



POPULATION ANALYSIS OF WATER BIRDS AT NAINARKULAM POND TIRUNELVELI DISTRICT, TAMILNADU

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ABSTRACT:

"Birds are the best indicators of wetland function or as a measure of success in wetland management, restoration and creation". In a wetland, multiple of habitats are available in a small area which attracts different species of water fowls. A population study of wetland birds were conducted during March 2017 to February 2018. Species diversity and total number of birds were calculated. Totally 4343 birds belonging to 40 species and 18 families under 9 orders were recorded. Of the total wetland birds recorded, 36 were least concern and 4 were near threatened species were recorded. The study also revealed that the wetland harbors plenty of resident as well as few migratory birds. Hence this study was taken up to assess the status of wetlands and this site could be protected for these birds.

KEYWORDS: wetland, restoration, Diversity, Migratory Birds,

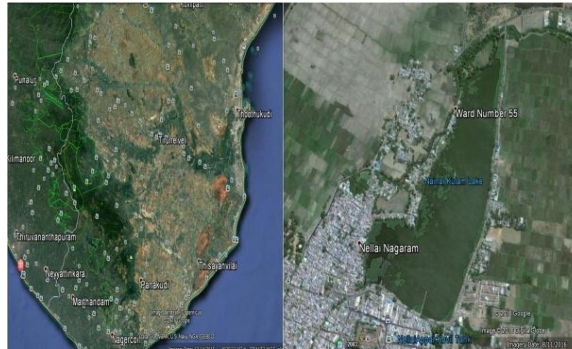
INTRODUCTION:

Diversity of avifauna is a very perceptive indicator of measure of pollution in terrestrial as well as aquatic ecosystem. In aquatic ecosystem, birds represent important group as they feed on vegetation, larvae, insects, fishes and other animals living there in. In the rapidly advancing time unlimited anthropogenic activities tent to destruction of natural habitat, thereby decreasing bird diversity. Day by day avian foraging habitat and their nesting site are getting lessened down due to deforestation activity at a disturbing for human welfare by overlooking various key components in the ecosystem. According to Manjunath and Joshi (2012) there are approximately 9,990 bird species on our planet, distributed in 29 orders, 195 families and 2113 genera. India being a mega diversity centre, harbors 1200 species of birds which amounts 13% of the bird species of the world (9600species)(Ali and Ripley, 1987) indicating rather good ecological health of the country. Uneven distribution of ecological status in India needs to be explored by understanding provincial avian diversity study. Quality of natural habitat could be assessed with the diversity of avifauna as an ecological indicator. In the human intruded ecosystems avifaunal diversity has been decreasing irrespective of their nature derived roles in stabilizing ecosystems, through pollination, seed dispersal, pest control and scavenging waste. A number of bird species are facing threat to their existence (Newton *et. al.*, 1986 and Ghosal, 1995). Though all the birds have to visit the wetland frequently overcome thrust. Therefore, analyses of natural areas of the aquatic bodies are the best places to study diversity of avifauna and to assess the community status of wetland birds. Therefore, the present study was conducted during March 2017- February 2018 at Nainarkulam pond.

MATERIALS AND METHODS:

Study area

Nainarkulam pond (8°43'59.5"N 77°41'30.5"E) is one of the important seasonal wetland which supplies water for irrigation. It acts as a feeding and breeding ground for many water birds and wetland dependent birds. It is about 1.5 k.ms away from Tirunelveli, Tamil Nadu. This wetland receives water from Canadians channel the distributing of river Thamirabarani. It is a large pond.



The bird survey was carried out monthly once for a period of one year (March 2017 to February 2018). Birds were observed from 6 a.m to 11a.m by using Olympus Binoculars (10 x 50) and photos were taken by using cannon camera (EOS 1300D) . The recorded species were identified using the books of “Birds of the Indian subcontinent” by (Richard Grimlott *et al.*, 2007) and Field Guide wetland birds of Tamil Nadu (Ganesh *et al.*, 2014). The bird population was estimated by direct counting method. In this method, a suitable vantage point is selected and all visible birds are counted. Another method of “total count” was used wherever possible by walking around the wetlands.

Data were analyzed by using the Shannon-Wiener diversity (H') function formula; species diversity $H = -\sum (P_i \cdot \ln P_i)$ and Evenness Index (J) $J = H/H_{max}$. And also some threats were observed in the study area. The check list was prepared based on the field work conducted in one year period at Nainarkulam pond.

RESULT

The list of observed water bird and their details in the study area are presented in **Table-1**. Total no of birds observed and their diversity in the study area are present in **Table 2**. The status of birds species available in each order are depicted in **Figure - 1**. IUCN status of birds species are depicted in **Figure - 2**. The migratory status of birds species are depicted in **Figure- 3**. The Ecological status of birds species are depicted in **Figure-4**.

Table-1 Systematic list of wetland birds with their conservation status in Nainarkulam pond, Tirunelveli district, Tamilnadu.

S.No	Order	Family	Common Name	Scientific Name	No of Species	IUCN Status	MS	Ecological status
1	Accipitriformes	Accipitridae	Black Kite	<i>Milvus migrans</i>	105	LC	R	Aerial forager
2			Brahminy Kite	<i>Haliastur Indus</i>	68	LC	LM	Aerial forager
3			Indian Spot Billed Duck	<i>Anas poecilohyncha</i>	95	LC	R	Swimmer
4			Northern Shoveler	<i>Spatula clypeata</i>	12	LC	M	Swimmer
5			Northern Pintail	<i>Anas acuta</i>	16	LC	M	Swimmer
6	Apodiformes	Apodidae	Asian-Palm Swift	<i>Cypsiurus Balasiensis</i>	673	LC	LM	Aerial forager
7	Charadriiformes	Jacanidae	Bronze-winged jacana	<i>Hydrophasianus Chirurgus</i>	57	LC	R	Wader
8			Pheasant tailed jacana	<i>Metopidius idicus</i>	8	LC	R	Wader
9		Recurvirostridae	Black winged stilt	<i>Himantopus himantopus</i>	622	LC	R	Wader
10		Charadriidae	Red-wattled Lapwing	<i>Vanellus indicus</i>	75	LC	R	Wader
11			Little Ringed plover	<i>Charadrius dubius</i>	6	LC	WM	Wader
12		Scolopacidae	Wood sand piper	<i>Tringa glarela</i>	77	LC	M	Wader
13			Green Sandpiper	<i>Tringa ochropus</i>	13	LC	M	Wader
14			Marsh Sandpiper	<i>Tringa stagnatilis</i>	8	LC	M	Wader
15			Laridae	Little Tern	<i>Sterna albifrons</i>	5	LC	WM
16		Ciconiiformes	Ciconiidae	Painted Stork	<i>Mycteria leucocephala</i>	126	NT	RM
17	Asian open bill			<i>Anastomus oscitans</i>	12	LC	LM	Wader
18	Coraciiformes	Alcedinidae	White-throated Kingfisher	<i>Malcyon smyrnensis</i>	103	LC	R	Aerial forager
19			Pied Kingfisher	<i>Merops philippinus</i>	3	LC	RM	Aerial forager
20		Meropidae	Blue tailed Beaeater	<i>Ceryle rudis</i>	7	LC	R	Aerial forager
22	Grucciformes	Rallidae	Gray headed swamphen	<i>Porphyrio poliocephalus</i>	75	LC	R	Wader
23			White breasted Waterhen	<i>Amaurionis phoenicurus</i>	68	LC	M	Wader
			Eurasian moorhen	<i>Gallinula chloropus</i>	21	LC	M	Swimmer
24	Passeriformes	Hirundinidae	Barn swallow	<i>Hirundo rustica</i>	50	LC	WM	Aerial forager
25		Motacillidae	Western yellow wag tail	<i>Motacilla flava</i>	10	LC	WM	Wader
26			White wagtail	<i>Motacilla alba</i>	9	LC	M	Wader
27	Ardeidae	Ardeidae	Cattle Egret	<i>Bubulcus ibis coromandus</i>	772	LC	R	Wader
28			Great Egret	<i>Ardea modesta</i>	11	LC	R	Wader
29			Little Egret	<i>Egretta garzetta</i>	53	LC	R	Wader
30			Indian pond heron	<i>Ardeola grayii</i>	212	LC	R	Wader
31			Purple heron	<i>Ardea purpurea</i>	30	LC	LM	Wader
32			Grey heron	<i>Ardea cinerca</i>	74	LC	LM	Wader
33			Pelecaniformes	Pelecanidae	Spot-billed pelican	<i>Pelecanus philippensis</i>	92	NT
34	Threskiornithidae	Black headed ibis		<i>Pseudibis papillosa</i>	292	NT	R	Wader
35		Glossy ibis		<i>Plegadis falcinellus</i>	60	LC	RM	Wader
36		Red naped ibis		<i>Pseudibis papillosa</i>	40	LC	R	Wader
37		Eurarian spoonbill		<i>Platalea leucorodia</i>	20	LC	M	Wader
38	Suliformes	Phalacrocoracidae	Little cormorant	<i>Microcarbniger</i>	91	LC	R	Diver
39			Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	64	LC	R	Diver
40		Anhingidae	Oriental Darter	<i>Anhinga melanogaster</i>	208	NT	R	Diver

(MS – Migrant status ; R – Resident; M- Migrant; RM – Resident Migrant; LM – Local Migrant; WM – Winter Migrant;; LC – Least Concern; NT – Near Threatened .

Table-2 Total no of birds observed and their diversity in the study area.

Name of the month	Number of birds species	Total number of birds	H- (Diversity)	H (max)	Eveness (j)
March	24	386	2.67	3.1780	0.84013
April	13	514	2.25	2.5649	0.87721
May	9	243	2.28	2.1972	0.96369
June	16	199	2.32	2.7754	0.83694
July	13	102	2.25	2.5649	0.87722
August	14	147	2.52	2.6390	0.95488
September	14	187	2.61	2.6390	0.98898
October	21	267	2.71	3.0445	0.89014
November	18	633	2.57	2.8903	0.88915
December	34	538	3.21	3.5263	0.91028
January	20	539	2.65	2.9957	0.88459
February	19	588	2.71	2.9444	0.92038

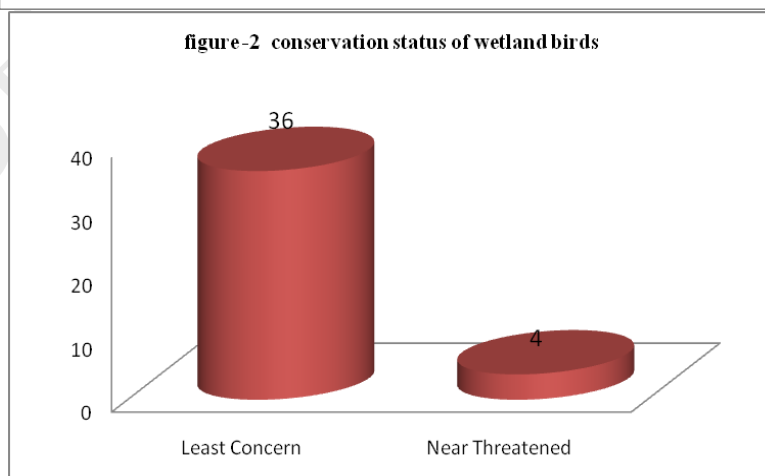
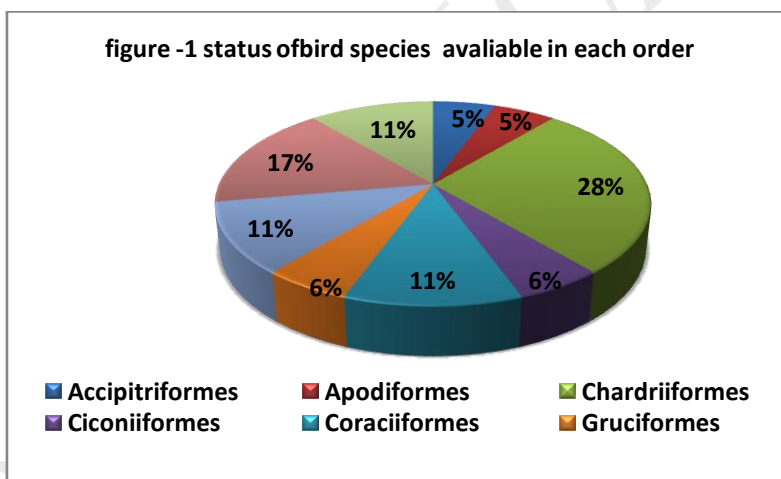


Figure - 3 Percentage of various residential groups of wetland birds

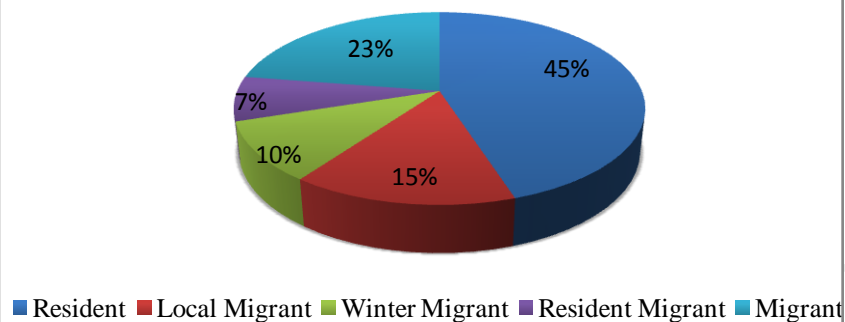
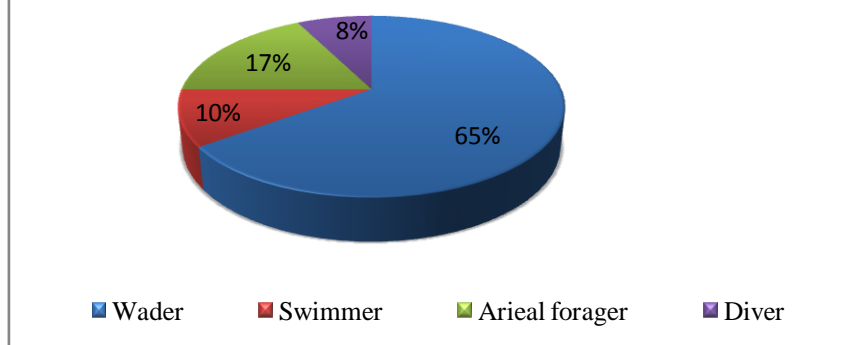


figure- 4 Percentage of various ecology groups of water birds.



DISCUSSION

a. Species Composition

Nainarkulam attract many water birds include migrant, local migrate, swimmer, wader and near threatened birds. In the present investigation 40 species of birds belonging to 9 orders and 18 families were recorded. (Table No. 1). The order Charadriiformes was found to be the most dominant being represented by 28% of the total identified wetland bird species, followed by Pelecaniformes with 17% of species, Suliformes, Coraciiformes and Passeriformes were represented by 11% of species each. Gruiformes and Ciconiiformes were represented by 6% of species each. Orders Accipitriformes and Apodiformes were least represented with 5% of species. (Fig. 1). The study also revealed that total wetland birds recorded(n= 36)Least Concern (LC) and (n= 4)were near threatened (NT) species, which includes, painted stork (*mycteria leucocephala*) spot billed pelican (*pelecanus philippineses*), Black headed Ibs (*Threskiornis melanocephalus*) and Oriental Darter (*Anhinga melanogaster*).The above threatened species protected status under the schedule IV of Indian wild life protection Act, 1972. (Arora k.ForestLaw. 2003). From the study the pond is harbouring plenty of resident as well as few Migratory birds, Out of total species, 45% were resident, Migratory species accounted for 23%. They were represented by winter migrants (10%), Local migrants (15%) and Resident migrants (75%) (Figure 3).The selection pattern of the wetland by migratory birds is based on their feeding and breeding demands for maintaining their physiological requirements (Nalik and Joshi N 2013). About 65% of waders were dominating the wetland and 17% areal forager 10% of swimmer and 8% of diver also recorded in the study area. Vegetation cover was also recorded in the wetland. Water Hyacinth (*Eichornia crassipes*) the most spreaded and dominant weed plant was found in the wetland. It acts as sheltering and foraging area for the water birds such as Jacanas and Moorhens (Weller 1981).

b. Species diversity index

Diversity indexes indicate the species richness and abundance in the study area. Higher values of diversity indexes indicate the higher species richness and abundance. On the basis of which it was represented in (Table – 2). The water bird abundance and species richness fluctuated during different month and season. The maximum numbers of individual birds (633) were recorded in (November, 2017) and minimum number of individual birds (102) were recorded in (July, 2017) . The Shannon index showed highest diversity (3.21) during December followed by February and October (2.71) and lowest (2.25) in April and July respectively. Maximum evenness index was observed in September (0.98898), lowest in June (0.83694). During the December month water level were also increased. This was due to rains and inflow of the pond water during South west Monsoon (October, November and December). The water level of the wetland increased towards the winter and decreased towards summer (Teneson and Ravichandran 2015) In the present study, highest bird density and diversity was recorded during winter months and the lowest density recorded in summer. .When the anthropogenic activities are minimum, also because of availability of varied sources of feed as well as foraging and safety (Bharatha Lakshmi 2006). Almost all of the migratory birds leave the wetland by March-end or early April (Manohara *et al.*, 2016). Our result also shows that the study area is supportive for large number of birds in the monsoon season due to the availability of water, food and foraging.

CONCLUSION AND SUGGESTION

The wetland acts as feeding and breeding ground for many water birds and few migratory birds, wader, swimmer, diver and threatened bird species. Many birds' species like Indian Spot Billed Duck, Asian-Palm Swift, White throated Kingfisher, Black winged stilt Asian-Palm Swift, Black Kite, Cattle Egret, Indian pond heron, Spot-billed pelican, Black headed ibis, Oriental Darter and Little cormorant were found dominating and bulk of the water birds sighted at the wetland. Hence Nainarkulam wetland is very important for several water birds and wetland depended birds especially migratory birds and threatened species .It is recommended that necessary action will be taken to conserve this important wetland. Prohibition of sewage discharged in the wetland. To create awareness of the local people regarding the importance of the wetland and water birds. Reduction in the over use of pesticides .There should be strict ban on hunting of migratory avian species. This area being one of the main habitats of wetland birds so, it should be maintain properly, which would be attract more number of bird species.

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