

CONSERVATION OF MIGRANT BIRDS : TWO CASE STUDIES

By Prakash Gole, Ecological Society, 1B Abhimanshree Society,
Pune 411 008, India.

Introduction

The hordes of migratory birds that sweep the Indian sub-continent every winter, fly over a broad east to west front. The valleys of the Indus on the west and the Brahmaputra on the east constitute the two principal flyways : western and eastern. A number of migrants have also been observed to follow the central route which involves flying over some of the highest Himalayan peaks at incredible altitudes (Ali s. & Ripley D. S.1978).

The migrants range from the tiny Passerines belonging to families Sylviinae (Warblers) and Fringillidae (Finches) to large-sized birds from Anatidae (Ducks and Geese) and Gruidae (Cranes) families.

Out of the about 350 bird forms (species and sub-species) that cross international borders every year, this paper pays particular attention to only two, viz. a goose and a crane, whose survival is year by year, becoming a global concern and therefore, should invoke cooperation between the governments and the people of several countries. The goose is the Indian or Barheaded Goose (*Anser indicus*) and the crane is the Siberian or White (*Grus leucogeranus*).

Barheaded Goose : Description and Range

This handsome grey and white goose is characterised by 2 parallel black bars on the crown that lend it its name. Its breeding range stretches from the northern fringes of the Indian sub-continent in Ladakh to north Tibet, Mongolia and the lake Baikal region of USSR. In these places it breeds on islands in and marshes around high-elevation lakes (Gole P. 1982) and sometimes nests have also been found on cliffs and in trees when the goose pair utilise nests and nest-sites already used by ravens, eagles etc. (Osmaston B. 1925 and Smirenski S. 1989 personal communication). Their winter range extends from the Indus valley in Pakistan to south China in the east. Many spend their winter in northern India becoming scarcer towards the south.

In India they start coming in by mid and late October and are well in by mid-December. In Pakistan they were sighted on the Tongsa Barrage near Dera gazikhan and the Chashma Barrage near Mianwali in January and some are believed to spend the entire winter on the Indus near Dera Ismailkhan (Ashiq Ahmad 1989 personal communication). They leave India by March and most are gone by the end of this month (Gole P. 1982 *ibid*). In Pakistan they were observed in Sialkot and the upper Chitral region on passage in spring (A. Ahmad 1989 *ibid*).

The Migration Route

The geese are believed to take the central migration flyway overcoming the highest Himalayan peaks on passage. On their way

to wintering grounds in north and south India many were seen to collect at Hokarsar lake in Kashmir in October (A. Wani 1989 personal communication) and have been observed flying over the Nepal Himalayas and at Dehradun at an altitude of over 8800 meters (Ali and Ripley 1978 *ibid*).

The Main Wintering Areas

The main wintering places in Pakistan have already been mentioned. In India they are observed wintering around lakes in east Rajasthan, on the rivers Chambal and the Jumna, on lakes in west UP and MP, in the Brahmaputra valley in the east and down the east coast of India as far as Point Calimere. In some winters major concentrations are seen on the Orissa coast (Bhitar Kanika swamps and Lake Chilka) and the coast of Tamilnadu (Lake Pulicat and Vedaranyam swamps Lat. 10 N. and Long. 80 E.) In recent years some have been observed on lakes in Kutch and Saurashtra and some on south Maharashtra and Karnatak lakes around Solapur and Dharwad (Lat. 15 N. and Long. 75 E.). A few have also been observed on lakes in Andhra Pradesh north of Hyderabad (Lat. 19 N. and Long. 76 E.).

There are no recent reports from Burma about their wintering distribution. In China they were observed wintering in the Napahai Reserve in Yunnan (Barzen J. personal communication).

The Decline in Numbers

At one time *A. indicus* was the most abundant goose wintering in India. In the opinion of Alan Hume it outnumbered every other goose in India by a proportion of 5 to 1. He observed 10,000

geese in a 16 km stretch of river near the confluence of the Chambal and the Jamuna (Gole P. 1982 *ibid*), in the closing years of the last century. In 1982 when I visited many lakes in east and central Rajasthan, I could however, count less than 2500 geese. In Keoladeo Ghana National Park, Bharatpur, spectacular assemblages of several thousands were formerly reported. In recent years less than 1000 are observed each year in this park.

Though Sultanpur jheel in Haryana gets about 200-300 wintering *A. indicus* almost every year, the numbers seen on the Jamuna have been declining, the decline observed since 1975 by the late Mrs Usha Ganguli. To the east the numbers on the Brahmaputra have been declining in recent years though some regularly visit the Kaziranga National Park in Assam. On the east coast their occurrence has become highly irregular and the numbers vary from a few hundred to almost 5000.

While submitting a report on the status of this goose to the International Goose Symposium in Hungary in 1981, I estimated the total world population of this goose to be between 10,000 and 20,000. The actual counting of waterfowl all over India and Pakistan was first organised in 1987. In that year 3733 *A. indicus* were counted in India and Nepal with none in Pakistan (van der Ven J. 1988). Though the count was admittedly partial, most of the major wintering areas were covered. No counts were made in China. In 1988 a little over 5000 were counted including 1666 in China (van der Ven J. 1989).

On the breeding ground around lake Koko nor and Long baotan marsh in 1987 May a little over 10,000 were estimated to occur. (Bishop M. 1988 personal communication). A researcher in Tibet estimated a population of about 5000 geese on the breeding grounds in 1987 in North Tibet. (Piao Ren Zhu 1988). An estimate of 5000 geese occurring in Mongolia* has also been made. In USSR about 150 to 250 breeding pairs are believed to nest. (Dr Sorokin A. 1989 personal communication). If these estimates from the breeding areas of *A. indicus* are examined, the total world population of this goose reaches a little over 20,000. This can be compared with the estimates of world population of other geese such as the Greylag (*Anser anser*) 1,50,000, Lesser Snow Goose (*Anser caerulescens*) over 3 million and Canada Goose (*Branta canadensis*) over 5 million. (Owen M. 1980).

The Causes of Decline

The causes of decline in the numbers of *A. indicus* are far from obvious. Till recent times this goose has not been studied intensively either on its ^{breeding} or its wintering grounds. Though Soviet authors admit of a great decline in numbers in their country, no explanation other than hunting was forthcoming. There are no recent reports from Mongolia. But in China Dr Ripley suspected hunting to be the main cause, especially in Tibet where soldiers did not share the Buddhist faith. Though geese are not killed or shot in Buddhist Ladakh and Tibet, local people habitually collect eggs from their nests for food.

It appears that the breeding goose population in China is fairly stable, around 5000 breeding pairs. The Soviet and Mongolian goose populations were perhaps never large, as geese were not protected in those countries by popular sentiment. All this leads me to believe that the world population of this goose was really never large, never exceeding 50,000 individuals, though big concentrations at a few important places created an illusion of abundance. In recent years it has declined to around 20,000 and is likely to decline further if protective measures are not undertaken.

Measures of Protection in Force

This goose is included in the Red Data Book of the Russian SFSR and is likely to be included in the Red Data Book of USSR now being compiled. In China and Pakistan it is legally protected. In India it is not included in the Schedule I of India's Wildlife Protection Act and can be hunted on a Small Game license. Certain states like Rajasthan have provided it protection by banning hunting altogether. No bag-statistics are available from India though it is believed to be still hunted in the east and the north and professional trappers trap them in Bihar and West Bengal. The geese that appear in Patna and Calcutta bird markets come from these trappers. In Nepal and Burma this goose is probably not protected.

Suggested Measures

Considering the low total world population, this goose needs protection urgently. It needs to be included in Schedule I of

India's WLP Act.

Close monitoring of its numbers is required both on its breeding and wintering grounds. The winter waterfowl count in Asia began in 1987 and needs to be strengthened in Pakistan, Nepal, India, Burma and China. Breeding bird counts do exist in USSR but efforts should be made to disseminate this information to countries where the goose winters. In China serious attention has not been paid to this goose so far. Regular counts of breeding and wintering geese and research in its ecology are expected from China. In India the count network needs to be strengthened especially in Ladakh and in the eastern parts of the country.

A conservation programme based on regular communication between scientific bodies of the concerned countries and exchange of information between governments and NGOs are urgently required to ensure adequate protection to this goose.

The Siberian Crane : Description & Range

Siberian Crane belongs to that widespread genus *Grus* which also includes the Sarus of the Indian sub-continent, the Red-crowned of East Asia, the Common of Eurasia and the Whooping and Sandhill of North America. This overall white crane has a reddish face and a pink bill and legs. Its black primaries are seen only in flight.

Its breeding range includes north Siberian taiga and tundra regions of USSR where an estimated 2700 cranes are believed to

occur. Most of them winter on the Poyang lake in the Yangtse region of China where 2626 were counted in 1988 by Japanese researchers. A small party of upto 15 winters in Iran and another small group winters in the Keoladeo Ghana National Park near Bharatpur in Rajasthan, India.

It is the future of this small Bharatpur flock which causes concern to people and governments of India, Pakistan and USSR and which therefore, forms the next topic of discussion here.

The Migration Route & Recent Occurrences

Precious little information is available about the precise route of fall and spring migrations of Siberian cranes that winter in Bharatpur's K. G. National Park. The only certain thing appears to be that the flock enters India from the west, overflying Afganistan and Pakistan. They were sighted on the lake Abe-i-estada on the Ghazni river in Afganistan on their spring migration in 1974 by the late Dr Ronald Sauey. In Pakistan 2 small parties were recorded in the closing years of the last century near Larkana and E. Narra districts, Sind (Ali & Ripley 1969). There were no sightings this century till recently when on 17th March 1988 Ashiq Ahmad of Pakistan Forest Institute sighted 17 birds in 2 flocks northeast of Peshawar which he believed to be Siberian cranes (A. Ahmed 1988 letter to Dr Landfried of USA).

In India these cranes were sighted from time to time over a wide area from Delhi to Bihar and Nagpur (Ali & Ripley *ibid*). In the present century however, the flock was seen to remain faithful to K G National Park though a single individual was

observed throughout the winter in the Dihailia jheel near Shivpuri, M.P. in 1988-89.

No sightings of these cranes were recorded elsewhere in the sub-continent in this century. The breeding grounds of the flock remain unknown though Soviet scientists believe that they lie in the delta region of the Ob and the Yenesi rivers in northwest Siberia (Lat.65 N & Long. 70 E). Some sightings of stray birds and small parties have been recorded in the delta of the Sirdariya river in Sept. 1982 & 1984 (Dr Sorokin A. personal communication). But no one knows from where the birds come and where they go back and the exact route on which they fly on passage.

The Statistics of Decline

The Bharatpur Siberian flock was believed to number as many as 100 in the 50's of this century, though only 76 were observed in 1969-70. Since those times there is a decline in numbers with certain years registering a sudden fall. Thus the flock declined from 57 in 1976-77 to 33 in 1979-80, though a recovery was seen in 1984-85 when the flock consisted of 41 cranes. Then a sudden decline from 41 to 23 was registered between 1986-87 and 1988-89. The last year's count in the National Park was 22 with one crane straying to Dihailia lake in M. P. (Vijayan & Landfried 1988).

The flock is now reduced to such low numbers that it appears to be on the brink of being wiped out in the coming decade if urgent measures for its protection are not instituted. This

Siberian flock is now in the same condition as was the Whooping Crane (*Grus americana*) in the 30's of this century in USA. The latter's recovery then began with the introduction of strict protection and other steps to help the crane population. This small flock now calls for similar urgent action to help it to recover.

Causes of Decline

Observers have related the decline in numbers to hazards on migration route and conditions on the wintering ground in India. Thus the sudden fall in the late 60's was attributed to severe drought in the National Park when the numbers fell from 100 to 76. The fall in the late 70's was probably due to the unstable conditions on the migration route. Apparently dead birds were found to be offered for sale in Afganistan. The war in that country began 1978-79 aggravating further the conditions on the migration route. This was followed by a severe drought in the Park in 1979-80 when the number fell to 33 from 55.

The next few years saw excellent water conditions in the National Park and the flock staged a recovery to 41 in 1984-85. Again a severe drought that lasted 3 years began in 1986 with the flock registering a steady decline from 41 to 31 between 1984-85 and 1987-88 and then a sudden fall to 23 in 1988-89 (Vijayan & Landfried *ibid*). The rainfall conditions in 1989 in the Park appear to be satisfactory giving rise to hopes that the fall will be arrested this year.

Measures of Protection in Force

The Siberian cranes is legally protected in all countries in which it occurs, though unstable political conditions in Afganistan are not conducive to the enforcement of protection. In Pakistan there is a tradition among certain tribes of trapping Demoiselle and Common cranes which are then offered for sale to people who keep them as pets. There is a recent report of a Siberian crane perishing, either having been killed or succumbing to injuries during trapping (A. Ahmad 1989 personal communication).

In India the Siberian crane is included in Schedule I of the WLP Act and is fully protected. No incidents of trapping or hunting have so far come to notice. These cranes however, are so rare and so little seen that most people are unaware of how they look. If they stray from the National Park they may fall a prey through sheer ignorance of their importance. During drought years conditions in the Park cause concern. In a recent meeting held between the officials of Govt. of India and Govt. of Rajasthan, it was agreed that adequate levels of water in the Park would be maintained ensuring good feeding condtions for Siberian cranes.

During drought years the cranes were observed to disappear from the Park from time to time, obviously going elsewhere to feed. In order to ensure strict protection, these feeding grounds must be located and a public awareness campaign through the media should be launched. It is planned to mount an aerial survey in early 1990 to locate these feeding grounds.

Suggested Measures

To protect this small flock of Siberian cranes, it is necessary to identify their migration routes and staging areas and then to ensure adequate protection and favourable feeding conditions during the entire passage. This involves cooperation between the governments and the people of USSR, Afganistan, Pakistan and India. Their departures and arrivals from the respective countries need to be monitored and communicated. This calls for a large and alert team of observers in each country who would watch the movements of cranes and communicate them to others.

In recent times the satellite communications system has been successfully used to study the movements of mammals including animals from the sea. It involves putting a transmitter on the animal and picking up its signals by means of a satellite circling the globe in space. On birds the transmitter can be put only if it is extremely lightweight. Researchers have succeeded in bringing down the weight of the transmitter to about 150 gms and are hopeful of bringing it further down to 100. The main difficulty will be how to capture a wild Siberian crane for putting the transmitter on it. There is a danger of the crane suffering injuries during the operation. This is planned to be solved by introducing a captive-bred Siberian crane into the wild flock, the captive bird carrying the transmitter. Both USA and USSR have captive cranes which can be used for this experiment.

Since the discovery of the large eastern flock wintering in

China, efforts are on to find out the genetic similarity of cranes from the western and eastern flocks. If the cranes are genetically similar, it will enable researchers to transfer eggs from the nests of the more numerous flock to the nests of the other flock.

A Cooperative Conservation Programme

In a recent crane meeting held in Tallinn, Estonia, USSR, the delegates from USSR, Pakistan and India signed a memorandum of understanding which delineates all the measures of discovery and protection discussed above. The delegates agreed to urge their respective governments to develop an international agreement on the lines suggested in the memorandum. Till this agreement is developed and signed by the governments, the scientists in these countries will make an all-out effort in their respective countries to create public awareness for protecting these cranes, develop and expand the network for monitoring movements of these birds and collect relevant facts and data necessary to enable the governments to reach the agreement of international cooperation for the conservation of Siberian crane.

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Field Collection Methods for Food Habits Studies

Dropping Collection Procedure

For each wetland, a minimum of 100 droppings should be collected over all parts of the goose grazing area. It is not necessary to gather the entire dropping, as a small part of the dropping is sufficient. This ensures that the food habits information will be representative of the whole goose population. If only a few droppings are collected, there is a chance that all them will come from a certain group of geese, such as only young geese, or males, or females, and these groups are known to vary in their food habits.

The collected droppings should be thoroughly mixed on an open newspaper, after any grass or debris is removed. Since you will be working in field conditions, grind the samples for at least five minutes with a mortar and pestle. Put less than 1/2 cup of the ground droppings into a 200 mm mesh screen (0.1 mm). Wash it by forcing water through it with a chemist's squirt bottle. The water should be of drinking quality and should not have any algae in it. Continue washing the sample until the water falling from the screen is clear.

Remove the sample from the sieve and air dry on a piece of paper, or better, a petri plate. I always dried my samples in an oven at 72^o C, but this was in order to comply with the rules of U.S. Customs. When the samples are completely dry, put them into vials. Be sure to mark the vial with all the necessary information, i.e., location, goose species, and date. Laxmi has vials, 200 mm mesh screen, petri plates, squirt bottle, and mortar and pestle.

Voucher Plant Collection

Two separate things need to be done for each plant present in the wetland, in order to document the plant species the geese may be eating. You need both whole herbarium specimens and ground specimens for microscopic analysis.

For each new plant species you encounter on your trip, whole plants, including roots, stems, leaves and flowers, will need to be collected and pressed as herbarium specimens. For Barheads, it will also be necessary to collect wheat, peas, grams, and whatever other agricultural species they may be eating. Your botanist friend will know how to do this.

In brief, press each plant species between a newspaper torn into half on the fold and then folded along the sub-fold into a square. Put each plant specimen into a separate newspaper, and label with the location, date, and species. Sandwich all the specimens between two stiff boards with extra pieces of newspaper between each specimen page. Secure the press tightly with a rope. Your botanist friend may have blotters and cardboards. If so, using them will make your specimens much flatter and more useable.

Each plant species also needs to be ground and processed using the same methodology as the goose droppings. I have tried to use dried plant specimens for the microscopic work, but green and brown plant pigments stain the microscopic features so that it is very difficult to see microscopic details. I would suggest that for each plant species, leaves and stems be cut with a scissors into very small pieces and then ground with a mortar and pestle until it becomes a paste. This will take at least 5 minutes. These ground samples should be washed in the sieve and handled in a way identical to the goose dropping samples.

& Conservation of

FOOD PREFERENCES OF BARHEADED GEESE IN INDIA
Preliminary Proposal

Prakash Gole
Ecological Society of India
Pashan Road
Pune 411008 INDIA
(212-56408)

and

Beth Middleton
Botany Department
Iowa State University
Ames, Iowa 50011 U.S.A.
(515-294-4033)

Need

Population numbers of Barheaded Geese, (Anser indicus), have dropped dramatically in the past decades (Gole, 1982) to less than 3,545 counted in India in 1987 (van der Ven 1987). Conflicts between local land use and park management could be ameliorated through an understanding of the food preferences of Barheaded Geese. Wildlife Conservation International is dedicated to research directed toward the conservation of wildlife and has a strong commitment to preserving wildlife in developing countries.

Background

Barheaded Geese winter, November-April, in monsoonal wetlands of India and breed in the Himalayas. These geese are commonly thought of as agricultural pests, which makes their situation even more precarious. However, preliminary studies in the Keoladeo National Park showed that Barheaded Geese derived less than 50% of their food from agricultural sources over one season (Middleton & van der Valk, 1987) and the percentage was even less in other wetlands in northern India (Middleton, 1988).

Objective

This study proposes to explore the seasonal food habits of Barheaded Geese over their entire overwintering range in order to

- evaluate usage of crop plants by Barheaded Geese
- construct a food preference index for Barheaded Geese
- provide planning information for the Indian Forest Service

Methods

Prakash Gole, as field coordinator, will advise research assistants during the collection season and gather the samples at the end of the season. Field assistants who live near the field sites (Figure 1) will make monthly collections of goose droppings which will be used to construct a seasonal food habits analysis at eight sites across India, encompassing most of the overwintering range of Barheaded Geese. There are field assistants available at three sites who have had experience with field collections and lab processing of droppings as part of Smithsonian Project #4013600 in the Keoladeo National Park.

Beth Middleton will travel to field sites to instruct field assistants in the collection and processing of droppings, to make voucher plant collections of plant parts for later lab comparisons of plant fragments in goose droppings, and to conduct a vegetation survey in grazing areas in monsoonal wetlands. At Iowa State University, Beth Middleton will assess food usage of Barheaded Geese using a microhistological analysis of droppings (Middleton and van der Valk, 1988). Food preference will be assessed using availability ranks from the vegetation survey in conjunction with the usage ranks from the food habits study (Johnson, 1980).

The Investigators

Prakash Gole is the coordinator for Barheaded Goose research in India for the International Waterfowl Research Bureau, ^{Director} president of the Ecological Society of

India, and is involved in research on the Saras Crane for the Government of India. Beth Middleton has worked on goose herbivory in monsoonal wetlands for 3 years in India and has developed the microhistological techniques for food habits studies of Indian waterfowl. Collaboration between these two individuals will combine the expertise needed to accomplish this much needed research.

BUDGET (1989-1990)

\$1.00 = Rs.12.00

	FWS		
	Rs.	\$U.S.	
Salaries			
Field Coordinator	10,000		
Field Assistants (400 hours)	15,000		
Lab Coordinator		4,000	
Lab Assistant (600 hours)		3,000	
Travel			
International	30,000		
Domestic	25,000		1,000,000
Supplies and Services	2 15,000	1,500	
Total	<u>Rs.95,000</u>	<u>\$8,500</u>	

Rs. 1,80,000

\$ 11250 \$ 8500

= \$ 20,000

SCHEDULE

- field assistant training (INDIA)
 October 1989
- collect monthly food habits information (INDIA)
 November 1989 - April 1990
- analysis of droppings and vegetation (U.S.)
 May 1990 - August 1990

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By: Aasheesh Pittie, 8-2-545 Road No. 7, Banjara Hills, Hyderabad 500034.

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