

ANNEXTURE-I (Progressive Report – First Year)

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TITLE OF PROJECT: “Comparative Study of Avifauna and Hydrobiology of Internationally Important Two Waterbird Sanctuaries (Nalsarovar & Thol) of Gujarat, India.”

Introduction: Nalsarovar and Thol are internationally important waterbird sanctuaries of Gujarat state. Thousands of Migratory waterbird are visiting these Two wetlands and fulfill their needs like food, reproduction and shelter every year. Gujarat State Government and Forest Department of Gujarat funding for development and organizes Waterbird census every year during winter to update and monitoring the migratory bird population of these two bird sanctuaries every year.

This year 9,10 February,2018 Forest Department of Gujarat organized Aquatic bird census for these TWO bird sanctuaries for latest DATA of birds during winter season 2018. Every year Forest department and some NGO of state monitoring and collects data of waterfowl and makes lots off efforts to conserving the species of flora and fauna of these two unique waterbird sanctuaries to sustains its natural beauty.

Nalsarovar is situated 100km away from my college and Thol is situated 120km away from my college. Nalsarovar belongs to Ahmedabad district while Thol is belongs to Mehsana district of Gujarat.

Nalsarovar bird sanctuary is also declared as RAMSAR SITE for unique Biodiversity of Flora and Fauna as well as Migratory and Residential waterbirds. Some species of waterfowl staying and using this wetland for most of part of year and survive their life.

Thol bird sanctuary is also important for migratory as well as Residential bird population of the State. Both the sanctuaries having different ecological zones which provides nesting, sheltering, reproduction ground and food availability to all species of water depended birds and aquatic plants as well as animals. thousands of people from all over states of India and abroad visited these two waterbird sanctuaries and satisfied with entertainments and research activities or specially with ornithological study and bird watching.

Gujarat Tourism department also funding and developed these two waterbird sanctuaries for tourism aspects and highlights these sanctuaries for tourism nationally and internationally. Every year and satisfied with entertainments and research activities or specially with ornithological study and bird watching.

Both waterbird sanctuaries are nearby less than 100km away to each other so the atmospheric conditions are mostly same. Temperature, rain, moist and other meteorological conditions are more adequate to each other which provides them more similarities and uniqueness in floral, faunal and avian diversity. This year rainfall was frequent and less than previous year so the water level at NALSAROVAR and THOL was very low comparatively previous year. Due to muddy and low level of water, this year may vary suitable for waterbirds in both sanctuaries. Ahmedabad side of Nalsarovar was very dry and vast area is covered with mud so boating is very difficult for visitors during wintering seasons. But this condition is varying suitable for waders and other waterbirds so Ornithologist predicts more numbers of waterbirds may visits Nalsarovar this year. Due to low water level and muddy area visitors may be (picnickers) decrease and bird watchers may increase in numbers during wintering seasons. This year migratory birds were comings start before one-month prior during October, generally they were start after November,25th. All conditions may favorable for waterbirds, so good numbers and wide range of species may be seen at these two waterbird sanctuaries during this wintering seasons that we hope.

Nalsarovar is a Bird Sanctuary since 1969, consisting of a 120.82-sq-km lake and marshes with shallow waters (4-5 ft) and muddy lagoons, dotted by 36 small islands, is situated about 60 km from Ahmedabad near Sanand Village, in Gujarat. Mainly inhabited by migratory birds as their wintering ground, it is the largest wetland bird sanctuary in Gujarat, and one of the largest in India. Nalsarovar is a Ramsar site since 24 September 2012. Thol Lake is an artificial lake near Thol village in Kalol area of Mehsana District in Gujarat, India. It is a reservoir made for irrigation purpose in 1912. It is a fresh water lake same as Nalsarovar and is a marshland. Thol is a Bird Sanctuary since the year of 1988.

Birds count in Thol is now three more times than in Nalsarovar. Estimated number of birds per sq km in Thol is around 8000. While in Nalsarovar is only approx. 2500 birds per sq km and the most birds are local and not migratory. The bird count released by forest department shows that the number of birds in Nalsarovar has increased by 12000, while the numbers in Thol has increased more than 34000. According to the reports, Thol had a count of almost 4000 birds per sq km and it is increased120%.

Officials say that fishing and poaching by the locals has major role in scaring birds

away from Nalsarovar sanctuary. Poachers lay nets to trap exotic birds of Nalsarovar, Gujarat. It is a bitter truth that locals of at least 15 surrounding villages are (said to be) involved in illegal fishing and poaching activities. Only seven to eight foresters and guards combined safeguards Nalsarovar. Locals take advantage of this staff scarcity to poach birds and sell them into the black market. The water level is now favorable for waterfowl birds like flamingos, i.e. 2 to 3 feet. This is the first time in many years that one has to walk almost a kilometer into the dry lake to see birds in Nalsarovar. The bird census of January, 2018 showed a record low greater and lesser flamingo count of just 3,651 numbers in Nalsarovar Ramsar site, which was around 10,000 in early 2010. Gujarat is a bird watcher's paradise, you can find rosy pelicans, lesser and greater flamingos, crakes, Brahminy ducks, purple moorhen, herons, white storks, various species of bitterns and grebes etc in the lake. Best time to visit Nalsarovar is in winter between November and February. However, migratory birds start arriving in October and stay until April but their population reaches its peak in mid-winter from Dec. to Jan. Best time to see the birds is early in the morning and in the evening.

These two wetlands near the surface are specific containing typical physical, chemical and biological features supporting the aquatic avifauna and floating and amphibious vegetation containing water bodies, which provide habitat to the local and migratory birds. Plankton are considered to be one of the most important linkage in aquatic food chain and play a major role in energy transfer, therefore the population dynamics of Zooplankton and Phytoplankton with reference to system energetics provide key information for the management practices. Zooplankton and Phytoplankton concentration are sensitive to physical and chemical changes in the water. The knowledge of their seasonal quantitative and qualitative fluctuation has been considered essential for proper manipulation of the factors influencing biological productivity of the wetlands. The dominant flora represents *Marselia*, *Vallisneria*, *Hydrilla*, *Nymphaea*, *Trapa*, *Chara* etc. and surrounding marginal flora contains bushes and trees. Fauna of both lakes is dominated by a rich variety of aquatic insects, worms, beetles, crustaceans, amphibians and fishes which attract the large number of migratory as well as local birds in the area. Mostly all the wetland areas of Gujarat having common tree species like *Acacia nilotica*, *A. leucopholea*, *Azadirachta indica*, *Ficus sp.* *Salvadora sp.* *Prosopis chilensis*, *Capparis sp.* which are the important tree species in and around the pond (Singh 1998 & 2001). Of the 1230 bird species found in India, around 23% are totally wetland dependent. Fulfilling the food and habitat requirements of these waterbirds is one of the most important functions performed by wetlands as it helps to maintain biodiversity globally. Protection and conservation of major wetlands, critically important to waterfowl on their traditional migratory flyways, is an urgent need.

LIST OF FAMILIES WITH SPECIES 2018

1 Family: Podicipedidae= 3

Little Grebe (Dabchick) *Tachybaptus ruficollis*
Great Crested Grebe *Podiceps cristatus* Linnaeus
Black-necked Grebe *Podiceps nigricollis*

2 Family: Phalacrocoracidae= 2

Little Cormorant *Phalacrocorax niger* Viellota
Indian Cormorant *Phalacrocorax fuscicollis*

3 Family: Anhingidae= 1

Darter *Anhinga melanogaster* (Ind.) *Anhinga rufa*

4 Family: Ardeidae= 10+2=12

Great Bittern *Botaurus stellaris*
Little Bittern *Ixobrychus minutus*
Night Heron *Nycticorax nycticorax nycticorax*
Indian Pond Heron *Ardeola grayii grayii*
Cattle Egret *Bubulcus ibis coromandus*
Little Egret *Egretta garzetta garzetta*
Intermediate Egret *Egretta intermedia intermedia*
Great Egret *Ardea alba alba* or *Egretta alba*
Grey Heron *Ardea cinerea rectirostris*
Purple Heron *Ardea purpurea manilensis*
Yellow Bittern *Ixobrychus sinensis*
Black Bittern *Dupetor flavicollis*

5 Family: Phoenicopteridae= 2

Greater Flamingo *Phoenicopterrus ruber*
Lesser Flamingo *Phoenicopterrus minor*

6 Family: Threskiornithidae= 4

Glossy Ibis *Plegadis falcinellus*
Black-headed Ibis *Threskiornis melanocephalus*
Black Ibis *Pseudibis papillosa* (Red-napped Ibis)
Eurasian Spoonbill *Platalea leucorodia*

7 Family: Pelecanidae= 1

Great White Pelican *Pelecanus onocrotalus* (White)

8 Family: Anatidae= 17

Greylag goose *Anser anser rubrirostris*
Ruddy Shelduck Brahminy duck *Tadorna feruginea*
Common Shelduck *Tadorna tedorna*
Eurasian Wigeon *Anas Penelope*
Falcated (Teal) Duck *Anas falcate*
Gadwall *Anas strepera strepera*

Common Teal *Anas crecca crecca*
Mallard *Anas platyrhynchos*
Spot-billed Duck *Anas poecilorhyncha*
CombDuck *Sakidiornis melanoto*
Northern Pintail *Anas acuta*
Garganey *Anas querquedula*
Northern Shoveller *Anas clypeata*
Red-crested Pochard *Netta rufina*
Common Pochard *Aythya ferina*
Ferruginous or White-eye-Pochard *Aythya nyroca*
Tufted Duck *Aythya fullguta*

9 Family: Dendrocygnidae = 2

Lesser whistling Duck *Dendrocygna javanica*:
Fulvous (L) Whistling Duck *Dendrocygna bicolor*

10 Family: Rallidae= 4

White-breasted waterhen *Amaurornis phoenicurus*
Common Moorhen *Gallinula chloropus*
Purple Swamphen *Porphyrio porphyria*
Common Coot *Fulica atra atra* Linnaeus

11 Family: Gruidae= 3

Common Crane *Grus grus* Linnaeus
Sarus Crane *Grus antigone* Linnaeus
Demoiselle Crane *Grus virgo*

12 Family: Ciconiidae= 4

Painted Stork *Mycteria leucocephala*
Asian Open-bill Stork *Anastomus oscitans*
Woolly-necked Stork *Ciconia episcopus*
Black-necked Stork *Ephippiorhynchus asiaticus*

13 Family: Rostratulidae= 1

Greater Painted Snipe *Rostratula benghalensis*

14 Family: Recurvirostridae= 2

Black-winged Stilt *Himantopus himantopus*
Pied Avocet *Recurvirostra avosetta* Linnaeus

15 Family: Glariodae= 2

Indian Courser *Cursorius coromandelicus*
Small Pratincole *Grareola lactea*

16 Family: Charadriidae= 05

Little Ringed Plover *Charadrius dubius Scopoli*
Common Ringed Plover *Charadrius hiaticula*
Red-wattled Lapwing *Hoplopterus indicus*

Yellow-wattled Lapwing *Vanellus malarbaricus*

White tailed Lapwing *Chettusia leucura*

17 Family: Scolopacidae=07

Sub-family: Calidridinae

Little Stint *Calidris minuta*

Sub-family: Gallinaginae

Common Snipe *Gallinago gallinago*

Sub-family: Tringinae

Common redshank *Tringa tetanus*

Common Greenshank *Tringa nebularia*

Eurasian curlew *Numenius arquata*

Green Sandpiper *Tringa ochropus*

Common Sandpiper *Actitis hypoleucos*

18 Family: Laridae= 04

Subfamily: Larinidae

Common black-headed Gull *Larus ridibundus*

Sub-family: Rynchopinidae

Indian Skimmer *Rynchops albicollis*

Sub-family: Streninidae

River Tern *Sterna aurantia*

Common Tern *Sterna Hirundo*

19 Family: Jacanidae

Pheasant-tailed Jacana *Hydrophasianus chirurgus*

Bronze-winged Jacana *Metropidius indicus*

20 Family: Burhinidae= 1

Eurasian Thick-Knee *Burhinus oediicnemus* (S. curlew)

21 Family: Passeridae= 3

Sub-family: Motacillinae

Forest Wagtail *Dendronanthus indicus*

White Wagtail *Motacilla alba*

White-browed Wagtail *Motacilla manderaspatensis*

Yellow Wagtail *Motacilla flava*

22 Family: Alcedinidae (Small Kingfisher)= 1

Common Kingfisher *Alcedo atthis*

23 Family: Halcyonidae (Large)

White-throated Kingfisher *Halcyon smyrnensis*

24 Family: Cerylidae

Pied Kingfisher *Ceryle rudis*
