

Survey of Ghodaghodi Lake Complex for Cotton Pygmy Goose *Nettapus coromandelianus* and Marsh Mugger *Crocodylus palustris*

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Abstract

Ghodaghodi lake complex is a Ramsar Site and also an important bird area. It forms an important wildlife corridor between terai and Siwaliks and between the two protected areas of the western lowland Nepal, Bardia National Park and Sukla Phanta Wildlife Reserve. A variety of wildlife has been recorded in the area including 140 species of birds, 34 species of mammals, 9 species of herpetofauna, 29 species of fish and several varieties of plant species. Past data shows that the site had 1% south Asian population of Cotton Pygmy Goose *Nettapus coromandelianus* and presence of Marsh Mugger *Crocodylus palustris*. Current survey targeted to these two indicator species has shown that Cotton Pygmy Goose has declined by 70% and Marsh Muggers with no clear trend of decline or increase. Hunting and disturbance, encroachment, habitat alteration are identified as major threats to the area. Recommendations are made for habitat management, education and awareness, scientific and participatory monitoring of lake biodiversity with birds and crocodiles as the indicator species, strengthening and capacity building of local CBOs, formation of district level coordination body and to provide a special category status for the GLA.

Key words: Cotton Pygmy Goose, Marsh Mugger, Ghodaghodi Lake

Introduction

Ghodaghodi lake area (GLA, 28°41'N 80°56'E) covers all smaller wetlands close to the main Ghodaghodi lake. It lies in Kailali district of far-western region at 205 meters above sea level. Ghodaghodi lake area includes about 13 associated lakes and ponds and covers an area of 2563 hectares (Anon 2002). It is positioned in a very strategic location between Bardia National Park and Suklaphanta Wildlife Reserve and alongside of the east- west highway. GLA also forms an important wildlife corridor

between the Terai and Siwalik hills (GoN/CSUWN undated).

GLA provides habitat for 34 species of mammals, around 29 species of fish, around 140 species of birds (migratory & resident) representing 16% of the national avifauna, and 9 species of herpetofauna including 3 species of turtle (DNPWC and WWF undated, GoN/CSUWN undated). It is also a nesting area for large turtles and Marsh Mugger crocodile *Crocodylus palustris*. Although quite widely distributed in the

past (Shah and Tiwari 2003), now the Marsh Mugger is threatened with extinction and has been listed by IUCN as Vulnerable (Crocodile Specialist Group 1996). It harbors an estimated 1% of South Asian biogeographic population of Cotton Pygmy-goose *Nettapus coromandelianus* (Anon 2002). This species is considered as Least Concern at global level (BirdLife International 2009a) and is the smallest duck species in south Asia (Ali and Ripley 1987, Sonobe and Usui 1993, Grimmett *et al.* 1998, Rasmussen and Anderton 2005). The area supports several globally threatened species including three species of endangered to critically endangered vultures as well as globally vulnerable species eg Indian Spotted Eagle *Aquila hastata* and Lesser Adjutant *Leptoptilos javanicus* (Baral and Inskipp 2005).

It also supports a variety of plant species including 388 vascular plants (GoN/CSUWN undated). Native aquatic plant like; Water primrose and Bladderwort with unique physiological adaptation are found in this lake. Ghodaghodi lake is surrounded by subtropical broadleaved trees such as Sal *Shorea robusta* and Saj or Asna *Terminalia alata* (Anon 2002). Other tree species include Amala *Phyllanthus emblica*, Mitho Neem *Murraya koenigii*, Kyamun *Cleistocalyx operculata*, Bael *Aegle marmelos*, Karma *Adina cordifolia*, Kusum *Schleichera trijuga* etc. Small patches of *Phragmites karka* grow in the shallower area of the lake. In other lakes, for example Nakhrodi, Bainsha trees *Salix* spp. are abundant.

Rationale for the survey

A biological survey of the area was done in 1992 which recorded 140 bird species in the lake (Baral 1992). IUCN carried out a

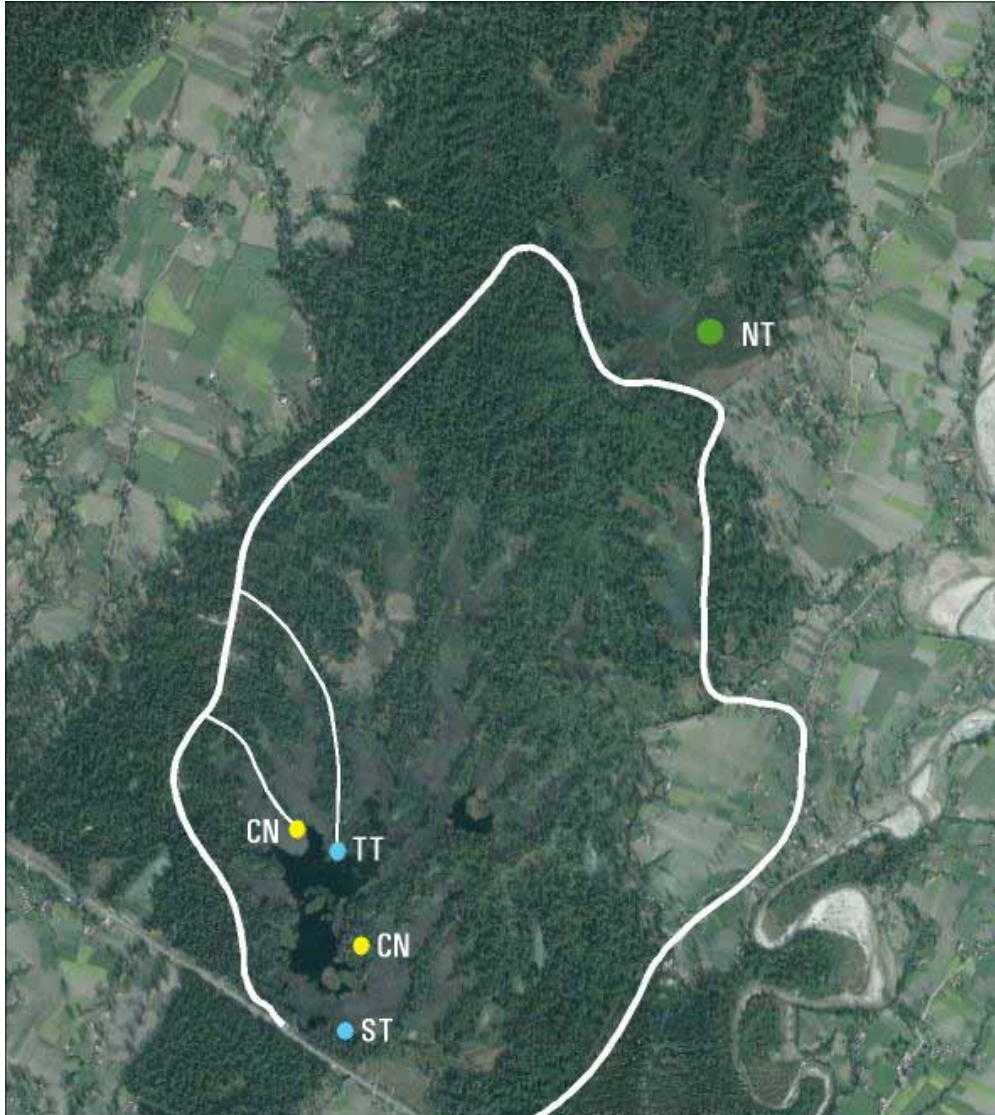
survey of major wetlands in lowland Nepal including Ghodaghodi Lake (Bhandari 1998). The place was declared as a Ramsar Site in 2003 and as an important bird area (IBA) in 2005 (Baral and Inskipp 2005, BirdLife International 2009b). The main feature of the lake mentioned in the information sheet on Ramsar Wetlands (RIS) is the internationally significant populations of Cotton Pygmy Goose *Nettapus coromandelianus* (Anon 2002). Cotton Pygmy Goose has been described as 'frequent and quite widespread resident and summer visitor' to Nepal (Grimmett *et al.* 1998, 2000). Although resident, there is only one breeding record from the country, Begnas Tal at least 20 years ago (Inskipp and Inskipp 1991). Since the site was declared as a Ramsar Site, no study and monitoring have taken place on the existing population levels of these pygmy-geese. Against this background, the wetland project, Conservation and Sustainable Use of Wetlands in Nepal (CSUWN) a joint undertaking of the Government of Nepal, MFSC and UNDP has identified and established the Cotton Pygmy Goose, Marsh Mugger crocodiles and wild rice as indicator species of the area. This survey aims to fulfill the gap on the existing knowledge on the current status of these species in the lake as well as form a baseline research to support the objectives and goal of the current wetland project.

Materials and methods

The methodology primarily consisted of desktop and field work.

Desktop work

Initial planning was done in Kathmandu for necessary preparation to obtain field instruments and gears such as site maps,



CN: Crocodile Nest, NT: Nakhrodi Tal, ST: Short Tower, TT: Tall Tower

Figure 1. Showing two major lakes, routes taken for survey (white line), CN: Crocodile nesting, TT: Tall Tower, ST: Short Tower, NT: Nakhrod Tal etc.

previous survey reports, telescope (SWAROVSKI High Definition HABICHT AT 80 with 20 to 60 magnification), digital camera and three pairs of binoculars (Carl Zeiss 10x30, Bushnell 10x42, Viking 8x40) for undertaking the survey.

Field work

Literature review and field consultations were done to identify NGOs working in the area in order to carry out bird monitoring work in Ghodaghodi Lake in the future. People who were utilizing forest resources and were present near the lake were asked about Ghodaghodi Lake and conservation issues.

The area was visited in June and data on birds and crocodile was collected from 10 to 15 June 2009. Following methods were adopted to meet the specific objectives:

1. All four major wetlands in GLC were visited to assess their status in terms of presence/absence of Marsh Mugger and Cotton Pygmy Goose (see route on the map—all covered for two days).
2. Survey concentrated on areas that showed presence of the species. A fixed route was followed to record numbers of indicator species (from short tower to crocodile nest on the west side close to tall tower (Figure 1). A total of ten counts were conducted to record the indicator species.
3. The route, crocodile presence and nesting were marked on a map.

Results

As many as 10 counts of Cotton Pygmy Goose were done in the lake area. The highest total was 139, a morning count in Ghodaghodi Lake Complex on 14 June 2009 (Table 1).

Table 1. Population count of Cotton Pygmy Goose

Date	Time	Count
10 June 2009	Afternoon	84
11 June 2009	Morning	110
12 June 2009	Morning	104
12 June 2009	Afternoon	121
13 June 2009	Morning	106
13 June 2009	Afternoon	51
14 June 2009	Morning	139
14 June 2009	Afternoon	85
15 June 2009	Morning	133
15 June 2009	Afternoon	68

In addition to this, two nesting sites of Marsh Mugger were confirmed. As many as six nest holes were observed. A total of 11 young Marsh Mugger and an adult (possibly a mother) were noted in this area. Freshly hatched egg shells with blood stains were also recorded from this new nesting area. The length of the mother crocodile was estimated to be nearly 9 feet where as the hatchlings were less than a foot.

Discussion

Although Ghodaghodi is a Ramsar Site and an IBA, the area remains unexplored from biological point of view. The first ornithological survey reported total avifauna of the lake as 140 species (Baral 1992). Since then a number of surveys and other activities have been conducted but status update on bird species found in the lake is still lacking. This survey has recorded only 88 species of birds compared to the 1992 survey (Baral 1992) mainly because of different time of the year. The earlier report

has incorporated several short surveys to produce a total of 140 species (for details see the references listed in Baral 1992).

The highest population count of Cotton Pygmy Goose in Ghodaghodi Lake was 139 individuals. Besides Ghodaghodi Lake, Nakhrodi contained a maximum of 14 birds during one of the counts. As the water level in Nakhrodi had been lowest of the year, considerable human activities had caused much disturbance and most birds were noted to be using Ghodaghodi for refuge during the rest of the time. Bird counts at Nakhrodi rest of the time resulted absence of the geese mainly because of the increased disturbance.

Perennou *et al.* (1994) give 1% biogeographic population for Cotton Pygmy Goose as 500 birds. There is no update on the 1% population figure until the year 2002 when the 1% figure is raised to 1000 (Wetlands International 2002). At the time Government of Nepal proposed Ghodaghodi as a Ramsar Site (January 2002, Anon 2002), population size given by Perennou *et al.* (1994) was the basis for 1% biogeographic population (Table 2). This means that only a population size of 500 would qualify the site under the 1% population criterion.

In the year 1995 which coincides with the work of the Biodiversity Profiles Project, a maximum of 450 Cotton Pygmy Goose was reported from Nepal's wetlands (Lopez and Mundkur 1997). Ghodaghodi Lake was covered in this particular year and it's likely that most of the birds were from this wetland. However even if the entire count of pygmy geese had been made in Ghodaghodi, the total population size mentioned for Nepal does not reach the 1% level. Therefore, RIS of Ghodaghodi mentions "the lakes support nearly 1% of

south Asian Cotton Teal (=Cotton Pygmy Goose) population" (Anon 2002). It is also likely that a count of larger number was made during summer months of which exact number is not available for reference to us.

Most authentic waterbird population estimates have been done by Wetlands International in close coordination with BirdLife International. Both organizations are recognized as international partners by the Ramsar Secretariat.

Table 2. 1% population estimates of Cotton Pygmy Goose in south Asia during different time periods

Number	References
500	Perennou <i>et al.</i> 1994
1000	Wetlands International 2002
1000	Li and Mundkur 2004
1000	Li and Mundkur 2007

In light of the data available for comparison for the year 1995 January where a maximum of 450 birds were counted, it is certain however that the population of Cotton Pygmy Goose has declined in Ghodaghodi Lake by nearly 70%. A thorough and specific survey conducted under the aegis of The Wetland Project resulted only 139 individuals which is significantly lower than numbers recorded in January 1995. We predict the pygmy goose population in January is generally lower compared to June which is the start of the breeding season and Ghodaghodi Lake's Cotton Pygmy Goose population is augmented by summer visitors.

Current survey found out that the main site for Marsh Muggger is Ghodaghodi Lake although these animals are known to use number of other wetlands in the area certain time of the year. Other two lakes, on the west and east side of the Ghodaghodi were used for aquaculture. Marsh Muggger and

Cotton Pygmy Goose were not observed here during the survey period. However, fish farmers complained about crocodile depredating local fish farms. According to the fisherman, crocodiles regularly visit the lake to eat fish during the night.

Two sites were confirmed as nesting sites for the Marsh Mugger. Earlier to this survey only one site (east of the tower) was considered to be the breeding site. The new site is protected partly by barbed wire fence to stop livestock. It was protected originally to provide a basking and resting site for crocodiles. Although the site is protected from most human intruders it seemed still quite vulnerable from fishermen and other locals who were seen using the area frequently. A total of 12 crocodiles that included one mother and 11 young were found in the study area. One of the team members was able to observe a hatchling crocodile coming out of the egg shell and going into the lake.

Major threats

The main threats to the two key species and the lake ecosystem are hunting and disturbance, eutrophication, unmanaged cattle grazing and fishing, overexploitation of other natural resources, reduced inflow of water into the lake and problems from the invasive species. Various types of structures are being built with very little knowledge on the long term impact to the functioning of the lakes' ecosystem.

Locals informed that there are plans to make a tower on the southern fringe of the lake, an information centre and a Tharu museum. It is best that Tharu Museum is made more towards the village area. Information Centre is a good concept and The Wetland Project should explore its role

in making a useful information centre for visitors. Tower on the southern side should be made with least damage to environment and how this will be managed after it is built should be also planned and discussed.

Conservation recommendations

In a nutshell, following actions are recommended for safeguarding biodiversity in and around the Ghodaghodi Lake:

- Periodical scientific monitoring and more frequent participatory monitoring on key indicator species should be started as soon as possible. Documentation of biodiversity from the area is also vital.
- There should be a total control on the development of new infrastructures, poaching and disturbance in and around the lake area
- Cattle grazing and fishing should be allowed on a controlled basis.
- Active habitat management is needed for birds, crocodiles and other biodiversity in the area.
- Conservation education, public awareness and ecotourism should be promoted, the latter with well designed management plans.
- Some income generation activities to reduce pressure on Ghodaghodi's natural resources, training and capacity building of the locals for safeguarding the lake area should be started.
- Ghodaghodi's conservation also includes conservation of its watershed area. Well beyond it, the network of wetlands present in the

district should be also given importance for conservation.

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