

A Field Study on Impact of Shrinking Wetlands on Winter Visitor and Resident Avifauna

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Abstract— By keeping eye on a shrinking micro wetland in Theri village in district Shri Muktsar Sahib of Punjab state (30°12'N 74°34'E) India, for three consecutive winters viz. 2016-17, 2017-18 and 2018-19. Important Observations were made on shrinking micro wetland; and very shocking outcomes were noticed. In first phase of data collection during the winters of year 2016-17, the avifauna diversity of winter visitor and resident birds was recorded 20 species; which reduced to 12 species of winter birds during the winters of 2017-18; afterwards during the winters 2018-19 the winter avifauna diversity recorded was only eight species. Only cause behind consecutive fall in winter avifauna diversity in given shrinking micro wetland was regular encroachment by local residents and anthropogenic activities. This is very disheartening to report that the in beginning of study water logging area of micro wetland was 23,130 sq.mt., and which reduced to 6,566 sq.mts. till winters of 2018-19. Present study directly correlates between destruction of habitats and fall of fauna diversity.

Keywords: Anthropogenic Encroachment, Micro Wetland, Phonicopterus Roseus, Resident Avifauna, Theri Village, Winter Visitor Avifauna

I. INTRODUCTION

With a record of approximate 9,990 species on our plant birds are very common dwellers in ecosystems; out of which 1,313 species are recorded from Indian subcontinent (Grimmett et al. 2011). Punjab is North West State of India comprising 1.57% of total geographical land of the country; about 84% part of Punjab is agricultural land and form cropland ecosystem, and wetland ecosystems are also main attraction comprising three Ramsar sites (Siddharth 2015). 428 species of birds belong to Indian state of Punjab including endemic, local migrants and winter visitors from other parts of globe; and many of them are dependent on wetlands and for feeding and breeding (Siddharth 2015). As environmental bio-indicators birds play very important role (Blair 1999); so present study was planned to estimate the effect of shrinking wetland on avifauna diversity; absence of any bird species could be easily marked. In present study only those species of birds are included which are dependent on logged shallow water bodies for feeding and breeding. For conducting the field study a suitable site was selected in Theri village (30°12'48"N 74°34'39"E) on the right side on SH-07 while moving 40 km from district Bathinda of Punjab to sub division Malout of District Shri Muktsar Sahib of Punjab.



Fig. 1: Study Area Co-ordinates (Image 1.0)

Satellite images of selected site suggest that in past years it would have been a large shallow water logging area where in post monsoon season great accumulation of bird community would have been observed, including winter visitors and local migrants. Recent land-fillings can easily marked in satellite images and even during the study the encroachment of land by local residents of village was still continued. Study was continued for three consecutive years in winter (viz. 2016-2017, 2017-2018 and 2018- 2019).Field visits for avifauna survey were done between October and February .For land survey besides visiting the site, satellite images were taken by using Google earth internet site and images were compared to calculate the change in size of water logging area. For field survey of avifauna frequent visits were made in morning 07:00 Hrs-10:00 Hrs and 16:00-18:00Hrs in evening ; for taking pictures NIKON D-5100

camera with zoom lens ,and for live view OLYMPUS 8x40DPS -I binoculars were used .Identification of birds in the field was done on the basis of Grimmett et al. (2011) and Grewal (1993) . On the basis of movement and seasonal occurrence, birds were classified as :resident birds (species found throughout the year), winter migrant (species migrates from outside India during winter) , and local migrant (species found irregularly but is resident to India).Depending up on the frequency of sightings during the field visits ,birds are classified as: abundant(birds sighted more than 80% of visits),common (birds sighted 60-<80%), uncommon (birds sighted in 40-<60%) and rare (birds sighted <20%). Breeding bird referred to as species observed to breed or showing evidence (nests or newly fledged chicks recorded) in survey area (Ali et al. 2013).

	Common Name	Biological Name	Order	Family	As1	As2	As3
1	Spot Bill Buck	Anas poecilorhynca	Anseriformes	Anatini	O	O	O
2	Northern Pintail	Anas acuta	Anseriformes	Anatini	A	A	A
3	Mallard	Anas platyrhynchos	Anseriformes	Anatini	A	A	A
4	Indian Pond Heron	Ardeola grayii	Ciconiiformes	Ardeidae	O	O	O
5	White Breasted Water Hen	Amauoronis phoenicurus	Guriformes	Rallidae	C	C	C
6	Purple Swampphen	Porphyrio porphyrio	Guriformes	Rallidae	C	C	O
7	Common Moorhen	Gallinula chloropus	Guriformes	Rallidae	C	C	C
8	Black Winged Stilt	Himantopus himantopus	Ciconiiformes	Recurvirostrini	O	O	O
9	Red Watted Lapwing	Vanellus indicus	Ciconiiformes	Charadriinae	O	O	O
10	Little Cormorant	Phalacrocorax niger	Ciconiiformes	Phalacrocoracidae	U	Ab	Ab
11	Cattle Cgret	Bubulcus ibis	Ciconiiformes	Ardeidae	O	O	O
12	Red Naped Ibis	Pseudibis papillosa	Ciconiiformes	Threskiornithidae	U	U	U
13	Greater Flamingo	Phoenicopterus ruber	Ciconiiformes	Phoenicopteridae	C	Ab	Ab
14	Great Egret	Casmerodius albus	Ciconiiformes	Ardeidae	O	O	Ab
15	Painted Stork	Mycteria leucocephala	Ciconiiformes	Ciconiidae	O	Ab	Ab
16	Eurasian Spoonbill	Platalea leucorodia	Ciconiiformes	Threskiornithidae	O	Ab	Ab
17	Pied Avocet	Recurvirosta avoselta	Ciconiiformes	Recurvirostrini	C	Ab	Ab
18	Grey Heron	Ardea cineria	Ciconiiformes	Ardeidae	O	Ab	Ab
19	Broad Billed Sandpiper	Limicola falcinellus	Ciconiiformes	Tringinae	O	Ab	Ab
20	Purple Heron	Ardea perpurea	Ciconiiformes	Ardeidae	O	Ab	Ab

Table 1: Abundance status of birds recorded in Study area

As-Abundance status; O-Occasional; A-Abundant; C-Common; U-Uncommon; Ab-Absent Table-1

It was observed that due to anthropogenic activities the size of water logging area regularly reduced every year due to land filling for the purpose of crop cultivation, as present satellite images prove above explained encroachment. Satellite images clearly explain that it was a larger sized wetland previously which shrank to the present size. Satellite generated image (1.0, winter 2016-17) estimates water logging area 15,287 sq. mts. with perimeter of 655 mts. ; which was 23,130 sq. mts. with perimeter of 865 mts. during winter of 2017-18, as recent land filling is very clearly visible

in image 1.1. It is very clear that this wetland area shrank 7843 sq.mts. in one year (2016-17 to 2017-18). In satellite generated image 1.3 was captured in winter of 2018-19, the water logging area is approximate 6,566 sq. mts. with a perimeter of approx. 322 mts.

Hence the size of water logging area reduced 15,287 sq.mts. to 6,566 sq. mts. during winter of 2017-18 to 2018-19; whereas satellite generated image 1.4 suggests the initial size of water logging area in this wetland few years back, which would have been approx. 101,559 sq.mts.



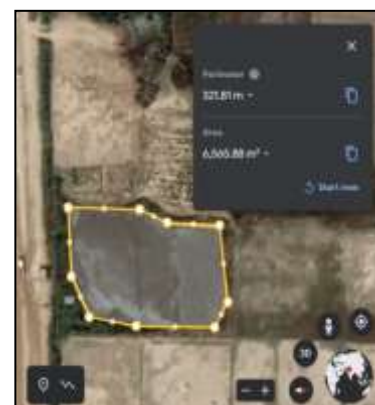
Satellite Generated Image
1.1



Satellite Generated image
1.2



Satellite generated image
1.3



Satellite generated image 1.4

II. RESULT & DISCUSSION:

Local residents or owners of this land are converting this area in to agricultural land by land filling .In beginning of this study the size of water logging area was approx. 23,130 sq. mts. with perimeter of 865m which shrank to 6,656 sq. mts.

with perimeter of 322 mts. till the last phase of field survey in winter of 2018-19 ; total decrease in water logging area during field study was recorded 16,474 sq. mts. ,and it can be assumed that with present rate of land filling this wetland will completely extinct.

	Common Name	Biological Name	Order	Family	M S	St 1	St 2	St 3
1	Spot Bill Duck	Anas poecilorhynca	Anseriformes	Anatini	R	Rd..	Rd..	Rd..
2	Northern Pintail	Anas acuta	Anseriformes	Anatini	W	Rd..	Rd..	Rd..
3	Mallard	Anas platyrhynchos	Anseriformes	Anatini	rW	Rd..	Rd..	Rd..
4	Indian Pond Heron	Ardeola grayii	Ciconiiformes	Ardeidae	R	Rd..	Rd..	Rd..
5	White Breasted Water Hen	Amaurornis phoenicurus	Guriformes	Rallidae	R	Rd..	Rd..	Rd..
6	Purple Swampfen	Porphyrio porphyrio	Guriformes	Rallidae	R	Rd..	Rd..	Rd..
7	Common Moorhen	Gallinula chloropus	Guriformes	Rallidae	R	Rd..	Rd..	Rd..
8	Black Winged Stilt	Himantopus himantopus	Ciconiiformes	Recurvirostrini	R	Rd..	Rd..	Rd..
9	RedWatteled Lapwing	Vanellus indicus	Ciconiiformes	Charadriinae	R	Rd..	Rd..	Rd..
10	Little Cormorant	Phalacrocorax niger	Ciconiiformes	Phalacrocoracidae	R	Rd..	N.Rd	N.Rd..
11	Cattle Egret	Bubulcus ibis	Ciconiiformes	Ardeidae	R	Rd..	Rd..	Rd..
12	Red Naped Ibis	Pseudibis papillosa	Ciconiiformes	Threskiornithidae	R	Rd..	Rd..	Rd..
13	Greater Flamingo	Phoenicopterus ruber	Ciconiiformes	Phoenicopteridae	rW	Rd..	N.Rd	N.Rd..
14	Great Egret	Casmerodius albus	Ciconiiformes	Ardeidae	Rw	Rd..	Rd..	N.Rd..
15	Painted Stork	Mycteria leucocephala	Ciconiiformes	Ciconiidae	R	Rd..	N.Rd	N.Rd..
16	Eurasian Spoonbill	Platalea leucorodia	Ciconiiformes	Threskiornithidae	RW	Rd..	N.Rd	N.Rd..
17	Pied Avocet	Recurvirostra avoselta	Ciconiiformes	Recurvirostrini	rW	Rd..	N.Rd	N.Rd..
18	Grey Heron	Ardea cineria	Ciconiiformes	Ardeidae	RW	Rd..	N.Rd	N.Rd..
19	BroadBilled Sandpiper	Limicola falcinellus	Ciconiiformes	Tringinae	W	Rd..	N.Rd	N.Rd..
20	Purple Heron	Ardea perpurea	Ciconiiformes	Ardeidae	R	Rd..	N.Rd	N.Rd..

Table-2: M S-Migratory Status ;St 1-Status on first phase survey; St 2-Status on second phase survey; St 3-Status on third phase survey ;Rd-Recorded species; N.Rd-Species not recorded ;R-Wide spread resident ;r-Very local resident ;W-Wide spread winter visitor ;w-sparse winter visitor

From study area total 20 species of resident and winter visitor birds were recorded in first phase of survey in winter of 2016-17; which included three orders viz. Anseriformes, Guriformes and Ciconiiformes. Observed three species of birds from order Anseriformes belong only family Anatini; three species from order Guriformes to only family Rallidae; and rest 14 species observed from area belong to eight different families of order Ciconiiformes viz. Ardeidae (four sps.), Recurvirostrini (two sps.), Charadriinae

(one sps.), Phalacrocoracidae (one sps.), Threskiornithidae (two sps.), Phoenicopteridae (one sps.), Ciconiidae (one sps.) and Tringinae (one sps.).

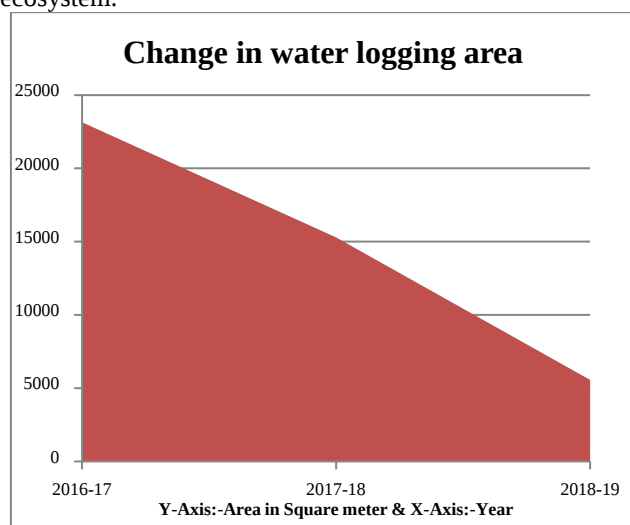
In second phase of survey in winter of 2017-18 total 11 species were recorded from study area, and no new species were observed; total three orders viz. Anseriformes, Guriformes and Ciconiiformes were present. Observed three species of birds from order Anseriformes belong only family Anatini; three species from order Guriformes to only family

Rallidae; and rest six species recorded from area belong to three different families of order Ciconiiformes viz. Ardeidae (three sps.), Charadriidae (one sps.), Recurvirostrini (one sps.) and Threskiornithidae (one sps.).

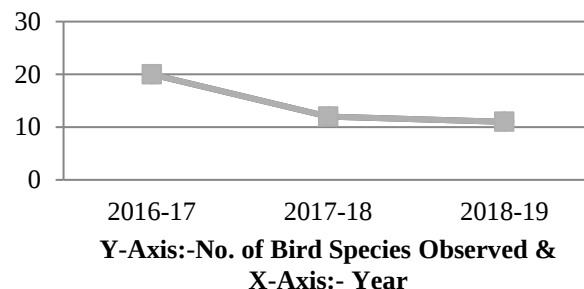
In third phase of survey during winter of 2018-19 total eleven species of birds were recorded from study area, and no new species were observed; which included in three orders viz. Anseriformes, Guriformes and Ciconiiformes. Observed three species of birds from order Anseriformes belong only family Anatini; three species from order Guriformes to only family Rallidae; and rest five species recorded from area belong to three different families of order Ciconiiformes viz. Ardeidae (two sps.), Recurvirostrini (one sps.), Charadriidae (one sps.) and Threskiornithidae (one sps.).

III. CONCLUSION:

Important part of this study was that the site selected for the survey was very closer to human habitation and it became easy to observe effect of anthropogenic activities on this wetland ecosystem. The size of water logging area reduced remarkably during the study period hence remarkable changes in biodiversity of birds in study area were observed including absence of a rare winter visitor species Greater flamingo (*Phoenicopterus ruber*) in subsequent surveys after winter of 2016-17. As human activities (farming & grazing) increased in study area; the species diversity of birds reduced drastically. During the winters of 2016-17 the number of listed bird species was twenty, whereas the area of wetland was 23,130 sq.mts. During the winters of 2017-18 the area of wetland reduced due to anthropogenic encroachment to 15,287sq.mts, in winter of 2018-19 water logging area left behind was just 5,566 sq.mts. Number of birds' species during the winters of 2017-18 reduced to 12 species from 20 recorded in 2016-17; and from 12 species to 11 species in winter of 2018-19. Present study is a fine example of Environment Impact Assessment as it clearly defines the correlation between biotic and abiotic components in ecosystem.



Change in species diversity of birds



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