Khabbaki Lake (C)

Country: Pakistan

Name of wetland: Khabbaki Lake

Geographical coordinates: 32° 37'N, 72° 14'E

General location: 10km northeast of Nowshera and 38km NNW of Khushab, Khushab District, Punjab Province.

Area: 283ha

Wetland type: Salt lake (inland drainage system)

Altitude: 978m

Biogeographic Province: Indus Ganges Monsoon Forest

Description of site:
A shallow brackish lake in the Salt Range, with a little aquatic vegetation but no extensive reed-beds. The lake is fed by local rainfall and several intermittent streams rising in the surrounding hills. The water level in the years 1988-89 had risen by 30-60cm causing an increase in size of the lake and decrease in salinity. Because of the subsequent failure of rains, water level again was lowered. The trend remained up to 1992 when due to exceptionally good monsoon rains, the water level rose again. The maximum depth is about 10.5m; a salinity of 5.2 p.p.t. was recorded in April 1987, and a Ph of 7.2 in January 1987, 9.5 to 10 in 1989 and 9 in the years 1991, 1992.

Climatic conditions:
Dry sub-tropical climate with hot summers and cool winters. The annual rainfall varies from 300mm to 800mm, and the relative humidity from 22% to 85%. Temperatures range from an average minimum of 0.5°C in January to an average maximum of 36°C in June.

Principal vegetation:
The aquatic vegetation includes *Carex fedia, Chara sp., Hydrilla verticillata, Juncus* sp., *Najas marina*, *Phragmites australis, Potamogeton crispus, P. pectinatus, Saccharum spontaneum, Scirpus* sp. (short), *Scirpus* sp. (tall), *Typha angustata, Vallisneria spiralis*, and *Zannichellia palustris*. The natural vegetation of the region is a mixture of sub-tropical semi-evergreen forest and tropical thorn forest with species such as *Acacia modesta, Asparagus gracilis, Cocculus laeba, Cynodon dactylon, Adhatoda vasica, Dodonaea viscosa, Ehretia laenis, Gymnosporia royleana, Olea ferruginea, Rhazya stricta, Sageretia lorandettuana, Reptonia buxifolia, Tamarix aphylla, Withania coagulans, Zizyphus mauritiana* and *Z. nummularia*. Most of the natural vegetation around the lake in the valley bottom has been cleared for agriculture, whereas the forest vegetation on the surrounding hills is severely depleted.

Land tenure:

The lake and the adjacent agricultural lands are privately owned, and the forests and range lands in the watershed are communally owned.

Conservation measures taken:
The area was first gazetted as a Wildlife Sanctuary (283ha) in 1966. The Sanctuary was re-notified in November 1975, and listed as a Wetland of International Importance under the Ramsar Convention in July 1976. However, the Wildlife Sanctuary was denotified in 1987 because of changes in its ecological character and the decline in numbers of wintering waterfowl. Following the advice of the Ramsar Monitoring Mission, and a change in the Ecological Conditions for the better, the sanctuary was renotified in December 1992.

Land use:
Fishing, domestic use (eg. washing of clothes) and illegal hunting. The lake is being developed for fisheries exploitation; a three year project which involved stocking with exotic fish species was completed in June 1986. Tilapia was also introduced along with the carp fishes. Tilapia being a prolific breeder out-manouvered the carp, and the lake was subjected to eutrophication due to over population of Tilapia. During the summers of 1991, tilapia died off due to over crowding and the lake was again stocked with carp fishes. In 1992-93 winters, the lake was leased for fishing for a period of three years. The Government of the Punjab, Forestry, Wildlife & Fisheries Department was approached to stop fishing as a safeguard for the population of white-headed duck. No further fishing leases would be granted after the expiry of the current lease period. The principal activities in surrounding area are agriculture and livestock grazing.

Disturbances and threats:
A change in the salinity and water level has brought about a change in the ecology of the lake, and this has been compounded by large-scale stocking with herbivorous fish species. It is believed that the direct competition for food between the introduced fishes and waterfowl has been responsible for the decline in waterfowl number in recent years. The fishing activities cause a considerable amount of disturbance to waterfowl, particularly in November when the wintering birds first arrive at the lake, and there is some disturbance from illegal hunting. The situation would hopefully improve once the fishing leases are stopped, and the lake is not stocked further. An important factor disturbing the ecology of the lakes is the sinking of tube wells in the adjoining agricultural fields which while drawing water affect the water level of the lake, which also fluctuates due to the changes in the rainfall pattern from year to year. Pollution from domestic waste has also been reported to be a problem to a small extent.

Economic and social value:
The lake now supports a commercial fishery. Marsh lands support grazing livestock. Recreation and illegal hunting also are a norm. The area may be developed as a tourist resort for the city dwellers, which would help increase the income of the local population.

Fauna:
Formerly and even now a very important wintering area for the endangered white-headed duck *Oxyura leucocephala*, 700 recorded in 1965 and 1,005 in 1968, 260 in

1974, 144 in January 1992; and a regular wintering area for greater flamingo *Phoenicopterus ruber* and many other waterfowl. As many as 8,700 waterfowl were recorded in the early 1970s, including: 60 *Anser anser*, 882 *A. platyrhynchos*, 826 *Fulica atra*, 12 *Podiceps griseigena*, 62 *P. nigricollis*, 365 *Phenicopterus roseus*, 169 *Anas penelope*, 200 *A. acuta*, 185 *Tachybaptus ruficollis*, 130 *P. cristatus*, 700 *Larus ridibundus*, along with small numbers of *Phalacrocorax niger*, four species of herons and egrets, three other species of ducks, three species of shorebirds and three species of gulls. About 50 bird species are normally recorded during summers.

Mammals and amphibians known to occur in the area include *Canis aureus, Vulpes vulpes, Felis libyca, Lepus nigricollis* and *Rana tigrina*.

Introduced fishes include *Labeo rohita, Catla catla, Cirrhinus mrigala, Cyprinus carpio* and *C. tenopharyngodon idella*.

Special floral values: None known

Research and facilities:
Annual mid-winter waterfowl censuses have been carried out at the lake since 1971. Punjab Wildlife Research Centre, Faisalabad, since 1988 are conducting regular fortnightly waterfowl surveys during the winters from October to March to monitor populations with special emphasis on the white-headed duck. Summer breeding birds are under study by the scientists from Punjab Wildlife Research Centre, Faisalabad. Ecology of the wetland has been studied by M.Sc. students of Zoology Department, Government College, Lahore. A project to study the Ecology of Ucchali Complex lakes (Ucchali, Khabbaki and Jahlar) is currently underway at Punjab Wildlife Research Centre, Faisalabad which is funded jointly by the Punjab Wildlife Department and WWF-Pakistan. A Management Plan has been written for the lakes based on the findings of the project.