

Status of and Threats to Waterbirds of Rupa Lake, Pokhara, Nepal

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Abstract: Rupa Lake is the third biggest lake of Pokhara valley. It supports a number of floral and faunal species. A total of 36 species of waterbirds have been recorded in the lake which represents about 19 percent of the total 193 wetland-dependent birds found in Nepal. The lake is under pressure from diverse anthropogenic factors. Waterbirds of Rupa Lake face a number of threats including trapping/hunting, fish farming using nets, habitat destruction by soil erosion, sedimentation and agricultural conversion, human disturbance, water pollution and eutrophication. This article provides an overview of waterbirds and threats to them in Rupa Lake Area.

Key words: Rupa Lake, waterbirds, threats

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1. Introduction

Nepal hosts great diversity of wetlands, which cover approximately five percent of its total land area (DOAD, 1992). The ecological diversity of the wetland ecosystems of Nepal is very great (Scott, 1989). Of 862 bird species found in Nepal (BCN, 2006), 193 (22.5 percent) (IUCN Nepal, 2004) are known to be dependent on wetlands. Wetlands of Nepal are threatened by natural and anthropogenic causes. Nepal's wetlands are undergoing subsidence, rapid vegetation succession, loss of vegetation, eutrophication, sedimentation, siltation, soil erosion, pollution and diminution (Bhandari, 1998; Baral and Inskipp, 2005; Gautam and Kafle, 2007). Wetland biodiversity is under threat from encroachment of wetland habitat, unsustainable harvesting of wetland resources, industrial pollution, poisoning, agricultural runoff, siltation and the introduction of exotic and invasive species into wetland ecosystems (HMG/N/MFSC, 2002; Baral and Inskipp, 2005; HMG/N/MFSC, 2002). Eutrophication combined with encroachment has reduced the area of wetlands, thereby, endangering various biological species inhabiting the area. The Nepalese communities use wetland resources for their sustenance and economic well-being (Bhandari, 1998). The livelihoods of several communities are based on wetland products or services. At least 20 ethnic and caste groups out of 103 are traditionally wetland dependent (IUCN Nepal, 2004).

Pokhara valley has eight subtropical lakes: Phewa lake (443 ha), Begnas lake (373 ha), Rupa lake (115 ha), Khaste lake (13.57 ha), Dipang lake (8.96 ha), Gunde lake (4.98 ha), Neurani lake (2.83 ha) and Maldi lake (1.17 ha). Wetlands in the Pokhara valley which are unprotected are even more at risk: from drainage, diversion, obstruction, siltation, encroachment, infrastructure development, land use changes, pollution and poison to kill fish resulting in a marked reduction in bird numbers and species diversity since the 1970s (Karki et al., 1997; Karki and Thapa, 1999; Subedi, 2003; Gautam and Kafle, 2007). This article provides a systematic overview of status of and threats to waterbirds of Rupa Lake, based on the studies carried between 2005 and 2008.



2. Study Area

Rupa Lake (Fig. 1) is situated in Kaski district of Nepal at an elevation of 600 m asl. Rupa Lake is the third biggest lake of Pokhara valley. It is elongated north to south and the main inflow of water is from *Talbesi* stream, whereas *Dhovan*

khola is the feeder stream with its outlet *Tal khola* at *Sistani ghat*, joining the *Seti Gandaki*. The lake area is 115 ha and its total watershed area is 30 sq km. The watershed area in the eastern portion is covered with mixed forest of Chilaune (*Schima wallichii*) and Katus (*Castanopsis indica*) and hill slope to the west is covered partially with vegetation and cultivated land. The northern slopes are privately owned terraced land for agriculture crops, and some floating aquatic vegetation, grasses and rice fields are found in the lake shoreline.

3. Materials and Methods

The major data sources of this study are: a) Asian Waterbird Census in Pokhara between 2005 and 2008 coordinated by Tiger Mountain Pokhara Lodge, b) Waterbird survey carried out by Wetland Friends of Nepal between 2007 and 2008, c) Author's observation between 2006 and 2008 and c) LI-BIRD's previous project outputs between 2005 and 2008. Presence/absence survey was carried out using binoculars (different models of varying capacity) to list the waterbird species. The water birds that can be identified were recorded in a data record form. Birds were identified following Grimmett *et al.* (2000) and nomenclature follows BCN (2006). Similarly, the threats to waterbirds were identified through direct observation, interview with key informants and secondary sources.

4. Results

4.1. Preliminary Checklist of Waterbirds of Rupa Lake

The records based on several surveys carried out during December to February (winter months) between 2005 and 2008 by different surveyors of Tiger Mountain Pokhara Lodge, Institute of Forestry, Bird Conservation Nepal Pokhara Branch, Wetland Friends of Nepal, and Local Initiatives for Biodiversity, Research and Development are presented. A total of 36 waterbird species was recorded in the lake which represents about 19 percent of the total 193 wetland-dependent birds found in Nepal (IUCN, 2004). Preliminary checklist of waterbirds of Rupa Lake is as follows:



Fig. 2: Common Coot - © Gandhiv Kafle

Rallidae

1. Common Moorhen (*Gallinula chloropus*)
2. White-breasted Waterhen (*Amaurornis phoenicurus*)
3. Purple Swamphen (*Porphyrio porphyrio*)
4. Common Coot (*Fulica atra*)

Anatidae

5. Gadwall (*Anas strepera*)
6. Eurasian Wigeon (*Anas penelope*)
7. Mallard (*Anas platyrhynchos*)
8. Northern Shoveler (*Anas clypeata*)
9. Northern Pintail (*Anas acuta*)
10. Common Teal (*Anas crecca*)
11. Red-crested Pochard (*Rhodonessa rufina*)
12. Common Pochard (*Aythya ferina*)
13. Ferruginous Pochard (*Aythya nyroca*)

Alcedinidae

14. Common Kingfisher (*Alcedo atthis*)

Cerylidae

15. Pied Kingfisher (*Ceryle rudis*)

Dacelonidae

16. White-throated Kingfisher (*Halcyon smyrnensis*)

Dendrocygnidae

17. Lesser Whistling Duck/Teal (*Dendrocygna javanica*)

Jacanidae

18. Bronze-winged Jacana (*Metopidius indicus*)
19. Pheasant-tailed Jacana (*Hydrophasianus chirurgus*)

Charadriidae

20. Red-wattled Lapwing (*Vanellus indicus*)

Podicipedidae

21. Little Grebe (*Tachybaptus ruficollis*)
22. Great Crested Grebe (*Podiceps cristatus*)

Phalacrocoracidae

23. Great Cormorant (*Phalacrocorax carbo*)

Ardeidae

24. Cattle Egret (*Bubulcus ibis*)
25. Intermediate Egret (*Mesophoyx intermedia*)
26. Little Egret (*Egretta garzetta*)
27. Great Egret (*Casmerodius albus*)
28. Indian Pond Heron (*Ardeola grayii*)

29. Grey Heron (*Ardea cinerea*)
30. Little Heron (*Butorides striatus*)

Ciconiidae

31. Woolly-necked Stork (*Ciconia episcopus*)

Muscicapidae

32. Plumbeous Water Redstart (*Rhyacornis fuliginosus*)

Passeridae

33. Citrine Wagtail (*Motacilla citreola*)
34. Grey Wagtail (*Motacilla cinerea*)
35. White Wagtail (*Motacilla alba*)
36. White-browed Wagtail (*Motacilla maderaspatensis*)

4.2. Threats to Waterbirds of Rupa Lake

Waterbirds of Rupa Lake face a number of threats including trapping/hunting, fish farming using nets, habitat destruction by soil erosion, sedimentation and agricultural conversion, human disturbance, water pollution and eutrophication. Due to large catchment area, sedimentation is high in inlet portion of the lake via Dhovan Khola. Soil erosion, landslides, roadside cuttings and agricultural intensification are the major causes and sources of sediment generation. Though recent water quality data is not available, cause and effect analysis have shown that the quality of the lake water is being gradually degraded due to increasing use of chemical fertilizers and pesticides in the upstream areas. Domestic sewage has enormously contributed to lake pollution. The deposited lake shore in the inlet portion is being encroached by local people for agricultural conversion. Fish farming in the lake using nets through Rupa Lake Rehabilitation and Fisheries Cooperative causes enormous disturbance to the birds even though fishery has enormously supported the livelihoods of local people.

Water Hyacinth (*Eichhornia crassipes*) – called *Jalakumbhi* has rapidly covered the water surface of the shore and outlet portion of the lake reducing the feeding areas for ducks and other waterbirds, though local community have periodically removed it from the lake. The extracted Water Hyacinth has been deposited at the lake shore and it again flows back to the waterbody in the rainy season.

5. Management Implications

Rupa Lake is rich in waterbirds representing about 19 percent of total wetland-dependent birds of Nepal. More species can be expected from the lake catchment including nearby paddy fields. So a detail bird survey needs to be conducted during both winter and summer season in the entire lake catchment to prepare a comprehensive checklist of waterbirds in the area. The lake area has been encroached and converted to paddy fields. It is possible that the paddy fields in the inlet and outlet portion of the lake support waterbirds, and therefore, a study is essential to assess the role of paddy fields in proximity to the lake in maintaining waterbird diversity. Anthropogenic factors are the root causes for lake degradation and habitat destruction of waterbirds. Therefore, conservation education and awareness programmes are essential for local farmers, students, fishing community and visitors to the lake. Publication of factsheets, checklists and pocket guide about biodiversity of Rupa Lake will help to widen the local knowledge among conservationists. Improved technology to utilize Water Hyacinth is needed, for example, the use of Water Hyacinth in compost making.

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