

STATUS OF WETLAND BIRDS IN KANYAKUMARI, THANJAVUR, CUDDALORE AND NAGAPATTINAM DISTRICTS OF TAMIL NADU, INDIA

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Introduction

Wetlands are one among the most important and productive ecosystems of the world, occupying about 6% of the earth's surface (Maltby and Turner, 1983). These have been described as "kidney of the landscape" as they function as the downstream receivers of water and waste from both natural and human resources (Mitsch and Gosselink, 2000). Wetlands are the important bird habitats and they use them for feeding, roosting and breeding (Weller, 1999; Stewart, 2001). Natural wetlands are in decline throughout the world as the human population keeps growing. Many wetlands have been drained, modified, or created to produce or enhance agricultural crops. This degradation has had an incalculable effect on wildlife numbers, water quality, hydrological cycles and other wetland functions and values. A recent study has shown about 38% loss of inland wetland in India during 1971 to 2001 (Prasad *et al.*, 2004).

Wading birds, especially the colonial nesting waders are one of the most conspicuous and well-known components of the wetland ecosystems (Hancock, 1984; Sharitz and Gibbons, 1989). Wetland birds are excellent indicators of water quality and measures of biodiversity. The wetland birds were used as an indicator of wetland function or as measures of success in wetland management, restoration, and creation (Weller, 1999). Hence, this study was undertaken to assess their status in the selected wetlands and to evaluate the quality of wetlands based on the status of the birds.

Study area

Tamil Nadu endowed with beautiful nature, has a tradition of preserving the ponds and tanks. The state has a number of rivers, all flowing from west to east from the Western Ghats to the Bay of Bengal. The rivers are entirely rain fed, short in length and are relatively small and seasonal. The presence of a large number of man-made wetlands (Village irrigation tanks) is a characteristic feature of the lowland plains. Totally, 42 major wetlands were surveyed in four selected districts i.e., Kanyakumari, Thanjavur, Cuddalore and Nagapattinam (Figure 1). Thanjavur District lies as the

East Coast of Tamil Nadu, between 09°50' and 11°25' N and 78°45' and 70°25' E. In this district 24 wetlands were surveyed namely Vaduvor lake, Kallaperambur lake, Arampundan lake, Ellachi lake or Maruthuri lake, Uppankuzhi lake, Andal lake, Aramundan lake, Kotra lake, Sembian lake, Kumman lake, Sayakudi lake, Alakapat lake, Pagadakudy lake, Pathamathiran lake, Maruthakudy lake, Pidari lake, Nangi lake, Raja lake, Vadavali lake, Bala lake, Ela lake, Karamba lake, Kada lake and Valambakudy lake.

Kanyakumari is the southernmost district of Tamil Nadu, which lies between 08°03' and 08°35' N and 77°15' and 77°36' E. In Kanyakumari district, 15 wetlands were selected namely Suchindram pond, Parakkai pond, Theroor pond, Manikkaputheri, Thathiar, Thalakudi pond, Putheri, Periakulam, Veeranikulam, Chunkakadai and Vembanur. Cuddalore district lies on the East Coast, to the north of Nagapattinam district, between 11°12' and 12°35' N and 78°38' and 78°80' E. In this district, two wetlands namely Wellington and Veeranam lake were selected. Nagapattinam district lies between 10°25' and 11°40' N and 76°49' and 80°01' E. Perumthottam wetland was selected for the present study. This study was carried out from January to March 2006.

Methods and Analysis

Birds are being counted following wide variety of methods (Bibby *et al.*, 2000). For water birds, direct counting method was used. In this method, a suitable vantage point is selected and all visible birds are counted. Another method, "total count" was used wherever possible, by walking around the wetlands or from specific vantage points to count the birds (Vijayan, 1991). If not completely covered, the percentage of coverage was marked. (b) Block count: During counts, each site was divided into many sections and each section was counted. Birds flying from behind the observer were not counted. Systematically this survey was conducted in early morning around 6.00 hrs to 10.00 hrs, all the birds on the ground or in the water were counted using Bushnell binocular (8x42) and birds were identified following the methods described by (Grimmett *et al.*, 1998) and Ali (2002). Vegetation cover was also recorded

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Table 1
Bird species diversity in different wetlands .

Name of the wetlands	Species Diversity
Suchindram	2.21
Parakkai	2.34
Theroor	2.24
Manikkaputheri	2.42
Thathiar	1.97
Thazhakudi	1.96
Putheri	2.66
Periakulam	2.7
Veeranikulam	2.31
Chunkakadai	2.03
Vembanur	2.37
Vaduvoor Lake	2.04
Kalleperambur	2.4
Arampundan	2.47
Maruthuru or Elachi	0.94
Uppankuzhi Lake	1.78
Andal	2.08
Kotra	1.85
Sembian eri	1.25
Kumman	2.04
Sayakudi eri	1.08
Alakapat	1.58
Pagadakudi	0.96
Pethamathiran	1.44
Maruthakudi	2.34
Pidari	2.35
Nangi eri	2.24
Raja	1.89
Vadavali	2.05
Bala eri	1.68
Ela eri	1.86
Karamba	1.42
Kada eri	0.41
Valambakudi	2.09
Veeranam Lake	1.85
Wellington Lake	1.45
Perunthottam Lake	1.64

in the study districts for analyzing quality of wetlands. Circular plot method was used for vegetation sampling. Four to five plots were laid randomly in each wetland depending upon its size. Plot size was about one meter radius and vegetation cover was calculated in percentage. Shannon-Weiner diversity index was used for diversity estimation at different wetlands, and commonness index and dominance index were used for estimating common and dominant bird species in different wetlands in the study area.

Results

During the study period, 42 wetlands were surveyed in four districts and 15616 individual birds

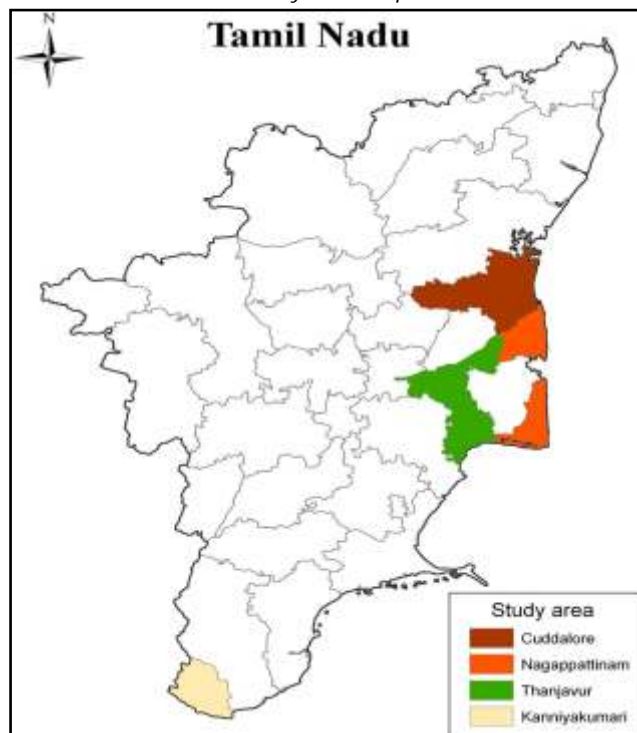
belonging to 65 species in 31 families were recorded. Out of 65 species of birds, 42 were wetland species and 23 species were terrestrial (Annexure 1). The most common family in the study area was Ardeidae (Commonness index=0.33) followed by Anatidae (Commonness index=0.27). The district-wise diversity was maximum in Kanyakumari district (2.24) followed by Thanjavur (1.74) and Cuddalore (1.65) (Fig. 2).

In Kanyakumari district, fifteen wetlands were surveyed. Total number of birds recorded were 6977 individuals belonging to 57 species of 29 families. Maximum number of birds (1184) were recorded in Theroor lake, these belong to 15 families. Minimum number of birds are 151 belonging to 13 families in Manikkaputheri. The bird species diversity was maximum in Periakulam (2.70) followed by Putheri (2.66) and least in Thazhakudi pond (1.59) (Table 1). In Kanyakumari district cattle egret (23.10 %) and little cormorant (13 %) were the dominant bird species. One threatened and two near threatened species namely spot-billed pelican (*Pelicanus philippensis*) (VU), painted stork (*Mycteria leucocephala*) (NT) and darter (*Anhinga melanogaster*) (NT) (Birdlife International, 2001) were recorded during study period. In this district, Theroor lake and Suchindram had moderate vegetation (40%). Other wetlands had high vegetation cover (60 -70 %) Thazhakudi lake had very low vegetation (10%) and water was very clear. Most dominant plant species of vegetation are *Trapa natans*, followed by *Nelumbo nucifera*, *Eichhornia crassipes*, *Nymphaea nouchali* and *Ipomea aquatica*.

During the study period, in Thanjavur district 24 wetlands were surveyed from which 5311 individual birds belonging to 46 species and 22 families were recorded. In Vaduvoor lake, maximum number of birds (1457) was recorded which belong to 24 species. Minimum number of birds was recorded in Kada eri (14) which belong to two families. Species diversity was very high in Aramundan lake (2.47) and it was lowest (0.41) in Kada eri (Table 1). In this district little egret (*Egretta garzetta*) (15.51 %), open-bill stork (*Anastomus oscitans*) (10.05%) and cattle egret (*Bubulcus ibis*) (9.73 %) were dominant species. In Thanjavur district, Vaduvoor and Kalleperambur had moderate vegetation cover (30%). Most dominant plant species were *Nelumbo nucifera*, *Lemna* sp, *Hydrilla verticillata* and Algae. *Acacia* and *Prosopis juliflora* were found in the wetland corners and surroundings. Kada eri had very low vegetation cover (5-6%) and water was very clear and most of the other wetlands in this district had high vegetation cover (60%) and those wetlands were polluted.

In Cuddalore district, two wetlands were surveyed

Fig. 1
Study area Map



and total 3218 individual birds belonging to 30 species and 17 families were recorded. In these two wetlands maximum number of birds were recorded in Wellington lake (2783) which belonged to 27 species. The species diversity was high (1.85) in Veeranam (Table 1). In this district Garganey Teal (*Anas querquedula*) was the dominant species (57.49%). In both Veeranam and Wellington lakes, vegetation cover was moderate (40%) and *Ipomea aquatica* and *Cyperus* sp were the dominant species.

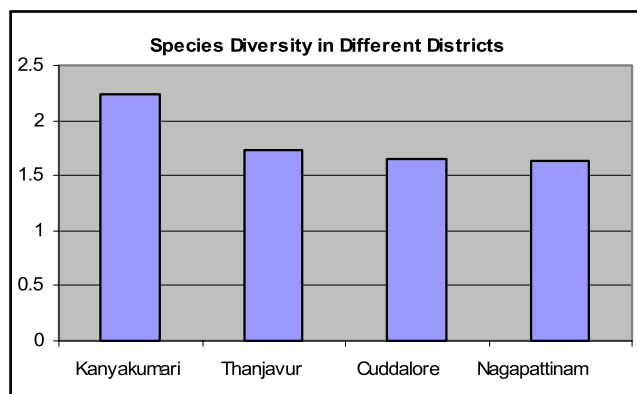
In Nagapattinam district, only one wetland Perunthottam was surveyed and a total of 110 birds belonging to 9 species and 8 families were recorded and the diversity value was 1.64. Open-billed Stork (*Anastomus oscitans*) was the dominant bird species (41.81%). Vegetation cover was very high and water was polluted by the local peoples. *Ipomea carnea*, *Nymphaea* sp, and *Sacharam* sp were the dominant plants.

Discussion

In the earlier study by Vijayan (1986), 318 species of birds in the inland wetlands of Tamil Nadu were reported. Out of these 193 species are fully depended on wetlands (Vijayan *et al.*, 2004), whereas in our study only 65 species were recorded, out of which 40 species were fully dependant on wetlands. This lower record of species number might be due to shorter period of study i.e. January to March 2006 which was a period of post winter season, at which time the water availability is very low and also the study was restricted to only few districts of

Tamil Nadu. During present study period the water level started decreasing in many of the wetlands and most of the migratory birds started moving. This might be the reason for the less sighting frequency. Various earlier studies have also reported that water level and bird abundance are inter-related (Vijayan, 1991; Colwell and Taft, 2000). Ardeidae contributed the maximum species in the present study like in many other studies on different wetlands of India (Vijayan, 1991; Urfi and Sharma, 1992). Nineteen of the colonially nesting water birds are known to breed in Indian heronries (Subramanya, 2005). During the present study eight species of herons were found to breed in different wetland sites. During the study period, one threatened species namely spot billed pelican and two near threatened species viz., darter and painted stock were recorded (Birdlife International, 2001). Present study indicates that species diversity related to the vegetation cover and the same trend was observed by Kauppinen and Vaisanen (1993). Shortage of nest sites was observed in many wetlands, mainly due to cutting, lopping of trees for timber, fuel-wood and fodder. *Nelumbo nucifera* was used by marsh nesting birds. Agricultural wetlands are primary foraging sites for many species of water birds, and as natural wetlands continue to decrease in area and quality. They have become increasingly important refugia for water birds throughout world (Czech and parsons, 2002). In the present study, maximum number of birds was recorded in moderate vegetation cover and most of the wetlands had a high vegetation cover. It might be affect feeding habits of birds and the nature of the wetlands. According to these results vegetation cover might be factor to determine birds' population and diversity and the same trend was observed in Keoladeo National Park by Vijayan (1995). It is interesting to note those lily pond ecosystems are invariably used by all the birds in the study sites. The wetland birds do not feed in those ponds but gather at the pond to seek relief from heat stress. *Ipomea carnea* was affecting especially, fully dependant wetland birds. Many wetlands such as Suchindram, Theroor, Vaduvor and Kalleperambur have support good number of birds and these wetlands are protected areas. Vaduvor has been declared as 'bird sanctuary' recently. The major threats observed in the studied wetlands were drainage, conversion for cultivation, encroachment for roads, settlements and human disturbances especially fishing. The above mentioned threats were reported elsewhere (Owens, 1977; Kaiser and Fritzell, 1984; Burger and Gochfeld, 1991; Skagen *et al.*, 1991; Marzluff *et al.*, 1998). Some nesting sites are close to human settlements and at the time of sunset, the colonial nesting birds make huge noise, often leading to conflict with local people. Loss of

Fig. 2



Bird species diversity in different districts

wetlands has significantly increased the importance of wetland-dependent organisms such as water birds (e.g. Podicipediformes, Ciconiiformes, Anseriformes, Gruiformes and Charadriiformes) (Mitsch and Gosselink 2000). For management of wetlands, providing a diversity of foraging habitats has led to attracting diverse and abundant waterbird communities (Fredrickson and Reid, 1986; Velasquez, 1992; Laubhan and Fredrickson, 1993; Reid 1993). These wetlands play an important role in the breeding and roosting of birds and also several other taxa of fauna and flora. Further surveys and intensive studies in various seasons of the year may bring out better results for the conservation of these wetlands.

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SUMMARY

Wetlands are important bird habitats and are also used by local people for their livelihoods. Study was undertaken to assess the status of the wetland birds in the selected wetlands by using total count method during January-March 2006. Forty two major wetlands were surveyed in four districts of Tamilnadu namely Kanyakumari, Thanjavur, Cuddalore and Nagapattinam. Totally 15,616 individual birds belonging to 65 species of 31 families were recorded. Out of the 65 species recorded, 42 were wetland and 23 were terrestrial species. The most common bird family in the study area was Ardeidae (Commonness index=0.33) followed by Anatidae (Commonness index=0.27). One threatened and two near threatened species namely, spot-billed pelican (*Pelicanus philippensis*) (VU), painted stork (*Mycteria leucocephala*) (NT) and darter (*Anhinga melanogaster*) (NT) were recorded.

Key words: wetland, water birds, Ardeidae, Tamil Nadu, conservation.

तमिलनाडु, भारत से कन्याकुमारी, तंजावर, कड्डालूर और नागपट्टिनम जिलों में जलभूमि पक्षियों की स्थिति

एन. श्रीधरन्, एस. सोमसुन्दरम्, के. त्याकेशन व ललिता विजयन

सारांश

जलभूमियाँ महत्वपूर्ण पक्षी प्राकृतावास हैं और अपनी आजीविका के लिए स्थानीय लोग भी इन्हें अपने काम में लाते हैं। जनवरी-मार्च 2006 के दौरान समग्र गणना विधि अपनाकर कुछ चुनी हुई जलभूमियों में जलभूमि पक्षियों की स्थिति आकलित करने का यह कार्य हाथ में लिया गया। तमिलनाडु के चार जिलों अर्थात्, कन्याकुमारी, तंजावर, कड्डालूर और नागपट्टिनम की बयालीस मुख्य जलभूमियाँ सर्वेक्षित की गई। कुल मिलाकर 31 वंशों में आती 65 जातियों के 15,616 पक्षि आलेखित किए गए। इन 65 जातियों में 42 जलभूमि की थी और 23 भूमि पर रहने वाली। अधीत क्षेत्र में सबसे आम मिलती वंश आर्डेयडि (सार्वत्रिका निर्देशांक =0.33) जिसके उपरान्त एनाटिडी वंश (सार्वत्रिका निर्देशांक =0.27) आता है। एक संकटापन्न और दो अन्य लगभग संकटापन्न जातियाँ अर्थात् लांछित चंचु प्लवक (पेलिकानस फिल्लीचेंसिस (VU)) रंगित स्टार्क (मायक्टेरिया ल्यूकीसेफालस (NT)) और डार्टर (आनहिंगा मेलानोगास्टर (NT)) भी आलेखित किए गए।

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Appendix 1

Distribution of wetland birds in different districts.

Common Name/Family	Scientific Name	Status	Kanyakumari	Thanjavur	Cuddalore	Nagapattinam
Podicipedidae						
Little Grebe	<i>Podiceps ruficollis</i>	R	✓	✓	✓	✓
Pelecanidae						
Spot-billed Pelican	<i>Pelicanus philippensis</i>	RM	✓		✓	
Phalacrocoracidae						
Little Cormorant	<i>Phalacrocorax niger</i>	RM	✓	✓	✓	
Anhingidae						
Darter	<i>Anhinga melanogaster</i>	RM	✓	✓	✓	
Ardeidae						
Grey Heron	<i>Ardea cinerea</i>	RM	✓	✓	✓	
Purple Heron	<i>Ardea purpurea</i>	RM	✓	✓	✓	
Indian Pond-Heron	<i>Ardeola grayii</i>	R	✓	✓	✓	✓
Cattle Egret	<i>Bubulcus ibis</i>	RM	✓	✓	✓	
Smaller Egret	<i>Egretta intermedia</i>	RM	✓	✓	✓	
Large Egret	<i>Ardea alba</i>	RM	✓	✓	✓	
Little Egret	<i>Egretta garzetta</i>	R	✓	✓	✓	
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	R		✓		
Ciconiidae						
Asian Open-bill Stork	<i>Anastomus oscitans</i>	R	✓	✓	✓	✓
Painted Stork	<i>Mycteria leucocephala</i>	RM	✓	✓		
White-necked Stork	<i>Ciconia episcopus</i>	R	✓			
Anatidae						
Lesser Whistling-Duck	<i>Dendrocygna javanica</i>	R	✓			
Common Teal	<i>Anas crecca</i>	M		✓		
Spot-billed Duck	<i>Anas poecilorhyncha</i>	RM	✓	✓	✓	
Garganey Teal	<i>Anas querquedula</i>	M	✓	✓	✓	
Northern Pintail	<i>Anas acuta</i>	M		✓	✓	
Cotton Teal	<i>Nettapus coromandelianus</i>	R	✓	✓	✓	
Rallidae						
Common Moorhen	<i>Gallinula chloropus</i>	RM	✓	✓		
White-breasted Water hen	<i>Amaurornis phoenicurus</i>	R	✓	✓		
Indian Purple Moorhen	<i>Porphyrio porphyrio</i>	R	✓	✓		
Common Coot	<i>Fulica atra</i>	RM	✓	✓		
Jacanidae						
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	R	✓	✓		
Bronze-winged Jacana	<i>Metopidius indicus</i>	R	✓			
Charadriidae						
Red-wattled Lapwing	<i>Vanellus indicus</i>	R	✓	✓	✓	
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	R	✓			
Little Ringed Plover	<i>Charadrius dubius</i>	RM	✓	✓		
Scolopacidae						
Common Sandpiper	<i>Tringa hypoleucos</i>	RM	✓	✓	✓	✓
Spotted Sandpiper	<i>Tringa glareola</i>	M	✓	✓	✓	
Marsh Sandpiper	<i>Tringa stagnatilis</i>	M	✓	✓		
Common or Fantail Snipe	<i>Gallinago gallinago</i>	RM	✓	✓		
Greenshank	<i>Tringa nebularia</i>	M		✓		
Recurvirostridae						
Black-winged Stilt	<i>Himantopus himantopus</i>	R	✓	✓		
Laridae						
Gull-billed Tern	<i>Gelochelidon nilotica</i>	RM	✓			
Common Tern	<i>Sterna hirundo</i>	RM	✓			
River Tern	<i>Sterna aurantia</i>	R			✓	
Alcedinidae						
Indian Pied Kingfisher	<i>Cerylerudis leucomelanura</i>	R	✓	✓		
Small Blue Kingfisher	<i>Alcedo atthis pallasii</i>	RM	✓	✓	✓	✓
Stork-billed Kingfisher	<i>Pelargopsis capensis</i>	R	✓			
White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	R		✓	✓	✓

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Sale of Bamboo Seeds

Limited quantity of seeds of edible bamboo *Dendrocalamus asper* are available for sale in the Range Office, Silviculture Division, Forest Research Institute, Dehra Dun @ Rs. 1,000=00 (Rupees One thousand only) per kg. For booking your order, write to Head, Silviculture Division, F.R.I., P.O. New Forest, Dehra Dun (Uttarakhand) or contact at Tel. No. 0135-2224418.