

## **Preliminary survey on some fauna at Naung Far Lake environ in Loilem District, Southern Shan State**

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### **Abstract**

Water quality analysis, fish fauna and bird species of Naung Phar Lake, near Kho Lam, Loilem District, Southern Shan State were studied. This area was abandoned for many years and no scholars had even investigated due to the lack of regional security. In the present studies, water qualities of three layers, fish fauna and bird species around Naung Phar lake were observed. Transparency of water quality is 161.29 cm. For this study, the water is not polluted still and should be used for fish production. A total of eight fish species were collected in that lake. Among them, they are mostly native fishes. Some fishes such as *Cyprinus carpio* and *Oreochromis mossambica* were found. Besides, eleven bird species dwelling around the lake were observed, among them, 5 species are protected and nearly all species are native aquatic birds. Naung Phar Lake water is suitable for drinking water and for fish culture. And its surrounding is a favourable pasture for bird species.

**Keyword:** water quality, polluted

### **Introduction**

Water is vital to all life on earth. Everybody knows that living organisms cannot survive without water. The suitability of water for human consumption, from the standpoint of both its flavor and its freedom from disease producing agents, depends to the large extent upon the microorganism it contains (William Bowen Sarles, 1956).

Some of the world's oldest lake contain a high diversity of endemic species that have evolved through the process of adaptive radiation. In lakes and ponds, much of the species diversity is concentrated in the littoral zone, near the shore, where algae and thrive in the abundant light needed for photosynthesis. Living within the plant matter is a cornucopia of animals including snails, amphibians, crustaceans insects and fish. Beyond the littoral zone is the limnetic zone. This is the zone of open water where light is still able to penetrate and support photosynthetic algae (i.e. photic zone). Consumers in this zone include zooplankton, which feed on the algae, some insects, and fish. Finally, the benthic zone is the bottom sediment (e.g. mud, sand, Rock) of the habitat, which is dominated by the invertebrate species (Cristescu et al. 2010).

The study area Naung Phar Lake is located near Kho Lam which is 7.5 miles far away from it. The lake is named Naung Phar because it is close to Nuang phar village (Plate 1). At the surrounding, eight villages – Kone Kar, Hpar Hpaw, Naung Phar Thut, Gam Yoon, Het Phar, Pa Seng etc. are situated. The villagers are included Shan, Lishaw and Silver Palaung tribes mostly. For that, the lake is called Naung Phar Lake. Previously Naung Phar was 6 miles wide around but nowadays only 1.5 miles wide and 3 miles long. Moreover, a small island called Mote Soe Ma (widow island) is situated at the center of the lake. A bridge known as the nickname “Second U Pein Bridge” spans the channel between the bank and the island. Actually, every visitor said that it is like U Pein bridge in Amarapura. The surrounding is beautiful and panoramic due to the silent nature.

The objectives of this work are:

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- To investigate some fauna such as fish aquatic birds and terrestrial birds,
- To get the chemical components of lake water.

### Materials and methods

#### Study Area

The study area, Naung Phar Lake is located between 21° 09' 27.8" N and 8° 12' 44.5" E, Southern Shan State(Plate 1).

It is situated on Taunggyi – Kengtong motorway.

#### Study Period

The study period was accomplished during in the month of June 2019 to November, 2019.

#### Data collection of the specimen

Fish specimen were observed and collected from the local fishermen and fish hawkers around the lake. Some fresh fish fauna were bought and brought to the department for identification.

Besides, some birds were observed by using Telescope. Some information was got from the villagers who were interested in bird watching.

#### Required apparatus

- (1) Water sample bottles
- (2) Secchi disc
- (3) Ruler tape (1.52m)
- (4) Thermometer-Immersion zeal N2 field 76mm
- (5) Digital camera
- (6) G.P.S
- (7) Telephoto lens
- (8) Binoculars
- (9) Recording sheets

#### Data Analysis

For water analysis, water samples were collected from three layers of water depths (3ft, 6ft and 10ft). Identification of birds were followed after E. Smythies(2001), King and Dickinson(1975) and Robson(2005). Identification of fishes were followed by Talwar and Jhingran (1991).

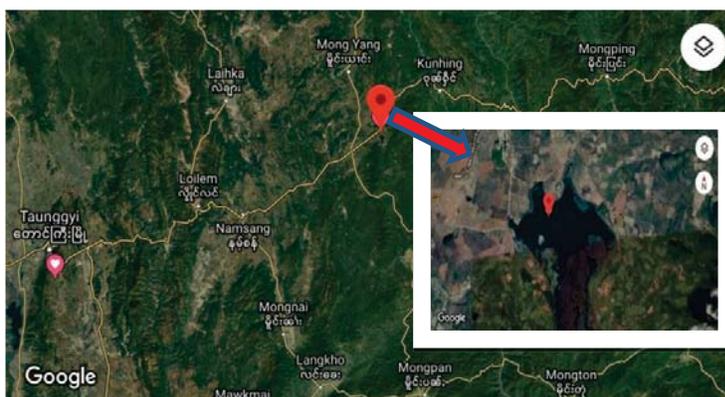


Plate 1 Map of study area (Source: Google Map)

(Naung Phar Lake, near Kho Lam, Loilem District, Southern Shan State)



**Plate 2 Study Sites of Nam Phar Lake**

### **Results and Discussion**

During June, 2019 to November, 2019 at Naung Phar Lake, Loilem District, Southern Shan State, this survey was accomplished as preliminary findings. In this work some fishes, bird species and water analysis were observed.

Firstly, eight species fishes in Naung Phar lake were collected (Table 1). Among them except *Cyprinus carpio* (common carp) and *Oreochromis mossambica* (Tapapia), the rest six species are found as native. These eight species are compared with the species found by the local scholar Khin Ohn Myint, MRes, 2009. The title of her paper is “Study on some fishes in Inlay lake by assessing the ecological aspect”. The paper described 18 fish species in comparison with fish study sites of Inlay Lake. This observation was somewhat different to her paper. To describe in detail *Lepidocephalichthys berdmorei*, *Puntius chola* and *Hampala macrolepidota* are found in Naung Phar Lake. It can be remarked that the fish distributes in different locality. Particularly, Naung Phar Lake was abandoned for years in wild state. This finding gives a new information that no scholar had untouched this lake before (Plate 3).

Secondly, eleven bird species were collected in this study (Table 2). A total of bird species- 2 totally protected species, 2 protected species and 1 seasonally protected species were recorded. It is compared with local scholar Khin Wint Mar Myint, MRes, 2009, the title of “Species diversity of Avifauna at Nyaung Shwe Township”. This finding is compared with to her paper. *Phalacrocorax fasciollis* (Indian Shag) and *Psittacula finschii* (Grey-headed

parakeet) are only found in this lake. It is assumed that *Phalacrocorax fascicollis* and *Psittacula finschii* are not found in Inlay Lake. It does not agree with this paper. Probable in Naung Phar Lake is more favorable for these species according to their feeding sites, nesting sites and breeding sites uniquely (Plate 4 & 5).

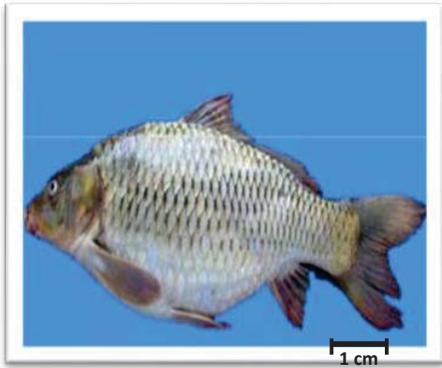
Furthermore, these eleven birds are compared to the list of Inlay Wet Land Wildlife Sanctuary. According to that, 80 bird species- 33 aquatic and 47 terrestrial- had already recorded in Inlay Lake. Among the species recorded, 3 species *Phalacrocorax fascicollis*(Indian Shag), *Corvus macrorhynchos*(Large-billed Crow) and *Dendrocygna javanica*(Lesser Whistling-Duck) are not included in it. Among these, *Dendrocygna javanica* is a migratory bird. Actually, this bird is also a totally protected in length status. In migratory birds, that are two ways of flyaway routes from two regions: from the northern region of Asia especially Russian highlands and from the Eastern region of Vietnam. In here, this bird species *Dendrocygna javanica* is assumed as coming from the Northern flyway route. Because, Naung Phar Lake is situated in North-Eastern site.

Table1 Fish species in Naung Phar Lake

Sr No	Order	Family	Scientific Name	Common name	Vernacular name	Status	Remark
1	Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i> (Linnaeus,1758)	Common carp	Shwe Wah Nga Gyin	Introduced	Mid + Bottom
2			<i>Cirrhinus cirrhosis</i> (Bloch, 1795)	Mrigal carp	Nga lu	Native	Surface
3			<i>Puntius chola</i> (F. Hamilton,1822)	Swamp Barb	Nga nyanma or Nga Khone ma taung pan	Native	Bottom
4			<i>Hampala macrolepidota</i> (Kuhl & van Hasselt, 1823)	Hampala Barb	Nga Konema	Native	Mid
5		Cobitidae	<i>Lepidocephalichthys berdmorei</i> (Blyth, 1860)	Burmese loach	Nga thale doe	Native	Bottom
6	Anabantiformes	Channidae	<i>Channa striata</i> (Bloch, 1793)	Snake head murrel	Nag yant	Native	Surface + Bottom
7	Cichliformes	Cichlidae	<i>Oreochromis mossambica</i> (W. K. H. Peters, 1852)	Mossambica tilapia	Tilapia	Introduced	All type
8	Osterolossiformes	Notopteridae	<i>Notopterus notopterus</i> (Pallas, 1769)	Bronze feather back	Nga pe	Native	Bottom

**Table 2 Bird species of Naung Phar Lake**

Sr No	Order	Family	Scientific Name	Common name	Local name	DIS Pattern	Legal
1	Suliformes	Phalacrocoracidae	<i>Phalacrocorax niger</i> (Vieillot, 1817)	Little Cormorant	အော်ယော	R	
2			<i>Phalacrocorax fasciollis</i> (Stephens, 1826)	Indian Shag	တင်ကျီး	R	
3	Pelecaniformes	Ardeidae	<i>Egretta garzetta</i> (Linnaeus, 1766)	Little Egret	ဝေသာလီချိုင်း	R	
4			<i>Ardeola grayii</i> (Sykes, 1832)	Indian Pond Heron	ချိုင်းအောက်	R	P
5			<i>Bubulcus ibis</i> (Linnaeus, 1758)	Cattle Egret	ကျွဲကျောင်းချိုင်း	R	
6		Threskiornithidae	<i>Plegadis falcinellus</i> (Linnaeus, 1766)	Glossy Ibis	ခရုစပ်ငှက်	R	
7	Anseriformes	Anatidae	<i>Dendrocygna javanica</i> (Horsfield, 1821)	Lesser Whistling-Duck	စွလီ	M	TP
8	Coraciiformes	Alcedinidae	<i>Alcedo atthis</i> (Linnaeus, 1758)	Common Kingfisher	ပိန်ညှင်း	R	P
9	Passeriformes	Corvidae	<i>Corvus macrorhynchos</i> (Wagler, 1827)	Large-billed Crow	တောကျီး	R	
10	Psittaciformes	Psittaculidae	<i>Psittacula finschii</i> (Hume, 1874)	Grey-headed parakeet	ကြက်တူရွေး	R	P
11	Gruiformes	Rallidae	<i>Gallinula chloropus</i> (Linnaeus, 1758)	Common Moorhen	ရေကြက်	R	SP



*Cyprinus carpio*



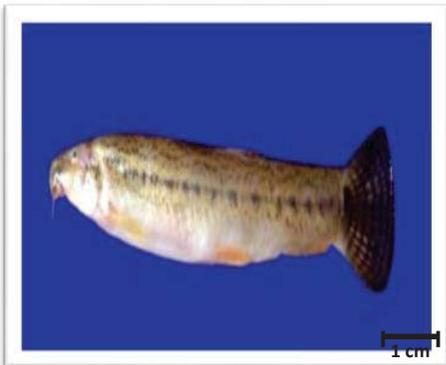
*Cirrhinus cirrhosis*



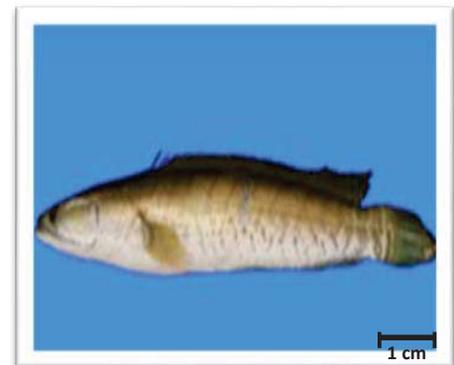
*Puntius chola*



*Barbus hampala*



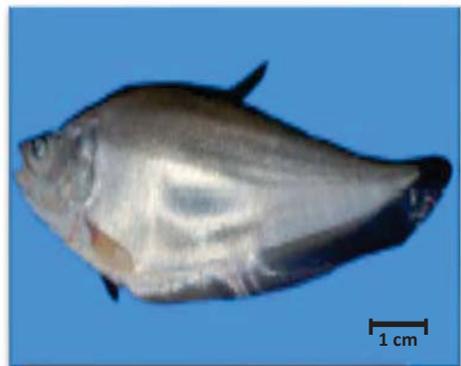
*Lepidocephalichthys berdmorei*



*Channa striata*



*Oreochromis mossambica*



*Notopterus notopterus*

**Plate 3 Fish Species in Naung Phar Lake**



*Phalacrocorax niger*



*Phalacrocorax fasciatus*



*Egretta garzetta*



*Ardeola grayii*



*Bubulcus ibis*



*Plegadis falcinellus*

**Plate 4 Bird Species in Naung Phar Lake**



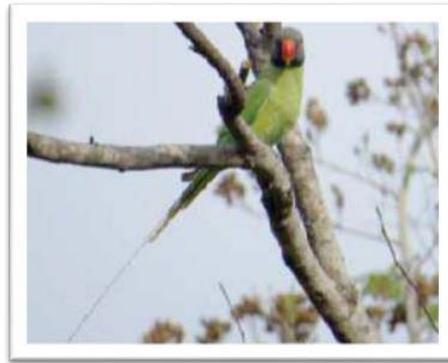
*Dendrocygna javanica*



*Alcedo atthis*



*Corvus macrorhynchos*



*Psittacula finschii*



*Gallinula chloropus*

### Plate 5 Bird Species in Naung Phar Lake

Thirdly, for the water analysis, water samples were collected from the different layers of the lake and seven chemical compounds- phosphorus, calcium, magnesium, aluminium, silicic acid, sulphur and copper were found in Naung Phar lake's water. Phosphorus is the most important nutrient in pond fertilizers and usually gives a much greater increase in fish production than nitrogen or potassium. An ideal farm pond fertilizer application should contain 4 to 8 pounds of phosphorus (and 2 to 4 pounds of nitrogen per surface acre). Phytoplankton and zooplankton need mainly phosphorous that make fertilizer. The results were not

unique in chemical components except phosphorous of the depth layer. The rest of the components were found nearly the same. Accordingly, the phosphorous is assumed that the proliferation of phytoplankton and zooplankton affect in surface water of the lake. It is represented as the lake is main fertilizer.

Calcium and Magnesium are essential for fish for metabolic reactions such as bone and scale formation. According to Stone and Thorforde(2004) acceptable  $\text{CaCO}_3$  range is above 10mg/l. In the lake waters, the richness of calcium and magnesium are shown to be essential to fish. Actually, calcium is important in fish hatchery water supplies and it is also required for phytoplankton. Thus, these nutrients are assumed as essential nutrients for aquatic plants and animals.

Aluminium toxicity depends on water pH and on the concentration of calcium and organic substances (Wauer G, Teien HCh 2010). During the elevation of Al temporarily, fish may be affected by as phxiation as moderate acidic or electrolytic imbalances at lower pH. Aluminium is acutely toxic to fish in acid waters. The gill is the principal target organ and death is due to a combination of osmoregulatory and respiratory dysfunction. In fact, the maximum Aluminium affects directly to the fish and aquatic organism in lake. In this water analysis, in the sample water is taken low composition and not to be harmful by to toxic effect for fish and any aquatic organism. Therefore, it is suitable for fish culture if it is used for the fish production.

Silicic acid from water strengthens cell walls. Among the phytoplankton, diatoms particularly need silicon. Diatoms have good nutritional value and do not degrade water quantity. Silicic acid is a weak acid that is largely unionized within the pH range of most natural waters. In the phytoplankton group, diatoms need silicon for its strong cell wall. The lake water is assumed that diatoms might obtain the good nutritional value and in turn it is the food for the fish larvae-fry and fingerling.

Sulphur is an essential element for plants, animals and bacteria. It is present in natural water and water of aquaculture systems, mainly as a sulphateion. The main Sulphur related issue in aquaculture is the occasional presence of toxic concentration of hydrogen sulphide. Sulphide can occur in water because it is a metabolite of desulphoribrio and certain other bacteria found in anaerobic zone usually in sediment. Sulphate contributes to osmotic pressure and Sulphur is a component of protein. However, freshwater apparently does not have a specific requirement for dissolved sulphate in water and obtain Sulphur mainly from their food. In the aspect of Sulphur composition in fish pond, it is mostly present in water of aquaculture system. Generally, when the weather changes, the stratified layers are disturbed, and the gas and oxygen depleted water rises to the top of the lake and cause rotten egg odor and fish suffocation. But fortunately, in this lake it can be avoided to happen like this. For that, this lake can be used for fish culture.

Copper has been used for many years as a chemical tool in freshwater aquaculture operation. It is both an effective algicide and a parasite treatment. On the other hand, it adversely affects to be toxic to many invertebrate species and some sensitive fishes even to more tolerant fish species. Chronic copper use can damage gills, kidney, spleens and other organs. Copper will depress the immune system. If it reaches to overdose state, no fish can survive. It means this composition is the minimum state and it could not harm for fish culture.

## Conclusion

The Optimum fish production is totally dependent on the physical, chemical and biological qualities of water to most of the extent. Hence, successful pond management requires an understanding of water quality. On the other aspect, the lake surface waters are assumed as appropriate drinking water for the local people of the surrounding villages. For that, according to the components of lake waters, it could be remarked as the effective fish pond and clean water.

Furthermore, these eleven birds are compared to the list of Inlay Wet Land Wildlife Sanctuary. According to that, 80 birds species- 33 aquatic and 47 terrestrial- had already been recorded in Inlay Lake. Among the species recorded, 3 species *Phalacrocorax fasciollis*(Indian Shag), *Corvus macrorhynchos*(Large-billed Crow) and *Dendrocygna javanica*(Lesser Whistling-Duck) are not included in it. Among these, except *Dendrocygna javanica* which has migratory habit. Actually, this bird is also a totally protected in length status. In migratory birds, there are two ways of flyaway routes from two regions: from the northern region of Asia especially Russian highlands and from the Eastern region of Vietnam. This bird species *Dendrocygna javanica* come from the Northern flyaway route. Because, Naung Phar Lake is situated in North-Eastern site, it could land probably at Naung Phar Lake that is a much smaller lake.

To be concluded, this study had been done as initial exploration. Moreover, the next detail studies are intended in this area to uncover the natural valuable resources more. Hence, the information from this study work would be of aid partially for further research workers.

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