Shamungou.
3. Islam MZ, Rahmani AR (2004). Important Birds Areas in India. Mumbai: Bombay Natural History Society.
4. Jain A, Sundriyal M, Roshnibala S, Kotoky R, Kanjilal PB, Singh HB, Sundriyal RC. 2011. Dietary use and conservation concern of edible wetland plants at Indo-Burma hotspot: A case study from North-Eastern India. J Ethnobiol Ethnomed 7: 29
5. Mitsch WJ, Gooselink JG. 2007. Wetlands. 4th ed., New York: Wiley.
6. Salim Javed & Rahul Kaul, 2002, Field Methods for Bird Survey. Indian Bird Conservation Network, Bombay Natural History Society
7. Sanjit, L., Bhatt, D., & R. K. Sharma (2005). Habitat heterogeneity of the Loktak Lake, Manipur. Current Science, 88 (7): 44- 45.
8. Singh, T. H. & R. K. S. Singh (1994). Ramsar Sites of India: Loktak Lake. World Wide Fund for Nature, New Delhi. 69pp.
9. Trishal CI, Manihar T. 2004. Loktak: The Atlas of Loktak Lake. New-Delhi: WISA-LDA.
10. Zedler JB, Kercher S. 2005. Wetland resources: status, trends, ecosystem services, and restorability. Annual Review of Environment and Resources 30:39–74

COMMON WATER BIRDS

Asian Openbill

Scientific Name: *Anastomus oscitans*
Local Name: Tharoichabi Chingai
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Scheduled IV

Common Moorhen

Scientific Name: *Gallinula chloropus*
Local Name: Uren
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Not Listed

Common Snipe

Scientific Name: *Gallinago gallinago*
Local Name: Chetphrang
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Scheduled IV

Great Cormorant

Scientific Name: *Phalacrocorax carbo*
Local Name: Ura Pongyai
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Schedule IV

Glossy Ibis

Scientific Name: *Plegadis falcinellus.*
Local Name: Kaksu
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Not Listed

Ferruginous Pochard

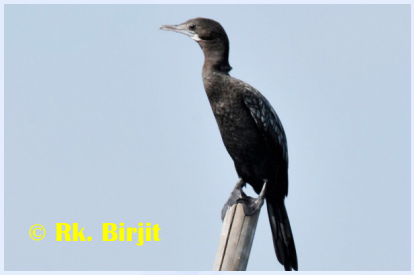
Scientific Name: *Aythya nyroca*
Local Name: Eeruppi Mitngou
IUCN Status: Least Concern
CITES: Appendices I and II
IWPA: Not Listed

Indian Pond Heron

Scientific Name: *Ardeola grayii*
Local Name: Urok lamprai
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Schedule IV

Little Cormorant

Scientific Name: *Microcarbo niger*
Local Name: Ura khomdon
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Scheduled IV



Pheasant-tailed Jacana

Scientific Name: *Hydrophasianus chirurgus*
Local Name: Yenpouraba
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Not Listed

Purple Heron

Scientific Name: *Ardea purpurea*
Local Name: Usai saingang
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Scheduled IV

Watercock

Scientific Name: *Gallicrex cinerea*
Local Name: Uthum
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Not Listed

White-breasted Waterhen

Scientific Name: *Amaurornis phoenicurus*
Local Name: Urenkonthou
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Scheduled IV

Bronze-winged Jacana

Scientific Name: *Metopidius indicus*
Local Name: Thamnachenbi
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Not Listed

Cattle Egret

Scientific Name: *Bubulcus ibis*
Local Name: Sandungil
IUCN Status: Least Concern
CITES: Appendices I, II and III
IWPA: Not Listed

Eurasian Wigeon

Scientific Name: *Anas Penelope*
Local Name: Thanggongmaan
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Not Listed

Gadwall

Scientific Name: *Anas strepera*
Local Name: Thoidingnam
IUCN Status: Least Concern
CITES: Not Listed
IWPA: Not Listed

Lesser Whistling-duck

Scientific Name: *Dendrocygna javanica*
Local Name: Tingi macha
IUCN status: Least Concern
CITES: Listed
IWPA: Scheduled IV

Little Grebe

Scientific Name: *Trachybaptus ruficollis*
Local Name: Upumnao/Uthit
IUCN Status: Least Concern
CITES: Listed
IWPA: Scheduled IV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