PARAMOUNT ROLES OF WETLAND BIRDS FROM KOLHAPUR CITY AS BIOINDICATORS OF ECOSYSTEM HEALTH

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Abstract

Over the year's birds have been used as bioindicators of environment, pollution, ecosystem health, contamination globally. Bioindicators are species used to appraise the health conditions of the environment and they are capable of determining the environmental integrity if their functions and populations are put into consideration. Birds are good indicators because they are very easy to detect and their presence is easy to observe in any environment. Apart from that, in classification individual species are easy to identify with their wide distribution. The response to changing environment is by changing their composting behaviour and population. The reduction in number of migratory birds in the three wetland sites and number of actual wetland birds was also less. This may be due to large influence of human activities in these three wetland sites, which disturbs the natural breeding and nesting sites of migratory and local birds. Therefore, using birds as bioindicators is necessary for ecological evaluation which promotes conservation of bird species.

Keywords: *Bioindicator, Wetland birds, Environment*, Ecosystem

INTRODUCTION

Birds add life, sound and colour to our lives. Watching birds is often a diversion from the pressures of our daily lives. Birds are an integral part of food chains and food webs. Birds are one of the links of food chain in ecosystem [Salim Ali; The book of Indian Birds, 6th Ed, Bombay Natural History Society, India, 2004]. The food of the birds in large proportion is insects, fishes including many that are highest degree to naturally or man and his concern. Birds provide many direct and indirect contributions to the ecosystems they occupy.These are often called "Ecosystem Services" (Bioindicators. Science Learning Hub. The University of Waikato, New Zealand. 2015-02-10). The birds are very useful to clean the environment. Birds help in cross fertilization of flowers and the fertile seeds and they also help in health generation of trees. [https://www.world birds / Indian birds, **https://www.naturewatch.ca/Mixedwood/birds/birds4.htm**]. Ethically and morally we have no authority as human being for our comfort to create unsafe environment to other species in the nature that have equal right to live with nature in peace as much as human race (**https://www.birds.cornell.edu/publications/birdscope/spring2000/bflcitsci2000142.html**) (IBCN, the Book of censes method, 1st ED, Bombay natural history society India, 2006)

Total number of bird's species known as science inhibiting the earth today has been estimated to about 8600. If sub species and geographical races are taken into account the figure would rise to nearby 30,000. In every year twice, in spring as well as autumn millions of birds migrate and set out long journey

in order to definite goal, sometime across ocean and continents [Hornbill, journal of BNHS, Bombay natural History society, India, 2006.] [K. Kathirsean, 2000]. There are three type of impacts such as 1) Direct impact result the disturbances occur within the wetlands 2) Indirect results disturbance occur in areas outside of the wetland 3) Cumulative impacts are those impacts resulting from combined direct and indirect impacts to the wetland all time [J.S. Samant, 1978.]

Kolhapur city is blessed with number of wetlands which are productive and unique ecosystem that support the number of birds Water is a basic need of all living things and it is now well established that life first arose in aquatic environment. A human civilization is always grown around the water bodies or constructed pond for their settlement and daily requirement, such a type of wetlands had already started supporting flora and fauna along with avifauna. The birds are bio-indicator of ecosystem. The response to changing environment is by changing their composting behaviour and population (Bilgrmi,1995). Water bird are most important component of wetland ecosystem as they occupy several level in the food web of wetlands nutrient cycle (Custer and Osborne 1977).

Changing life style and climatic changes has reduced the number of wetland birds in particular areas. Thus, in the present study three different wetlands i.e., Kalamba lake, Rankala lake and New Palace lake were studied to observe number of birds in wetland areas.

MATERIAL AND METHOD

Study area- Mainly three different wetland sites were selected on the base of relative amount of human activity and the bird diversity. The study was conducted around the 3 wetlands site of Kolhapur city. The Birds were observed in Morning time between 7am to 10am from month of October 2019 to February 2020. They were identified using pictorial guide i.e. The Book of Indian Birds by Salim Ali. The photographs were taken on Canon 1300D DSLR camera.

OBSERVATION

- Table no. 1 - List of Birds from three different wetlands.

Sr. No.	Birds Name	Scientific Name	Order	Family
1	Eurasian coot	*Fulica atra*	Gruiformes	Rallidae
2	Indian purple moorhen	*Porphyrio porphyrio*	Gruiformes	Rallidae
3	Kingfisher	*Alcedinidae*	Coraciiformes	Alcedinidae, Rafinesque
4	Green Bee eater	*Merops orientails*	Coraciiformes	Meropidae
5	Indian pond heron	*Ardeola grayii*	Pelecaniformes	Ardeidae
6	Intermediate Egret	*Ardeidae*	Pelecaniformes	Ardea alba
7	Black bird	*Acridotheres fuscus*	Passeriformes	sturnidae
8	White browed	*Motacilla cinerea*	Passeriformes	Motacilla

	wagtail			
9	Black robin	*Cercotrichas podobe*	Passeriformes	Muscicapidae
10	Red wattled bulbul	*Pycnonotus cafer*	Passeriformes	Pycnocnotidae
11	Small minivet	*Pericrocotus cinnamomeus*	Passeriformes	Campephagidae
12	Yellow wagtail	*Motacilla flava*	Passeriformes	Motacillidae
13	Sparrow	*Passer*	Passeriformes	Passeridae
14	Indian robin	*Copsvchus fulicatus*	Passeriformes	Muscicapidae
15	Wire tailed swallow	*Hirundo smithii*	Passeriformes	Hirundinidae
16	Great tit	*Parus minor*	Passeriformes	Paridae
17	Bush lark	*Mirafra erythroptera*	Passiriformes	Alaudidae
18	Black winged stilt	*Recurvirotridae*	Charadriiformes	Himantopus himantopus
19	Red –wattled lapwing	*Vanellus indicus*	Charadriiformes	Charadriidae
20	Little ringed plover	*Charadrius dubius*	Charadriiformes	Charadriidae
21	Brahminy kite	*Haliastar indus*	Accipitriformes	Accipitridae
22	Rose-ringed parakeet	*Acridotheres*	Psittaciformes	Psittaculidae
23	Spotted dove	*Spilopelia chinensis*	Columbiformes	Columbidae
24	Indian grey hornbill	*Ocyceros birostris*	Bucerotiformes	Bucerotidae
25	Indian spot billed duck	*Anas poecilorhyncha*	Anseriforms	Anatidae
26	Swift	*Apodidae*	Apodiformes	Apodidae
27	Cormorant	*Phalacrocoracidae*	Saliformes	Phalacrocoracidae, Reichenbach
28	Painted stork	*Mycteria leucocephala*	Cicoiidae	Ciconiidae

- Table 2 – List of Common birds in 3 wetlands

Birds name	Kalamba lake	Rankala lake	New palace
Eurasian coot	+	+	-
Kingfisher	+	+	+

Indian pond heron	+	+	-
Painted stork	+	-	-
Black bird	-	+	-
Indian purple moorhen	-	+	-
Black winged stilt	+	+	-
Intermediate egret	-	+	-
White wagtail	-	+	-
Brahminy kite	+	+	-
Rose-ringed parakeet	-	+	-
great tit	-	-	+
Green Bee eater	-	+	-
Black robin	-	+	+
Red wattled bulbul	-	-	+
Spotted dove	-	-	+
Small minivet	-	-	+
Red –wattled lapwing	+	+	+
Indian grey hornbill	+	-	-
Indian spot billed duck	+	-	-
Swift	+	-	-
Yellow wagtail	+	+	+
Little ringed plover	-	+	-
Sparrow	+	+	+
Indian robbin	-	+	-
Carmorant	+	+	-
Wire tailed swallow	+	-	-
Bush lark	-	+	+

RESULT AND DISCUSSION

In the present study, the birds from three different wetlands from the Kolhapur city were observed i.e. Kalmba, Rankala and New Palace. From the three different wetlands total 28 different birds from 13 different orders were observed i.e. 15, 15 and 8 different birds were observed, Klamaba, Ranakla and New Palace respectively. The birds from order Passeriformes were observed in large amount i. e. Total 11 birds were observed from this family.

Birds are bioindicators of change in environmental conditions. They exist at the top of food chain making them sensitive to changes at lower level of food chain leading to indicating the change in

environmental conditions (Egwumah F. A, 2017). These include both community and ecosystem composition (Zacharias M 2001). It has been predicted that climate change could be responsible for a major change in forest composition and migration of bird species due to a large correlation between climatic conditions and bird population changes (N Lemoine 2007). Therefore, birds are considered as pioneer indicators for changes related to global warming as a result of their rapid response to temperature changes. The intimate linkages between some bird species and their habitats make them useful for identifying ecosystem health. As such, they can be indicators of deteriorating habitat quality and environmental pollution, as well as metrics to determine the success of restoration efforts. Combined with their ability to signal the eminent outbreak of diseases, birds are incredibly useful as indicators to both the fields of environmental science and to human health. (Jacob Hill).

Over time, birds have extensively been used as biomonitors of environmental contamination with persistent organic pollutants. (Walker CH 2001, Herzke D 2003, Lindberg P 2004) Conventionally, birds have also been used to monitor ecological processes, such as food web structure and the dynamics, (Cury PM, 2011) ecosystem health, (Andrea B, 2014) forest and agricultural management, (Benton TG, 2002) and the response of biological systems to climate change. (Andrea B, 2014)

Using birds as bioindicator is a function of properties of interest and resources available for ecological evaluation which promotes conservation of bird species for generation yet unborn. Therefore, it is essential to examined prospective mechanism by which conservation of bird species more importantly species that are endanger and threaten. Birds from 13 different orders were noted. The order Passeriformes was commonly observed from all the three wetland sites, whereas there was no observance of the migratory birds in the three wetland sites and number of actual wetland birds was also less. This may be due to large influence of human activities in these three wetland sites, which disturbs the natural breeding and nesting sites of migratory and local birds.

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