

Diversity of Amphibian in Ghodaghodi Lake Complex, Kailali

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Abstract

A field survey was conducted in Ghodaghodi Lake Area in September-October, 2009 for 28 days in order to document the diversity and conservation issues of the amphibians in the area. Walk through survey, interview with local people and literature review methods were used to gather information. The amphibians recorded from the study area belong to a total of 1 Order, 3 Families 7 Genera and 8 Species. Among the recorded species the maximum percentage was found to be attained by Euphlyctis cyanophlyctis (83.6%). Out of 8 species of amphibian recorded from the study area one species (Limnonectes teraiensis) has been recorded for the first time. The study also discusses potential threats to the turtles in the area especially due to anthropogenic activities.

Key words: Amphibian, Conservation, Threats, Wetland.

Introduction

As pointed out by Zug (1993), the earlier amphibians were adapted for life on land before they live there, they are generally regarded as an intermediate group of animals that provides an evolutionary link between fishes and reptiles, amphibians were the first creatures to depart from the aquatic habitats and develop lungs that enable them to breathe on land. They have soft scaleless and often moist skins through which they are able to increase their intake of oxygen. They lay jelly coated eggs in water and are divided into 3 Orders: Gymnophiona (legless blind worms), Caudata (newts and salamanders) and Salienta or Anura i.e. tailless frogs and toads (Shah and Tiwari, 2004). There are currently **6,487** species (spp) of amphibian including **5,732** frogs and toads (88%), **579** newts and salamanders (3%) and **176** caecilians in the world (9%) (<http://biothenumbers.com/index.php/tag/amphibians/>; Nov. 8, 2009). Shah and Tiwari (2004) have recorded a total number of 52 species of amphibians from Nepal including 1 salamander, 4 toads and 47 species of frogs.

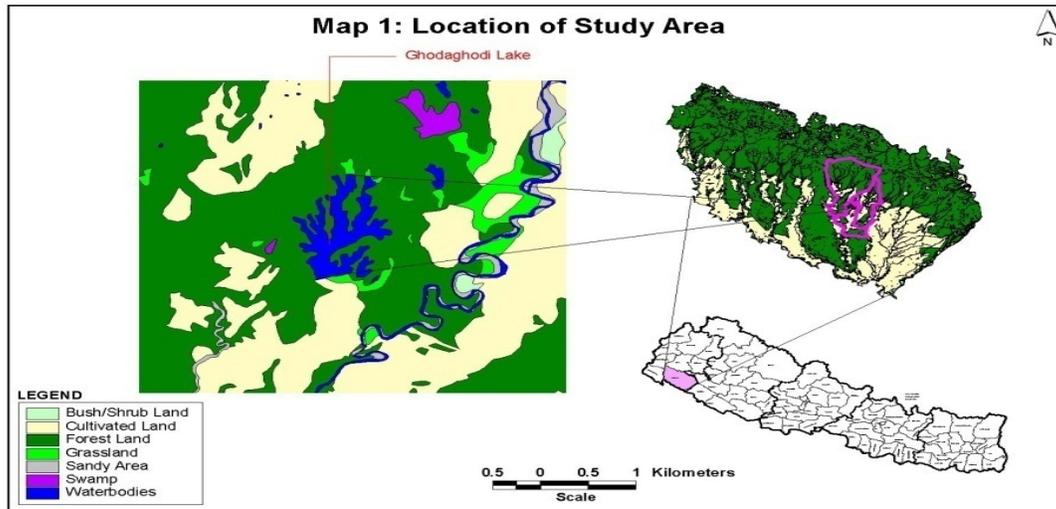
The most distinctive feature that separates the amphibians from the reptiles lies in their development history. The vast majority of the amphibians pass the first stage of their lives as free swimming aquatic tadpoles breathing by mean of gills. No amphibian eggs have protective covering to prevent it from drying up. So they need water for their developing purposes. But the reptiles, early in their evolution, succeeded in producing a parchment like as calcareous covering to their eggs and with and abundant supply of yolk and albumen and the development of structure, a completely terrestrial existence became possible. Although the reptiles in their organization are far behind the warm blooded vertebrates, in their general structure, and particularly in the brain, they are in advance of amphibians (Rai, 2003).

Objectives

- The inventory of amphibians of Ghodaghodi Lake complex
- Identification of threats of amphibians

Materials and Methods

Study area: The study was carried out from 1 September-1 October, 2009. Ghodaghodi Lake (138 ha) is the largest ox-bow lake of Nepal with 28°41.06' latitude and 80°56.44' longitude and have topography - palm shaped with many ramifications, 205m amsl. Hydrology of lake is fed by atmospheric inputs, surface flows, springs, No inlet, 2 outlets along the high way; Climate - sub tropical monsoonal type of climate with dry winter and rainy summer. The study area consists Flora - Terminalia Forest, Shorea-Terminalia Forest, Riverine Forest, Grasslands and Aquatic Vegetations with 473 plants; Fauna - 34 mammals, 35 herpetofauna, 148 spp. Birds, 29 spp. Fish and 32 spp. Butterflies.



Location of Study Area

Inventory of amphibians

- | | |
|--------------------------------------|-----------------------------|
| 1. Educational Local Technique | 4. Direct Observation |
| 2. Questionnaire Survey | 5. Focus Group Discussion |
| 3. Photographs and Personal Contacts | 6. Review of Secondary Data |

Data Analysis

$$\% \text{ of Occurrence according to observation} = \frac{\text{Number of individuals of a species}}{\text{Total number of individuals of herpetofauna}}$$

Interpretation and calculation of the data was done by using MS-Excel, 2007.

Findings

Four hundred eighty one individuals of seven genera and eight species of amphibians were recorded during the study period. These eight species are as:

Family: Bufonidae

Bufo melanostictus -Black spined toad

Bufo stomaticus -Marbled toad

Family: Microhylidae

Microhyla ornata - Black throated frog

Uperodon systemus -Marbled balloon frog

Family: Ranidae

Euphlyctis cyanophlyctis -Skittering frog

Hoplobatrachus tigerinus – Indian bull frog

Rana tytleri - Taipeh frog

Limnonectes teraiensis -Nepalese Terai frog

S.N.	Name of species	No of Individuals observed	Percentage of Occurrence (%)
1	<i>Bufo melanostictus</i>	1	0.21
2	<i>Bufo stomaticus</i>	3	0.63
3	<i>Euphlyctis cyanophlyctis</i>	402	83.6
4	<i>Hoplobatrachus tigerinus</i>	65	13.51
5	<i>Rana tytleri</i>	7	1.42
6	<i>Limnonectes teraiensis</i>	3	0.63
	Total	481	100

Table 1: Showing the No. of species and percentage of occurrence of amphibians

One species of frog (*Limnonectes teraiensis*) has been recorded for the first time from the study area. One species mentioned by earlier researchers *Rana limnocharis* is not observed during the research period although its presence has been verified through literatures and interview with local people.

Threats

Improper Land/Pesticide Use: The agricultural practice of draining swamps and marsh for cultivating crops and for harvesting fish were prevalent in the study area. A pond along the Mahendra Highway, south to the Parseni Lake has been found to be drained by using high powered pumping set for harvesting fish. That added to the general decline of many native turtles from their habitat. Without their natural habitat, the turtles as well as many other wildlife species become unable to reproduce and remain a part of the environment. None of the wetlands of Ghodaghodi lake complex except Nakhrodi Lake have perennial source of water and depend upon the monsoon rains. IUCN (2004) had also found the draining practice of wetlands as a threat in 43% of 163 wetland sites in the Terai inventoried by IUCN in 1998.

Inappropriate Wetland Management: Water is pumped from wetlands for dry-season crop irrigation, or they are subjected to widen agriculture or heavy grazing, disturbing the wetland vegetation structure. Even the management of wetlands for fishing does little to conserve biodiversity since fisher folk often takes fish and fingerlings until stocks are depleted (Bista 2010). The water bodies where management is done as commercial fishing lots, the owners often

seek to maximize returns by harvesting all aquatic species, including turtles and amphibians, often by pumping the wetland dry, thereby removing the breeding stock as well (IUCN, 2004). Out of 20 lakes of Ghodaghodi Lake Complex (CSUWN, 2010), all lakes, except Ghodaghodi Lake and Nakhrodi Lake are being managed for commercial fishing.

Highway Accidents: The killing of turtles on road by vehicles like car, bus truck etc has been found to be another threat to their survival. A snake (*Xenochrophis piscator*), a turtle (*Lissemys punctata andersoni*) and a frog (*Hoplobatrachus tigerinus*) are found crushed on the highway. Shrestha (2001) had also described the killing of turtles each year by cars, buses and trucks as a threat for their survival.

Harmful Fishing Practices: Poisoning and use of small-mesh net are the major fishing practices at the study sites observed.

Invasive Species: Ghodaghodi Lake has been found to be highly encroached by the *Pistia stratiotes*. The native species like *Nelumbo nucifera*, *Ceratophyllum demersum*, *Potamogeton natans*, *Hygrohyza species*, *Lidwigia agrcendens*, *Nymphoids species* and *Hydrilla verticillata* are also found to be disturbing the movement of aquatic animals. The large biomass of those macrophytes might have added organic content to water body resulting in the depletion of Oxygen level especially during summer.

Overgrazing: Overgrazing and movement of livestock along the shoreline contribute to soil erosion and high inputs of nitrogenous nutrients into the wetlands, resulting in elevated eutrophication of water and excessive growth of certain aquatic vegetation, which again leads to loss of suitable habitat for aquatic life.

Conclusion

Only eight species of amphibians were recorded during the study. Out of the total species, *Limnonectes teraiensis* has been recorded for the first time from the area. Among the amphibians recorded *Eucphlyctis cyanophlyctis* is found to be dominant with 83.6 percentage of occurrence followed by *Hoplobatrachus tigerinus* (13.5%) and *Rana tyleri* (1.42%). One species of frog (*Limnonectes teraiensis*) has been recorded for the first time from the study area. One species mentioned by earlier researchers *Rana limnocharis* is not observed during the research period although its presence has been verified through literatures and interview with local people.

Recommendations

- An Intensive survey and regular monitoring of amphibians in Ghodaghodi Lake Complex,
- Community and School based awareness programs should be conducted,
- Proper land management can aid for the conservation efforts,
- Alternatives for pesticide use

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