

Title	Environmental Impact on the Occurrence of Waterbird Species in Monpin Lake, Meiktila
All Authors	Ni Ni Yin, Thant Zin
Publication Type	Local Publication
Publisher (Journal name, issue no., page no etc.)	Universities Research Journal, Vol. 5, No. 3
Abstract	A total of 11817 birds representing 40 species during August 2008 to July 2009 and 897 birds representing 14 species during August 2009 to July 2010 were recorded in Mon pin Lake, Meiktila. According to Myanmar Forest and Wildlife protection Act, 13 totally protected species, 10 ordinarily protected species and one seasonally protected species were included. The occurrence of waterbirds significantly declined during second year due to environmental effects.
Keywords	Environmental impact, occurrence, waterbirds, Monpin Lake, Meiktila
Citation	Yin, N.N. Zin, T., 2012. Environmental Impact on the Occurrence of Waterbird Species in Monpin Lake, Meiktila. <i>Universities Research Journal</i> , 5(3): 165-178.
Issue Date	2012

Environmental Impact on the Occurrence of Waterbird Species in Monpin Lake, Meiktila

Ni Ni Yin¹ and Thant Zin²

Abstract

A total of 11817 birds representing 40 species during August 2008 to July 2009 and 897 birds representing 14 species during August 2009 to July 2010 were recorded in Mon pin Lake, Meiktila. According to Myanmar Forest and Wildlife protection Act, 13 totally protected species, 10 ordinarily protected species and one seasonally protected species were included. The occurrence of waterbirds significantly declined during second year due to environmental effects.

Key words: Environmental impact, occurrence, waterbirds, Monpin Lake, Meiktila

Introduction

Abundance and diversity of birds may be able to tell us whether a site is still good for wildlife (Welty and Bepista, 1990). Annual differences in bird-habitat relationships occurred because environmental conditions can vary annually, affecting the abundance of individuals and their habitat use (Louise *et al.*, 2002).

According to Bhusha *et al.* (1993), out of the waterbird migration routes within Asia, the East Asian Flyway across Myanmar. Meiktila stands around the bank of Meiktila Lake and supported by variety of aquatic habitats including Monpin Lake, a good habitat for waterbirds that annually arrive there as migration stopover sites and wintering areas.

Nevertheless, the destruction and alteration of aquatic habitats greatly threatened in Meiktila coupled with climatic changes and human impacts appeared to have led to the virtual extirpation of several resident and migratory waterbirds.

This paper describes the occurrence of waterbirds in Monpin Lake during two study periods and the environmental impact on their occurrence.

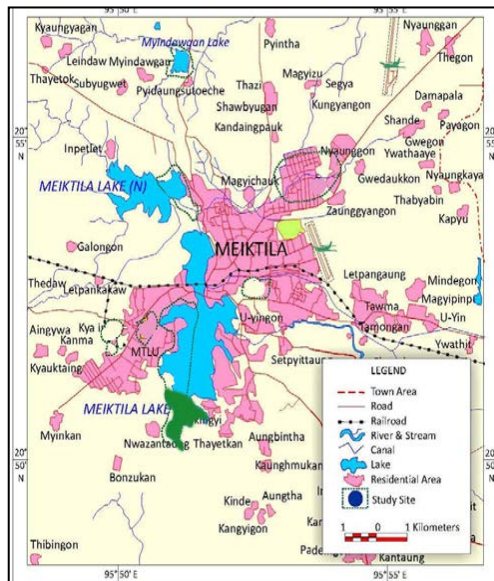
1. Lecturer, Dr., Department of Zoology, Meiktila University

2. Professor, Dr., Department of Zoology, University of Mandalay

Materials and Methods

Study area

Monpin Lake is located at southern part of Meiktila Lake. Monpin Lake is not connected by Meiktila Lake. Monpin Lake receives the water supply from Mondaing canal when overflowing of water into Meiktila Lake. It lies between 20° 51' to 21° 51' N and 95° 50' to 95° 51' E. The area is 82.43 hectares and maximum water level is about 3.0 meters.



Source: Topographic map no.2095-13.

Fig.1 A map of Meiktila showing the study site.



Monpin Lake



Monpin Lake (October 2009)



Monpin Lake (February 2010)

Fig.2 Monpin Lake

Study Period

The duration of study period was from August 2008 to July 2010. The study period was divided into first study period (August 2008 to July 2009) and second study period (August 2009 to July 2010).

Study design

Data collection was made every month during study period. Bird samplings were carried out from 06:00 to 12:00 am by point count method (Bibby *et al.*, 2000). Position of the sample points were selected based on vegetation cover of area and better assessment of the species. Birds were viewed using binoculars or naked eyes and photographic records were taken immediately after viewing. Species and individuals encountered were noted.

The bird species and individuals recorded in all months of one study period were pooled and presented. Status of recorded species have been assigned strictly with reference to the study area on the basis of presence or absence method (Thakur, 2008) (cited in Thakur *et al.*, 2010). Species identification was made based on Robson (2007).

Results

From August 2008 to July 2009, a total of 40 species and 11817 individuals of birds were recorded (Table.1, 2, Fig. 3 and Plate. 1). Among them, *Dendrocygna javanica* (Lesser Whistling Duck), *Fulica atra* (Common Coot), *Mesophoyx intermedia* (Intermediate Egret), *Bubulcus ibis* (Cattle Egret), *Egretta garzetta* (Great Egret), *Phalacrocorax niger* (Little Cormorant), *Vanellus cinereus* (Grey-headed Lapwing), *Ardeola bacchus* (Chinese Pond Heron), *Porphyrio porphyrio* (Purple Swamphen) and *Tadorna ferruginea* (Ruddy Shelduck) were most dominated (Table. 1).

During first year, the area of surface water ranged 46.73 hectares (May) to 84.23 hectares (October) and water depth ranged 0.4 m (May) to 3.1 m (October).

From August 2009 to July 2010, a total 897 individuals represented with 14 species was observed (Table 2 and Fig. 4). During the study period, the area of surface water range 8.62 hectares (December) to 50.45 hectares (August) and water depth ranged 0.1 m (December) to 0.5 m (August). The area totally dried up during January to April. (Table 2 and Fig.4). The

numbers of species and individuals were significantly declined during second year.

Throughout the two consecutive years, 21 species of winter visitors, 17 species of residents and two species of residents with local movement were recorded (Table 1). With regard to monthly occurrence, species and individuals gradually decreased from January to May in the first year study period and totally absence from January to June in the second year study period (Table.2). Fluctuation of waterbird species and individuals between two consecutive years were influenced by rainfall and temperature (Fig. 5, 6 and Plate 2).

Discussion

When comparison was made on two consecutive years, recorded number of bird species and individuals were significantly different. The number of recorded species and individuals were highly dependent on rainfall and temperature.

Decreasing the number of species and individuals were significantly started from January to May especially during the hot season in the former study period. In the latter study period, bird speceis were totally absent in the months of January, February, March and April due to no trace of rain from November 2009 to April 2010 that triggers off extreme hot and severe drought in the study area.

Welty and Bepista (1990) stated that "among all the limiting environmental factors that influence on birds too much of certain elements such as temperature, rainfall etc. may operate as a limiting factors and may reduce in population". It is evident that there were no trace of rain from November 2008 to February 2009 and November 2009 to April 2010 as well as the extreme hot throughout the summer was found in both years. This condition triggers off the prolong drought coupled with desiccation of water and habitat deterioration in both years.

The present study showed that there are marked differences in the occurrence of water birds between two years and hence this area is tremendously important for in-situ conservation.

Actually, the diversity of natural ecological communities has never been more valued than they are now, as they become increasingly threatened by the environmental crisis (Urfi, 2004).

Table 1 Comparison on the occurrence of waterbird species and individuals between two years

Sr. No	Scientific name	Common name	Status	Number of birds	
				Aug:2008 to Jul:2009	Aug: 2009 to Jul:2010
1	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	WV	2935	-
2	<i>Dendrocygna bicolor</i>	Fulvous Whistling Duck	WV	5	-
3	<i>Tadorna ferruginea</i>	Ruddy Shelduck	WV	35	-
4	<i>Anas crecca</i>	Common Teal	WV	15	-
5	<i>Anas poecilorhyncha</i>	Spot-billed Duck	WV	25	-
6	<i>Anas clypeata</i>	Nothern Shoveler	WV	2	-
7	● <i>Alcedo atthis</i>	Common Kingfisher	R	35	17
8	● <i>Alcedo meninting</i>	Blue-eared Kingfisher	R	15	5
9	● <i>Halcyon smyrnensis</i>	White-throated Kingfisher	R	27	10
10	● <i>Halcyon pileata</i>	Blue-capped Kingfisher	R	12	5
11	<i>Amaurornis phoenicuous</i>	White-breasted Waterhen	R	15	13
12	<i>Fulica atra</i>	Common Coot	WV	1750	-
13	◇ <i>Porphyrio porphyrio</i>	Purple Swamphen	R/LM	15	-
14	* <i>Gallinago gallinago</i>	Common Snipe	WV	60	-
15	* <i>Tringa ochropus</i>	Marsh Sandpiper	WV	9	-
16	* <i>Tringa erythropus</i>	Spoted Redshank	WV	6	-
17	* <i>Actitis hypoleucos</i>	Common Sandpiper	R	18	15
18	* <i>Charadrius veredus</i>	Oriental Plover	R	6	-
19	<i>Himantopus himantopus</i>	Black-winged Stilt	WV	38	20
20	* <i>Charadrius biaticula</i>	Common-ringed Plover	R	20	-
21	* <i>Vanellus cinereus</i>	Grey-headed Lapwing	WV	265	175
22	* <i>Vanellus indicus</i>	Red-wattled Lapwing	WV		-

Sr. No	Scientific name	Common name	Status	Number of birds	
				Aug:2008 to Jul:2009	Aug: 2009 to Jul:2010
23	● <i>Ardea cinerea</i>	Grey Heron	WV	3	-
24	* <i>Glareola maldivarum</i>	Oriental Pratincole	WV	3	-
25	<i>Phalacrocorax carbo</i>	Little Cormorant	R	1053	265
26	* <i>Phalacrocorax niger</i>	Great Cormorant	R/LM	25	-
27	<i>Egretta garzetta</i>	Little Egret	R	1550	190
28	● <i>Casmerodius albus</i>	Great Egret	R	795	-
29	<i>Mesophoyx intermedia</i>	Intermediate Egret	R	1760	78
30	<i>Bubulcus ibis</i>	Cattle Egret	R	1120	96
31	● <i>Ardeola grayi</i>	Indian Pond Heron	R	5	-
32	● <i>Ardeola bacchus</i>	Chinese Pond Heron	R	127	6
33	● <i>Butorides striatus</i>	Little Heron	WV	5	-
34	● <i>Nycticorax nyctorax</i>	Black-crowned Nightheron	WV	2	-
35	<i>Ixobrychus sinensis</i>	Yellow bittern	R	7	-
36	<i>Ixobrychus cinnamomeus</i>	Cinnamon bittern	R	8	2
37	<i>Rostrula benghalensis</i>	Greater-painted Snipe	WV	2	-
38	* <i>Hydrophasianus chirurgus</i>	Pheasant-tailed Jacana	WV	2	-
39	* <i>Plegadis falcinellus</i>	Glossy ibis	WV	15	-
40	* <i>Gygis alba</i>	White tern	WV	12	-

WV = Winter visitors

* = Totally protected

R = Resident

● = Ordinarily protected

R/LM = Resident with local migrant

◇ = Seasonally protected

Table 2. Monthly occurrence of bird species and individuals in Monpin Lake during two study periods

Month	Aug 2008 to Jul 2009		Aug 2009 to Jul 2010	
	no.of species	no.of individuals	no.of species	no.of individuals
August	29	1696	9	351
September	29	1651	8	223
October	39	1882	9	236
November	39	1690	3	45
December	37	1765	2	37
January	25	785	-	-
February	23	343	-	-
March	23	398	-	-
April	13	226	-	-
May	16	256	-	-
June	19	438	-	-
July	23	487	2	5
Total	40	11817	14	897

Table 3 Monthly average rainfall, mean temperature and humidity in Meiktila at water condition in Monpin Lake (From Aug: 2008 to Jul: 2009)

Months	Rainfall (mm)	Temperature (C°)	Humidity (%)	Surface area of water (hectares)	Water depth (m)
August	028	29.05	86.50	70.55	2.0
September	192	28.30	87.50	78.26	2.7
October	285	27.35	89.50	84.23	3.1
November	000	24.85	85.00	82.15	2.9
December	003	22.60	84.50	80.56	2.5
January	000	23.30	79.00	72.66	2.8
February	000	26.30	65.50	65.96	0.8
March	006	27.90	62.00	62.55	0.5
April	012	31.85	69.00	50.26	0.5
May	142	31.05	78.00	46.73	0.4
June	192	28.55	85.00	60.92	1.3
July	11	28.90	82.50	65.28	1.5

Table 4 Monthly average rainfall, mean temperature and humidity in Meiktila at water condition in Monpin Lake (From Aug: 2009 to Jul: 2010)

Months	Rainfall (mm)	Temperature (C°)	Humidity (%)	Surface area of water (hectares)	Water depth (m)
August	203	28.85	86.5	50.45	0.5
September	055	28.65	87.5	47.20	0.45
October	041	29.25	83.5	32.35	0.4
November	001	27.4	76	20.53	0.3
December	000	22.65	74	8.62	0.1
January	000	23.8	69.5	0	0

Months	Rainfall (mm)	Temperature (C°)	Humidity (%)	Surface area of water (hectares)	Water depth (m)
February	000	25.4	61.5	0	0
March	000	30.1	60.5	0	0
April	000	33.65	57.5	0	0
May	087	32.75	66.5	15.47	0.2
June	068	29.95	81	35.20	0.3
July	084	29.9	83	40.57	0.5

Source; Meteorological Department of Air Training Force , Meiktila

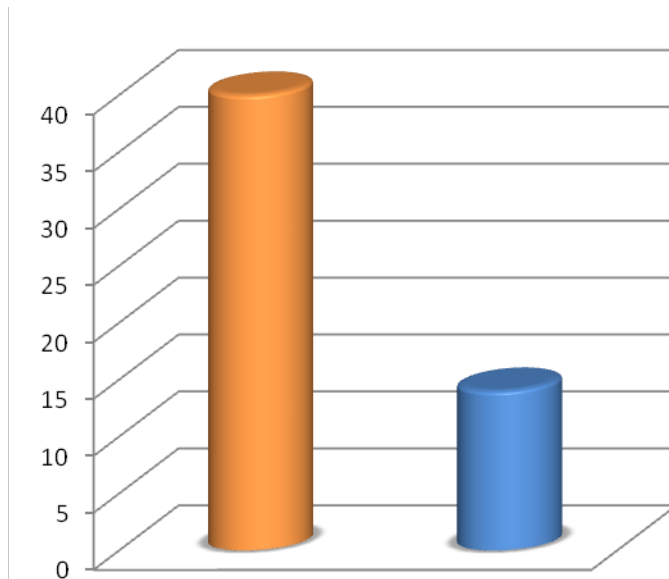


Fig. 3 Comparison on the number of recorded water bird species between August 2008 to July 2009 and August 2009 to July 2010

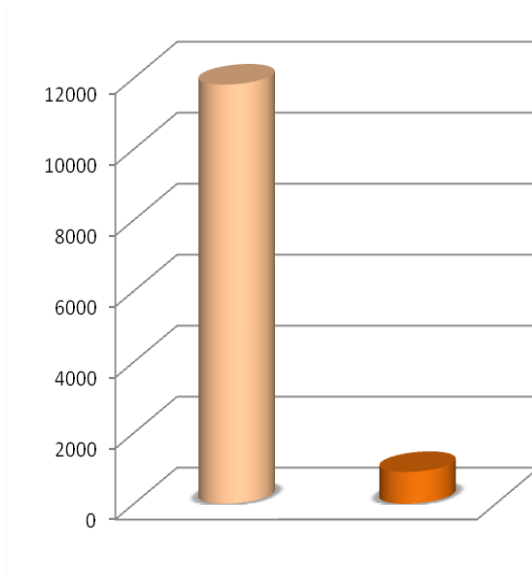


Fig. 4 Comparison on the number of individuals of recorded water birds between August 2008 to July 2009 and August 2009 to July 2010

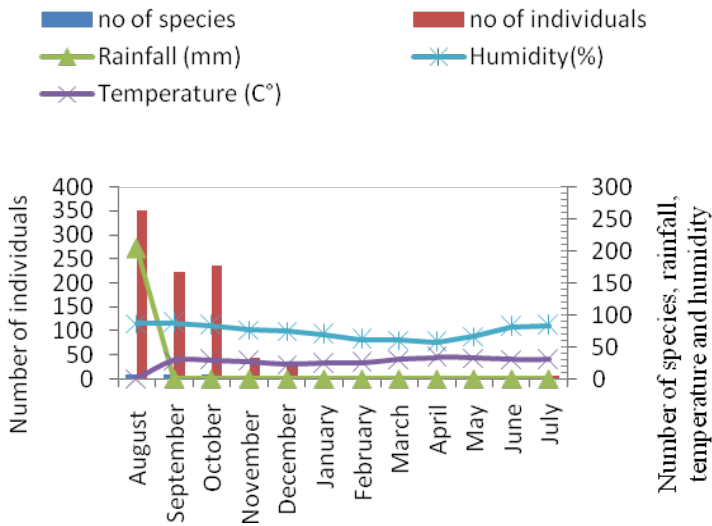


Fig. 5 Monthly comparison on the number of water bird species and individuals with average rainfall, temperature and humidity (From August 2008 to July 2009)

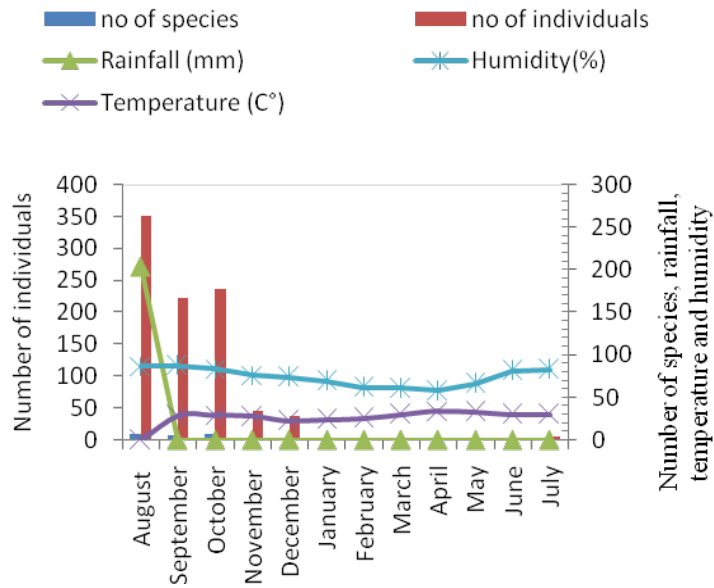


Fig. 6 Monthly comparison on the number of water bird species and individuals with average rainfall, temperature and humidity (From August 2009 to July 2010)



Dendrocygna javanica



Ixobrychus cillanomeus



Plegadis falcinellus



Porphyrio porphyrio



Ruddy shelduck



Ardea cinerea



Fulica atra



Charadrius dubius

Plate I. Some of the recorded water birds in Monpin Lake



A group of heronry in Mopin 'In'



A flock of Lesser Whistling Duck



A flock of Common Coot

Plate I Continued

By its very nature, there will always be a degree of uncertainty about how, when and where climate and human-induced factors will affect the natural systems. Therefore, monitoring and research on known and environmental impacts on species and habitats will help close the gap in knowledge about its fauna and flora, but also a greater stake in protecting their environment.

In conclusion, as more and more habitats are subjected to environmental effects, it is imperative to assess current species distribution and population trends that provide ample opportunities for conservation and management strategies thereby helping to protect Myanmar's precious biodiversity.

Acknowledgement

I wish to express my heartfelt thanks to Dr Mg Thynn, Rector, Meiktila University, Dr Mie Mie Sein, Professor (Head) of Zoology Department, and Dr Naw Dolly Wilbur, Professor, Mandalay University, Daw May Thet Oo, Professor (Head), Dr Shan

Shan, Professor of Zoology Department, Meiktila University and Dr Thida Kyaw, Professor, Department Zoology, Yangon University for their encouragement.

References

- Bhushan, B., Fry, G., Hibi, A., Mundkur, T., Prawiradilaga, D.M., Sonobe, K. and Usui, S. (1993). *A field guide to the water birds of Asia*. Wild Bird Society of Japan. Sanyo Printing Co., Ltd. 224 PP.
- Bibby, C.J., Burgess, N.D., Hill, D.A. and Mustoe, S. (2000). *Bird census techniques*. Academic Press. London. 302 PP.
- Gill, F.B., (2001). *Ornithology*. Second Edition. W.H. Freeman and Company. New York. 766 pp.
- Louise, F., Monica, W., Mather, H. and Seip, D. (2002). *Distribution and abundance of birds relative to elevation and biogeoclimatic zones in coastal old-growth forest in Southern British Columbia*, Vol; II.
- Thakur, M.L., Mattu, V.K., Mattu, N., Sharma, V.N., Bhardwaj, R. and Thakur, V. (2010). Bird diversity in Sarkaghat Valley, Mandi (Himachal Pradesh), India. *ASIAN J.EXP. BIOL. SEI*, 1(4): 940-950.
- Urfi, A.J. (2004). *Birds beyond watching*. Universities Press (India) Private Ltd. Hyderguda, Hyderabad. 214 pp.
- Velty, J.C. and Bepista, L. (1990). *The life of birds*. Fourth edition. U.S.A. Saunders College Publishing. New York, 717 pp.