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Wetland Friends of Nepal

Otters in Nepal: Urgent Need for Action !

Five species of otters are found in Asia. Nepal is home to three of them: Eurasian Otter (*Lutra lutra*), Smooth-coated Otter (*Lutra perspicillata*) and Asian Small-clawed Otter (*Aonyx cinerea*). There is lack of information on status and ecology of otters in Nepal, and only few preliminary studies have been conducted. Wetlands are under threat due to adverse natural and biotic factors, and such threats directly affect the survival of otter species in wetland areas. Habitat destruction, human disturbance, conflict with fishpond owners, water pollution, intentional killing and lack of awareness are the major threats to otters in Nepal. Fishpond owners see otters as their enemy as otters eat fish in their ponds at night. It is high time now to initiate research, awareness and conservation intervention for survival and conservation of otters in Nepal. If timely intervention is not carried out, it is likely that otters will be in verge of extinction from Nepal.

(By Gandhiv Kafle, Affiliate Member, IUCN/SSC Otter Specialist Group)



Eurasian Otter (Source: Wikipedia-Online)

Editorial

This is the first issue of the peer-reviewed half-yearly online journal of Wetland Friends of Nepal. We are highly encouraged by the overwhelming support of authors from Nepal and abroad who have contributed good articles for this issue. We could not include all the articles received in this issue because of limited pages. We will gradually publish other articles in the forthcoming issues and so please, bear with us. We would like to receive your comments and suggestions on this issue in order to make the forthcoming issues more accurate and useful. We also look forward to receiving your articles for the next issue of the journal. Please read the journal at <http://journal.wetlandfriends.org>. Have a nice reading !

The Editors

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IUCN/SSC Otter Specialist Group
<http://www.otterspecialistgroup.org>

The Rufford Small Grants Foundation
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Wonderful Wholesome Wetlands

¹Harban Singh

Such an array of intricate spectacular biodiversity
 A testimony of our living ecological heritage and resource
 Home and nursery to varied terrestrial and marine wildlife
 Here lies some of the world's most productive ecosystems

It mitigates floods and forms a natural barrier to the storms
 It is a melting pot of curious rich and vital biota
 Nature's gift of mangroves, marsh, peat forests, rivers and lakes
 Yet few research and venture to discover these incredible wetlands

Whenever we indulge in crabs, prawns and fishes alike,
 Let's acknowledge the priceless role of the wetlands
 They even generate livelihoods to the deprived but happy fishermen
 Globally, we are blessed with so many types of wetlands of Int'l importance

Wetland regulates water treatment have a direct bearing on climatic change
 Nonetheless, it is most misunderstood by rapacious politicians
 Their demise will be a tragedy for mankind and the environment
 It is imperative we accept wetlands as lifelines and tap resources sustainably

To all city planners and developers, I urge to exercise economic evaluations
 Before destroying fragile ecosystems and wetlands paraphernalia
 There have so much direct and indirect values in the diversity reservoir of our nation
 Please preserve these vast wetland treasures of Mother Earth, before it is too late.

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Preliminary Survey and Awareness for Otter Conservation in Rupa Lake, Pokhara, Nepal

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Otters are top predators and important biological indicators of the wetland health. They are highly adopted aquatic hunters and semi-aquatic mammals with long stream-lined bodies, flat tails and webbed feet. They are essentially associated with freshwater lakes, ponds, rivers, canals, streams and undisturbed forest and shrub land adjacent to the water bodies for security. The main food items of otters are fish, crab, frog, insects and wild fruits. They feed only on prey that are numerous and/or species which are less active, so they are opportunistic in feeding.

There are thirteen species of Otters distributed world wide except Australia, Antarctica and most Oceanic Island. Five species: Eurasian Otter (*Lutra lutra*), Smooth-coated Otter (*Lutra perspicillata*), Hairy-nosed Otter (*Lutra sumatrana*), Asian Small-clawed Otter (*Aonyx cinerea*) and Sea Otter (*Enhydra lutris*) are known to occur in Asia. Out of these, only three species viz. Eurasian Otter, Smooth-coated Otter and Asian Small-clawed Otter have been recorded in Nepal.

A study was carried out in Rupa lake to evaluate the knowledge of local villagers on otters, to document the number of otters and to raise public awareness for otter conservation. The major methods used in the study were reconnaissance survey, household survey, key informants' survey, direct observation, ground transects, boat transects, community meetings and educational classes.

About half of the respondents had some knowledge about otters. Three species of otters were reported by the local people but it has still not been verified through survey. The villagers claimed to have seen 33 otters in the area during the last 12-15 years. Majority of the respondents agreed that they had otters mostly during winter season.

It is likely that the otters present in the Rupa lake are Asian Small-clawed Otter, Smooth-coated Otter and Eurasian Otter, but it should be verified through intensive survey. 16-18 years ago, some Indians were hired to hunt the otters because of the damage done through fish predation in fish ponds of local people. They killed otters for pelts and meat.

After that incident villagers noticed very few otters in Rupa lake. These tragic incidents reflect that there was need of awareness and education among local villagers to adopt other alternative methods to protect their fish ponds. About 250 school students in Rupa lake area were taught about the importance of and need to conserve otters.

Conservation education and awareness activities are highly recommended for local people. Intensive survey of the otters should be initiated in the area.

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Online discussion forum of Wetland Friends of Nepal (WFN)

<http://dgroups.org/groups/wetlandfriends> and <http://groups.yahoo.com/group/wetlandfriends>

Nepal: Research Article

Seasonal Diversity and Population Status of Waterbirds in Phewa Lake, Pokhara, Nepal

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Abstract: The study (2007-08) was carried out in Phewa Lake which is one of the largest lake systems in Nepal to evaluate seasonal diversity and population status of waterbirds. A total of 39 waterbird species belonging to 17 families of 5 orders was recorded. The highest number of species (31 species) was found in December and January. Winter was the most diverged season in terms of number of species (35 species) and summer and autumn by 17 species. January had the highest (1584) and September the lowest (345) waterbird population. Out of 39 species, 15 species were winter visitors, 10 resident, and 4 rare winter visitor. The highest diversity ($\bar{H}=2.6228$) was found in February and lowest ($\bar{H}=1.2014$) in June. The value of evenness (Jacob's coefficient) was higher (0.8485) in February and lowest (0.4555) in June. During June, 69.92% (616 individuals) of the total population (881) constituted only Cattle Egret. The dominancy was found highest ($C=0.5058$) in June and lowest ($C=0.1020$) in February. The bird communities of summer and autumn were more similar ($S=0.7059$) than the summer and winter ($S=0.5$). The fluctuation in number of individuals of bird species was found unrelated to seasons (months) ($F=1.71$, $df = 8, 342$, $P \leq 0.05$). The species richness was found different in different seasons (months) ($\chi^2=29.34$, $df = 8$, $P \leq 0.05$). Detail study of bird diversity and population status with periodic monitoring in Phewa Lake is recommended for their conservation and management as a whole.

Key Words: Phewa lake, wetland, waterbirds, diversity, population

Citation: Giri, B. and M. K. Chalise. 2008. Seasonal Diversity and Population Status of Waterbirds in Phewa Lake, Pokhara, Nepal. *Journal of Wetlands Ecology*. 1(1/2):3-7.

I. Introduction

Nepal has many types of wetlands scattered in the Mountain and Terai regions. Its wetlands (approx. 743,500 ha) are particularly important for threatened species (DOAD, 1992). Because of its mountainous physiography, bigger wetlands are rather very few (Manandhar, 2005). However, it possesses unique biodiversity and much more can be expected in wetlands of such areas (Chalise, 2007). Wetlands are one of the most threatened habitats because of their vulnerability and attractiveness for development (Hollis et al., 1988). Wetlands provide homes for a huge diversity of wildlife: birds, mammals, fish, frogs, insects and plants (Buckton, 2007). Among 862 bird species (Baral and Inskipp, 2005) recorded in Nepal, 193 are wetland dependent birds, of which Terai wetlands support 187 species (Thapa, 2006). Nearly half of the country's globally threatened birds (14 species) and 10 near threatened species regularly inhabit wetlands (Baral and Inskipp, 2005). Birds are good bio-indicators and useful models for studying a variety of environmental problems (Urfi et al., 2005). Migratory waterfowls are one of the most remarkable components of global biodiversity (Li Zuo Wei and Mundkur, 2004). Nepal's wetlands are facing tremendous anthropogenic pressure (IUCN, 2004; Bhandari, 1998; Sah, 1997), which can greatly influence the structure of bird community (Franc and Schnell, 2002).

Phewa Lake is home for 18 fish species and many birds, reptiles, frogs and invertebrates like snails and insects harbor around it. The lake is now infested with a floating macrophyte, the Water Hyacinth (*Eichhornia crassipes*) and blue green

algae indicating enriched nutrient loading into the lake (NARC-FRCP, 2004/05). Presently, the lake is facing problems as a result of nutrient loading from agriculture, embankment landslides and rapid urbanization from the surrounding area (Lamichhane, 2000). The recent trend is toward rapid eutrophication (Oli, 1997; Rai, 2000) due to tourist flow and recreational activities around the lake.

2. Study Area

Phewa Lake is situated in Pokhara Valley (28°1'N, 82°5'E, elevation 742 m from masl) in the western mid hill region of the country that has humid subtropical monsoon climatic condition (Fig. 1). The temperature is moderate, with maximum temperature peaks at 25.5°C in July-August and falls to minimum of 13.2°C in January.

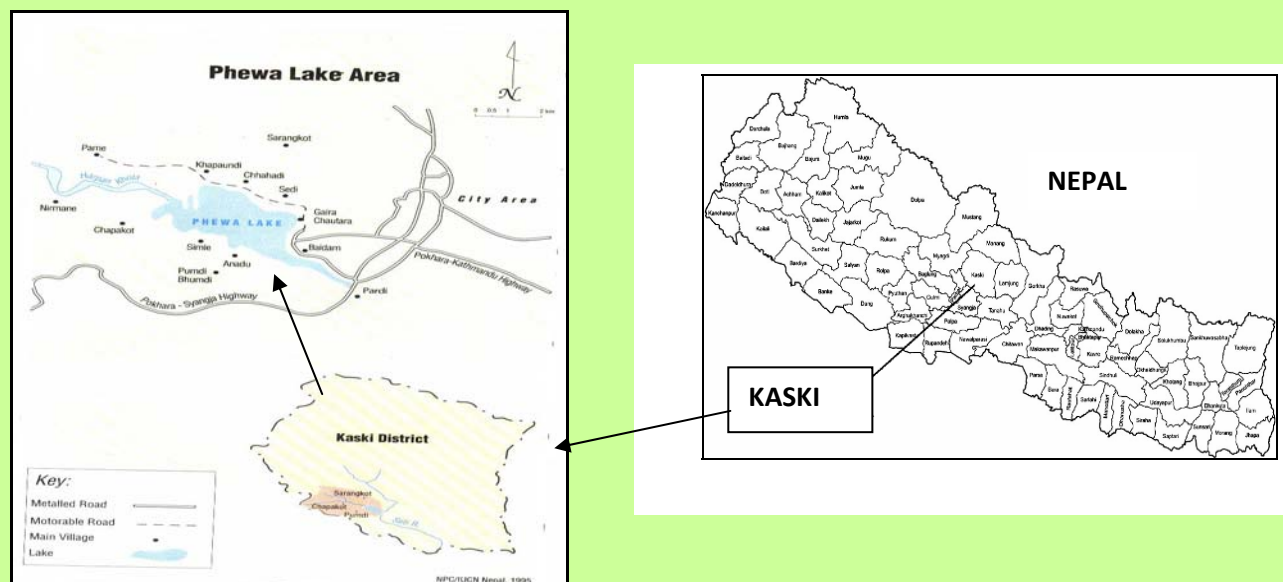


Fig. 1: Map showing Phewa lake

It has a watershed area of approximately 110 km² (Ferro and Swar, 1978). Lamichhane (2000) estimated 443 ha of water surface area with a maximum depth of 23 m. However, a total area of 8.5 sq. km was taken during the present study. The surrounding area of the Phewa Lake is mainly dominated by tree species like Katus (*Castanopsis indica*) and Chilaune (*Schima wallichii*).

3. Materials and Methods

Direct count method through ten vantage points was followed to take field data. In each vantage point, 10 to 15 minutes time was spent tending towards as shorter time period as possible to avoid multiple counting of a single individual of the bird species. The study area was visited in the middle of each month from June 2007 to February 2008. The total time spent in the field was 176 hours and the total working period was 155 hours, spending about 17 hours in each visit. Bird counting was done by using binoculars (Shakura, 20×50 magnification). For the identification of the bird species, a comparison was done with a popular field guide, Helm Field Guides "Nepal ka Charaharu" (Grimmett et al., 2003).

Shannon's index of diversity (\overline{H}), Jacob's coefficient (J) and Simpson's index of dominance (C) was used to find the diversity trend of the waterbirds. Similarity index (S) was used to check the similarity of the bird communities of different study periods. One way ANOVA was used to find fluctuation in number of individuals of the bird species according to the seasons (months). Chi-square test (χ^2) was used to test the dependency of species richness in the season (months).

4. Results

During the study, a total of 39 species belonging to 17 families and 5 orders was recorded. Highest number of species (18 species) belonged to order Ciconiiformes. Out of 39 species, 11 species which were winter visitors belonged to the family Anatidae only. The highest number of bird species (31) was found in the months of December and January (Fig. 2). Winter season was the most diverged season in terms of the number of species and summer and autumn by 17 species only. The highest number of birds was found in January (1584) and second largest population was in December (1472 individuals). September had the lowest population of the waterbirds (345 individuals) (Fig. 3). During June, Cattle Egret constitutes 69.92% (616 individuals) of total population (881) counted. December, January and February, had the highest population of Common Coot. The species like Ruddy Shelduck, Common Teal, Common Pochard and Little Grebe also had comparatively higher population.

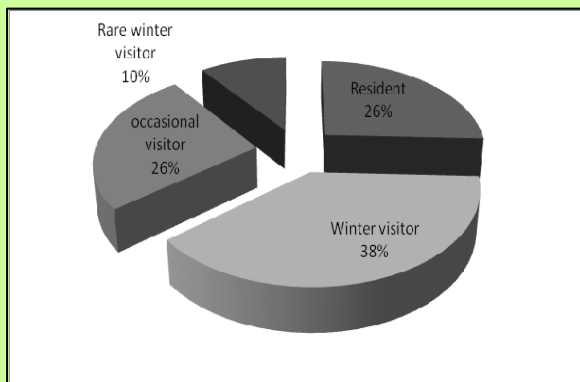


Fig. 2: Species richness in different survey periods

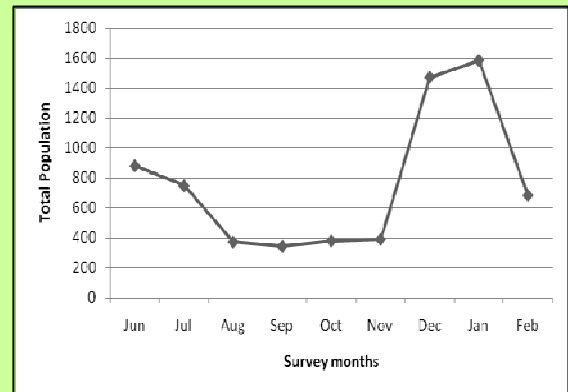


Fig. 3: Population recorded in different survey periods

Out of 39 species recorded, 10 species were resident, 15 species winter visitors, 10 species occasional visitor and 4 species rare winter visitor (Fig. 4). Among them, 13 species were frequent, 6 species common, 17 species uncommon and 3 species abundant (Fig. 5).

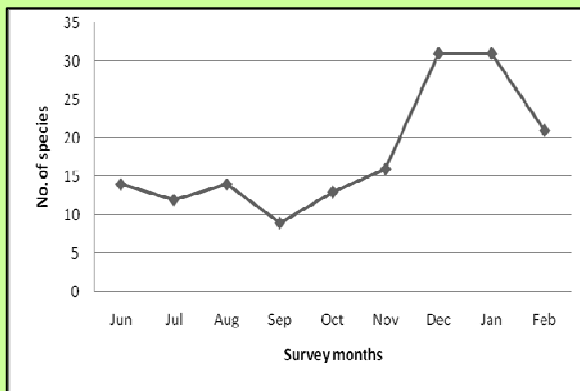


Fig. 4: Status of waterbirds in study area according to time spent in the site

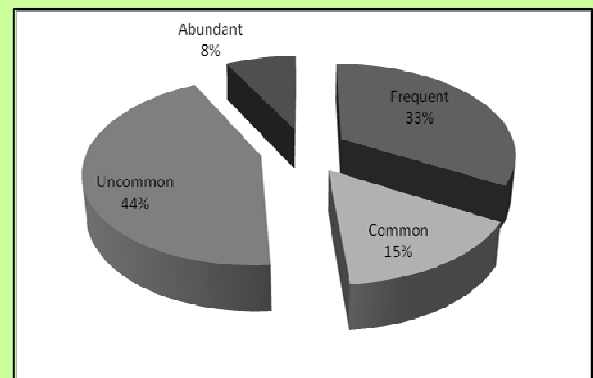


Fig. 5: Status of waterbirds in study area according to the population abundance

The Shannon's index of diversity was found highest ($\bar{H} = 2.6228$) in February and lowest ($\bar{H} = 1.2014$) in June. The value of evenness (Jacob's coefficient) also was found highest (0.8485) in February and lowest (0.4555) in June. The Simpson's index of dominance was highest in June ($C = 0.5058$) and lowest in February ($C = 0.1020$). The Similarity index (S) was higher ($S = 0.7059$) between the summer and autumn than between summer and winter seasons ($S = 0.5000$). The summer bird community ($S = 0.5000$) was found less similar than the autumn season ($S = 0.6154$) with winter season. The value of similarity index of bird communities between the months of a particular season was found higher than the months belonging to different seasons. The calculated value of F (1.71) was less than the table value of F (1.94), at 5% level of significance at df 8,342. So the null hypothesis was accepted i.e. the number of individuals of the bird species were not affected by seasons (months). The calculated value of Chi-square (χ^2) at 5% level of significance and 8 df ($n = 9$) was higher ($\chi^2 = 29.34$) than tabulated value ($\chi^2 = 15.5$). So the null hypothesis was rejected i.e. prevalence of seasonality in the species richness.

5. Discussion

Gautam and Kafle (2007) had presented records of waterbird species combining two survey results conducted by them independently in August 2003 to July 2004 and 1-5 January 2004 respectively. They recorded a total of 43 species of waterbirds belonging to 14 families. During the study only 39 species of the waterbirds were recorded. The species such as Baer's Pochard (*Aythya baeri*), Bar-headed Goose (*Anser indicus*), Comb Duck (*Sarkidiornis melanotos*), Common Golden-eye (*Bucephala clangula*), Darter (*Anhinga melanogaster*), Little Cormorant (*Phalacrocorax niger*), Purple Swamphen (*Porphyrio porphyrio*), etc. were not recorded during the present study. The species such as Lesser Whistling Duck (*Dendrocygna javanica*), Black-headed Gull (*Larus ridibundus*), Little Heron (*Butorides striatus*), Black-crowned Night Heron (*Nycticorax nycticorax*), Woolly-necked Stork (*Ciconia episcopus*), Plumbeous Water Redstart (*Rhyacornis fuliginosus*), etc. were the additional species recorded during the study. It can thus be concluded that there is possibility of increment of the waterbird species. It will be possible from the improvement of habitat condition.

Gautam and Kafle (2007) had recorded globally threatened species viz: Comb Duck (*Sarkidiornis melanotos*) (Critically Endangered), Baer's Pochard (*Aythya baeri*) (Vulnerable) and Ferruginous Pochard (*Aythya nyroca*) (Near-threatened). But during the study, only Ferruginous Pochard was recorded (in December 5 individuals and in January 7 individuals). The Ferruginous Pochard is listed as Near Threatened on the IUCN Red List of Threatened Animals (Birdlife International,

2002). The Ferruginous Pochard is a little studied, partial migrant, widely distributed in Europe, Asia and Africa (Robinson and Hughes, 2003). The winter months showed less similarity in community composition of waterbirds with other months. This dissimilarity probably was due to higher movement of birds in this area in winter season. The higher diversity and population of birds in the winter was probably because of the addition of birds during this season. Waterbirds tend to be highly mobile in winter, moving to other areas in response to factors such as cold weather and changes in water levels and in food resources (Kershaw and Cranswick, 2003).

Wetlands comprise some of the most valuable and important natural environments for living creatures, including man. And yet, like tropical forests, they are one of the most threatened habitats in the world, under pressure from human activities and development (Sonobe and Usui, 1993). The wetlands are fast disappearing ecosystems of Nepal (Baral, 1998). 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 (Karki *et al.*, 1997; Karki and Thapa, 1999; Subedi, 2003) resulting in a marked reduction in bird numbers and species diversity since the 1970 (Gautam and Kafle, 2007). The diversity of waterbirds reflects the many ways of life possible for birds in wetlands. Waterbirds exploit a range of different parts of a wetland, or microhabitats. Each of these microhabitats can support a variety of different food types: from fish, crustacean and mud-dwelling invertebrates, to water plants and tiny plankton (Sonobe and Usui, 1993). Rai (2003) recorded 60 wetland species (out of 270 species recorded) in Beeshazari Tal, a wetland listed as Ramsar Site and its suburbs. In comparison to this result, the Phewa Lake also shows the possibility of becoming important area for waterbirds at least of national level.

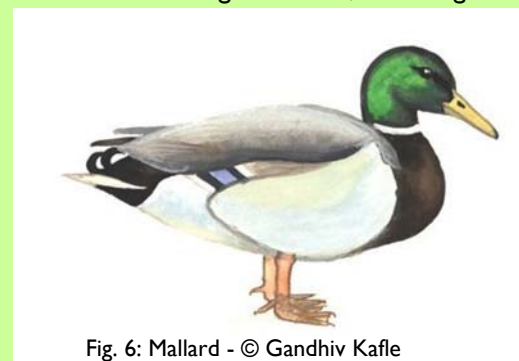


Fig. 6: Mallard - © Gandhiv Kafle

6. Management Implications

In the case of Phewa Lake, more species can be expected. Like this study, studies related to the diversity and population status of waterbirds should be conducted on regular basis for the assessment of the environmental condition of the Phewa Lake. It can help the implementation of conservation and management programmes in the wetland biodiversity of Lake Phewa. It is recommended to initiate study of bird diversity and population status immediately with periodic monitoring in Phewa lake area for its conservation and management.

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Indonesia: Project Paper

Local People's Perspective for Milky Stork: A Case from South Sumatra, Indonesia

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Indonesia supports five species of storks. The South Sumatra Province holds the core population of four of the five Indonesian storks. One of them is Milky Stork (*Mycteria cinerea*). The Milky stork has a small, declining population owing to loss of coastal habitat, hunting and trade. These factors are predicted to cause rapid declines in the near future. It therefore qualifies as Vulnerable (Birdlife International 2001 and Birdlife International 2004). Given that most of the population occurs in Sumatra, it is the trend that largely determined the species status. In particular, could the population have declined by >50% over the last three generations (24 years, extrapolating from *Ciconia* spp.), as this would qualify the species for Endangered status.

The long term conservation prospects for the Milky Stork in South Sumatra will depend upon maintenance of forest blocks which are large enough to support viable breeding populations. However, without involvement of local people, it looks like impossible to conserve this species. For this reason, a survey to review local people perspective for this stork was conducted in South Sumatra Province on March 2008. This survey is a part of Milky Stork monitoring and population assessment in South Sumatra supported by Wildlife Conservation Society Research Fellowship Programme, Rufford Small Grants for Nature Conservation and equipment grant from Idea Wild.

Interviews with local people and forestry officials were conducted between 6-17 March 2008. Interviews were principle source of information on Milky Stork. Interviews were conducted whenever possible. A standard set of questions was asked and answers were recorded on interview form. Preliminary questions were asked to every interviewee. Not all questions were asked in every interviewee, depending on how much the interviewee appeared to know. Complete interview was only conducted with people with obvious knowledge on the species. Questions covered: distribution (current, historical), abundance (changes in number and size structure overtime), taxonomy (different color form), nesting biology, local custom and beliefs, hunting and trading (past and present).



Fig. 1: Milky Storks - © Muhammad Iqbal

Information on current and historical distribution was gathered from interviews with animal traders and hunters, forestry and nature conservation department records (Provincial and District), discussion with staff of forestry and nature conservation department who regular patrols fields, and information gained from local people. The village head was met whenever possible, and the survey aims were discussed.

All information from interviews with local people can confirm for further searching of population and potential breeding areas of Milky Stork in the field. Terrestrial surveys were conducted both on foot and by using boats. Trip routes were planned on roads and tracks that cross as many river and tributaries as possible.

Density of Milky Stork was assessed by survey in a mega transect line. A major transect line along the east coastal of South Sumatra Province from the coastal line Ogan Komering Ilir District (in the South) to along Banyuasin Peninsular/river (in the north) was regularly visited. It was more than 150 km (up to 200 km) transect line.

Additional transect lines were applied depending on condition in the field and information from local people. The transect line and sighting localities were recorded with help of GPS. The birds were generally searched with help of binoculars and monoculars.

Interviews with local people in the east coast of South Sumatra Province were conducted for exploring local knowledge about Milky Stork. There was difference languages for calling Milky Stork among local people. Local people from Pasir river to Batang river (Pasir river, Jeruju river, Lumpur river, Pedado river, Kualo Duo Belas river, Janun river, Kong river and Pulau bay) called this species as “Rerake” or “Rake putih”. Local people in Sugihan Bay called this species as “Sindang Lawe” and “Bangau” for local people in Sungsang and around Sembilang National Park (Banyuasin Peninsular, Sembilang river, Terusan Dalam and Benu river). They knew well about Milky stork and able to distinguish this species with other large waterbirds e.g. stork (e.g. Lesser Adjutant), egrets and herons. Local people can easily distinguish this species with other large waterbird from large and whitish of body and with black wing covert (compare with egret and Lesser adjutant).

Local people reported that they saw Milky Stork every time. Most of sightings are in mangrove forest among coastline or mudflat. Sometime they saw Milky Stork in the fish pond (locally called Tambak) when water level fish pond recede. Local people only reported hundreds of Milky stork, and most of them answered that population size was stable from 2, 5, 10 and 15 years ago (we assumed between 200-300).

Information about breeding areas of Milky Stork was reported by local people in Pasir river to Batang river, but not in northern part of survey areas (from Kuala Sugihan River to Terusan-Benu River). Local people from Pasir river answered “hundreds” of nest and chicks of Milky Stork, not up to thousands. There were up to 200-300 nest in the breeding areas. In Pasir river, the breeding sites were reported up to 10 km to the upper belt of river. The nests were close with paddy field area (near a transmigration areas). The Milky Stork bred in mangrove vegetation. The egg laid on the nest was approximately one meter from the ground. Other information came from Batang river people. Their report was not really different from Pasir river. They answered “hundreds” of nest and chicks of Milky Stork, not up to thousands. There were up to 200-300 nest (or up to 500) in the breeding areas. In Batang river, the breeding sites were reported from upper of Kumpai River, a small river near Kuala Sugihan. The Milky Stork were also reported breeding in mangrove vegetation and the egg laid on the nest was approximately one metre from the ground. In addition, local people also reported two additional localities of breeding sites - first near Teluk Pulau (PT SBA wood concession area) and second in Janun river.

Monitor Lizard (*Varanus salvator*) was reported by local people in Batang river, which sometimes used to eating egg and young Milky Stork. Some young Milky Storks which were collected by local people in Batang river were sometimes eaten by Crocodile (*Crocodilus porosus*). Local people who collected young Milky Stork reported that they usually found some fishes in the nest of Milky Stork. The fishes sometimes they found were: Milkfish (*Chanos chanos*, locally called Bandeng), Elangote Mudskipper (*Pseudapocryptes elongatus*, locally called Janjan), Giant Mudskipper (*Periaphtholomodon schlosserii*, locally called Seluncat), Mullet (*Moolgarda sp.* / *Chelon sp.*, locally called Belanak). From the fishes mention above, Elangote Mudskipper was the common one.

Milky Stork was became a common caught bird by local people and they took care the bird as a cage bird. When the young bird grew up and flew, most of birds returned again to the people who took care them. Local people used to collect young bird from the nest where the bird breeds. If they caught the bird, sometime they sold the young bird or took care the bird as bird cage. The Milky Stork as not sold as fresh meat or cooked meat, but people sold the bird in live condition. The price of young bird ranged between Rp 25.000-30.000 (± \$2,5-3).

Based on information from local people, there is still hope to rediscover substantial numbers of breeding colonies of Milky Stork in Sumatra that were not recorded since last 15 years. Many nesting sites reported were located outside protected areas. As recommended by Birdlife International 2001, further survey work is required as continued monitoring of all subpopulations at key sites. In this case, information from local people will be very valuable sources to determine sites for searching potential breeding areas for Milky Stork in South Sumatra Province.

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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 (HMGN/MFSC, 2002; Baral and Inskipp, 2005; HMGN/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 Maidi 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.

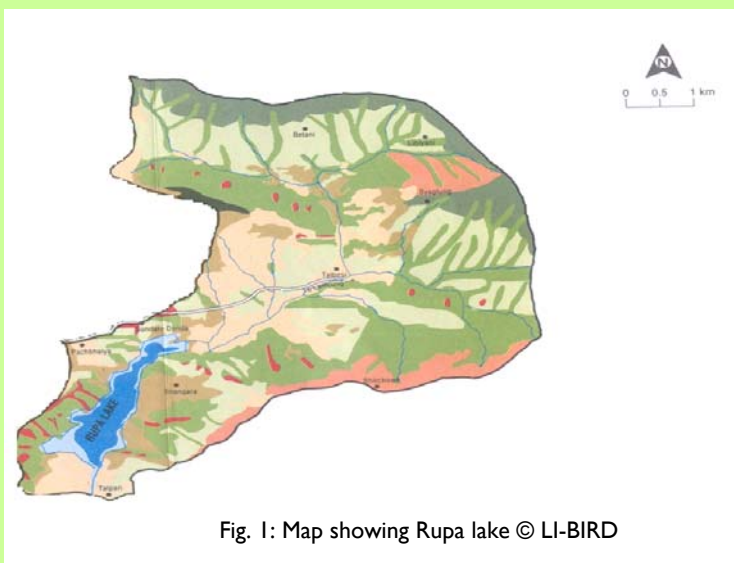


Fig. 1: Map showing Rupa lake © LI-BIRD

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* (*Shima 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 Swampphen (*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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Dunga Swamp and its Conservation in Kenya

¹Evarastus Obura

Dunga swamp (KE 037), one of the 60 Endemic Bird Areas in Kenya is located on the South Eastern shores of lake Victoria at (01° 10'S, 34° 47'E). The swamp is predominantly Papyrus (*Cyperus papyrus*) which forms distinctive habitat type for papyrus specialist birds. The birds include the restricted range endemics like the globally threatened Papyrus Yellow Warbler (*Chloropeta gracilirostris*), the near threatened Papyrus Gonolek (*Linarius mufumbiri*), White Winged Warbler (*Bradypterus carpalis*), Carruthers's Cisticola (*Cisticola carruther*) and Papyrus Canary (*Serinus koliensis*) (IUCN RED-DATA LIST and the Kenya IBA directory). The swamp is also a filter to sediment entering lake Victoria, it controls flooding in the area among others. The major threats to Dunga swamp and associated biodiversity include:

- Pressure caused by high population densities on its edges
- Over-harvesting of Papyrus for thatching and making products such as mats and baskets
- Clearing of Papyrus beds for agriculture by the local people rendering them less suitable for birds.
- Grazing ground for cattle at times of drought

Lake Victoria Sunset Birders (LVSB)

This is one of the Site Support Groups in Lake Victoria Important Biodiversity Area (IBA) working under the Birdlife IBA programme to promote the conservation of these wetlands at community level. Some of these major wetlands include Dunga Yala, Koguta and Kusa swamps - all classified as IBAs. The group works with the support of Nature Kenya, a Birdlife partner in Kenya to enhance the conservation of these wetlands through lobbying and advocacy, research, promotion of sustainable livelihoods and organizing trainings for grass root wetland custodians. More specifically LVSB promotes the conservation of these wetlands through the following means:

- Public awareness forums like school and community outreaches
- Periodic site monitoring for conservation action
- Promotion of avitourism in the sites as a sustainable resource use alternative
- Offering trainings relevant to wetland conservation and micro enterprise development to the local community groups.

The above activities have been enabled by the support of various donors such as the Rufford Small Grants Foundation, the Wildlife Conservation Society, IUCN- Netherlands and the United Nations Development Programme.

Challenges Encountered

LVSB has faced various challenges in the attempt to conserve Lake Victoria wetlands. Inadequate field equipment makes it difficult to carry out intensive research in parts of the wetlands because of their inaccessibility. However, various organizations have been supporting research initiatives in the wetland through donations in both equipment and funds. Quite often conflicts between our research teams and wetland adjacent communities arise because of misinformation. This has however, reduced after vigorous public education forums organized by the Public Education Department of LVSB. There is also urgent need to train more members of LVSB on various aspects of natural resource conservation so as to build LVSB's knowledge resource base to meet the increasing need for more community awareness facilitators. This will be enabled through the support of well wishers.

Achievements

Through LVSB programs, 20 schools are already actively involved in advocating for Dunga swamp conservation. This has been enabled by the many school awareness programs supported in the past by Nature Kenya and the Rufford Small Grants Foundation. Data collected through periodic site monitoring in Dunga and Yala swamp has facilitated the development of on going conservation actions in the site. The findings to these researches have been published in the Kenya annual IBA status reports. LVSB membership base has risen from six to fifty two in 10 years which has complemented conservation efforts at community level in four lake Victoria wetlands.

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High Altitude Wetlands as Ramsar Sites in Nepal: Status after Declaration

¹Jhamak B. Karki

Of the eight Ramsar sites declared in Nepal, four are located in high altitude areas. Significant achievements have been made within less than a year of its declaration (23rd Sep. 2007) of high altitude wetlands as Ramsar sites. The high altitude wetlands declared as Ramsar sites are Rara (Rara National Park, Mugu District), Phoksundo (Shey Phoksundo NP, Dolpa District), Gokyo and Associated Wetlands (Sagarmatha NP, Solukhumbu District) and Gosaikunda and Associated Wetlands (Langtang NP, Rasuwa District). The plant endemism, endemic fish and frog (Rara), biogeographic location supplemented by religio-cultural values and endangered mammals are the main criteria that contributed for declaration of Ramsar sites.

One of the commitments of the government after declaration of Ramsar sites is to strengthen the conservation and wise-use of the wetlands. Preparation of site management plans is underway for the Gosaikunda and Associated Wetlands whereas it is under process of approval for Gokyo and Associated Wetlands. These plans will help streamline and consolidate the conservation and wise-use of the wetlands. The implementation of the project in Gokyo and Associated Wetlands supported by WWF Nepal has resulted in the awareness amongst the residents of the buffer zone of Sagarmatha. They have formed the Gokyo Cho wetland user group with the responsibility of mainstreaming wetland conservation, minimizing the pollution and garbage and further working to link coordinated tourism activities for the improved livelihood of the hotels lying along the banks of wetland.

WWF supported Langtang NP and Buffer Zone Support Program under Sacred Himalayan Landscape Initiative is being implemented in Gosaikunda and Associated Wetlands. In both sites, study of the adaptation and mitigation of climate change has been instituted. Awareness raising informative materials were produced and distributed both in English and Nepali vernacular language. Coordinated wetland day celebration and publication of proceedings are also taking place. The fact sheets of these sites were published. Cultural significances of the sites were studied and published.

Nepal is preparing to attend the forthcoming CoP 10 to be held in Republic of Korea from 28 October to 4 November 2008. In the process, Nepal's national report has been submitted on 31st March 2008 to Ramsar Secretariat (can be seen in www.ramsar.org). Mapping of the Gokyo and associated wetlands has been completed by ICIMOD, data base preparation has been started through the support of WWF Nepal and ICIMOD.

Strengthened implementation of the ongoing site management plans and preparation and implementation of the site management plans of rest of the two sites, Rara and Phoksundo, is the need of the time. Declaration of one Ramsar site in each of the remaining high altitude protected areas (Khaptad and Makalu Barun NPs, Dhorpatan HR, Annapurna, Manaslu and Kangchanjungha CAs) as Ramsar site is the long term aim of the government.

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Community-based Biodiversity Conservation in Mid Hills of Nepal

¹Mohan Raj Kafle

Nature Research, Development and Awareness Club Nepal (Nature-Nepal) is implementing 'Community Based Biodiversity Conservation Project' in Marsyangdi Watershed area of Gorkha District of Nepal with financial support from SeaWorld and Busch Gardens Conservation Fund, USA. It is emerging discussion in Nepal that community forests are gradually being converted to monoculture because more emphasis has been given to promote only timber species especially *Sal Shorea robusta*. Adequate research has not been carried out to find the reality with scientific results. This project aims to find the impact of community forestry on biodiversity conservation. Another issue is the limited knowledge and skill of Community Forest User Groups (CFUGs) in preparation and renewal of forest management plan. To address this issue, this project aims to prepare user-friendly biodiversity monitoring manual and protocols with CFUGs in participatory manner, train them in using these protocols and prepare/renew the forest management plans with them. It is expected that CFUGs will be able to carryout biodiversity monitoring and preparation/update of forest management plan themselves with the knowledge, skills and documents to be obtained from this project. For more information, please write to ¹Mr. Mohan Raj Kafle (mkafler@gmail.com) - team leader of this project.

Healthy Wetlands, Healthy People: Educating and Mobilizing Youths for Reducing Water Pollution and Sedimentation in Lakes of Pokhara Valley, Nepal

Pokhara valley consists of nine sub-tropical lakes, with high diversity of flora and fauna. These lakes are used for irrigation, drinking water, fishery and eco-tourism purpose. But the water quality of these lakes is degrading gradually by the intense human activities and their impacts. These lakes are plagued with multiple problems: sedimentation, eutrophication, pollution, encroachment and fish poisoning. The upstream catchments of these lakes have many degraded areas, which serve as sources of sediments in the water body. *Wetland Friends of Nepal* (WFN) has started healthy wetlands healthy people project since February 2008 to deal with these issues in its capacity.

Wetland Friends of Nepal and Toyota Motor Corporation are partners in this project to maintain healthy wetlands, healthy people and rich biodiversity in lakes of Pokhara Valley.

Objectives

The main objective of this project is to educate and mobilize the local youths for reducing water pollution and sedimentation in the lakes of Pokhara valley. It is expected that water pollution, soil erosion and invasion in the lake will gradually be decreased, and a good network of 'Friends of Wetlands' will be established in the area for long-term conservation activities.

Major Activities

- Local institution formation/identification and capacity building
- Demonstration of soil conservation, composting from Water Hyacinth and bamboo handicrafts promotion
- Conservation and pollution control
- Public awareness and wetland education
- Publication and dissemination
- Online networking

Achievements to Date

- Nine local conservation groups (= Friends of Wetlands (FOW) identified/formed
- One Wetland Friends of Nepal Network (WFN-Network) inception
- Two plants for compost preparation (from Water hyacinth) installed and experiment ongoing
- Two plants for preparation of fish feed for fish from Water hyacinth installed and experiment ongoing
- One nursery in the farmer's field established/maintained and supported
- Cultivation of coffee seedlings in farmers' fields
- Degraded sites around the lakes identified and mapped
- Different land rehabilitation structures constructed in four degraded sites (gully, stream bank, road side cutting and landslide)
- Cultivation of Napier seedlings in farmer's fields
- A report entitled 'Lakes in Pokhara Valley and Their Role in Maintaining Waterbirds' prepared
- Identification of degraded sites around five wetland sites and their mapping
- Water Hyacinth (*Eichhornia crassipes*) removed from certain sections of the lakes periodically
- FOW members trained on wetland issues
- Creation of conservation awareness among Friends of Wetlands (FoWs) and local community on wetland conservation

Ongoing Activities

- Experiment on preparing compost and fish feed from invasive Water Hyacinth
- Establishment of solid waste disposal drums around the lakes
- Removal of invasive Water Hyacinth from the affected lakes
- Publication of extension materials and dissemination
- Conservation awareness campaign



For more information, please write to Project Officer - Mr. Mohan Kafle (mohan@wetlandfriends.org).

Inter and Intra- Organizational Collaborative and Consultative Program of Society of Wetland Scientists Asia Chapter (SWS)

¹**Prof. Isidro T. Savillo**

Right after the 2006 International Convention and Meeting of the Society of Wetland Scientists, Org. at Cairns, Queensland, Australia, the IOCCP or the Inter and Intra- Organizational Collaborative and Consultative Program was established by Prof. Isidro T. Savillo, Regional President, SWS Asia Chapter. The main objective of the program is to facilitate solve the numerous wetland problems that were occurring in the Asian region as cited by various Asian wetland scientists. The participation for collaboration and consultation in important and/or critical research projects can occur within members of the Society of Wetlands Scientists particularly the Asia Chapter as well as other wetland organizations. The IOCCP is now preparing a roster for wetland scientists who are members of the SWS Asia Chapter to submit their fields of specialization so that the SWS Asia Chapter will not have any difficulty of matching them as collaborators or consultants or even referees to particular projects especially proposed by third world country SWS Asia Chapter Scientists.

¹*Regional President and Organizer, Society of Wetland Scientists Asia Chapter (SWS)*

Journal of Wetlands Ecology

Journal of Wetlands Ecology is a half-yearly online journal of Wetland Friends of Nepal (WFN) dedicated to the exchange and dissemination of information related to wetland issues connecting wetlands, human and wildlife. The opinions expressed by the contributing authors are not necessarily those of WFN. The designations employed and the presentation of the materials in the Journal do not employ the expression of any opinion on the part of WFN concerning the legal or constitutional status of any country or geographical area.

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Application Form

Global Network of Wetland Friends of Nepal (GloNet-WFN)

To join the Global Network of Wetland Friends of Nepal, please send the following information to mail@wetlandfriends.org.

Name: ----- Affiliation: ----- Title/Designation: -----

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A directory of the GloNet-WFN is being prepared. We look forward to welcoming you in the Global Network of Wetland Friends of Nepal, which will be reflected in this directory !