

RESEARCH ARTICLE

WETLAND RESOURCE UTILIZATION BY SPOT-BILLED PELICANS IN COIMBATORE, TAMIL NADU

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ABSTRACT

The Spot-billed Pelican (*Pelecanus philippensis*), a near threatened bird and one of eight pelican species in the world, can be found only in South and Southeast Asia over an area between 129000 and 181000 km² with strongholds in India, Sri Lanka, southern Cambodia and coastal areas of Sumatra. In India, it is presently distributed in southern and northeastern India with concentrations in Andhra Pradesh, Tamil Nadu, Karnataka and Assam states. The present study deals how the spot-billed pelicans utilize the wetlands as well as their behaviour is noted in order to plan conservation and management strategies for the species.

Keywords: wetland resources, Spot-billed pelican, threats, conservation.

1. INTRODUCTION

Wetland

Wetlands are defined as 'lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water (1). Wetland ecosystems are important habitats for flora and fauna and hence are of national and international importance for conservation. Wetlands can be defined as areas of high groundwater environments that are characterised by permanent (shallow water bodies) or temporary inundation, or soils having hydric properties. They provide a number of critical ecological functions, including the regulation of water regimes, and support a significant percentage of the world's biodiversity that have adapted to life in saturated conditions. Wetland ecosystems depend on water levels and therefore climate change, especially changes in precipitation, is likely to have a significant impact on these habitats and associated species (2).

Wetlands in India occupy 58.2 million hectares, including areas under wet paddy cultivation (Directory of Indian Wetlands). Majority of the inland wetlands are directly or indirectly dependent on the major rivers like, Ganga, Bhramaputra, Narmada, Godavari, Krishna, Kaveri, Tapti. They occur in the hot arid regions of Gujarat and Rajasthan, the deltaic regions of the east and west coasts, highlands of central India, wet humid zones of south peninsular India and the Andaman and Nicobar & Lakshwadeep islands. Wetlands are important to both floral and faunal populations. Wetlands birds provide us with some of nature's wonderful sights. Apart from their beauty and economic importance, these birds are excellent

indicators of water quality and measures of biodiversity. A wide variety of birds use wetland habitats for all or part of their life. They form one of the major components of the wetland ecosystems.

Pelican

Pelicans belong to the family Pelecanidae. They are large, web-footed, gregarious birds. They are characterised by large wing- spread, very long bill and a pouch in the upper throat in which they store fish before swallowing. The air sacs serve to keep the pelican remarkably buoyant in the water (3). They roost and loaf communally on beaches, sandbanks, and in shallow water. Adult pelicans rely on visual displays and behaviour to communicate (4). Pelicans are gregarious and nest colonially. Pairs are monogamous for a single season, but the pair bond extends only to the nesting area; mates are independent away from the nest. The location of the breeding colony is constrained by the availability of an ample supply of fish to eat, although pelicans can use thermals to soar and commute for hundreds of kilometres daily to fetch food (5). They feed usually on fish. There are eight living species of pelicans which are American white pelican (North America and Mexico - Least Concern), Brown pelican (Coastal distribution ranging from North America and the Caribbean to northern South America and the Galapagos - Least Concern), Peruvian pelican (Pacific Coast of South America from Ecuador and Peru south through to southern Chile - Near Threatened), Great white pelican (Patchy distribution from eastern Mediterranean east to Indo-China and Malay Peninsula, and south to South Africa- Least Concern), Australian pelican (Australia and New Guinea; vagrant to New Zealand, Solomons, Bismarck Archipelago, Fiji and Wallacea - Least

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Concern), Pink-backed pelican (Africa, Seychelles and south-western Arabia – Least Concern), Dalmatian pelican (South-eastern Europe to India and China – Near Threatened) and Spot-billed pelican (Southern Asia from southern Pakistan across India east to Indonesia – Near Threatened). In southern India there are 21 known breeding colonies in the states of Andhra Pradesh, Karnataka and Tamil Nadu (6).

Spot-billed Pelican (*Pelecanus philippensis*)

Spot billed pelican is one of the eight species of Pelicans. Adult pelican has a silver-grey on back with darkish centres to wing-coverts and whiter beneath. Bill pinkish with, in early season, bright yellow margin and bluish-spotted sides (hence name) becoming yellowish towards tip, with orange nail. Pairing pelicans have pale bill-tip. Pouch dull purple or reddish. Legs, feet brown or blackish. Juvenile has pinkish bill at first, not distinctly spotted till 2nd year though spots seen before then. Pouch is pink, grey or pale bluish. Commutes in flocks to and from feeding areas. Both solitary and communal feeding observed latter involving line or semi-circle of birds. These are mainly piscivorous birds. Food includes frogs, lizards, and snakes as well as fish. Twenty types of behaviour were grouped into nine categories: alert, resting, comfort/maintenance, locomotion, foraging, antagonistic, sexual, chick care and feeding and vocalizations (7). The Spot-billed Pelican is not as aggressive to other members of the same species and other species as the White Pelican (*Pelecanus erythrorhynchos*). In the presence of a perceived threat, both young and adults turn silent. During mating, the pelicans use a number of different social signals, both vocal and visual. Mates also greet each other with neck stretching and a duet of groans. The spot-billed pelican frequents marshes, rivers, estuaries, reservoirs, tanks, flooded fields, large lakes, brackish lagoons, tidal creeks, along the coast, and often feeds in quiet backwaters. As for nesting habitat, it prefers large trees of species in undisturbed areas. The pelicanries are generally found in and around water bodies, including rivers, reservoirs and seasonal ponds and are seen mixed colonies with other water (Kannan & Pandiyan, 2013).

Present status of Spot-Billed pelicans

Spot-billed Pelican is one of the most threatened of the seven species of pelicans in the world (8). The species was first documented in 1789 by Gmelin in the Philippine Islands (9). Most endangered pelican. World breeding population probably not more than 2,500 pairs and total population fewer than 13,000 individuals. Formerly

abundant, though ‘millions’ in Burma perhaps not literal; widespread in Asia. Now mainly if not entirely in Sri Lanka and SE India though perhaps still present in Burma and possibly other sites in Indo-Malaya (Bock and Kikkawa). It’s only known present day breeding populations occur in Sri Lanka, India and Cambodia. It was categorized as “Vulnerable” in the IUCN Red Data List in 2001 but according to a recent update from India, its’ estimated population has been revised upwards from a low of 5,500-10,000 birds in 2002 to estimated 13,000-18,000 individuals in 2006. Therefore its status has been reviewed as “Near threatened” (10) (Weerakoon and Athukorala). Due to habitat loss and human disturbance, the spot-billed pelican's numbers have declined and many populations in Southeast Asia are now extinct (11).

2. MATERIALS AND METHODS

2.1. Study area

Selected study areas include few of the tanks of Coimbatore district which include Ukkadam-Periyakulam, Valankulam, and KurichiKulam.

Ukkadam: This Lake is also called as Periyakuam. It receives water supply from the Coimbatore Anicut channel from Noyyal River and from SelvaChinathamani Lake. The lake is used for regular fishing. The lake is used as a regular habitat by many birds. Most species were recorded in March before the start of summer and was the least in the winter months of November and December.

Kurichi Kulam: Kurichi Kulam is one of the major lakes of Coimbatore city. The lake is an excellent example for the species diversity. It inhabits many insects, reptiles, fishes and birds. It is situated near to the Pollachi road. Slum dwellers living around the lake use it for domestic purposes.

Valankulam: Ukkadam-Valankulam Lake is one of the lakes in Coimbatore, South India. It is situated between Trichy road and Sungam bypass road connecting with Ukkadam. A railway track connecting Coimbatore Junction and Podanur passes over the lake. It serves as an excellent habitat to many local migrant birds.

3. RESULTS

The status and colony size of spot-billed pelicans were studied in Tamil Nadu from the month of July 2018 to December 2018. Bird count and habitat use studies were carried out in the three different wetlands namely Ukkadam- periyakulam,

Kurichikulam and Valankulam, which are used as the foraging sites by the spot-billed pelicans.



Map of three foraging sites

Colony size dynamics was studied with the help of colony size and duration of presence of species. Out of the three sites, the highest number was observed in the Valankulam (73) in the month of July and by the month of November and December the number of spot-billed pelican decreased drastically in all the three wetlands. During the survey, the maximum number of spot-billed pelicans were observed in the month of July; (42), (54) and (73) in Ukkadam-periyakulam, Kurichi kulam and Valankulam respectively whereas the minimum population was observed in the month of December; (6), (0) and (0) in Ukkadam-periyakulam, Kurichi kulam and Valankulam respectively (Fig 1.).

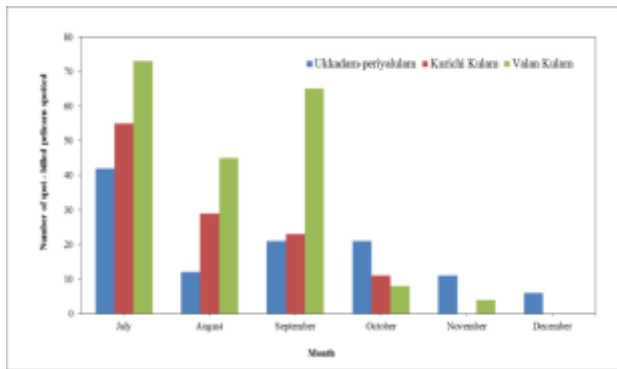


Fig 1. The population of Spot- Billed Pelican observed in different habitat during the ground surveys at three foraging sites from July 2018 to December 2018

The spot-billed pelicans utilized the resources of the three wetlands namely trees, bund, water and tower. In Ukkudam Lake the species were observed utilizing all the four resources compared to the other two wetlands. In the month of July, the maximum population of the spot-billed pelicans were sited on the bund and few numbers in the water followed by August. The species started occupying the trees

interestingly and the towers situated in and around the lake slowly by the month of September followed by October. By the month of November and December, the colony size of the spot-billed pelicans reduced drastically in the lake and they were sited only on the bund and in the water (Fig 2.).

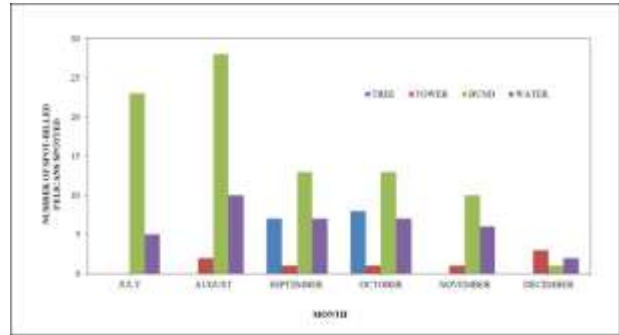


Fig 2. Population of spot-billed pelican observed utilizing the wetland resources during the ground survey at Ukkadam-periyakulam from July 2018 to December 2018

When compared to Ukkadam-periyakulam and Valankulam, Kurichi kulam has no trees and towers situated nearby and therefore the spot-billed pelicans mainly occupied the bund located in the centre of the lake and also utilized the water for different activities. Maximum population was observed on the bund in the month of July which dramatically reduced to zero by the month of December (Fig 3.).

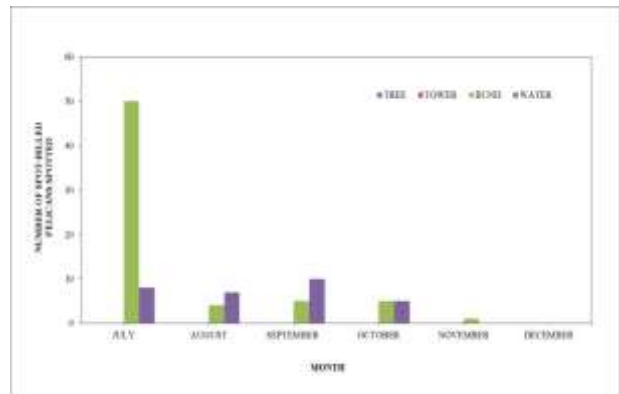


Fig 3. Population of spot-billed pelican observed utilizing the wetland resources during the ground survey at Kurichikulam from July 2018 to December 2018

Valankulam has no towers allocated nearby, which therefore resulted the sightings of the species on the bund, trees and water. In the month of July, the spot-billed pelican colonies were seen on the bund and the species first started appearing on the trees in

August followed by September and October respectively. The colony was restricted only to water in November and by the month of December there were no spot-billed pelicans observed in the lake (Fig 4.).

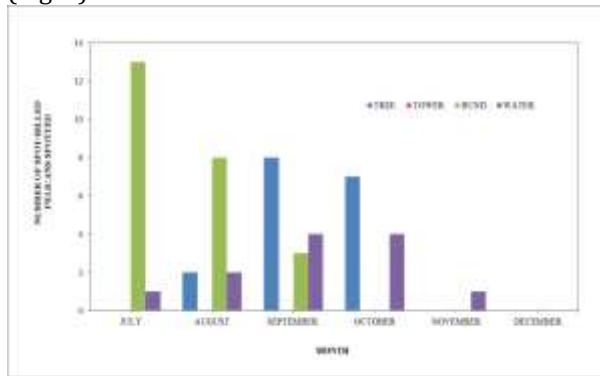


Fig 4. Population of spot-billed pelican observed utilizing the wetland resources during the ground survey at Valankulam from July 2018 to December 2018

4. DISCUSSION

The spot-billed pelicans are considered as the category of Near Threatened species by the IUCN (9). Interestingly the species are observed in South India namely in Karnataka, Andhra Pradesh and Tamil Nadu in varying numbers (8).

The population size of the spot-billed pelican decreased during the study period of six months from July 2018 to December 2018. The population size changed with changes in high quality habitat and broader ranges of habitat. The three wetlands had optimum amount of water and as a result a huge number of avian diversity was observed. Spot-billed pelicans are considered to be the local migratory birds. As pelicans are highly mobile, they can move in and out of the study area in large numbers if conditions are not conducive to feeding. These emigrations create real fluctuations in numbers (12).

The spot-billed pelican population is very high in Valankulam during the months of July to September, whereas the numbers are comparatively high in Ukkadam-periyakulam during October to December. It is noted that the population in the Kurichi kulam gradually decreased from July to December (Fig 1.). It may be suggested that local migration has not been affected in Kurichi kulam during this period, whereas there are changes observed in migration in the other two foraging sites studied. During the month of November and December, none or very few numbers were spotted in the Kurichi kulam (Fig 1.), which also indicates that July to October are the suitable period for the

spot-billed pelicans for inhabiting the three wetlands studied.

In Ukkadam Lake the species were observed utilizing all the four resources compared to the other two wetlands. Among the four resources, the spot-billed pelicans occupied mainly the bund all over the study period except in the month of December 2018, wherein the species utilized water resources almost throughout the study period invariably. Very few numbers were spotted on the tower and trees throughout the study period except in the month of December (Fig 2.). Compared to the other two wetlands, trees and towers were not available in the Kurichi kulam and therefore the spot-billed pelicans mainly utilized the bund for roosting throughout the study period except in the month of December. Water resources were well utilized by the species mainly for feeding due to the tremendous availability of fishes in the lake (Fig 3.).

In Valankulam the spot-billed pelicans were observed utilizing the water resources throughout the study period except in the month of December. Compared to the other two study sites the species were recorded utilizing the trees consecutively for three months (August to September). Whereas the bunds were utilized only for the three months from July to September (Fig 4.).

Probably, increased water level was not preferred by this species as they started moving from the three foraging sites to other wetlands which held shallow water. They mostly preferred shallow water for feeding and are voracious feeders. Like other water birds, pelicans are generally found on or near water. Due to its large size and their strong gregarious tendencies, pelicans need an abundant supply of fish, a requirement that severely restricts the potential range of most species (13). Due to the climatic change experienced by south India, it led to the increase in water level in the wetlands which resulted in the drastic variation in the population density of the species. The aquaculture practices in these three wetlands increased as the water level had risen, which marked a threat to the bird. They were being trapped and tangled in the fishing lines which were surrounded all around the lake.

The spot-billed pelicans breeding from the month of October to April (8), in the present study, it was noted that the spot-billed pelicans were migrating to Vellalore lake in for breeding from the foraging sites. Environmental factors can play an important role in influencing pelican population. Weather in particular has various biological and ecological impacts in population of spot-billed pelican (14).

Anthropogenic activities also influenced the declining of the Spot-billed pelicans during the present study period. The pelicans, pelicanaries and their foraging grounds are under multitude of increasing pressures, which, if not addressed, could result in the decline or extinction of the species. Most of the wetland habitats in India face severe and increasing threats from human and human related factors (8). The future of nesting colonies of these birds located in protected areas appears to be safe when looked in isolation, but since breeding success is dependent on food supplies, their future will be assured only if their foraging grounds are in good health.

The reduction in numbers has been attributed to the unscientific desilting, which has damaged native species and blocked the inflow and outflow of water. Rapid urbanization and overgrowth of invasive vegetations like Water Hyacinth, Hydrilla, Prosopis juliflora and Parthenium are also seen as causes.

Based on the observations made in the present study, we concluded that the maximum population were recorded at Valankulam and minimum population at Ukkadam-periyakulam. The spot-billed pelicans mainly utilized wetland resources in the form of bund, tower, trees and water in the three foraging sites. The species preferred shallow water and which was one of the major reasons that spot-billed pelicans were observed in the three selected wetlands. One of the main reasons for the population reduction of Spot-billed pelicans in the studied wetlands is the intense aquaculture practices which are ongoing in the wetlands. It marked a major threat to the species as they tend to get trapped and tangled among the fishing lines spread across the lakes. Local migration for breeding is another reason for the population decline of Spot-billed pelicans.

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