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Status and occurrence of gulls in Jhansi, Uttar Pradesh

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Abstract
Gulls belonging to family Laridae are lesser studied bird species in India. The population trend of wintering Gulls in Jhansi was evaluated from November 2016 to January 2017. Observations were made along line transects and Point Count Methods with the aid of binoculars and SLR Camera. The total population of these migratory gulls increased gradually from November (218) to December (280) and January (249). The total population of Gull species for three months was 747 with a mean population of 249. The Variance (Population Standard), σ^2 was 640.66 with a standard deviation 25.31. Gull species were absent in Laxmi Taal, Ghadmau Jheel and Bhasneeh Jheel. The findings highlight the importance of fish for the migratory gulls. The gulls shared the habitats with egrets, herons, storks, cormorants and ducks. Some obvious threats are Habitat loss, over-fishing, and hunting that might affect their occurrence. Site specific awareness and conservation measures are required.

Keywords: Gulls, Population, migratory

Introduction
Out of 310 Indian wetland birds, 107 species are winter migrants. Water birds are not only the most prominent groups which attract people to wetlands, but also are good bio-indicators and useful models for studying a variety of environmental problems (Urfi *et al*., 2005) [1]. In temperate regions, the winter period is often associated with cold temperatures and fewer light hours, and often with reduced food availability. One strategy to overcome the difficulties associated with the winter period is to migrate to southern regions to find mild weather (Malet C.C., 2015) [2]. The availability of feeding and roosting habitats is very important for the migratory species, which in some cases migrate up to thousands of kilometers. As wetlands provide a wintering ground for many trans-equatorial species of migratory birds, several wetlands in the country have been identified as being internationally significant under the Ramsar Convention. However, wetlands in India, are facing tremendous anthropogenic pressures (Prasad *et al*., 2002) [3], which can adversely influence the structure of bird communities (Verma *et al.*, 2004) [4]. Till date very few empirical studies have been carried out to validate these ecological hypotheses in migratory species, presence of suitable roosting and nursery sites (Wiens, 1989) [5]. This lack of knowledge is most reflected into conservation practices, which concentrate most of their efforts to protect populations during breeding. There have been very few studies in India regarding gulls to reveal the population status and occurrence as well as habitat utilization. Knowledge of the arrival dates and breeding dates of bird is important for studying long term trends of changes in timing of breeding in the ongoing climate changes (Parmesan and Yohe, 2003) [6]. Therefore, such information could be used as an indicator tool and impact assessment on the system. There are no reports on Gulls from this habitat; hence the present study has been conducted to focus on the ecological status, diversity, and occurrence of these lesser known species in Jhansi district of Uttar Pradesh, India.

Species studied
Gulls: There are 55 species of Gulls worldwide. Only 13 species of Gull occur in India. Gulls belonging to family Laridae are lesser studied bird species in India. During the winters Gull species from southwest Siberia, South Russia to North West Mongolia, Ladakh, Europe, West and Central Asia move south to the area of the Black and Caspian Seas as well as Kazakhstan, Uzbekistan, Turkmenistan, Pakistan and India (https://en.wikipedia.org/wiki/Gull) [7].

Study area

The study was carried out in Jhansi district of Southern Uttar Pradesh in India. Jhansi is part of Bundelkhand Region that lies between 23^0 35′-26′ N and 78^0-82′ E. Physiographically the entire drainage of Bundelkhand forms a part of Ganga basin.

Table 1: Details of Study area

District	Area	GPS	Rivers
Jhansi	5,028 km²	$25^0$07”- $25^0$57” N and $78^0$10”- $79^0$25” E	Betwa, Pahuj, Dhasan

Jhansi district in the southwestern part of Uttar Pradesh lies between $25^0$07′ and $25^0$57′ north latitude and $78^0$10′ and $79^0$25′ east longitudes (Fig.1). Total Geographical area of the district is 5028 sq. km. The area is chiefly drained by the river Betwa and minor rivers like Dhasan and Pahuj. The Betwa and Pahuj rivers are tributaries of Yamuna and Dhasan is tributary of Betwa. The major tributaries of Dhasan are the Lakheri, Sukhnai, Kurera etc which are mainly ephemeral. All three main rivers are perennial. The average annual rainfall is 850.1mm. The climate is sub-humid and it is characterized by a hot dry summer and cold winter. About 91% of rainfall take place from June to September. During monsoon surplus water is available for charging to ground water. January is the coldest month of the year when the mean daily maximum temperature is 24.1 ^{0}C and the mean daily minimum temperature is 9.2 ^{0}C, May is the hottest month with mean daily maximum temperature 42.6 ^{0}C and mean daily minimum temperature 28.8^{0}C. The mean monthly maximum temperature is 32.6 ^{0}C and mean minimum temperature is 19.2 ^{0}C. In the district, number of tanks, ponds and reservoirs have been constructed in the district taking advantage of the typical physiography by building dams across the major and minor streams for storing water for irrigational and domestic purposes (Prasad, 2008) [8]. In Jhansi district total 10 sites were surveyed for the presence of gulls (Table 2 & Fig.2). These included rivers, lakes, and reservoirs on main rivers of the district such as Betwa, Dhasan, Pahuj. The Betwa and Pahuj rivers are tributaries of Yamuna and Dhasan is tributary of Betwa. The major tributaries of Dhasan are the Lakheri, Sukhnai, Kurera etc which are mainly ephemeral. All three main rivers are perennial. In the district, number of tanks, ponds and reservoirs have been constructed in the district taking advantage of the typical physiography by building dams across the major and minor streams for storing water for irrigational and domestic purposes. Most of these reservoirs suffer from seepage losses due to fractured nature of Bundelkhand granite and gneisses over these have been constructed (Prasad J., 2008) [8]. The sites selected covered the entire district.

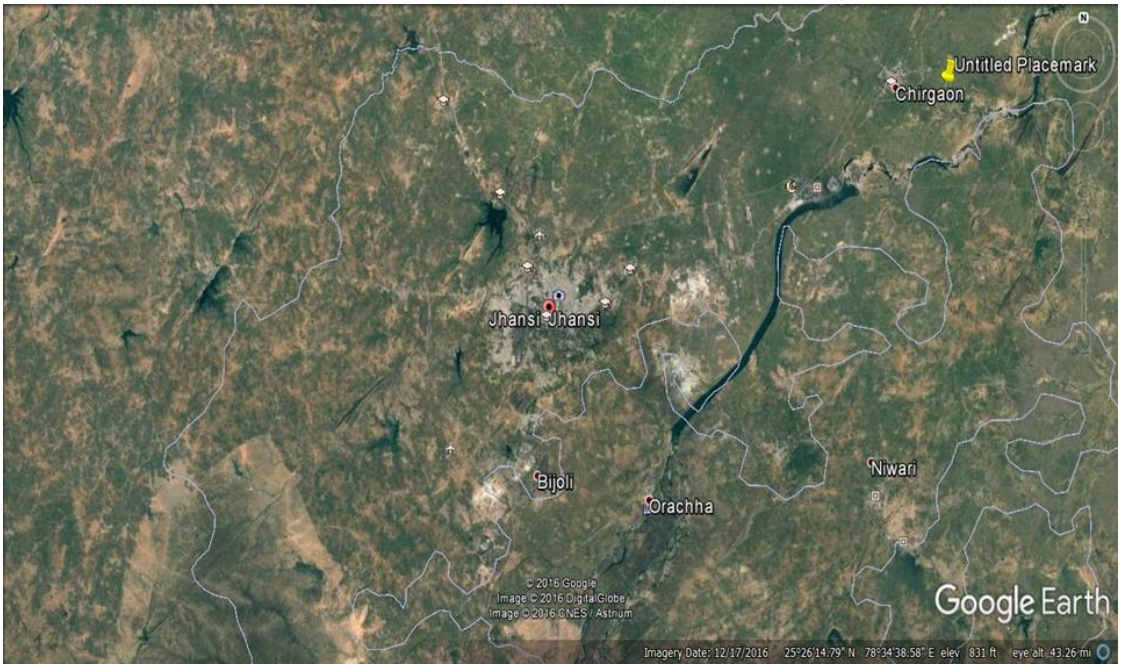


Fig 1: Google Map of Jhansi District

Table 2: Site details from Jhansi District

S. No	Sites in Jhansi	River/Area	GPS
1.	Pahuj Dam	Pahuj River/Length 2040m	N 25°29′51.81″ E 078°32′37.65″
2.	Sukhma Dukhma Dam	Betwa	N 25°11′27.47″ E 078°32′20.63″
3	Lachuraghat	Dhasan	N 25°19′18.16″ E 079°16′10.03″
4	Saprar Dam	Sukhnai	N 25°12′54.13″ E 079°05′11.81″
5	Paricha Dam	Betwa	N 25°30′17.67″ E 078°46′14.70″
6.	Erach	Dhasan	N 25°46′31.58″ E 079°04′52.46″
7	Dongri Reservoir	Pahuj/Length 2760m	N 25°23′20.94″ E 078°27′43.70″
8	Laxmi Taal	-	N 25°27′10.96″ E 078°35′55.27″
9	Ghadmau Jheel	-	N 25°31′21.37″ E 078°40′29.90″
10	Bhasneh	-	N 25°31′21.37″ E 079°09′52.38″

Fig 2: Site Maps of Jhansi district

Methodology

Research Design Point Count method- From November 2016 to January 2017, the IBCS team visited all wetlands and water bodies of the Jhansi district. Questionnaire was prepared to collect secondary and primary data. Survey work were carried out during the winter months (November to February) for 4 hrs in the morning and 2 hrs in the evening (morning: 07:00-11:00 am, evening: 03:00-5:00 pm). Observations were made along line transects with the aid of 10x50 mm binoculars and Canon 7D SLR Camera. Boat surveys were also carried out for more accurate data. Point count stations were made within the study plot either in a systematic manner or in a random manner. GPS was recorded with 20e-trex. The distance between the two points was at least 200 metres. Photographs of birds and their habitat were taken in most cases.

Results and Discussion

The three month study reveals the Gull diversity in the selected district. In the study area 3 gull species have been recorded (Table 3). All Gull species are migratory and Least Concern according to IUCN Status. In the study area, the Pallas's Gulls are uncommon while Brown-headed Gull and Black-headed Gull are common.

Table 3: Gulls in the study area

S. No	Common name	Zoological name	Local name	Family	R/M	AC	IUCN Status
1	Pallas's Gull	*Larus ichthyaetus*	Dhomra	Laridae	M	UC	LC
2	Brown-headed Gull	*Larus brunnicaphalus*	Bhuri ganga chilli	Laridae	M	C	LC
3	Black-headed Gull	*Larus ridibundus*	Kal-siri gangachilli	Laridae	M	C	LC

R-Residential; M-Migratory; AC-Abundance Code; C-Common; UC-Uncommon; LC-Least Concern. Source: The IUCN Red List of Threatened Species. Version 2016-3. <www.iucnredlist.org>. Downloaded on 07 February 2017[9].

1. Pallas's's Gull (*Larus ichthyaetus*) Pallas's 1773

Fig.3a **Fig.3b**

Fig 3: Pallas's Gull (*Larus ichthyaetus*) non-breeding and breeding stage

Field characters: Size: (66-72 cm) Domestic duck +. Largest of gulls found in India.

Sexes: Alike **Voice**: Loud, rasping *kraa-a.*

Adult non-breeding: Upperparts darkish grey. Head mainly white, dark eye-patch spreads lightly to crown, nape and hind neck speckled brown, heavily towards lower neck. Bill orange-yellow with red tip and a broad black band in between. Legs greenish-yellow (Fig.3a).

Adult breeding: Black hood on head, white crescent marking above and below eye. Rest as non-breeding adult. (Some individuals seen in this plumage in winter also Fig.3b.)

Habitat: inland in large rivers and water reservoirs.

Habits: Solitary, only rarely in small loose flocks, swims by sitting on water (Fig. 4). Scavenger and often indulges in piracy; fight steady. Ranges far into water bodies sometimes following fishing boats. Rests on mudflats or sandbanks in company of other gulls and terns.

Food: fish, crustaceans, offal.

Fig 4: Pallas's gulls in solitary

Status: Winter visitor. Locally uncommon. Maximum population seen in December month in Sukhwa Dukhwa Resevoir in Jhansi.

Distribution: Winter visitor to the coasts of India, Pakistan, Bangladesh, Sri Lanka, Nepal, Bhutan and Maldives. Occasional vagrants to the inland waters. Breeds in S Russia to NW Mongolia. Also winters in SE Mediterranean, Red Sea, coasts of Middle East.

Fig. 5: Brown-headed Gull resting

2. Brown-headed Gull (*Larus brunnicaphalus*) Jerdon, 1840

Fig. 6: Brown-headed Gull in flight

Field characters: Size: (46 cm) Jungle Crow. Medium sized gull.

Sexes: alike **Voice**: Loud rasping *kreeak.*

Adult non-breeding: Upperparts grey. Head white with a black vertical crescent at ear coverts. Bill bright red with black tip. Legs bright deep blood red (Fig.5 & 6).

Adult breeding: As non-breeding, but develops a brown hood. This plumage attained before leaving the wintering area in April and retained till October as they arrive. Bill blood red.

Habitat: Rivers, lakes and reservoirs.

Habits: Gregarious, Scavenger, frequently fishing villages in association with other gulls. Accompanies fishing boats to and from water bodies to feed on discarded catch. Floats and swims well. Confiding.

Food: fish, offal and insects and worms occasionally.

Status: Winter visitor. Common. The population was maximum in December in in Sukhwa Dukhwa Resevoir in Jhansi.

Distribution: Winter visitor to the coasts of India, Pakistan, Nepal Bhutan, Bangladesh, Sri Lanka and Maldives. Breeds in Ladakh between 3000 and 4500m and in high plateaus of C Asia up to Mongolia. Also winters on coasts of Middle East, Sand SE Asia.

3. Black-headed Gull (*Larus ridibundus)* Linnaeus, 1766

Fig.7: Black-headed Gull resting on mudflat

Fig.8: Black-headed Gull in flight

Fig.9: Black-headed Gull breeding stage

Field characters: Size: (43 cm) House Crow. The smallest of Indian gulls.

Sexes: alike **Voice:** A querulous *kree-ah* and a wailing *ka: Jek.*

Adult non-breeding: Upperparts grey. Head white with a black crescent at ear-coverts. Bill deep red with black tip. Legs bright red (Fig.7& 8).

Adult breeding: Develops a brown hood over head (Fig.9). Bare parts become brighter (Sashikumar *et al.*, 2004) [10].

Habitat: Reservoirs, lakes and rivers (Fig.10).

Habits: Gregarious. Seen in company of Brown-headed Gull mostly, whose habits it shares too. Also seen around the cormorants that is efficient in diving and catching fishes from deep water.

Fig 10: Black-headed gulls (breeding and non-breeding stages) in reservoir

Status: Winter visitor. Common. The population was maximum in December in Sukhwa Dukhwa Resevoir in Jhansi.

Distribution: Winter migrant to the coasts of India, Pakistan, Bangladesh, Sri Lanka, Nepal and Maldives. Breeds across Europe, W and C Asia up to S Mongolia. Also winters on coasts of N Africa, Mediterranean, Middle East and S and SE Asia.

Knowledge of the winter distribution of Gulls in Jhansi was poor before this study. The data for gulls in Jhansi was recorded month wise (November, December and January) in total 10 sites Pahuj Dam, Sukhma Dukhma Dam, Lachuraghat, Saprar Dam, Paricha Dam, Erich, Dongri Reservoir, Laxmi Taal, Ghadmau Jheel and Bhasneh jheel. The Pallas's Gull was uncommon in Jhansi. Out of total 10 sites it was reported only from 4 sites with a maximum population of 21 in December at Sukhwa Dukhwa reservoir (Table 4 & 5). The Black-headed were most common followed by Brown-headed gulls and observed in small and large groups resting on mudflats or floating on water. The total population of these migratory gulls increased gradually from November (218) to December (280) and January (249). The total population of Gull species for three months was 747 with a mean population of 249. The Variance (Population Standard), σ^2 was 640.66 with a standard deviation 25.31. The total population of Pallas's Gull for three months was 129 with a mean of 43. The Variance (Population Standard), σ^2 was 68.66 with a standard deviation 8.28. The total population of Brown-headed Gull for three months was 243 with a mean of 81. The Variance (Population Standard), σ^2 was 42.66 with a standard deviation 6.53. The total population of Black-headed Gull for three months was 375 with a mean of 125. The Variance (Population Standard), σ^2 was 114.66 with a standard deviation 10.70. There were no Gull species in Laxmi Taal, Ghadmau Jheel and Bhasneeh Jheel. Pallas's Gull were also absent at Lahchuraghat, Paricha Reservoir and Erach. There was immense variation in the occurrence of gulls; from single to as many as 130-140 in flocks. The team observed good congregation of Gulls at Pahuj, Sukhma Dukhma and Dongri reservoir (Fig.11, 12 & 13). These are located within an area of 35 km. There was probably more food availability as compared to other sites. Large group of gulls were seen flying together and floating in shallow water of these reservoirs. This indicates that these three reservoirs are good wintering grounds for the migratory Gulls. The Gulls were seen hovering around the fishing boats so as to filch the fishes. Gulls are opportunistic feeders, utilizing various sources of food, but it is also known that fish may greatly enhance breeding success (Pierotti 1982; Murphy *et al.*, 1984; Sydeman *et al.*, 1991; Annett and Pierotti 1999) [11, 12, 13, 14]. Fish are easily digestible and contain many microelements, e.g. calcium, necessary for development and adult birds should switch to fish diet during the chick-rearing period (Murphy *et al.* 1984; Annett and Pierotti 1999) [13, 14]. It has

been shown that fish availability may facilitate inland colonization by large gulls (Hu¨ppop and Hu¨ppop 1999) [15]. Rich food resources during winter (refuse dumps, fishery discards) probably improve winter survival (Kilpi and Ost 1998; Pons and Migot 1995) [16, 17].

Table 4: Month wise occurrence of Gull species in various water bodies in Jhansi district of Uttar Pradesh

S.N.	sites	November			December			January		
		Pallas's Gull	Brown headed	Black headed	Pallas's Gull	Brown headed	Black headed	Pallas's Gull	Brown headed	Black headed
1	Pahuj Dam	7	11	17	5	17	21	6	13	19
2	Sukhma Dukhma Dam	17	29	38	21	31	46	19	31	41
3	Lachuraghat	0	4	6	0	3	8	0	3	6
4	Saprar Dam	4	12	19	6	13	22	5	13	22
5	Paricha Dam	0	2	3	0	2	4	0	2	3
6	Erich	0	2	3	0	2	3	0	2	1
7	Dongri Reservoir	4	13	27	10	21	35	8	17	31
8	Laxmi Taal	0	0	0	0	0	0	0	0	0
9	Ghadmau Jheel	0	0	0	0	0	0	0	0	0
10	Bhasneh jheel	0	0	0	0	0	0	0	0	0
	Total	32	73	113	52	89	139	45	81	123

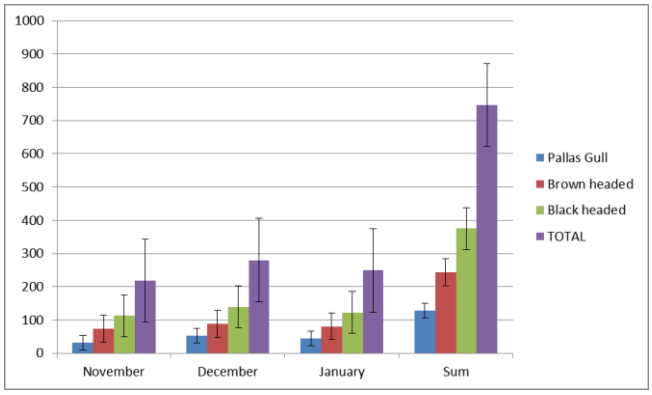
Table 5: Month wise total population of Gull species in Jhansi District of Uttar Pradesh

S.N	Gull Species	November	December	January	Sum	Mean	Variance σ^2	Standard Deviation σ
1	Pallas Gull	32	52	45	129	43	68.666	8.28
2	Brown headed	73	89	81	243	81	42.666	6.53
3	Black headed	113	139	123	375	125	114.666	10.70
	TOTAL	218	280	249	747	249	640.666	25.31

Fig 11: Gulls with cormorants at Pahuj Reservoir, Jhansi

Fig 12: Gulls at Sukhwa Dukhwa reservoir, Jhansi

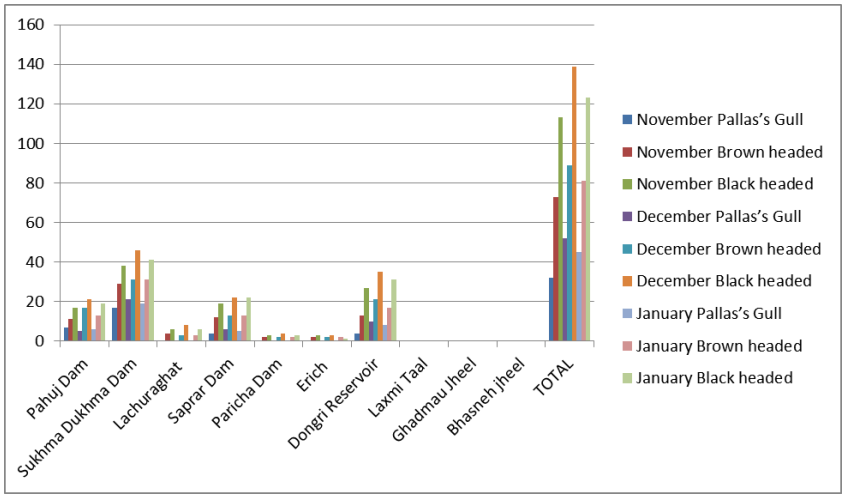
Fig 13: Gulls at Dongri reservoir, Jhansi



Graph 1: Gull population in Jhansi District for three months

Graphs 1 and 2 shows, the population of all the three Gull species in the selected 10 sites of Jhansi for three months (November 2016-January 2017). Regular surveys related to

water bird species diversity and awareness of the local people should be conducted for a detailed assessment of the wetlands (Kumar and Gupta, 2013) [18].



Graph 2: Distribution of Gulls in 10 sites of Jhansi district in three months

Conclusion

The study revealed the biodiversity of Gull species in Jhansi district of India for the first time. Continued monitoring will be helpful in conserving wetlands biodiversity as well as feeding and breeding sites of aquatic birds. Regular surveys helped in finding out the present status and occurrence. This indispensable study proved to be very significant in terms of describing current status, and threats to Gulls and their habitat that have been overlooked so far. This will benefit wild population and have a significant conservation value. Additional scientific knowledge is essential for saving both aquatic bird's diversity and the wetland habitats that rely on them. The study of winter demographic processes is also important to i) to obtain a deeper understanding of population functioning, ii) investigate the mechanisms of winter mortality, iii) to have an insight in migratory strategies and finally iv) to guide conservation actions in the wintering quarters. The view 'from the winter quarters' can bring important and complementary information to the study birds during the breeding period for a full understanding of species' ecology during the whole annual cycle. Comprehensive information on migration, important staging areas, non-breeding sites, feeding requirements, quality of habitat and seasonal use of habitat and population changes is now available for Gull Species in the study area. Monitoring of Gulls, their distributions and populations during the migration cycle is no more in its infancy; thus, their population sizes and trends are known now. The findings reported here provide a baseline and improve current knowledge on these hitherto poorly-known species.

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References

1. Urfi AJ, Sen M, and Megnathan T. Counting birds in India: methodologies and trend, Current Science. 2005; 89(12):1997-2003.
2. Malet CC. Bird population dynamics in the wintering season: the case of the Mediterranean Gull *Larus melanocephalus*. Ph.D thesis. University of Barcelona, Barcelona. 2015.
3. Prasad SN, Ramachandra TV, Ahalya N, Sengupta T, Kumar A, Tiwari AK *et al*. Conservation of wetlands of India- A review. Tropical Ecology. 2002; 43(1):173-186.
4. Verma A, Balachandran S, Chaturvedi N, Patil V. A preliminary survey on the biodiversity of Mahul Creek, Mumbai, India. Zoos' Print Journal. 2004; 19(9):1599-1605.
5. Wiens JA. The Ecology of the Bird‟s Communities, Cambridge University Press, Cambridge. 1989; (2):8-9.
6. Parmesan C, Yohe G. A globally coherent fingerprint of climate change impacts across natural systems. Nature, 2003; 421:37-42.
7. Gull. https://en.wikipedia.org/wiki/Gull. 29 March 2017.
8. Prasad J. Ground Water Brochure of Jhansi District, Uttar Pradesh. 2008, 1-19.
9. The IUCN Red List of Threatened Species. Version 2016-3. <www.iucnredlist.org>. 07 February, 2017.
10. Sashikumar C, Muhamed JP, Meppayur S, Radhakrishnan C. PtdonalJ-/andbook -ShorebirdI' oj' Kerala (Induding Gulls and Terns): 1-165. (Published Director, Zoo!. Surv. India) 2004.
11. Pierotti R. Habitat selection and its effects on reproductive output in the herring gull in Newfoundland. Ecology. 1982; 63:854-868.

12. Murphy EC, Day RH, Oakley KL, Hoover AA. Dietary changes and poor reproductive performance in glaucous-winged gulls. Auk 1984; 101:532-541.
13. Sydeman WJ, Penniman JF, Penniman TM, Pyle P, Ainley DG. Breeding performance in the western gull: effect of parental age, timing of breeding and year in relation to food availability. J Anim Ecol. 1991; 60:135-149.
14. Annett CA, Pierotti R. Long-term reproductive output in western gulls: consequences of alternate tactics in diet choice. Ecology. 1999; 80:288-297.
15. Huppop O, Huppop K. The food of breeding Herring Gulls *Larus argentatus* at the lower river Elbe: does fish availability limit inland colonisation? Atl Seabirds. 1999; 1:27-42
16. Kilpi M, Ost M. Reduced availability of refuse and breeding output in a herring gull (*Larus argentatus*) colony. Ann Zool Fenn.1998; 35:37-42
17. Pons JM and Migot P Life-history strategy of the Herring Gull: changes in survival and fecundity in a population subjected to various feeding conditions. J Anim Ecol. 1995; 64:592-599.
18. Kumar P, Gupta SK. Status of wetland birds of Chhilchhila Wildlife Sanctuary, Haryana, India. Journal of Threatened Taxa. 2013; 5(5):3969-3976.