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Population trend of wintering gulls in Kadalundi-Vallikkunnu Community Reserve, Southern India

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Abstract

Data on population trend of birds in stop-over sites is a prerequisite for managers to implement/execute species/ecosystem-oriented conservation programme. However, such data for wetland birds and their associated ecosystems is meagre/unavailable in India. At this juncture, population trend of gulls in Kadalundi-Vallikkunnu Community Reserve (KVCR) was evaluated on the basis of primary and secondary data collected between 1989 and 2009. Data of 1,26,103 birds belonging to five species were recorded during the study. During 2005-2009, Black-headed Gull and Brown-headed Gull were dominant species, while Pallas's Gull and Slender-billed Gull were lesser in number. In response to data on observation made during 1989, population of scavenging gulls viz., Black-headed Gull and Brown-headed Gull was increased to 165 and 135 % respectively, while the population of specialist gulls such as Pallas's Gull and Slender-billed Gull found to be stable or on decline. Increasing trend of scavenging gulls and declining pattern of specialist gulls could be attributed to the consequences of habitat loss and other anthropogenic pressure (over-fishing, mining, pro-human developmental activities and dumping of poultry wastes) in KVCR. Site-specific conservation measures need to be undertaken across the stop-over sites in the West and East Coast of India to conserve this vital habitat in the Central Asian Flyway.

Key words

Kadalundi-Vallikkunnu Community Reserve, Population trend, Stop-over sites, Wintering gulls

Introduction

Around 66% of the population of known waterbirds in Asia has been experiencing drastic decline, mainly due to human induced factors (Wetland International, 2010). Data on population trend of birds is available only for few species and they were found to decline in number. Thus, it is appraised to initiate the population monitoring of waterbirds to comprehend the pattern (Wetland International, 2010). Data on population fluctuation of migratory birds across the stop-over sites is a prerequisite for launching species level conservation programme, which would in turn help the policy managers to curtail/mitigate confusion (Lawton and May, 1995; Caughley and Gunn, 1996). Further, data on, decisive factors that determine the pattern of population trend and resource use is also obligatory to execute conservation initiatives for restoring the declining population (Nebel *et al.,* 2008). However, site level population monitoring of wintering birds in India is restricted to few RAMSAR sites alone *viz.,* Keoladeo National Park, Chilika Lake, Point Calimere, Kole and Vembanad. Although counting on migratory water fowl are being carried out across key stop-over sites, the same is not being done throughout winter.

West-coast of India is an important zone in Central Asian flyway as it provides shelter and food for several millions of migratory water birds during winter season. Kadalundi-Vallikkunnu Commuity Reserve (KVCR) is the first community reserve in South India, located at the estuary of River Kadalundi of West Coast. Apart from an elaborated study carried out by Kurup (1991), data on only few short duration studies if available

(Balakrishnan *et al.,* 2002; Vijayakumar, 2005; Aarif, 2009) from this threatened ecosystem. Significance of conservation of wetlands for winter birds and high dependency of locals for their sustenance has made this wetland an important area for addressing questions related to the population trend and the factors that regulate this trend. In this context, the present study initiated to address on the pattern of population fluctuation of gulls over the years in KVCR and factors that regulate this trend.

Materials and Methods

Study area : Kadalundi-Vallikkunnu Community Reserve is located, at the estuary of River Kadalundi, in South-West Coast of India. Kadalundi River is one among 41 west flowing rivers of Kerala State. At its drainage point, the river forms wetland and then drains into the Arabian Sea. This wetland is located in Vallikunnu Panchayat of Tirur Taluk. In 2008 3 km^2 of this wetland has been declared as Community Reserve to conserve the important wetland in a sustainable way. Mudflats, mangroves, sand beach and nearby waterbodies are the major habitats in KVCR. Two over-bridges (for rail and road respectively) intersect the estuary, one each on the eastern and western sides of mudflats. On the western side of railway track, about 8 ha of mudflats are being exposed during low tide. 109 species of birds that include 65 migratory and 44 resident birds were recorded from 3 km^2 region of KVCR. All five species of gulls recorded from Kerala State were observed in KVCR. Other birds of conservation significance observed here were critically endangered Spoon-billed Sandpiper *Eurynorhynchus pygmeus*, endangered Black-bellied Tern (*Sterna acuticauda*) and near-threatened River Tern (*Sterna aurantia*). Waders such as Lesser Sand Plover (*Charadrius mongolus)*, Whimbrel *(Numenius phaeopus)* and Common Redshank *(Tringa tetanus)* were found over-summering here (Aarif, 2011). The resources of the estuary are being exploited by the people of two village Panchayath through sand mining, fishing and farming.

Bird counting : Counts of gulls in KVCR were carried out for 4 winter periods during September 2005 to May 2009. The study was carried out throughout the year. Data for only 9 months (September to May) were taken for analyses as the migratory birds were absent in the study area during the remaining 3 months. Four visits per month were made to take the weekly counts. Counts were made using a binocular (10x50) between 0600 and 1100 hrs in both low and high tide zones. Sporadic visits were also made in dusk hours. Bird counting was done on sunny and cloudy days, whereas no counting was made on rainy days.

Total count method was employed to count gulls (Hoves and Bakewell, 1989) and for this purpose two vantage points: one each near the mangrove and mudflats was selected for estimating the population. Counting large flock of gulls (more than 2000 individuals) was made to 100's or 1000's. Although it is an approximate count, still it would provide a reliable estimate of the population trend of gulls.

Analyses : Mean and standard deviation were analysed using SPSS 11. Count data were log transformed (log_{10} (n+1)) to stabilize the variance. Temporal population change in the count data between 1989 and 2009 were expressed as proportion of change in the population.

Results and Discussion

Arrival of wintering gulls corresponds to the end of south-west monsoon. The number of gulls increased with the arrival and passing off of the post-monsoon months. Maximum number of

Table 1 : Arrival and maximum number of Gulls observed in the KVCR during September 2005 to May 2009

Species	2005-06	2006-07	2007-08	2008-09	1% threshold (*)	Maximum number of birds observed in a visit (year)
Black-headed Gull	Sep	Nov	Sep	Nov	-	15,000 (07-08)
Brown-headed Gull	Nov	Nov	Sep	Nov	1,500	10,000 (07-08)
Pallas's Gull	Nov	Nov	Nov	Dec	1,000	1,000 (07-08)
Heuglin's Gull	Nov	Nov	Dec	Nov	-	500 (07-08)
Slender-billed Gull	-	-	Jan	Apr	1,500	3 (07-08)

(*) = Threshold values for each species of gulls and terns; 1% of biogeographic population of a congregatory water bird species

Table 2 : Mean abundance of wintering gulls observed in KVCR from September 2005 to May 2009

Species	2005-2006		2006-2007		2007-2008		2008-2009	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Black-headed Gull	260.3	0-700	3570	0-11500	5490.9	0-30200	2521	0-15000
Brown-headed Gull	497.0	0-1800	5711.1	0-25000	7147.4	0-39311	2460	0-10000
Pallas's Gull	99.0	0-490	981.1	0-3500	0.54	0-3	43.6	0-100
Heuglin's Gull	92.3	0-503	125	0-600	472.9	0-2601	32	0-100
Slender billed Gull	0	0	0.3	0-3	0	0	0.2	0-1

gulls was recorded during the period between December and March and thereafter gradually declined to nil (after June). Among gulls, Brown-headed Gulls reached the destination prior to arrival of other wintering gulls in all sampled years (Table 1). Around 13 and 1 % of biogeographical populations of Brown-headed Gull (20,000) and Pallas's Gulls (1,000) were recorded from KVCR.

A total of 1, 26,103 individuals belonging to five species *viz.,* Black-headed Gull, Brown-headed Gull, Heuglin's Gull, Slender-billed Gull and Pallas's Gull were recorded. Around 86% of counted gulls were Brown-headed (52.24%) and Black-headed (33.59%) (Fig. 1). Slender-billed Gull was observed seldom during the recent years (2005-2009). Log transformed data revealed that all gulls other than Black-headed and Brown headed declined during 2008-2009 (Table 2). Large congregation of gulls (Black headed, Brown-headed, Heuglin's, Pallas's and Slender-billed Gull) were counted during the years 2006-2007. With respect to the 1989 count, the population of scavenging gulls such as Black-headed Gull and Brown-headed Gull increased to 165 and 135 % respectively (Table 3).

All five species of gulls reported from Kerala (Easa and Jayson, 2004; Sashikumar *et al*. 2012) were from KVCR. High species richness of gulls in KVCR has been attributed to the availability of food in KVCR and the exposed sand-beds even during high tides where gulls rest and preen. Even after two decades the Brown-headed Gull remains the dominant gull species in KVCR. However, their number has increased several folds in recent years. Around 20% of the bio-geographical population of Brown-headed Gull was recorded from KVCR. Similar observation was made in Chilika Lake in Orissa (Balachandran *et al*., 2005).

Congregation of gulls in Kole wetland was observed during November to January and after that their population gradually declined to nil (Sivaperuman and Jayson, 2012). Whereas, in Kadalundi, the gulls arrived at the end of south west monsoon and remained here till May. This indicates that KVCR is an important wintering ground for gulls, especially Brown-headed and Black-headed Gulls in the West Coast of Kerala.

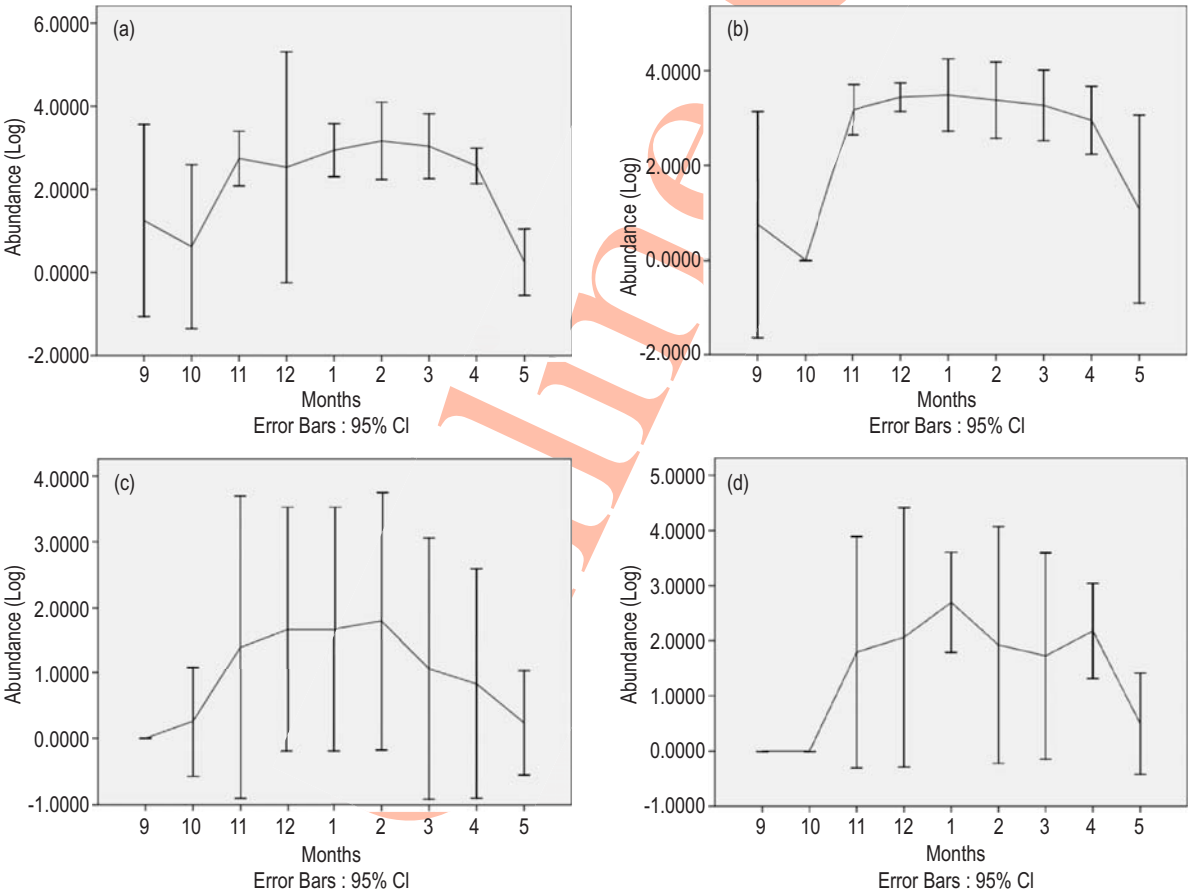

Fig. 1 : Population fluctuation in various months in the KVCR during September 2005 to 2009 of (a) Black headed Gulls (b) Brown headed Gulls (c) Heuglins Gulls and (d) Pallas's Gulls

Table 3 : Proportional change in the population of Black-headed Gull and Brown-headed Gull in the KVCR during 1989 and 2009

Species	1989	2009	Change (%)
Black-headed Gull	191.3 ± 234.6	507.5 ± 893.5	+165.2
Brown-headed Gull	327.5 ± 339.1	771.4 ± 600.0	+135.5

Gulls in KVCR have been found to exhibit two trend patterns- an increasing pattern of scavenging gulls (Black-headed Gull and Brown-headed Gull) and a decreasing pattern of specialist gulls (Pallas's Gull and Slender-billed Gull) (Fig. 2). These trends clearly indicate that wetland has highly been exploited, may be to meet the livelihood issues of locals/neighbouring urbanites. The declining trend of specialist gulls has attributed to the loss of potential wintering ground, water and soil pollution, secondary poisoning, natural phenomenon such as reduction in rainfall, predation by dogs, crows and raptors (Kurup, 1991; Aarif, 2008; Wetland international 2010; Aarif *et. al* 2014), developmental activities such as construction of over bridges, land filling (of wetland) and fluctuations in the level of pH and salinity (Sandilyan *et al.,* 2010). In addition several other factors have been reported to influence the population decline of water birds that include water extraction from inland wetland (Kingsford, 2000; Nebel *et al.,* 2008).

KVCR is one of the important wintering grounds for many species of waterbirds especially shorebirds, gulls and terns (Kurup, 1991; Aarif, 2008; Aarif and Prasadan 2014). Although the landscape has been recognized as a community reserve still it faces severe anthropogenic pressures in the form of sand mining, over fishing, construction of bridges etc. Anthropogenic factors either directly or indirectly exert pressure on wetland and its associated avifauna. Increasing human population in the surrounding areas have resulted in an increase in the solid waste being deposited in the estuary (Aarif *et al*., 2014).

Increasing trend of scavenging gulls and declining pattern of specialist gulls can be attributed to the consequences of habitat loss and other anthropogenic pressure. The study also highlights the essentiality of continuous monitoring of waterbirds especially of the migratory waterbirds over large stretch of lands such as Malabar region to formulate long term conservation strategies. Local communities need to be made aware of the significance of conserving the coastal ecosystem in general and the habitat of migrant waterbirds in particular.

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