

Status and distribution of Wetland Birds in Tsunami inundated Wetlands of South Andaman

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Abstract

The Andaman and Nicobar islands is one of the major groups of islands of India, and rich in biodiversity with high endemism due to isolation, about 17 percent of flowering plants, 13 percent of faunal including 40 per cent of birds and 70 percent of butterflies. One hundred and twenty-two taxa of birds were recorded from the tsunami inundated wetlands. These belong to 27 Families under 11 Orders. Of the 122 species, 69 were winter migrant, 24 species were resident. Thirty four species of shorebirds were recorded during the period of the study. These belong to the order Charadriiformes and distributed into six families. The sighting of Chinese Egret from the Andaman Islands was the first record of the species from India and South Asia. As this wetland is coming under 'East-Asian Australasian Flyway', protection of the migratory species is of highest priority. The wetland lands of Andaman are an ideal habitat for migratory and resident birds, especially for the winter visitors.

Keywords: Avifauna, Conservation, South Andaman, Wetlands

Introduction

Wetlands are amongst the most productive ecosystems on the Earth (Ghermandi et al., 2008), and provide many important services to human society (ten Brink et al., 2012). However, they are also ecologically sensitive and adaptive systems (Turner et al., 2000). Wetlands exhibit enormous diversity according to their genesis, geographical location, water regime and chemistry, dominant species, and soil and sediment characteristics (Space Applications Centre, 2011). Globally, the areal extent of wetland ecosystems ranges from 917 million hectares (mha) (Lehner and Döll, 2004) to more than 1275 mha (Finlayson and Spiers, 1999) with an estimated economic value of about US \$ 15 trillion a year (MEA, 2005). Wetlands are considered to have unique ecological features which provide numerous products and services to humanity (Prasad et al., 2002). Ecosystem goods provided by the wetlands mainly include: water for irrigation; fisheries; non-timber forest products; water supply; and recreation. Major services include: carbon sequestration, flood control, ground water recharge, nutrient removal, toxic retention and biodiversity maintenance (Turner et al., 2000).

Wetlands are important in supporting species diversity. Some vertebrates and invertebrates depend on wetlands for their entire lifecycle while others only associate with the searreas during particular stages of their life. Because wetlands provide an environment where photosynthesis can occur and where the recycling of nutrients can take place, they play a significant role in the support of food chains (Adams, 1988). In India, lakes, rivers and other fresh water bodies support a large diversity of biota representing almost all taxonomic groups. The total numbers of aquatic plant species exceed 1200 and they provide a valuable source of food, especially for water fowl (Prasad et al., 2002).

Tropical island birds have been estimated to possess extinction risks up to 40 times greater than mainland species due to their restricted ranges and population sizes, and consequently are highly vulnerable to habitat destruction (Trevino et al., 2007; Pimm et al., 1995). Indeed, over 90 per cent of recent bird extinctions have been island endemics (Clements, 2007; Birdlife International, 2004) and almost 40 per cent of species currently listed as threatened by the IUCN are restricted to oceanic islands a highly disproportionate figure given the small land mass and contribution to global avian richness

these ecosystems represent (IUCN, 2009; Trevino *et al.*, 2007; Johnson and Stattersfield, 1990; Martin and Blackburn, 2010).

Information on the avifauna of an area is a prerequisite to assess the status of birds and the habitat quality with specific attention to indicator species including the rare, endangered and endemic species. Birds are one of the best indicators of the health of an ecosystem. They are highly mobile and easily observed indicators of change in the environment (Holmes *et al.*, 1986). Many wetland species also play a role in the control of agricultural pests, while some species are themselves considered pest of certain crops. After fish, birds are probably the most important faunal group that attract people to wetlands. Loss of wetland habitats through direct and indirect modifications and non-sustainable harvesting of water birds for human needs have led to decline in several water bird populations and a number of species (Jin-Han Im *et al.*, 2001). The number of water birds using a particular habitat is related to types and quality of habitats, abundance and availability of food and level of disturbance. Monitoring of water birds can thus provide valuable information on the status of wetlands and can be a key tool for increasing the awareness of importance of wetland and conservation values. In this paper, the status, occurrence and species composition of avifauna recorded from the tsunami inundated wetlands are elucidated.

Wetlands of Andaman

The mega undersea earthquake of 26 December 2004, and the consequent tsunami, has changed the landscape

of Andaman and Nicobar Islands. About 40 km² of land, in many locations, has been directly or indirectly affected by this event, resulting in a drastic change in land use patterns (Roy *et al.*, 2009). The subsidence of the South Andaman Island by almost one meter had caused high tides that reached inland and flooded the low-lying flatlands, including agricultural lands and human habitations (Chatterjee, 2006). Prior to the tsunami, local inhabitants utilised the tsunami-inundated areas of South Andaman Islands for agriculture (Table 1; Fig. 1). These inundated wetlands became opportunistic feeding grounds for migratory waders and resident waterbirds.

The Andaman and Nicobar Islands, especially the South Andaman Islands is one of the most human-influenced areas. The inundation of agricultural lands by the tsunami has led to them being abandoned by the people, as they have turned into wetlands (Malik *et al.*, 2006; Dam Roy *et al.*, 2017). Wetlands have long attracted the attention of public and scientists because of the charm, copiousness, visibility and social behavior of the waterbirds, as well as for their recreational and economic importance. Recently, waterbirds have become of interest as indicators of wetland quality and as parameters of restoration success and regional biodiversity. Each year, large number of water birds that breeds in areas of Europe and North and Central Asia in summer under takes migratory journey along major river valleys to spend the winter in more hospitable shelters in southerly latitudes. As the wetlands in northern areas become frozen due to the onset of winter and the food disappears under snow cover.

Table 1: Characteristics of wetlands of South Andaman Islands

Wetlands	Garacharma	Sippighat	Chouldhari	Ograbraj	Stewartgunj
Location	11° 37.055' N; 92° 42.496' E	11° 36.749' N; 92° 41.583' E	11° 37.350' N; 92° 40.108' E	11° 39.463' N; 92° 39.785' E	11° 43.617' N; 92° 42.826' E
Total Area		1.1411 km ²		0.6348 km ²	0.3428 km ²
Submerged area		0.7186 km ²		0.2473 km ²	0.2599 km ²
No. of Wetlands	5	5	4	3	2

Description	Grassland, Marsh Area, Mudflat, Shallow water, Mangrove and Littoral Forest	Floating Vegetation, Grassland, Marsh Area, Mudflat, Shallow water, Mangrove and Littoral Forest (0.5m water depth during high tide). One side has mangroves and the Andaman Trunk Road borders the other.	Shallow-water/ tidal mudflat /cultivation land/ Mangrove	Tidal mudflat, tsunami inundated area with dead trees, surrounded by human settlement, mangrove. A road has divided this wetland into two sections.	Grassland, some parts grass with stagnant water. This wetland is surrounded by human settlement.
Main Threats for birds	Hunting or poaching, logging and introduction of exotics, dumping domestic sewage and landfilling.	Illegal hunting of birds by local people with air guns, kayaking, dumping domestic sewage, landfilling, fishing activities. Reclamation by local people for construction.	Fishing boats, pollution, poaching and fishing	Dumping waste materials Pollution, poaching and fishing, and landfilling.	Degradation of wetland; land filling, dumping of waste materials especially

Migratory Flyways

Water birds are an important component of most of wetland environment, as these occupy several trophic levels in the food web of wetland nutrient cycles. The Strategy adopts the Ramsar Convention definition for waterbirds "*Birds ecologically dependent on wetlands*" and includes recognized groups popularly known as wildfowl, waterfowl and shorebirds and waders. In addition to these groups, other species groups dependent on wetlands are passerines. Several wetlands in the coastal floodplains are important for the migratory waders and ducks. As the shorebirds use varied habitats like estuaries, riverbanks, paddy fields, etc. foraging and roosting sites are readily available. Migration remains one of the most compelling aspects of the avian world. Twice a year, billions of birds migrate vast distances across the globe. Typically, these journeys follow a predominantly north-south axis, linking breeding grounds in arctic and temperate regions with non-breeding sites in temperate and tropical areas. The routes followed by migratory birds

on their journeys between their breeding and wintering places are known as flyways.

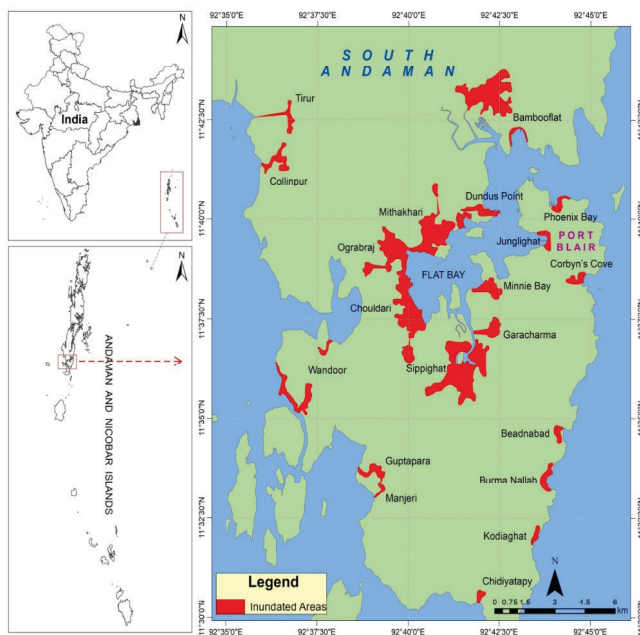


Fig. 1: Map of tsunami inundated wetlands of south Andaman

Boere and Stroud (2006) defined the flyways as “the biological systems of migration paths that directly link sites and ecosystems in different countries and continents”. The International Wader Study Group identifies eight multiple-species flyways that broadly describe the migrations of waders (Boere and Stroud, 2006). Of these, five are recognized as major flyways for migratory shorebirds namely, Central Pacific Flyway, American Flyway, African-West Eurasian Flyway, Central Asian Flyway and East Asian-Australasian Flyway. These global flyways are a considerable over simplification of the complex journeys undertaken by the world’s 2,274 migratory species (Kirby, 2010). India is known to support 1232 species of bird species, out of these 257 species are water birds. East Asian-Australasian Flyway (EAAF) extends from Arctic Russia and North America to the southern limits of Australia and New Zealand. It encompasses large parts of East Asia, all of Southeast Asia and includes eastern India and the Andaman and Nicobar Islands. The migratory birds arrive in Andaman and Nicobar Islands during August/September and stay in the area up to March/April.

More than 50 million migratory waterbirds including 8 million waders are using the EAAF annually. Many waders travel all the way from their high arctic breeding grounds to spend the northern winter in the temperate latitudes of the southern hemisphere. For the Bar-tailed Godwit *Limosa lapponica*, this can entail an 11,000 km non-stop flight from Alaska to New Zealand (Gillet *et al.*, 2009). Some species, such as Red-necked Stint *Calidris ruficollis* and Spotted Greenshank *Tringa guttifer* (EN) also cross Bangladesh to spend the winter in eastern India.

Methods

The species compositions of birds were computed from the data obtained through daily census and field observations. Birds were classified as migratory and resident species based on the occurrence data and published literature. Globally threatened species of birds

were identified based on (BirdLife International, 2019). Feeding and guild composition were collected from the available literature (Ali and Ripley, 1983). Bird species have been categorised as aquatic feeders, insectivores, granivores, nectar-frugivores, carnivores, frugivores and omnivores. They were also classified as water birds, waders and terrestrial birds based on their habitat use.

Results

Occurrence of species

One hundred and twenty-two taxa of birds were recorded from the tsunami inundated wetlands. These belong to 27 Families under 11 Orders. Of the 122 species, 69 were winter migrant, 24 species were resident (Table 2).

Distribution of bird species in the intensive study area

The highest species of birds were recorded from Sippighat (98), followed by Ograbraj (96), Garacharma (95), Chouldhari (81), Chidiyatappu (73), Stewartgunj (68) and Shoal Bay (60) (Table 3).

Shorebirds

Waders constitute an important group of wetland species. These birds depend heavily on shallow waters and mud flats, normally recorded from September onwards in the tsunami inundated wetlands. Details on the occurrence of waders in the four intensive study sites are presented in Table 4. The highest species of waders was recorded from Sippighat (32) followed by Garacharma (31), Ograbraj (30), Chouldhari (25), Stewartgunj (19), Shoal Bay (17), and Chidiyatappu (14). Pacific Golden Plover, Lesser Sand Plover, Greater Sand Plover, Pintail Snipe, Eurasian Whimbrel, Eurasian Curlew, Common Redshank, Wood Sandpiper, Common Sandpiper, Rufous-necked Stint, Long-toed Stint, Curlew Sandpiper and Oriental Pratincole were recorded from all the intensive study sites in the three migratory seasons.

Table 2. List of birds recorded from the tsunami inundated wetlands

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
Waterbirds								
Podicipediformes								
Podicipedidae								
1	Little Grebe	<i>Tachybaptus ruficollis</i> (Pallas, 1764)	WM	LC	R	C	F	DC
Procellariiformes								
Procellariidae								
2	Wedge-tailed Shearwater	<i>Puffinus pacificus</i> (Gmelin, 1789)	WM	LC	U	C	O	AAqC
Pelecaniformes								
Sulidae								
3	Red-footed Booby	<i>Sula sula</i> (Linnaeus, 1766)	V	LC	R	C	O	AAqC
Phalacrocoracidae								
4	Little Cormorant	<i>Microcarbo niger</i> (Vieillot, 1817)	PM/WM	LC	U	C	S	WC
Fregatidae								
5	Great Frigatebird	<i>Fregata minor</i> (Gmelin, 1789)	SM	LC	U	C	O	AAqC
6	Christmas Island Frigatebird	<i>Fregata andrewsi</i> Mathews, 1914	V	CR	U	C	O	AAqC
Ciconiiformes								
Ardeidae								
7	Little Egret	<i>Egretta garzetta</i> (Linnaeus, 1766)	R/LM	LC	C	C	S	WC
8	Pacific Reef-Egret	<i>Egretta sacra</i> (Gmelin, 1789)	R	LC	C	C	S	WC
9	Grey Heron	<i>Ardea cinerea</i> Linnaeus, 1758	R/WM	LC	R	C	S	WC
10	Purple Heron	<i>Ardea purpurea</i> Linnaeus, 1766	R/LM	LC	F	C	S	WC
11	Large Egret	<i>Casmerodius albus</i> (Linnaeus, 1758)	R/LM	LC	C	C	S	WC
12	Median Egret	<i>Mesophoyx intermedia</i> (Wagler, 1829)	R/WM	LC	F	C	S	WC
13	Eastern Cattle Egret	<i>Bubulcus coromandus</i> (Boddaert, 1783)	R/LM	LC	C	C	G	WC
14	Chinese Egret	<i>Egretta eulophotes</i> (Swinhoe, 1860)	WM	LC	R	C	M	WC

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
15	Indian Pond-Heron	<i>Ardeola grayii</i> (Sykes, 1832)	R/WM	LC	R	C	M	WC
16	Chinese Pond-Heron	<i>Ardeola bacchus</i> (Bonaparte, 1855)	WM	LC	F	C	M	WC
17	Andaman Little Green Heron	<i>Butorides striatus spodiogaster</i> Sharpe, 1894	R	LC	C	C	M	WC
18	Yellow Bittern	<i>Ixobrychus sinensis</i> (Gmelin, 1789)	WM	LC	F	C	G	WC
19	Chestnut Bittern	<i>Ixobrychus cinnamomeus</i> (Gmelin, 1789)	R	LC	F	C	G	WC
20	Black Bittern	<i>Dupetor flavicollis</i> (Latham, 1790)	PM/SM	LC	U	C	G	WC
Pelecaniformes								
Threskiornithidae								
21	Glossy Ibis	<i>Plegadis falcinellus</i> (Linnaeus, 1766)	PM/WM	LC	U	C	G	WC
Anseriformes								
Anatidae								
22	Lesser Whistling-Duck	<i>Dendrocygna javanica</i> (Horsfield, 1821)	R/LM	LC	C	H	F	DH
23	Cotton Teal	<i>Nettapus coromandelianus</i> (Gmelin, 1789)	R	LC	F	H	F	DH
24	Eurasian Wigeon	<i>Anas penelope</i> Linnaeus, 1758	WM	LC	U	H	S	DH
25	Andaman Teal	<i>Anas gibberifrons</i> (Muller, 1842)	R	LC	F	H	S	DC
26	Garganey	<i>Anas querquedula</i> Linnaeus, 1758	WM	LC	R	H	S	DH
27	Ferruginous Pochard	<i>Aythya nyroca</i> (Guldenstadt, 1770)	WM	NT	U	H	F	DH
Gruiformes								
Rallidae								
28	Andaman Blue-Breasted Rail	<i>Gallirallus striatus obscurior</i> (Hume, 1874)	R	NR	F	C	G	WC
29	Corn Crake	<i>Crex crex</i> (Linnaeus, 1758)	V	LC	U	C	F	WC
30	Andaman White-breasted Waterhen	<i>Amaurornis phoenicurus insularis</i> Sharpe, 1894	R	LC	C	C	G	WC

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
31	Baillon's Crane	<i>Porzana pusilla</i> (Pallas, 1776)	WM	LC	R	C	F	WC
32	Ruddy-breasted Crane	<i>Porzana fusca</i> (Linnaeus, 1766)	R/WM	LC	R	C	G	WC
33	Watercock	<i>Gallinula cinerea</i> (Gmelin, 1789)	R/LM	LC	F	C	G	WC
34	Purple Moorhen	<i>Porphyrio porphyria</i> (Linnaeus, 1758)	R	LC	C	C	F	WC
35	Common Moorhen	<i>Gallinula chloropus</i> (Linnaeus, 1758)	R	LC	C	C	F	WC
36	Common Coot	<i>Fulica atra</i> Linnaeus, 1758	R/LM	LC	R	H	F	DH
Charadriiformes								
Jacaniidae								
37	Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i> (Scopoli, 1786)	WM	LC	F	H	M	WH
Charadriidae								
38	Pacific Golden-Plover	<i>Pluvialis fulva</i> (Gmelin, 1789)	WM	LC	C	C	M	WC
39	Grey plover	<i>Pluvialis squatarola</i> (Linnaeus, 1758)	WM	LC	R	C	M	WC
40	Little Ringed Plover	<i>Charadrius dubius</i> Scopoli, 1786	WM	LC	F	C	M	WC
41	Kentish Plover	<i>Charadrius alexandrinus</i> Linnaeus, 1758	WM	LC	R	C	M	WC
42	Lesser Sand Plover	<i>Charadrius mongolus</i> Pallas, 1776	WM	LC	C	C	M	WC
43	Greater Sand Plover	<i>Charadrius leschenaultii</i> Lesson, 1826	WM	LC	F	C	M	WC
44	Grey-headed Lapwing	<i>Vanellus cinereus</i> (Linnaeus, 1758)	WM	LC	R	C	M	WC
Scolopacidae								
45	Pintail Snipe	<i>Gallinago stenura</i> (Bonaparte, 1830)	WM	LC	C	C	M	WC
46	Common Snipe	<i>Gallinago gallinago</i> (Linnaeus, 1758)	WM	LC	F	C	M	WC
47	Jack Snipe	<i>Lymnocyrtes minimus</i> (Brunnich, 1764)	PM	LC	R	C	F	WC
48	Black-tailed Godwit	<i>Limosa limosa</i> (Linnaeus, 1758)	WM	NT	R	C	M	WC

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
49	Bar-tailed Godwit	<i>Limosa lapponica</i> (Linnaeus, 1758)	WM	LC	R	C	M	WC
50	Eurasian Whimbrel	<i>Numenius phaeopus</i> (Linnaeus, 1758)	WM	LC	C	C	G	WC
51	Eurasian Curlew	<i>Numenius arquata</i> (Linnaeus, 1758)	WM	NT	C	C	M	WC
52	Spotted Redshank	<i>Tringa erythropus</i> (Pallas, 1764)	WM	LC	U	C	M	WC
53	Common Redshank	<i>Tringa tetanus</i> (Linnaeus, 1758)	WM	LC	C	C	M	WC
54	Marsh Sandpiper	<i>Tringa stagnatilis</i> (Bechstein, 1803)	WM	LC	F	C	M	WC
55	Common Greenshank	<i>Tringa nebularia</i> (Gunner, 1767)	WM	LC	F	C	M	WC
56	Green Sandpiper	<i>Tringa ochropus</i> Linnaeus, 1758	WM	LC	R	C	M	WC
57	Wood Sandpiper	<i>Tringa glareola</i> Linnaeus, 1758	WM	LC	F	C	M	WC
58	Terek Sandpiper	<i>Xenus cinereus</i> (Guldenstadt, 1774)	WM	LC	R	C	M	WC
59	Common Sandpiper	<i>Actitis hypoleucos</i> Linnaeus, 1758	WM	LC	C	C	M	WC
60	Ruddy Turnstone	<i>Arenaria interpres</i> (Linnaeus, 1758)	WM	LC	F	C	M	WC
61	Great Knot	<i>Calidris tenuirostris</i> (Horsfield, 1821)	WM	VU	R	C	M	WC
62	Little Stint	<i>Ereunetes minutes</i> (Leisler, 1812)	WM	LC	R	C	M	WC
63	Rufous-necked Stint	<i>Ereunetes ruficollis</i> (Pallas, 1776)	WM	LC	F	C	M	WC
64	Temminck's Stint	<i>Ereunetes temminckii</i> (Leisler, 1812)	WM	LC	R	C	M	WC
65	Long-toed Stint	<i>Ereunetes subminutus</i> (Middendorff, 1853)	WM	LC	F	C	M	WC
66	Curlew Sandpiper	<i>Erolia ferruginea</i> (Pontoppidan, 1813)	WM	LC	F	C	M	WC
67	Broad-billed Sandpiper	<i>Limicola falcinellus</i> (Pontoppidan, 1763)	WM	LC	R	C	M	WC
	Recurvirostridae							WC
68	Black-winged Stilt	<i>Himantopus himantopus</i> (Linnaeus, 1758)	WM	LC	R	C	S	WC

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
Dromadidae								
69	Crab-Plover	<i>Dromas ardeola</i> Paykull, 1805	R/WM	LC	U	C	M	WC
Burhinidae								
70	Beach Stone- Plover	<i>Esacus magnirostris</i> (Vieillot, 1818)	R	NT	R	C	M	WC
Glareolidae								
71	Collared Pratincole	<i>Glareola pratincola</i> (Linnaeus, 1766)	PM/SM	LC	R	C	M	WC
72	Oriental Pratincole	<i>Glareola maldivarum</i> J.R. Forster, 1795	PM/WM	LC	F	C	G	WC
Laridae								
73	Black headed Gull	<i>Chroicocephalus ridibundus</i> Linnaeus, 1766	PM/WM	LC	R	C	A	AAqC
74	Gull-billed Tern	<i>Gelochelidon nilotica</i> (Gmelin, 1789)	WM	LC	R	C	A	AAqC
75	Lesser Crested Tern	<i>Thalasseus bengalensis</i> Lesson, 1831	WM	LC	F	C	A	AAqC
76	Roseate Tern	<i>Sterna dougallii</i> Montagu, 1813	SM	LC	R	C	A	AAqC
77	Black-naped Tern	<i>Sterna sumatrana</i> Raffles, 1822	R	LC	F	C	A	AAqC
78	Little Tern	<i>Sternula albifrons</i> Pallas, 1764	WM	LC	R	C	A	AAqC
79	Whiskered Tern	<i>Chlidonias hybrid</i> (Pallas, 1811)	WM	LC	F	C	A	AAqC
80	White-Winged Black Tern	<i>Chlidonias leucopterus</i> (Temminck, 1815)	PM/WM	LC	F	C	A	AAqC
81	Brown Noddy	<i>Anous stolidus</i> (Linnaeus, 1758)	WM	LC	R	C	A	AAqC
Wetland Dependent and Associated Birds								
Falconiformes								
Accipitridae								
82	Brahminy Kite	<i>Haliastur indus</i> (Boddaert, 1783)	R	LC	F	C	A	ATC
83	White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i> (Gmelin, 1788)	R	LC	C	C	A	AAqC
84	Western Marsh-Harrier	<i>Circus aeruginosus</i> (Linnaeus, 1758)	WM	LC	U	C	A	ATC

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
85	Japanese Sparrowhawk	<i>Accipiter gularis</i> (Temminck & Schlegel, 1845)	WM	LC	U	C	A	ATC
86	Besra Sparrowhawk	<i>Accipiter virgatus</i> (Temminck & Schlegel, 1845)	SM	LC	R	C	A	ATC
87	Changeable Hawk-Eagle	<i>Nisaetus cirrhatus andamanensis</i> Tytler, 1865	R	NR	F	C	L	ATC
Pandionidae								
88	Western Osprey	<i>Pandion haliaetus</i> (Linnaeus, 1758)	V	LC	R	C	A	ATC
Falconidae								
89	Common Kestrel	<i>Falco tinnunculus</i> Linnaeus, 1758	WM	LC	F	C	A	ATC
90	Peregrine Falcon	<i>Falco peregrinus calidus</i> Latham, 1790	WM	LC	R	C	A	ATC
Coraciiformes								
Alcedinidae								
91	Small Blue Kingfisher	<i>Alcedo atthis</i> (Linnaeus, 1758)	WM	LC	F	C	A	AAqC
92	Andaman Blue-eared Kingfisher	<i>Alcedo meninting rufigastra</i> Walden, 1873	R	LC	R	C	L	ATC
93	Andaman Oriental Dwarf Kingfisher	<i>Ceyx erithaca macrocarus</i> Oberholser, 1917	R	LC	R	C	L	ATC
94	Andaman Stork-billed Kingfisher	<i>Pelargopsis capensis osmastoni</i> (Baker, 1934)	R	LC	C	C	A	AAqC
95	Andaman Ruddy Kingfisher	<i>Halcyon coromanda mizorhina</i> (Oberholser, 1915)	R	LC	R	C	L	AAqC
96	Andaman White-breasted Kingfisher	<i>Halcyon smyrnensis saturatior</i> Hume, 1874	R	LC	C	C	A	AAqC
97	Black-capped Kingfisher	<i>Halcyon pileata</i> (Boddaert, 1783)	WM	LC	F	C	L	AAqC
98	Andaman Collared Kingfisher	<i>Halcyon chloris davisoni</i> Sharpe, 1892	R	LC	C	C	L	AAqC
Meropidae								
99	Blue-tailed Bee-eater	<i>Merops philippinus</i> Linnaeus, 1766	WM	LC	F	I	A	AI

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
100	Andaman Chestnut headed Bee eater	<i>Merops leschenaulti andamanensis</i> Marien, 1950	R		F	I	A	AI
101	Small Bee-eater	<i>Merops orientalis</i> Latham, 1801	SM		F	I	A	AI
Passeriformes								
Hirundinidae								
102	Sand Martin	<i>Riparia riparia</i> (Linnaeus, 1758)	WM	LC	R	I	A	ATC
103	Common Swallow	<i>Hirundo rustica</i> Linnaeus, 1758	WM	LC	F	I	A	ATC
104	House Swallow	<i>Hirundo tahitica</i> Gmelin, 1789	R	LC	C	I	A	ATC
105	Red-rumped Swallow	<i>Hirundo daurica</i> Linnaeus, 1771	WM	LC	R	I	A	ATC
106	Asian House-Martin	<i>Delichon dasypus</i> (Bonaparte, 1850)	SM	LC	R	I	A	ATC
Motacillidae								
107	White Wagtail	<i>Motacilla leucopsis</i> Gould, 1838	WM	LC	R	I	G	SIP
108	Eastern Yellow Wagtail	<i>Motacilla tschutschensis</i> Linnaeus, 1758	WM	LC	F	I	G	SIP
109	Short-tailed Grey-headed Yellow Wagtail	<i>Motacilla flava thunbergi</i> Billberg, 1828	WM	LC	F	I	G	SIP
110	Grey Wagtail	<i>Motacilla cinerea</i> Tunstall, 1771	WM	LC	F	I	G	SIP
111	Red-throated Pipit	<i>Anthus cervinus</i> (Pallas, 1811)	PM	LC	F	I	G	SIP
Turdidae								
112	Common Stonechat	<i>Saxicola torquata</i> (Linnaeus, 1766)	WM	LC	F	I	L	ATC
Sylviidae								
113	Andaman Palefooted Bush-Warbler	<i>Urosphena pallidipes osmastoni</i> (Hartert, 1908)	R	LC	R	I	L	TI
114	Streaked Grasshopper-Warbler	<i>Locustellalanceolata</i> (Temminck, 1840)	WM	LC	R	I	L	TI
115	Rusty-rumped Grasshopper-Warbler	<i>Locustella certhiola</i> (Pallas, 1811)	WM	LC	R	I	L	TI

Sl. No.	Common Name	Scientific Name	Residential Status	IUCN Status	Abundance Status	Food	Stratum	Behaviour
116	Black-browed Reed-Warbler	<i>Acrocephalus bistrigiceps</i> Swinhoe, 1860	WM	LC	F	I	L	TI
117	Oriental Great Reed-Warbler	<i>Acrocephalus orientalis</i> (Temminck & Schlegel, 1847)	WM	NR	F	I	L	TI
118	Indian Great Reed-Warbler	<i>Acrocephalus stentoreus</i> (Hemprich & Ehrenberg, 1833)	WM	LC	F	I	L	TI
119	Eastern Thick-billed Warbler	<i>Acrocephalus aedon</i> (Pallas, 1776)	WM	LC	R	I	L	TI
120	Dusky Warbler	<i>Phylloscopus fuscatus</i> (Blyth, 1842)	WM	LC	F	I	L	TI
Muscicapidae								
121	Red-throated Flycatcher	<i>Ficedula parva</i> (Bechstein, 1792)	WM	LC	F	I	G	TI
Pachycephalidae								
122	Mangrove Whistler	<i>Pachycephala grisola</i> (Blyth, 1843)	R	LC	F	C	L	AAqC

Table 3: Distribution of wetland birds in the tsunami inundated wetlands of South Andaman

Sl. No.	Common Name	Garacharma	Sippighat	Chouldari	Ograbraj	Stewartgunj	Chidyatappu	Shoal Bay
1	Little Grebe		√				√	
2	Wedge-tailed Shearwater						√	
3	Red-footed Booby	√						
4	Little Cormorant				√			
5	Great Frigatebird				√			
6	Christmas Island Frigatebird				√			
7	Little Egret	√	√	√	√	√	√	√
8	Pacific Reef-Egret	√	√	√	√	√	√	√
9	Grey Heron	√	√	√	√	√		
10	Purple Heron	√	√	√	√	√		
11	Large Egret	√	√	√	√	√	√	√
12	Median Egret	√	√	√	√	√	√	√
13	Eastern Cattle Egret	√	√	√	√	√	√	√
14	Chinese Egret		√		√		√	

Sl. No.	Common Name	Garacharma	Sippighat	Chouldari	Ograbraj	Stewartgunj	Chidyatappu	Shoal Bay
15	Indian Pond-Heron	✓	✓	✓	✓	✓	✓	✓
16	Chinese Pond-Heron	✓	✓	✓	✓	✓	✓	✓
17	Andaman Little Green Heron	✓	✓	✓	✓	✓	✓	✓
18	Yellow Bittern	✓	✓	✓	✓	✓	✓	✓
19	Chestnut Bittern	✓	✓	✓	✓	✓	✓	✓
20	Black Bittern		✓	✓	✓			
21	Glossy Ibis	✓		✓				
22	Lesser Whistling-Duck	✓	✓	✓	✓	✓	✓	✓
23	Cotton Teal	✓	✓	✓	✓	✓	✓	
24	Eurasian Wigeon	✓	✓		✓			
25	Andaman Teal	✓	✓	✓	✓	✓	✓	✓
26	Garganey		✓		✓		✓	
27	Ferruginous Pochard		✓					
28	Andaman Blue-Breasted Rail	✓	✓	✓	✓	✓	✓	✓
29	Corn Crake		✓					
30	Andaman White-breasted Waterhen	✓	✓	✓	✓	✓	✓	✓
31	Baillon's Crake	✓	✓	✓				
32	Ruddy-breasted Crake	✓	✓	✓	✓	✓	✓	
33	Watercock	✓	✓	✓	✓	✓	✓	✓
34	Purple Moorhen	✓	✓	✓	✓	✓	✓	✓
35	Common Moorhen	✓	✓	✓	✓	✓	✓	✓
36	Common Coot		✓	✓	✓	✓		
37	Pheasant-tailed Jacana	✓	✓	✓	✓	✓		
38	Pacific Golden-Plover	✓	✓	✓	✓	✓	✓	✓
39	Grey plover	✓	✓	✓	✓			
40	Little Ringed Plover	✓	✓	✓	✓	✓		✓
41	Kentish Plover	✓	✓		✓	✓		✓
42	Lesser Sand Plover	✓	✓	✓	✓	✓	✓	✓
43	Greater Sand Plover	✓	✓	✓	✓	✓	✓	✓
44	Grey-headed Lapwing	✓	✓	✓	✓	✓		✓
45	Pintail Snipe	✓	✓	✓	✓	✓	✓	✓
46	Common Snipe	✓	✓	✓	✓			
47	Jack Snipe				✓			
48	Black-tailed Godwit	✓	✓	✓	✓			

Sl. No.	Common Name	Garacharma	Sippighat	Chouldari	Ograbraj	Stewartgunj	Chidyatappu	Shoal Bay
49	Bar-tailed Godwit	✓	✓		✓			
50	Eurasian Whimbrel	✓	✓	✓	✓	✓	✓	✓
51	Eurasian Curlew	✓	✓	✓	✓	✓	✓	
52	Spotted Redshank	✓	✓					
53	Common Redshank	✓	✓	✓	✓	✓	✓	✓
54	Marsh Sandpiper	✓	✓	✓	✓			
55	Common Greenshank	✓	✓	✓	✓	✓		
56	Green Sandpiper			✓	✓	✓		
57	Wood Sandpiper	✓	✓	✓	✓	✓	✓	✓
58	Terek Sandpiper	✓	✓	✓				
59	Common Sandpiper	✓	✓	✓	✓	✓	✓	✓
60	Ruddy Turnstone	✓	✓		✓			
61	Great Knot	✓	✓					
62	Little Stint	✓	✓		✓			
63	Rufous-necked Stint	✓	✓	✓	✓	✓	✓	✓
64	Temminck's Stint	✓	✓		✓			
65	Long-toed Stint	✓	✓	✓	✓	✓	✓	✓
66	Curlew Sandpiper	✓	✓	✓	✓	✓	✓	✓
67	Broad-billed Sandpiper	✓	✓	✓	✓			
68	Black-winged Stilt			✓	✓			
69	Crab-Plover							✓
70	Beach Stone- Plover						✓	✓
71	Collared Pratincole	✓	✓					
72	Oriental Pratincole	✓	✓	✓	✓	✓	✓	✓
73	Black headed Gull	✓			✓			
74	Gull-billed Tern				✓			
75	Lesser Crested Tern	✓		✓	✓			
76	Roseate Tern	✓	✓				✓	
77	Black-naped Tern	✓	✓	✓	✓	✓	✓	✓
78	Little Tern	✓						
79	Whiskered Tern	✓	✓	✓	✓			
80	White-Winged Black Tern	✓	✓	✓	✓			
81	Brown Noddy						✓	
82	Brahminy Kite	✓	✓	✓	✓	✓	✓	✓

Sl. No.	Common Name	Garacharma	Sippighat	Chouldari	Ograbraj	Stewartgunj	Chidyatappu	Shoal Bay
83	White-bellied Sea-Eagle	√	√	√	√	√	√	√
84	Western Marsh-Harrier	√	√	√	√			
85	Japanese Sparrowhawk	√					√	
86	Besra Sparrowhawk	√	√	√		√	√	
87	Changeable Hawk-Eagle	√	√	√	√	√	√	√
88	Western Osprey		√					√
89	Common Kestrel	√	√	√	√	√	√	
90	Peregrine Falcon				√	√		
91	Small Blue Kingfisher	√	√	√	√	√	√	√
92	Andaman Blue-eared Kingfisher	√	√	√		√	√	√
93	Andaman Oriental Dwarf Kingfisher	√	√				√	√
94	Andaman Stork-billed Kingfisher	√	√	√	√	√	√	√
95	Andaman Ruddy Kingfisher	√	√	√	√		√	√
96	Andaman White-breasted Kingfisher	√	√	√	√	√	√	√
97	Black-capped Kingfisher	√	√			√	√	
98	Andaman Collared Kingfisher	√	√	√	√	√	√	√
99	Blue-tailed Bee-eater	√	√	√	√	√	√	√
100	Andaman Chestnut-headed Bee-eater	√	√	√	√	√	√	√
101	Small Bee-eater	√	√	√	√	√	√	√
102	Sand Martin				√			
103	Common Swallow	√	√	√	√	√	√	√
104	House Swallow	√	√	√	√	√	√	√
105	Red-rumped Swallow	√	√	√	√			
106	Asian House-Martin				√			
107	White Wagtail	√						
108	Eastern Yellow Wagtail	√	√	√	√	√	√	√
109	Short-tailed Grey-headed Yellow Wagtail	√	√	√	√	√	√	√
110	Grey Wagtail	√	√	√	√	√	√	√
111	Red-throated Pipit	√	√				√	√
112	Common Stonechat	√	√	√	√		√	√

Sl. No.	Common Name	Garacharma	Sippighat	Chouldari	Ograbraj	Stewartgunj	Chidyatappu	Shoal Bay
113	Andaman Pale-footed Bush-Warbler		✓			✓	✓	✓
114	Streaked Grasshopper-Warbler				✓		✓	
115	Rusty-rumped Grasshopper- Warbler				✓			
116	Black-browed Reed-Warbler		✓		✓		✓	
117	Oriental Great Reed-Warbler	✓	✓	✓	✓	✓		
118	Indian Great Reed-Warbler	✓	✓	✓	✓	✓		
119	Eastern Thick-billed Warbler						✓	
120	Dusky Warbler	✓	✓	✓	✓	✓	✓	✓
121	Red-throated Flycatcher	✓	✓	✓	✓	✓	✓	✓
122	Mangrove Whistler	✓	✓	✓		✓	✓	✓

Table 4: Shorebirds recorded from the tsunami inundated wetlands

Sl. No.	Common Name	Garacharma	Sippighat	Chouldari	Ograbraj	Stewartgunj	Chidyatappu	Shoal Bay
1	Pheasant-tailed Jacana	✓	✓	✓	✓	✓		
2	Pacific Golden-Plover	✓	✓	✓	✓	✓	✓	✓
3	Grey plover	✓	✓	✓	✓			
4	Little Ringed Plover	✓	✓	✓	✓	✓		✓
5	Kentish Plover	✓	✓		✓	✓		✓
6	Lesser Sand Plover	✓	✓	✓	✓	✓	✓	✓
7	Greater Sand Plover	✓	✓	✓	✓	✓	✓	✓
8	Grey-headed Lapwing	✓	✓	✓	✓	✓		✓
9	Pintail Snipe	✓	✓	✓	✓	✓	✓	✓
10	Common Snipe	✓	✓	✓	✓			
11	Jack Snipe				✓			
12	Black-tailed Godwit	✓	✓	✓	✓			
13	Bar-tailed Godwit	✓	✓		✓			
14	Eurasian Whimbrel	✓	✓	✓	✓	✓	✓	✓

Sl. No.	Common Name	Garacharma	Sippighat	Chouldari	Ograbraj	Stewartgunj	Chidyatappu	Shoal Bay
15	Eurasian Curlew	√	√	√	√	√	√	
16	Spotted Redshank	√	√					
17	Common Redshank	√	√	√	√	√	√	√
18	Marsh Sandpiper	√	√	√	√			
19	Common Greenshank	√	√	√	√	√		
20	Green Sandpiper			√	√	√		
21	Wood Sandpiper	√	√	√	√	√	√	√
22	Terek Sandpiper	√	√	√				
23	Common Sandpiper	√	√	√	√	√	√	√
24	Ruddy Turnstone	√	√		√			
25	Great Knot	√	√					
26	Little Stint	√	√		√			
27	Rufous-necked Stint	√	√	√	√	√	√	√
28	Temminck's Stint	√	√		√			
29	Long-toed Stint	√	√	√	√	√	√	√
30	Curlew Sandpiper	√	√	√	√	√	√	√
31	Broad-billed Sandpiper	√	√	√	√			
32	Black-winged Stilt			√	√			√
33	Crab-Plover		√					
34	Beach Stone- Plover						√	√
35	Collared Pratincole	√	√					
36	Oriental Pratincole	√	√	√	√	√	√	√

Arrival and departure of migratory birds

The migratory birds arrived in the tsunami inundated wetlands in the month of September onwards during the three migratory seasons. Arrival and departure of resident and migratory birds for the period of three years is presented in Table 5. Eighty-nine species of migratory

birds were observed, of these, sixty-nine species were winter migrants. The result shows that, most of the migratory birds are arriving during the month of August/September and stay upto March/April in Andaman Islands. The departure of migratory birds started in early March, and continued up to May, however few species were recorded in all months during the study period.

Table 5: Arrival and Departure of resident and migratory birds

Common Name	2013-2014		2014-2015		2015-2016	
	Arrival	Departure	Arrival	Departure	Arrival	Departure
Little Grebe			11 th February	13 th May		
Wedge-tailed Shearwater			19 th May	28 th May		
Red-footed Booby			30 th December	14 th June		
Chinese Egret				17 th March	22 nd January	12 th April
Yellow Bittern	5 th November	27 th May	7 th November	6 th June	7 th October	25 th May
Eurasian Wigeon	19 th November	2 nd April				
Garganey	18 th December	29 th April	19 th November	13 th April	12 th November	26 th April
Ferruginous Pochard			17 th December	3 rd January	12 th November	
Western Marsh-Harrier	7 th November	10 th January	21 st January	24 th April	12 th November	15 th February
Western Osprey			19 th April	14 th May	14 th February	16 th May
Common Kestrel	15 th November	11 th February	8 th December		15 th November	
Peregrine Falcon	12 th January	13 th March			18 th November	
Baillon's Crane	24 th December	5 th May	8 th January	14 th April	9 th February	
Common Coot	18 th April	5 th February	14 th September	26 th February	6 th June	
Pheasant-tailed Jacana	18 th September	5 th April	12 th August	13 th April	12 th December	
Pacific Golden-Plover	20 th August	27 th July	1 st July	6 th May	8 th July	14 th May
Grey plover	2 nd August	24 th September	6 th November	25 th April	7 th October	
Little Ringed Plover	24 th September	8 th April	28 th October	2 nd April	19 th September	
Kentish Plover	9 th February	26 th March	19 th February	27 th March	19 th November	03 rd May
Lesser Sand Plover	8 th May				7 th October	12 th April
Greater Sand Plover	6 th August	5 th May	7 th July	6 th May	15 th July	15 th May
Grey-headed Lapwing	24 th September	8 th March	19 th November	14 th February	9 th October	29 th April
Pintail Snipe	14 th August	29 th April	26 th September	22 nd April	19 th September	
Common Snipe	14 th August	11 th March	10 th September	12 th March	27 th November	25 th May
Jack Snipe	14 th October	27 th March	27 th January	11 th March		24 th January
Black-tailed Godwit	12 th November	13 th May	24 th September	2 nd April	12 th November	
Whimbrel	30 th May				7 th October	
Eurasian Curlew	23 rd April				7 th October	15 th February

Common Name	2013-2014		2014-2015		2015-2016	
	Arrival	Departure	Arrival	Departure	Arrival	Departure
Spotted Redshank			19 th September		7 th October	
Common Redshank	24 th April		2015		7 th October	
Marsh Sandpiper	18 th December	2 nd April	9 th October	13 th May	18 th July	16 th May
Common Greenshank	6 th August	29 th April	11 th September	2 nd April	7 th October	
Green Sandpiper	5 th November	2 nd February	15 th October	18 th December	16 th December	
Wood Sandpiper	20 th August	13 th May	10 th July	22 nd April	12 th August	12 th March
Terek Sandpiper	12 th July	19 th March	11 th September	26 th November	19 th September	
Common Sandpiper	6 th August	5 th May	10 th July	13 th May	12 th August	03 rd May
Ruddy Turnstone	6 th August	27 th March	24 th September	22 nd March	8 th October	12 th April
Great Knot	24 th December	10 th March	14 th January	27 th March	15 th December	15 th May
Little Stint	6 th August	27 th March	20 th August	4 th February	19 th November	29 th April
Rufous-necked Stint	4 th December	22 nd April	20 th August	19 th May	8 th July	
Temminck's Stint			15 th October	12 th December	8 th July	25 th May
Long-toed Stint	19 th November	29 th April	12 th August	13 th May	8 th July	24 th January
Curlew Sandpiper	6 th August		2015		8 th July	
Broad-billed Sandpiper	24 th November	15 th March	7 th December	23 rd January	2 nd December	26 th April
Black-winged Stilt			7 th November	22 nd March	15 th December	
Gull-billed Tern					10 th April	
Lesser Crested Tern	24 th September	110 th January	7 th November	14 th January	24 th November	
Little Tern	12 th July	12 th November	12 th August	9 th October	12 th September	3 rd May
Whiskered Tern			17 th October	30 th November	2 nd October	12 th April
Brown Noddy			29 th June			29 th April
Small Blue Kingfisher	21 st March	12 th April	12 th October	27 th April	11 th May	
Black-capped Kingfisher	20 th October		20 th October		15 th October	25 th May
Blue-tailed Bee-eater	18 th September	27 th March	24 th September	4 th February	2 nd October	24 th January
Sand Martin						26 th April
Common Swallow	18 th August	22 nd April	9 th October	14 th April	12 th August	
Red-rumped Swallow	17 th December	23 rd March	23 rd December	27 th February	12 th December	15 th February
Yellow Wagtail	5 th September	29 th April	11 th September	22 nd April	25 th September	

Common Name	2013-2014		2014-2015		2015-2016	
	Arrival	Departure	Arrival	Departure	Arrival	Departure
Short-tailed Grey-headed Yellow Wagtail	5 th September	29 th April	11 th September	22 nd April	25 th September	16 th May
White Wagtail	18 th November	28 th January	6 th December	18 th February	12 th December	
Grey Wagtail	24 th September	20 th January	6 th September	21 st February	10 th September	
Common Stonechat	6 th December	8 th February	4 th November	14 th April		
Streaked Grasshopper-Warbler					12 th January	17 th April
Rusty-rumped Grasshopper-Warbler					4 th January	11 th April
Black-browed Reed-Warbler			6 th November	18 th January	18 th December	03 rd May
Oriental Great Reed-Warbler	17 th December	21 st February	8 th January	20 th March	19 th November	12 th April
Indian Great Reed-Warbler	29 th November	2 nd April	7 th November	22 nd April	28 th January	15 th May
Eastern Thick-billed Warbler			7 th March	10 th April		29 th April
Dusky Warbler	12 th November	13 th May	28 th October	12 th March	3 rd November	
Red-throated Flycatcher	14 th October	27 th March	9 th October	27 th January	13 th December	25 th May
Bar-tailed Godwit	1 st October	27 th March	24 th September	12 th March	2 nd October	26 th April
Greater Short-toed Lark	15 th December				19 th December	
Red-throated Pipit	29 th November	26 th January	6 th December	4 th February	19 th December	12 th March
Black Bittern			14 th January	12 th March		
Collared Pratincole			27 th March	14 th April	12 th January	
Little Cormorant			14 th March	22 nd April		
Glossy Ibis		18 th September	14 th April	12 th March	17 th January	24 th January
Oriental Pratincole	5 th November	5 th May	7 th November	22 nd April	12 th November	
Black headed Gull			9 th March		12 th January	16 th May
White-Winged Black Tern	25 th January	2 nd March	25 th March	14 th May		15 th May
Chinese Pond-Heron	18 th September	13 th April	9 th October	15 th April	7 th October	29 th April
Besra Sparrowhawk	27 th November	14 th January	24 th September	16 th January	12 th November	

Common Name	2013-2014		2014-2015		2015-2016	
	Arrival	Departure	Arrival	Departure	Arrival	Departure
Grey Heron	4 th December	10 th April	9 th October	22 nd April	19 th September	03 rd May
Indian Pond-Heron	14 th October	13 th May	9 th October	19 th May	6 th October	15 th May
Crab-Plover					12 th January	15 th February
Great Frigatebird			14 th March	18 th March		
Roseate Tern			10 th May		18 th June	12 th March
Asian House-Martin					24 th November	
Christmas Island Frigatebird			11 th June	7 th July		
Corn Crane					9 th February	12 th March

Comparative occurrence of wetland birds

A comparison of number of wetland bird species recorded from the tsunami inundated wetlands with those

from Andaman & Nicobar Islands, India, Asia and World is given in Table 6. Out of the 245 species of wetland birds recorded from India, 50 percent were found in the tsunami inundated wetlands.

Table 6: Comparative occurrence of wetland bird species in the tsunami inundated wetlands

Order and Family	World ¹	Asia ¹	India ²	A & N Islands ³	South Andaman *
Podicipediformes					
Podicipedidae	25	6	5	1	1
Procellariiformes					
Procellariidae	110	33	9	1	1
Pelecaniformes					
Sulidae	13	5	3	1	1
Fregatidae	5	3	3	3	2
Threskiornithidae	39	14	4	1	1
Phalacrocoracidae	40	13	3	1	1
Ciconiiformes					
Ardeidae	82	33	20	18	14
Anseriformes					
Anatidae	192	81	41	10	6
Gruiformes					
Rallidae	190	45	18	14	9
Charadriiformes					
Jacaniidae	8	3	2	1	1
Charadriidae	75	32	19	8	7
Scolopacidae	102	72	42	28	23
Recurvirostridae	13	2	2	1	1
Dromadidae	1	1	1	1	1
Burhinidae	11	5	4	1	1
Glareolidae	18	9	6	2	2
Laridae	120	65	37	15	9
Falconiformes					
Accipitridae	295	102	59	27	6
Falconidae	70	28	13	5	2
Pandionidae	3	1	1	1	1
Apodiformes					
Apodidae	123	34	16	7	1
Coraciiformes					
Alcedinidae	142	59	12	11	8

Meropidae	35	11	6	3	1
Passeriformes					
Hirundinidae	102	24	16	5	5
Motacillidae	34	27	21	9	5
Turdidae	198	73	28	11	1
Sylviidae	342	154	18	16	8
Muscicapidae	323	171	102	5	1

1 - Gill and Donsker (2012); 2 - Ali and Ripley (1983); 3 - Tikader, 1984; 4 - Present study

Discussion

The number of species recorded from the tsunami inundated wetlands of south Andaman showed high species richness, which is comparable to other wetlands in India. In the present study, 122 species of wetland and wetland dependent birds were recorded, which showed the importance of the area as a wintering ground for migratory species. The highest species of birds were recorded from Sippighat, followed by Ograbraj, Garacharma, Chouldhari, Chidiyatappu, Stewartgunj and Shoal Bay. In the present study, 38 species of trans-continental migrants were recorded, which showed the importance of the area as a wintering ground for migratory species.

The migratory birds arrived in the tsunami inundated wetlands in the month of September onwards during the three migratory seasons. Eighty nine species of migratory birds were observed, of these, sixty nine species were winter migrants. The result shows that, most of the migratory birds are arriving during the month of August/September and stay upto March/April in Andaman Islands. The departure of migratory birds started in early March, and continued upto May, however few species were recorded in all months during the study period.

Among the trans-continental migrants, Bar-tailed Godwit, Great Knot and Whimbrel are apparently capable of long distance flights (Driscoll and Ueta, 2000). Of the recorded species, seventy species were winter migrant, 24 species were resident. According to IUCN redlist, 114 species were listed as Least Concern in the IUCN red list, four species are Near Threatened, one species Vulnerable and three species are not recognized. The sighting of Chinese Egret from the Andaman Islands was the first

record of the species from India and South Asia.

Also the reports of nineteen new records from this islands shows the importance of the conservation of wetlands *i.e.* Marsh Sandpiper *Tringa stagnatilis*, Black-tailed Godwit *Limosa limosa*, Pheasant-tailed jacana *hydrophasianus chirugus*, Glossy Ibis *Plegadis falcinellus*, **Black-winged Stilt** *Himantopus himantopus*, **Black-headed Gull** *Chroicocephalus ridibundus*, Chinese Egret *Egretta eulophotes*, Ruff *Philomachus pugnax*, Heuglin's Gull *Larus fuscus*, Grey-headed Lapwing *Vanellus cinereus*, Corn Crake *Crex crex*, Ferruginous Pochard *Aythya Nyroca*, Garganey *Anas querquedula*, *Wedge-tailed Shearwater* *Puffinus pacificus*, Eurasian Wigeon *Anas Penelope*, Collared Pratincole *Glareola pratincola*, Little Cormorant *Phalacrocorax niger*, Common Starling *Sturnus vulgaris*, and Pied Crested Cuckoo *Clamator jacobinus*. As this wetland is coming under 'East-Asian Australasian Flyway', protection of the migratory species is of highest priority. The wetlands of Andaman are an ideal habitat for migratory and resident birds, especially for the winter visitors.

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