

## The study of biodiversity of water birds in the Suruwila lake region of Anawilundawa Tank Sanctuary (Ramsar Convention), Srilanka

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### ABSTRACT

The Suruwila Lake, is a part of the Anawilundawa Water tank system that comprises of seven small irrigation tanks, Pinkattiya, Wellawala, Maradansole, Irakka-wela/IhalaWewa, Anawilundawa, Suruwila and Maiyawa located between 7°40'N and 79° 49'E , in the North Western Province of Puttalam in Sri Lanka. It is protected under the Ramsar Convention for wetlands since 03/08/2001. The total area of the region under protection encompasses an area of 1397 ha. The study was conducted over a period of three days (from 13/05/2014 to 28/05/2014) spread over a fortnight and employed an all-out search method. The recorded sightings include the birds that were seen and identified at the water front during the daylight from between 0600 hours to 1600 hours, thus this research project include only daylight sighting of water birds as the primary component. A total of 29 birds that reside near the lake were recorded, which can be broadly divided into 13 families. Of the birds, that, were observed at the Suruwilalake, there is a greater presence of birds belonging to FamilyArdeidaeat a species level. Of the 9 identified species, a lone *Casmerodiusalbus*(GreatEgret) was seen, in flight. A single sighting of *Platalealeucordia* (Eurasian spoonbill) and *Anhinga melanogaster*(Oriental Darter) were made. The most common species of the Family Rallidaewere *Porphyrioporphyrrio*(purple swamphen). Dense human habitation and settlement, who engage in fishing and paddy cultivation for an occupation is noticeable. The region sees the disturbing presence of water hyacinth that are reported to be abundant in the Suruwila Lake during the rainier presence was observed, whose successful growth rate can be attributed to inorganic fertilizers that are used in paddy farming. Detrimental impact of the human population extends to reports suggesting the involvement of people in illegal trade of animals and birds. A closer proximity to the highway suggest that the wetland system can be affected by pollution and in turn may have adverse effect on the biodiversity count. There is a possibility that the practice of agriculture can lead to the encroachment of the area that comprise the wetland. The study emphasis the need to conserve the wetland ecosystem, they sustain a high level of biodiversity of both flora and fauna. Moreover, they aide in, flood mitigation, maintaining ground water levels and in reducing pollution.

### Key words:

Ramsar, Wetland, Suruwila Lake, Anawilundawa Water Tank, water birds, biodiversity.

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## 1. INTRODUCTION

The Convention on Wetlands of International Importance, called the Ramsar Convention was adopted in the Iranian city of Ramsar in 1971. The Ramsar Convention of Wetlands came into force in Sri Lanka on 15 October 1990. Budala had been the first to be included in the Ramsar List. The inclusion of Anawilundalawa water tanks was made in 2001. Presently, Sri Lanka has 6 of its wetlands listed in the Ramsar List of wetlands which total a surface area of 198, 172 hectares. The Ramsar Convention defines wetlands as “areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres”.

Wetlands are among the most productive ecosystems in the world. They provide fundamental ecological services and are regulators of water regimes. They play an important role serving as flood retention areas; as filters for sediments, nutrients and pollutants released to the environment. It is a source of biodiversity at all levels – species, genetic and ecosystem. They are known to harbor around 25% of the endangered species, and hence is crucial to the ecological balance. They constitute a resource of great economic, scientific, cultural and recreational value for the community. Wetlands have played an important role in the culture of many communities and countries. In addition, wetlands have a vital role in the climate change adaptation and mitigation. Progressive encroachment on and loss of, wetlands cause serious and sometimes irreparable environmental damage to the provision of ecosystem services. They should hence be restored and rehabilitated, whenever possible and it should be ensured that its use is sustainable and not damaging.

Wetlands, both natural and man-made, currently make up about 15% of the land area of Sri Lanka. They are an integral part of Sri Lanka's unique ecological and biological diversity. About two-thirds of the total area of all wetlands in the islands are man-made, and consist of rice paddies, irrigation tanks, large reservoirs, canals, and aquaculture ponds. Though lacking large natural lakes, Sri Lanka has about 12,000 irrigation tanks that vary in size from 1 to 6,500 ha. and less than 100 exceed 300 ha in size. While most irrigation tanks were originally constructed several centuries ago, they have been restored for present use. Most tanks are located mainly in the Dry Zone and together they irrigate over 500,000 ha of agricultural land., the larger irrigation reservoirs exceeding 200 ha each cover an area of 7820 ha. At present the irrigation reservoirs and their associated canal network add up to about 2,400 sq km. Rice paddies, an important component of the wetland scene consist of about 525,000 ha are distributed throughout the country. Almost all wetlands (other than rice paddies) are under state ownership, while some are wholly or partly under private ownership. Around 15% of the fish produce of the country is procured from these freshwater bodies.

However, many wetland ecosystems in Sri Lanka are being indiscriminately exploited at an alarming rate, for commercial, agricultural, residential and industrial purposes, and for dumping garbage and waste. Although the proper management of these ecosystems is vital and urgent, it is a difficult task due largely to the lack of specific legislation and a single responsible agency.

## 2. STUDY AREA

The Suruwila Lake is a part of 7 small reservoirs that constitute the larger Anawilundawa Water Tank System. It is situated in North Western province in the Puttalam district of Sri Lanka, between the coast and Negombo-Puttalam railway (7°42'N, 79°49'E) (Rodrigo, 2008). Suruwila along with Pinkattiya, Wellawala, Maradansole, Irakka-wela/Ihala Wewa, Anawilundawa and Maiyawa, encompasses the 1397 ha large Anawilundawa Wetland Ramsar Sanctuary. Anawilundawa is a rainfed tank system constructed in 1140 D by King Parakramabahu to serve the purpose of irrigation. Its main sources are surface run-off water from Rathambala Oya basin with a catchment of 215 km<sup>2</sup>, and spill water from the Katupotha tank located upstream. Water levels are highest when the rainfall peaks during the northeast monsoon, from October to November. This period also sees the flocking of a diverse species of birds and is home to 37 species of migratory birds and about 131 species of resident birds. Usually, the tanks become dry by the middle of the September, however, during the period that this study was done, in May, the region had experienced a few showers. Suruwila lake is precisely located in Muthupantiya and has a total area of 12 ha. Paddy cultivation is practiced by the human inhabitants who reside in and around the region. During the rainy seasons, the water tanks are filled with water and are the habitat of the invasive water hyacinths.

## 3. METHODOLOGY

The data for was collected over a period of three days, spread over fortnight between 13/05/2014 to 28/05/2014. Observations were made during the daylight hours, from 0600 hours to 1600 hours. An all-out search method for collection of data gave a list of 29 different species of birds that occupied area around the Suruwila Lake. Identification and recording of the birds were made with the aid of binoculars with an optical zoom of 50X70 manufactured by JS Breaker. A field guide by Sarath Kotagama and Gaminini Ratnavira titled “An Illustrated Guide to the Birds of Sri Lanka” enabled to make accurate identifications of the birds that were studied. Further information was collected by interviewing the local residents, who provided information of the agricultural practices and on the human interaction with the surrounding area. These reports were interpreted to understand the impact of the human habitation and the relationship that exist between human beings and nature.

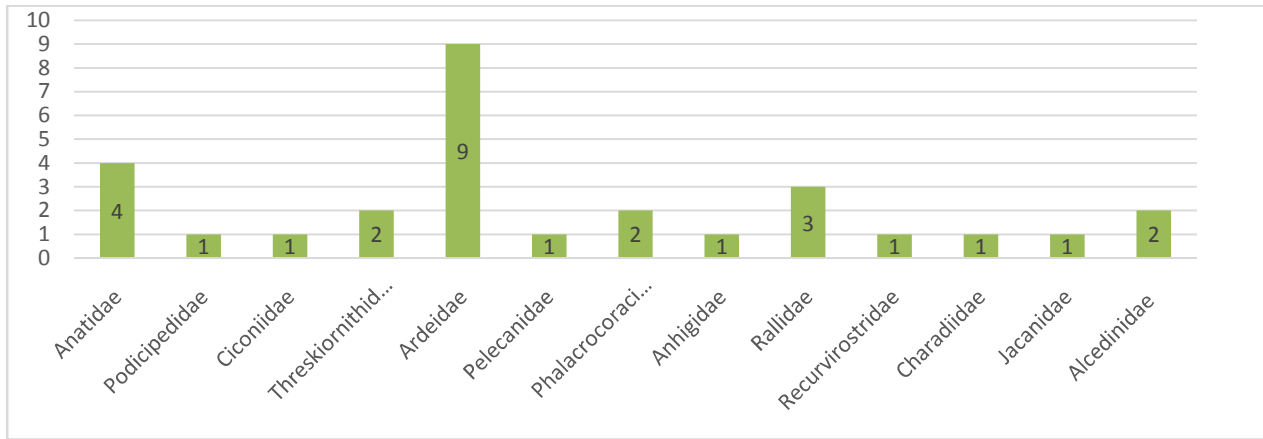
## 4. RESULTS

The following is a list of birds that had been identified and recorded during the study conducted in May, in the Suruwila Lake.

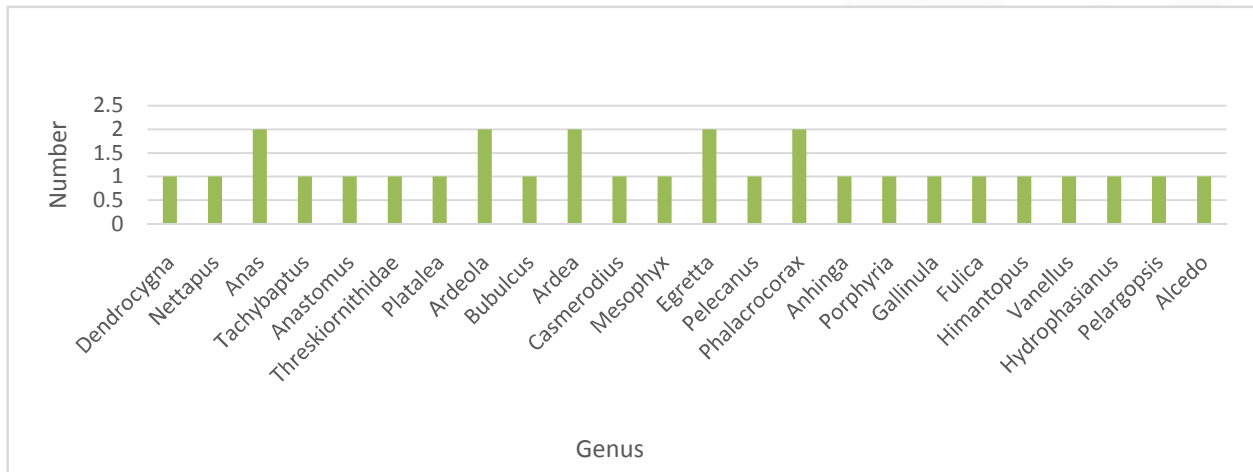
**Table 1** List of Recorded Birds, May 2014

Family : Anatidae	
<i>Dedrocygnajavanica</i>	Lessser-whistling duck
<i>Nettapuscoromandelianus</i>	Cotton pygmy goose
<i>Anasstrepera</i>	Gadwall
<i>Anasquerquedula</i>	Garagney
Family : Podicipidae	
<i>Tachybaptusruficollis</i>	Little grebe
Family: Ciconidae	
<i>Anastomuscitans</i>	Asian openbill
Family : Threskiornithidae	
<i>Threskiornismelanocephalus</i>	Black-headed ibis
<i>Platalealeucorodia</i>	Eurasian spoonbill
Family : Ardeidae	
<i>Ardeolagrarii</i>	Indian pond-heron
<i>Ardeolabacchus</i>	Chinese pond-heron
<i>Bubulcus ibis</i>	Cattle egret
<i>Ardeacinerea</i>	Grey heron
<i>Ardeapurpurea</i>	Purple heron
<i>Casmerodiusalbus</i>	Great egret
<i>Mesophoyx intermedia</i>	Intermediate egret
<i>Egrettaarazetta</i>	Little egret
<i>Egrettaularis</i>	Western reef-egret
Family : Pelecanidae	
<i>Pelecanusphilippensis</i>	Spot-billed pelican
Family : Phalacrocoracidae	
<i>Phalacrocoraxniger</i>	Little cormorant
<i>Phalacrocoraxcarbo</i>	Great cormorant
Family : Anhigidae	
<i>Anhinga melanogaster</i>	Oriental darter
Family : Rallidae	
<i>Porphyrioporphyrus</i>	Purple swamphen
<i>Gallinullachloropus</i>	Common moorhen
<i>Fulicaatra</i>	Common coot
Family : Recurvirostridae	
<i>Himantopus himantopus</i>	Black-winged stilt
Family : Charadriidae	
<i>Vanellusindicus</i>	Re-wattled lapwing
Family : Jacanidae	
<i>Hydrophasianuschirurgus</i>	Pheasant-tailed jacanidae
Family : Alcedinidae	
<i>Pelagropiscapensis</i>	Stork-billed kingfisher
<i>Alcedoatthis</i>	Common kingfisher

The most abundant birds belonged to the family Ardeidae, which included the herons and the egrets, which, occupied the paddy fields. The pheasant-tailed Jacana, is the only species that belongs to the family Jacanidae that can be found island-wide. Purple moor hens and cotton-pygmy goose showed a noticeable presence. Single sightings of the Greater egret and Eurasian spoonbill were made.

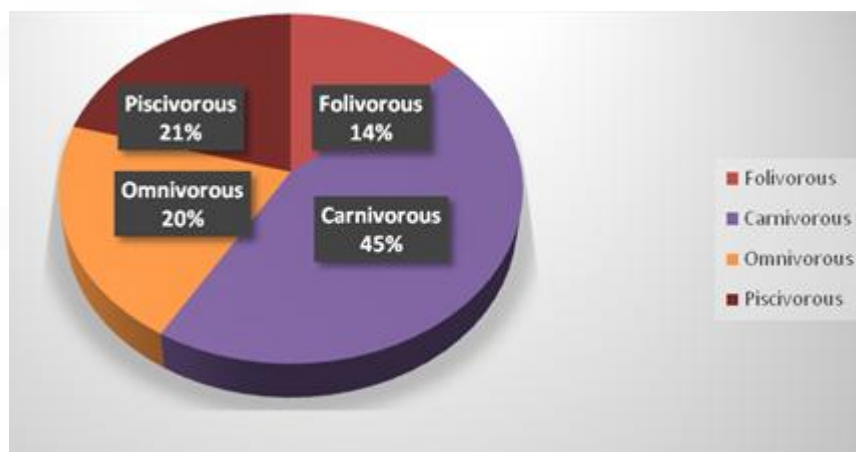


**Figure 1:** Depiction of Incidence of Avianfauna in Family-wise manner



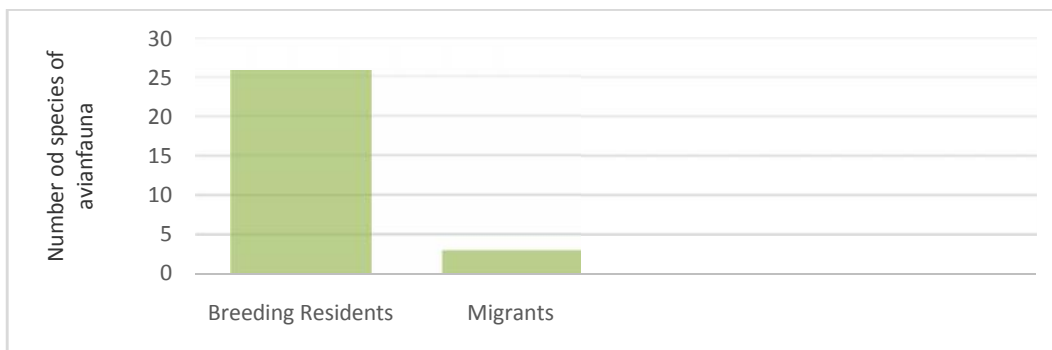
**Figure 2:** Depiction of incidence of Avianfauna in Genus-wise manner

A classification of the avianfauna in a genus wise manner, gives 24 genus of birds, which, belong to 13 different families. Majority of the species belong to family Ardeidae, followed by Anatidae and Rallidae. Among the Rallidae, purple-moor hens showed the maximum presence, while cotton-pygmy of family Anatidae were the more visibly present. A lone Oriental darter was the single representatives of its family, Anhingidae. Among Threskiornithidae, the black-headed ibis showed a larger presence as against the single sighting of the Eurasian sponbill, which, belongs to the same family.



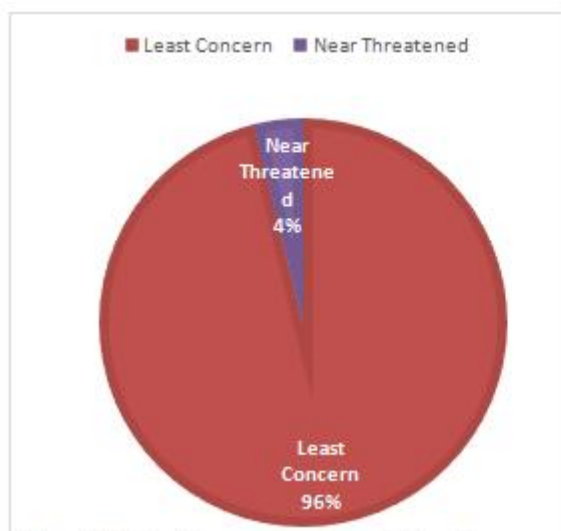
**Figure 3 :** Avian foraging habits

The distribution of birds on the basis of their foraging habits gives 14% of folivorous birds which are Anatidae, which feed upon the lake vegetation. The percentage presence of carnivores and omnivores are near similar. The maximum number of birds happens to be carnivorous amounting to 45% of the total species observed. Of these Ardeidae cluster around in the paddy fields, during the harvesting season.

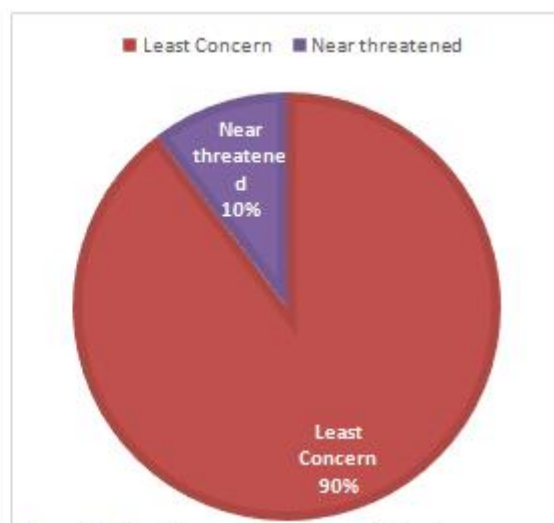


**Figure 4: Comparison of Resident and Migrant Birds**

Of the 29 species that were identified in the Suruwila Lake region, 3 of them were migrant birds whereas the remaining 26 happen to be breeding residents. *Anas strepera*, *Anas querquedula* and *Ardeola bacchus* comprise the migrant species that happen to indicate their presence in the region.



**Figure 6: National Conservation Status of Avian Fauna**



**Figure 5: Global Conservation Status of Avian fauna**

Of the breeding residents that inhabit the Suruwila Lake, black-headed ibis, spot-billed pelican, oriental darter are globally threatened, however the same species are categorized under the least threatened of species in the country. The Great cormorant is nationally threatened, among the breeding residents. Of the migrant species, the presence of gadwall is nationally threatened. The conservation status of these species are however of least concern globally.

## 5. DISCUSSION

The Anawilundawa Tank system were constructed to serve the need for irrigation of agricultural fields, thus, human habitation is woven into its ecology. An approximate number of 2500 families are known to live in and around the region, of which, 90% of the families are known to practice agriculture. The primary agricultural crop is paddy, followed by banana, onion and other food crops. Paddy cultivation, apart from being a major source of income for the cultivators, permits the sustenance of the bird population. The agricultural fields are a major feeding ground for the birds, primarily to those that belong to the family Ardeidae. A host of egrets and herons were seen to outnumber the other species of birds that reside in the Suruwilalake, during the harvesting season, when the land was being ploughed up.

However, agricultural practices have a negative impact, on the ecology. The excessive amount of artificial fertilizers, which get drained into the water bodies have led to its eutrophication. Artificial fertilizers being rich in nitrogenous compounds, are a rich source of nutrients for the

invasive *Eichorniacrassipes*. Water hyacinths grow at an uncontrolled rate and thus are detrimental to the aquatic life, as they lead to a decrease in the oxygen availability.

Irrigation of the crop fields, is met from water supply that is obtained from these tanks. However, an excessive use of the water for irrigation purposes has led to the drying of the tanks. The flourishing state of wetlands are much dependent on the availability of water which is an elixir upon which life survives. A reduction in the water level of these tanks will directly affect the food web. It can lead to a decrease in the freshwater organisms that live within the aquatic ecosystem. Further, it will impact organisms dependent upon them for a food source, thus possibly leading to a disruption in the ecological balance.

The presence of human beings around a region of faunal excess is disadvantageous to the organisms that, attempt at a balanced existence with *Homo sapiens*. Land available to the animals and birds, that, inhabit in this region have the possibility of being encroached on, as they might be utilized to meet space the requirement for agricultural land and also housing.

Informal conversations with the localites, reveal that the residents in illegal trade of animals and birds. The water tanks are situated between two major towns of the country, Chilaw, 10 km to the south, and Puttalam, 35 km to the north. The proximity of the sanctuary to the highway can have harmful effect on the bird population. Birds being sensitive to pollution and environmental changes and are susceptible to health risks.

## 6. RECOMMENDATIONS

The region, receives the status of a sanctuary, and as such is not protected with the much required strict regulations and rules. The interfering effect of human population on the ecology, thus, can prove to be negative in the years to follow. Thus there is a need to ensure strict regulation on the use of land, and ensure that human settlements do not encroach upon the faunal civilization that exists alongside. There is need to implement, the laws, meant for animal protection and conservation into proper action, in order to prevent the illegal trade in animals and birds. This is much required, if they are to be protected. The use of artificial fertilizers for the production of agricultural crops should be minimized to prevent the further eutrophication of the water bodies which otherwise might prove detrimental to the aquatic habitat. Further studies have to be conducted to analyze and understand the present status of the avian population. There is a need to conduct studies, which, look into the impact of pollution and human habitation on the existing population of both flora and fauna and further understand their impact on populations.

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