

AFGHANISTAN

INTRODUCTION

Area: 636,265 sq.km.

Population: 16,557,000 (1990).

The Republic of Afghanistan is a mountainous, land-locked country centred on the Hindu Kush system and over 500 km distant from the nearest ocean. It is bounded in the north by Turkmenistan, Uzbekistan and Tadjikistan, in the east and south by Pakistan, and in the west by Iran. A narrow tongue of land in the extreme northeast (the Wakhan Corridor) extends to the borders of Xinjiang Autonomous Region in China. The Hindu Kush are the second highest mountain range in the world, reaching heights of over 7,320 m, and supporting forests on their slopes and alpine tundra on their summits. Northwest of the Hindu Kush, the land slopes rapidly to as low as 350 m on the plains of the Amu Darya (Oxus) River on the Tadjikistan border, and 200 m in the fertile valley of the Harm Rud, towards the border with Turkmenistan. South of the mountains, arid uplands descend gradually into desert in the southwest, with elevations falling below 500 m in the Seistan Basin on the Iranian border in the extreme southwest.

Afghanistan has a continental climate, with winter severity being increased by the effects of altitude. Summers are warm everywhere except on the highest peaks. Winters can be extremely cold with considerable snowfall at high altitudes, but at lower elevations, winters are milder and the climate is desertic or semi-desertic. Mountain ranges to the south protect most of the country from summer monsoonal rains, except in the extreme east, which receives summer rainfall of up to 1,000 mm. Elsewhere, the average annual precipitation is generally less than 300 mm, with most occurring during winter and spring, and often as snow.

There is good evidence that the natural vegetation of large parts of Afghanistan was originally woodland and forest, the present steppes reflecting centuries of wood-cutting by man and grazing and browsing by domestic livestock. According to Sayer and van der Zon (1981), in the late 1970s approximately 84% of the country was rangeland, 12% arable land and only 3.4% forest. Rangelands are being degraded and abused, while in more arid regions, dryland farming has exhausted soils and led to serious soil erosion. The few remaining forested areas are being destroyed at an alarming rate to meet the fuel requirements of the major cities (Day, 1988).

The country is divided into 29 provinces, with Kabul as the largest city and administrative capital. Agriculture has traditionally been the basis of the economy, the main crops being wheat, fruit and vegetables, maize, barley, cotton, sugar-beet and sugar cane. The rearing of livestock, mainly sheep, cattle and goats, is also important, and is the principal activity throughout the desert and semi-desert areas. The little industrial activity concentrates on food processing, textiles, leather goods and furniture. Natural gas

production in the north is largely for export. Since 1979, most sectors of the economy have been badly affected by almost continuous civil warfare.

Summary of Wetland Situation

Much of Afghanistan is mountainous and the remainder, in the southwest, is extremely arid. As a consequence, it possesses few wetlands other than its major river systems rising in the high mountain ranges in the centre and northeast of the country. Much the largest lake system is the Hamun-i Puzak, one of a group of three large freshwater lakes in the Seistan Basin, an inland drainage basin surrounded by desert on the border with Iran. These wetlands receive most of their water from the Helmand River and Khash River, which rise far away to the northeast in the Hindu Kush. The only other large natural lakes are two brackish to saline lakes in the central highlands, Dashte Nawar and Ab-i Istada, both of which are renowned as breeding areas for the Greater Flamingo *Phoenicopterus ruber*, and two high altitude freshwater lakes, Zor Kol and Chaqmatin Lake, in the Pamir Ranges in the Wakhan Corridor. Kole Hashmat Khan, a small eutrophic lake in the foothills of the Hindu Kush near Kabul, is the only remaining water body of the formerly extensive wetlands on the plain of Kabul. Other notable wetlands include a chain of six lapis lazuli lakes separated by travertine terraces in the Bande Amir Valley and several small freshwater lakes along the Kabul River, notably Lake Sarobi and Lake Duronta. In the north, there were formerly extensive floodplain wetlands along the Amu Darya river on the border with Tadjikistan, but much of this habitat has probably now been lost to agriculture.

Undoubtedly the most serious threat to wetlands in Afghanistan has been the drainage of wetlands for agriculture and urban development, and diversion of water supplies for irrigation purposes. Ab-i Istada and Kole Hashmat Khan have been affected by the diversion of water from the inflowing rivers, while flood control projects and irrigation schemes on the Helmand River have reduced the extent of flooding in the Hamun-i Puzak, especially during years of below average rainfall. At many wetlands, heavy grazing of marsh vegetation by domestic livestock is inhibiting natural plant succession, and is causing permanent damage to aquatic plant communities as the highly palatable species are grazed to extinction. This has been reported to be a serious problem at Dashte Nawar, Ab-i Istada, the Bande Amir lakes and Kole Hashmat Khan.

Waterfowl hunting occurs commonly at wetlands throughout Afghanistan, and uncontrolled hunting and the collection of birds' eggs have been reported to be serious problems at most of Afghanistan's wetlands. The rapid decline and eventual extinction of the Central Asian population of the Siberian Crane *Grus leucogeranus*, which formerly wintered at Bharatpur in India, is now thought to have been at least partly due to excessive hunting at Ab-i Istada, a key staging area for this crane flock in spring and autumn (Archibald & Landfried, 1993).

Wetland Research

Most of Afghanistan's major wetlands were surveyed during the 1960s and 1970s, but none is as yet properly documented, and further survey and study is urgently required. Savage (1968), summarizing the meagre information available at that time, identified six wetlands in Afghanistan as being especially important for waterfowl. In the early 1970s, the Government of Afghanistan requested the assistance of the United Nations Development Programme (UNDP) in the conservation and management of its wildlife and natural areas. A project on National Parks and Wildlife was initiated by the Food and Agriculture Organization (FAO) in 1972, and ran until the onset of hostilities in 1979. The project involved field surveys in many of Afghanistan's most important wildlife areas, including five of the principal wetlands, Ab-i Istada, Dashte Nawar, Bande Amir, Kole Hashmat Khan and Hamun-i Puzak, and provided the best information hitherto available on these sites (*e.g.* Petocz & Habibi, 1975; Petocz & Skogland, 1974; Petocz *et al.*, 1975; Rahim & Larsson, 1978; Shank & Larsson, 1977; Shank & Rodenburg, 1977). Mid-winter waterfowl counts were undertaken at lakes in the Kabul Valley, Ab-i Istada and Hamun-i Puzak between 1971 and 1974 under the sponsorship of the International Waterfowl and Wetlands Research Bureau (*e.g.* Koning & Dijkzen, 1971; Koning & Walmsley, 1972 & 1973), and the Hamun-i Puzak was surveyed from the air in January 1976 as part of a joint aerial survey of the wetlands of the Seistan Basin involving the Afghani Directorate of Wildlife and National Parks and the Iranian Department of Environment (Petocz *et al.*, 1976). Other investigations involving wetlands have included studies of Greater Flamingos *Phoenicopterus ruber* at Ab-i Istada and Dashte Nawar (*e.g.* Akhtar, 1947; Kiokenhoff & Madel, 1970; Niethanimer, 1970; Nogge, 1974) and general ornithological surveys in wetland areas (*e.g.* Madge, 1970; Niethammer 1967 & 1971; Nogge, 1973). As far as is known, the only serious investigation to have been carried out at a wetland in Afghanistan since the outbreak of war in 1979 was a survey of Ab-i Istada in November 1993, sponsored by the International Crane Foundation and BirdLife International (Jamil, 1994).

A recent inventory of Important Bird Areas in the Middle East, sponsored by BirdLife International, has identified 17 sites as being of special importance for bird conservation in Afghanistan (Evans, 1994). Five of these sites are wetlands and a further four contain significant tracts of wetland habitat. All of these wetland areas are included in the present inventory.

Wetland Area Legislation

Nature conservation began in Afghanistan around the beginning of this century with the establishment of hunting preserves for use by royalty. These reserves, which included several wetlands, were individually declared by Royal Decree. As of 1991, there was still apparently no overall enabling legislation to provide for the establishment and management of protected areas (IUCN, 1992). Several protected areas were established in the 1970s on the basis of government orders in response to petitions submitted to the Head of State, but few if any of these were formally gazetted (Day, 1988). A draft Law of Forests has been prepared, but this has not as yet been legislated. It has been proposed

that this draft legislation be revised to incorporate provisions for the establishment and management of protected areas. Unregulated hunting was curbed in the 1970s, and the sport was reserved for tourists in certain specified areas.

At international level, Afghanistan ratified the World Heritage Convention in March 1979, and has signed the Biodiversity Convention. No natural World Heritage Sites have been designated.

Wetland Area Administration

The Department of Forests and Range, established in 1957 in the Ministry of Agriculture, is responsible for wildlife protection and the establishment and management of protected areas. A system of protected areas was established in the early 1970s with the assistance of the UNDP/FAO National Parks and Wildlife Project. This system included two categories of protected areas: National Parks and Waterfowl Reserves or Sanctuaries. Of the six protected areas designated between 1973 and 1978, four included important wetlands: Ab-i Istada Waterfowl Sanctuary, Dashte Nawar Waterfowl Sanctuary, Kole Hashmat Khan Waterfowl Sanctuary and Bande Amir National Park (Day, 1988).

A Directorate of Wildlife and National Parks was established within the Department of Forests and Range in 1973, but apparently this was never given any specific and approved jurisdictional powers (Day, 1988). One of its first activities concerned the protection of waterfowl at Ab-i Istada, especially the breeding flamingos. The Afghan Tourist Organization was largely responsible for the commercial exploitation of wildlife, and retained jurisdiction over Afghanistan's only national park, Bande Amir. The Republican Guard, a cadre of the Afghan army directly linked to the presidential office, was given charge of former royal hunting reserves (which include Kole Hashmat Khan Waterfowl Sanctuary) when the monarchy was abolished in 1973 (Day, 1988). Conservation activities were brought to an abrupt halt in 1979 due to political unrest, and since then there has been extremely limited activity in the field of conservation and the management and administration of protected areas (MacPherson, 1991).

Organizations involved with Wetlands

Department of Forests and Range, Ministry of Agriculture
Directorate of Wildlife and National Parks
Responsible for the conservation and management of wildlife and protected areas.

Afghan Tourist Organization
Responsible for sport hunting and the management of Bande Amir National Park.

Republican Guard
In charge of former royal hunting reserves (*e.g.* Kole Hashmat Khan Waterfowl Sanctuary).

National bodies involved in scientific research have included the Science Research Centre at the Afghanistan Academy of Sciences and the Faculty of Agriculture at Kabul University. There are no non-governmental organizations concerned with nature conservation in Afghanistan.

WETLANDS

Site descriptions compiled from the literature.

Wetland Name: Zor Kol and Chaqmatin Lake

Country: Afghanistan

Coordinates: Zor Kol 37°27'N, 73°40'E; Chaqmatin Lake 37°14'N, 74°12'E

Location: Near the eastern tip of the Wakhan Corridor, Badakhshan Province.

Area: Zor Kol c.3,500 ha; Chaqmatin Lake c.2,500 ha.

Altitude: Zor Kol c.4,100 m; Chaqmatin Lake c.4,000 m.

Physical and ecological features: Two high altitude lakes in broad valleys in the Pamir Mountains near the eastern tip of the Wakhan Corridor, close to the borders with China, Pakistan and Tadjikistan. Zor Kol lies on the border with Tadjikistan in a broad eastwest valley in the headwaters of the Pamir River. The lake is about 17 km long and up to 4 km wide. It is fed by snow-melt from the Big Pamir to the southwest and mountain ranges in Tadjikistan to the north, and overflows through an outlet at the western end into the Pamir River. Chaqmatin Lake, some 45 km southeast of Zor Kol, lies in a broad valley between the Big Pamir and Small Pamir ranges, and is fed by snow-melt from both these ranges. It is about 16 km long and up to 2 km wide. The lake drains through an outlet at its eastern end into the Aksu River, which joins the Pamir River in Tadjikistan. The lakes are surrounded by barren mountain ranges rising to peaks at over 6,100 m in the Big Pamir and 5,900 m in the Small Pamir.

Land tenure: No information.

Conservation measures taken: None. The two lakes are included within a much larger site (the Small Pamir, c.200,000 ha) identified as an Important Bird Area by BirdLife International (Evans, 1994).

Conservation measures proposed: None known.

Land use: The Small Pamir are inhabited by about 2,000 Kirghiz people who are primarily pastoralists, grazing their flocks on the lower slopes. Hunting tours were allowed into the area in the 1970s.

Possible changes in land use: None known.

Disturbances and threats: There are few threats to the area, due to its remoteness and the sparse human population. The eggs of Bar-headed Geese *Anser indicus* were being collected for human consumption in the 1970s. Very heavy grazing pressure and the cutting of *Artemisia* bushes for fuel have resulted in some degradation of the alpine steppe vegetation (Evans, 1994).

Hydrological and biophysical values: No information.

Social and cultural values: No information.

Noteworthy fauna: No information is available on the aquatic fauna of the lakes. The Bar-headed Goose *Anser indicus* is a summer visitor to the region, with important breeding colonies at both lakes. Other breeding species include *Tadorna ferruginea*, *Netta rufina*, *Mergus merganser* and *Charadrius mongolus*. Hundreds of Common Cranes *Grus grus* are reported to pass through the area on migration.

Noteworthy flora: No information.

Scientific research and facilities: Basic faunal surveys were conducted in the 1970s (Nogge, 1973; Petocz, 1978).

Management authority and jurisdiction: No information.

References: Evans (1994); Nogge (1973); Petocz (1978); Sayer & van der Zon (1981).

Reasons for inclusion: 1a & 2c. Good examples of high mountain lakes, and the only such lakes in the Pamirs; important as a breeding area for *Anser indicus* and some other waterfowl.

Source: See references.

Wetland Name: Amu Darya Marshes

Country: Afghanistan

Coordinates: 37°10'-37°35'N, 68°40'-69°40'E

Location: Along the Amu Darya River on the border with Tadjikistan, 60 km north of Kunduz and 80 km north of Taloqan, Kunduz and Takhar Provinces.

Area: Present area unknown; formerly at least 40,000 ha.

Altitude: 350-470 m.

Physical and ecological features: The site comprises the riverine and floodplain wetlands of the Amu Darya (Oxus) River in Kunduz and Takhar Provinces. The main areas are some 20,000 ha of floodplain wetlands along a 40 km stretch of river near Imam Sahib (37°15'N, 68°50'E) in the west, and some 20,000 ha of wetlands along a 45 km stretch of river near Darqad (37°25'N, 69°30'E) in the east. The wetlands consist of networks of braided river channels and creeks with numerous large and small islands, vast tracts of reeds *Phragmites* interspersed with thickets of *Tamarix* and *Salix* trees, and quite large stands of *Elaeagnus* woodland. Extensive swamp woodland formerly dominated this region, but large areas had already been cleared by the late 1970s, and it is doubtful if any significant stands of woodland remain.

Land tenure: No information.

Conservation measures taken: Both the Imam Sahib and Darqad areas were declared Royal Hunting Preserves in the early part of the century, with restrictions on settlement, access, conversion to agriculture and hunting. However, the reserves were never gazetted, and no conservation measures were formally proposed. The two main areas, Imam Sahib and Darqad, have been identified as Important Bird Areas by BirdLife International (Evans, 1994).

Conservation measures proposed: None.

Land use: No information.

Possible changes in land use: Any future damming of the Amu Darya river upstream in Tadjikistan would pose a serious threat to the integrity of the site.

Disturbances and threats: Habitat destruction is a very great threat and has probably reached critical proportions. It is likely that much of the area has already been destroyed

and converted into cultivation, as it has on the north side of the river in Tadjikistan. The swamp woodland was being severely deforested and converted into cultivation by settlers in the late 1970s, following the overthrow of the monarchy. Both *Cervus elaphus bactrianus* and *Phasianus colchicus bianchii* were hunted extensively and without control in the 1970s, and their survival is in doubt (Evans, 1994).

Hydrological and biophysical values: No information.

Social and cultural values: No information.

Noteworthy fauna: In the 1970s, the swamp woodland still contained a small population of *Phasianus colchicus bianchii*, the last remnants of this subspecies of the Common Pheasant in Afghanistan. The area was reported to be important habitat for waterfowl throughout the year, and *Marmaronetta angustirostris* was thought to breed in the marshes (Savage, 1968). Other probable breeding species included *Vanellus leucurus*, *Riparia paludicola*, *Acrocephalus concinens*, *A. melanopogon* and *Panurus biarmicus* (Evans, 1994).

The area was also extremely important for tiny remnant populations of an endangered subspecies of the Red Deer *Cervus elaphus bactrianus* and the Caspian Tiger *Panthera tigris virgatus*. Tracks of the tiger were reported in the Darqad area as recently as 1967. The continued presence of these large mammals is now highly unlikely, and the Caspian Tiger is considered to be extinct (Evans, 1994).

Noteworthy flora: Any surviving stands of swampy woodland would be of considerable botanical interest as this community has been widely destroyed or degraded throughout the region.

Scientific research and facilities: The entire area is very poorly known.

Management authority and jurisdiction: No information.

References: Evans (1994); Savage (1968); Sayer & van der Zon (1981).

Reasons for inclusion: 1d, 2a & 2b. Formerly an example of a wetland type (swampy woodland) with very limited distribution in this part of Central Asia; important for several globally threatened species and subspecies of animals, and one of the last known haunts of the Caspian Tiger.

Source: See references.

Wetland Name: Bande Amir Lakes

Country: Afghanistan

Coordinates: 34°50'N, 67°15'E

Location: In Bande Amir National Park in the Hazarajat Mountains of the western Hindu Kush, 55 km west of Bamiyan Town, Bamiyan Province.

Area: Combined area of lakes 600 ha; area of National Park 41,000 ha.

Altitude: The lakes lie at approximately 2,900 m; surrounding peaks rise to 3,832 m.

Overview: A chain of six lapis lazuli lakes separated by travertine terraces in the Bande Amir Valley, an area of outstanding scenic beauty in the western Hindu Kush. The area was declared a National Park in 1973.

Physical features: The lakes of Bande Amir consist of a chain of six lapis lazuli lakes nestled between 300 m high magenta rock walls in the Bande Amir Valley. From west to east, these are Gholaman, Qambar, Haibat, Panir, Pudina and Zulfiqar. Travertine dams, about 10 m high and 3 m thick, and formed by the precipitation of calcium carbonate,

separate the lakes from each other in a series of terraces. The two largest lakes, Haibat and Zulfiqar, cover 490 ha and 90 ha, respectively. Panir Lake, at only 100 m in diameter, is the smallest. Qambar Lake is also of limited extent, but gastropod shells found beyond its present water level indicate that it used to be larger. After clearing the final travertine terrace of Gholaman Lake, the Bande Amir flows down the northern slopes of the Hindu Kush and peters out in the desert near the Tadjikistan border. The waters of the lakes are oligotrophic and calcareous, with a pH of 7.8. Their deep blue colour is a result of the water's purity and high lime content. Surface water temperatures reach 14-17°C during summer; in winter, the lakes freeze over. The high rolling steppe around the lakes rises steeply in the west to rugged limey schist and conglomerate peaks (Day, 1988).

The climate is strongly continental, with low air humidity, high evaporation, and extreme temperature variations. The average annual rainfall is about 400 mm, all of which falls between October and May, with 50% falling in April alone.

Ecological features: Lake shore vegetation is dominated by reeds *Phragmites australis*, cat-tail *Typha laxinanni* and species of *Carex* and *Scirpus*. *Salix* bushes cover some of the limestone dams. Uncultivated ground between the lakes and the steep cliffs is covered in meadows of dense grasses and herbs. These meadows have been invaded by nitrophilous plants due to grazing practices. Common meadow plants of natural origin include *Mantha longifolia*, *Plantago gentianoides*, *Gentiana* spp., *Calamagrostis* spp., sedges and rushes. The Darae Sabzel and Darae Bande Amir creeks downstream from the lakes are flooded each spring as a result of snow-melt. Vegetation on the creek banks is therefore dominated by pioneer species. Below the normal high water level, sedges and the rush *Juncus turkestanicus* are found. Above normal high water level, where flooding is only occasional, are shrubs, notably *Myricaria germanica*, willows *Salix* spp. and sea buckthorn *Hippophae rhamnoides*. Elsewhere in the National Park, the vegetation consists of alpine steppe with an *Artemisia-Acantholimon* community and grassy steppe, formerly dominated by species of *Stipa*, *Festuca*, *Herdeum* and *Poa*, but now much affected by centuries of overgrazing (Dieterle, 1973; Shank & Larsson, 1977).

Land tenure: The lakes are state owned. Wheat fields around the lakes are also state owned, but subject to traditional farming rights, passed on by patrilineal descent (Day, 1988). Much of the land elsewhere in the National Park is common land, used for grazing.

Conservation measures taken: The Bande Amir area was declared a National Park (41,000 ha) in September 1973 in response to a petition from the Afghan Tourist Organization. This declaration was never published in the official Government Gazette by the Ministry of Justice, and therefore has no legal status (Day, 1988). The boundaries of the National Park encompass the entire catchment area of the headwaters of the Bande Amir river. A strategy for the establishment and development of the National Park was prepared in 1977 (Shank & Larsson, 1977). The long-term objectives of this strategy were to conserve the natural landscapes through a system of zonation and to develop the tourist potential of the area. Traditional land-use practices would continue within a buffer area, while an inner core zone would protect the lakes and their immediate uplands. Activities in the park were interrupted in 1979 at the onset of hostilities in Afghanistan. Bande Amir National Park has been identified as an Important Bird Area by BirdLife International (Evans, 1994).

Conservation measures proposed: None known, other than those contained within the strategy of Shank and Larsson (1977).

Land use: The immediate banks of the lakes are quite densely inhabited by a predominantly Hazara population, estimated at 3,000-5,000 residents in the 1970s. The land surrounding the lakes is extensively farmed for wheat, while elsewhere in the National Park the steppe is heavily grazed by domestic livestock. In the 1970s, there were an estimated 10,000 sheep and goats, 1,500 cattle and 200 horses belonging to local residents, and a further 1,500-3,000 sheep owned by semi-nomadic kuchis and muiclan. The latter arrive in the area in May, and remain there for three or four months (Shank & Larsson, 1977).

Possible changes in land use: It has been suggested that the lakes be stocked with Rainbow Trout *Salmo irideus*.

Disturbances and threats: Heavy grazing pressure and the cutting of *Phragmites* and *Salix* for fuel have degraded the lakeside vegetation. Unlimited grazing by domestic livestock and uprooting of shrubs have caused serious degradation of steppic vegetation throughout the park, with resulting soil erosion.

Hydrological and biophysical values: No information.

Social and cultural values: The lakes have considerable cultural significance, their creation having been attributed to Ali, son-in-law of Mohammed, the founder of Islam. A small mosque, built in 1904, commemorates the spot where Au recited two ragats (cycles) of prayer on the shores of Haibat Lake (Day, 1988).

Noteworthy fauna: A species of carp (Cyprinidae), known locally as milk fish or “shir moi”, is abundant in the lakes. The lakes are mostly too deep and steep-sided for waterfowl, although a number of species have been recorded in small numbers on migration, including *Ixobrychus minutus*, *Casmerodius albus*, *Aythya nyroca*, *Fulica atra*, *Himantopus himantopus*, *Charadrius dubius*, *Tringa ochropus* and *Actitis hypoleucos* (Petocz *et al.*, 1975). The lakeside vegetation provides an attractive staging area for many migratory birds, especially passerines; 152 species of birds have been recorded, mostly during a study of bird migration through the area in August and September 1970 (Madge, 1970). No large mammals occur in the vicinity of the lakes because of the high levels of human disturbance. Small mammals include Afghan Pika *Ochotona rufescens*, Long-tailed Marmot *Marmota caudata* and the jerboa *Allactaga williamsi* (Day, 1988).

Noteworthy flora: The National Park contains four of the eleven plant species endemic to Bamiyan Province (Day, 1988).

Scientific research and facilities: Preliminary surveys of the geology (Jux & Kempf, 1971), vegetation (Dieterle, 1973) and wildlife (Petocz & Skogland, 1974) have been carried out. A study of bird migration through the area was undertaken in August and September 1970 (Madge, 1970).

Recreation and tourism: The Bande Amir area is one of the most beautiful natural landscapes in Afghanistan, and was a popular tourist attraction in the 1970s, attracting several thousand visitors each year. Day tours from Bamiyan were operated by the Afghan Tourist Organization (Shank & Larsson, 1977).

Management authority and jurisdiction: The Afghan Tourist Organization maintained control over the National Park in the 1970s.

References: Day (1988); Dieterle (1973); Evans (1994); Jux & Kempf (1971); Madge (1970); Petocz & Skogland (1974); Petocz *et al.* (1975); Shank & Larsson (1977).

Reasons for inclusion: 1d. A very good example of a series of mineral lakes with travertine terraces, in an area of outstanding scenic beauty.

Source: See references.

Wetland Name: Kole Hashmat Khan

Country: Afghanistan

Coordinates: 34°30'N, 69°12'E

Location: On the southeastern outskirts of Kabul, just south of the Kabul to Gardez highway, Kabul Province.

Area: 191 ha.

Altitude: 1,793 m.

Overview: A natural, brackish lake and marshes on the outskirts of Kabul, important as a staging area for migratory waterfowl, and also to a lesser extent as a breeding and wintering area. The lake has been partially protected for centuries as a waterfowl hunting area for royalty, and was declared a Waterfowl Sanctuary in 1973. It is under considerable threat from diversion of water supplies, pollution and various forms of human disturbance.

Physical features: Kole Hashmat Khan (also known as Lake Chaman) is a small, shallow, slightly saline, eutrophic lake in a basin on a large shelf in the foothills of the Hindu Kush. It is surrounded by hills on two sides and opens up into the Logar Valley to the northeast. The lake is the only remaining water body and marsh area of the formerly extensive wetlands on the plain of Kabul. It is fed by a tributary of the Logar River, and has no outlet except when the water level is exceptionally high. The lake is L-shaped, about 2.5 km in length and 0.3-1.0 km in width, and has a maximum depth of no more than 1.5 m. Formerly much more extensive, the lake has been reduced in size as a result of the development of irrigation systems which have tapped the Logar River, and large areas of former wetland have been converted into agricultural land. The water level fluctuates seasonally, being highest in winter and early spring, and lowest in late summer, when the lake almost dries up. High evaporation creates slightly saline conditions (Rahim & Larsson, 1978).

Summers are hot and dry, and winters are cold. The average annual precipitation is 295 mm, with most falling between December and April. Precipitation normally falls as snow from December to March. The mean annual temperature is 11.8°C; the warmest month is July with a mean of 24.9°C, and the coldest month is February with a mean of -2.6°C. The lake is usually frozen over for two to three months of the year (Rahim & Larsson, 1978).

Ecological features: The lake is strongly eutrophic and supports an abundant growth of algae, *Utricularia* sp. and *Ranunculus* spp. Approximately half of the lake is covered with dense reed-beds of *Phragmites australis*. A meadow-type halophytic plant community dominates the ground cover on the lake margins. This has been strongly modified by grazing and fertilization from animal droppings. Species present include *Ranunculus arvensis*, *Bromus danthoniae*, *Centaurea* sp., *Eleocharis* sp. and several species belonging to the families Cyperaceae, Cruciferae and Compositae (Rahim &

Larsson, 1978). Most of the lake shore above high water level is under cultivation, mainly for wheat. The irrigated wheat fields eventually give way to a dry overgrazed steppe community on the mountain slopes.

Land tenure: The lake is state owned. Fields to the south belong to a Public Bath, those to the north are privately owned.

Conservation measures taken: During the reign of Amin Habibullah Khan (1901-1919), the lake was closed to all hunting except by a few privileged individuals. In the 1930s, King Mohammed Zahir Shah took a personal interest in the area and declared it a waterfowl reserve. The lake was then well protected as a private hunting area for the king until the 1970s, but little if any management was carried out. The lake was declared a Waterfowl Sanctuary by the Directorate of Wildlife and National Parks in 1973, but this has never been legally gazetted. Access has been restricted since 1979, and management activities have ceased.

Kole Hashmat Khan has been identified as an Important Bird Area by BirdLife International (Evans, 1994).

Conservation measures proposed: Rahim and Larsson (1978) made a number of recommendations for research and management aimed at establishing a waterfowl sanctuary and environmental education centre. In particular, they recommended that the lake and its shoreline (up to high water level) be legally gazetted as a Waterfowl Sanctuary and placed under the management of the Department of Forests and Range.

Land use: The lake has been used as a waterfowl hunting area since Moghul times, and was maintained as a royal hunting ground until 1973. Hunting continued through the 1970s, and took place from small boats manoeuvred through the reed-beds. Between 15 and 400 waterfowl were reportedly shot every Friday during late spring and early summer (Rahim & Larsson, 1978). The lake is used as a source of water for irrigation in the surrounding wheat fields, and cattle and water buffalo are allowed to graze in the reed-beds. Nomadic pastoralists utilize the area for one or two months in spring en route to the central Hindu Kush, their animals grazing on the lake shore. The surrounding area is densely populated, and there is a village (Tujik) immediately to the west of the lake.

Possible changes in land use: No information.

Disturbances and threats: The ecology of the lake has been much affected by the surrounding human population. Numerous irrigation channels take water from the tributary stream of the Logar River feeding the lake to irrigate wheat and alfalfa fields in the area. This has been a major factor contributing to low water levels in the lake during drought periods. Various pollutants, including domestic sewage, agricultural effluents and some industrial waste, enter the lake from the Logar River, and part of the marshes has been used as a rubbish dump. Domestic animals grazing in the reed-beds are a major cause of disturbance to breeding birds, especially when the water level is low. Reeds are cut, and there is considerable hunting pressure. The shore is used as a playground by children, and clothes are laundered in the lake (Rahim & Larsson, 1978; Sayer & van der Zon, 1981). Various Cyprinid fish have been introduced into the lake, including the Common Carp *Cyprinus carpio*.

Hydrological and biophysical values: No information.

Social and cultural values: The lake is an important recreational site for the population of Kabul, and is also of considerable religious and historical significance. The shrine of Jubur Ansar is situated near the lake; this was built in 645 AD in memory of soldiers

killed in an effort to convert the Afghan population from Buddhism and Hinduism to Islam. The remains of an old road pass through the lake itself, and there is an old fort, Qala-i-Hashmat Khan, nearby. This fort was built during the reign of Amir Habibullah Khan and used as a royal guest house (Rahim & Larsson, 1978).

Noteworthy fauna: The lake is an important staging area for migratory waterfowl in spring and autumn, and when not completely frozen over, is used by small numbers of several species in winter (Savage, 1968). Mid-winter waterfowl counts in 1972 and 1973 included up to 40 *Anas strepera*, 400 *A. crecca*, 300 *A. platyrhynchos*, 50 *A. acuta*, 180 *A. clypeata*, 74 *Netta rufina*, 150 *Aythya ferina*, 80 *A. fuligula*, 3 *Mergellus albellus* and 1,500 *Fulica atra* (Koning & Walmsley, 1972 & 1973). Counts of waterfowl on passage have included up to 233 *Podiceps nigricollis*, 471 *Anas clypeata*, 2,210 *Aythya ferina*, 10,000 *Fulica atra*, 500 *Tringa glareola* and 150 *Chlidonias hybridus* (Evans, 1994). *Marmaronetta angustirostris* and *Oxyura leucocephala* were recorded in small numbers on passage in the 1960s and 1970s, and the latter may have bred. Other scarce passage migrants have included *Plegadis falcinellus*, *Platalea leucorodia*, *Phoenicopterus ruber* and *Aythya nyroca*. Several species of waterbirds were breeding at the lake in the 1960s and 1970s, including *Tachybaptus ruficollis*, *Podiceps nigricollis* (30 pairs), *Aythya* (2 pairs), *Gallinula chioropus* and *Fulica atra*. Possible breeding species included *Botaurus stellaris*, *Netta rufina* and *Porzana pusilla*. By 1978, 157 species of birds had been recorded at the lake, including 46 species of waterfowl (Rahim & Larsson, 1978). Mammals recorded from around the lake include the voles *Alticola roylei* and *Microtus afghans*, Jackal *Canis aureus* and Red Fox *Vulpes vulpes*. Other mammals known to occur in the general area include Wolf *Canis lupus*, Marbled Polecat *Vormela peregusna*, Euphrates Jerboa *Allactaga euphratica* and Grey Hamster *Cricetulus migratorius* (Rahim & Larsson, 1978).

The lake itself contains a typical aquatic community of crustaceans, insects and some amphibians, notably the toad *Bufo viridis* and frogs *Rana* spp. Golden Carp have been introduced and thrive, together with other carp of the family Cyprinidae (Rahim & Larsson, 1978).

Noteworthy flora: None known.

Scientific research and facilities: Niethammer (1967) and Puget (1971) studied the avifauna of Kole Hashmat Khan, and Rahim and Larsson (1978) conducted an ecological survey of the lake to assess its conservation importance.

Conservation education: Situated in the outskirts of Kabul, the site has excellent potential for conservation education. An environmental education centre was proposed by Rahim and Larsson (1987).

Recreation and tourism: Many Kabul residents visit the religious shrines and large cemetery near the lake, and also visit the lake for recreational purposes. Conversion of the old fort of Qala-i-Hashmat Khan into a hotel, restaurant or visitor centre has been suggested.

Management authority and jurisdiction: The Republican Guard was given jurisdiction over the former royal hunting reserve when the monarchy was abolished in 1973. In 1978, jurisdiction passed to the Department of Forests and Range, but effective control remained with the Republican Guard (Day, 1988).

References: Day (1988); Evans (1994); Niethammer (1967); Puget (1971); Rahim & Larsson (1978); Savage (1968); Sayer & van der Zon (1981).

Reasons for inclusion: 1d, 2a, 2b & 3b. One of the few examples of a natural eutrophic lake in the Hindu Kush, and the only remaining water body of the formerly extensive wetlands on the plain of Kabul. The lake lies on a major bird migration route through the Hindu Kush, and is an important staging area for migratory waterfowl including the globally threatened *Oxyura leucocephala*.

Source: See references.

Wetland Name: Lake Sarobi and Lake Duronta

Country: Afghanistan

Coordinates: Lake Sarobi 34°35'N, 69°45'E; Lake Duronta 34°30'N, 70°20'E

Location: In the valley of the Kabul River, 70 and 10 km west of Jalalabad, respectively, Nangarhar Province.

Area: Lake Sarobi 200 ha; Lake Duronta 2,000 ha.

Altitude: Lake Sarobi c. 1,200 m; Lake Duronta c.600 m.

Physical and ecological features: Two small freshwater lakes, Sarobi and Duronta, in the valley of the Kabul River west of Jalalabad. Lake Sarobi is a small lake of about 200 ha, created by a barrage on the Kabul River. Lake Duronta, near the city of Jalalabad, is an open freshwater lake of about 2,000 ha, with reed-beds along its western shore. Both lakes are normally ice-free in winter.

Land tenure: No information.

Conservation measures taken: None. The two lakes are included within a much larger site (the Jalalabad Valley, 25,000 ha) identified as an Important Bird Area by BirdLife International (Evans, 1994).

Conservation measures proposed: None known.

Land use: No information.

Possible changes in land use: There is a possibility of Lake Duronta being developed as a recreational area.

Disturbances and threats: No information.

Hydrological and biophysical values: No information.

Social and cultural values: No information.

Noteworthy fauna: The lakes are used extensively by waterfowl on passage, and by small numbers of several species in winter (Savage, 1968). Waterfowl recorded in winter in the early 1970s included up to 90 *Podiceps cri status*, 13 *P. nigricollis*, 6 *Phalacrocorax carbo*, 6 *Casmerodius albus*, 50 *Ardea cinerea*, 50 *Anas strepera*, 430 *A. crecca*, 1,020 *A. platyrhynchos*, 42 *A. acuta*, 20 *A. clypeata*, 63 *Netta rufina*, 50 *Aythya ferina*, 80 *A. fuligula*, 15 *Mergellus albellus*, 19 *Mergus merganser*, 1 *Melanittafusca*, 400 *Fulica atra*, 130 *Vanellus vanellus*, 7 *Larus cachinnans* and 27 *L. ridibundus*. *Riparia paludicola* is common at Lake Sarobi in summer.

Noteworthy flora: None known.

Scientific research and facilities: Some mid-winter waterfowl counts were undertaken in the early 1970s (Koning & Dijksen, 1971; Koning & Walmsley 1972 & 1973).

Management authority and jurisdiction: No information.

References: Carp (1980); Evans (1994); Koning & Dijksen (1971); Koning & Walmsley (1972, 1973); Savage (1968).

Reasons for inclusion: 1a & 3b. Freshwater lakes important as staging and wintering areas for migratory waterfowl.

Source: See references.

Wetland Name: Dashte Nawar

Country: Afghanistan

Coordinates: 33°35'N, 67°48'E

Location: About 55 km northwest of Ghazni, Ghazni Province.

Area: Ab-i Nawar 3,500 ha; Waterfowl Sanctuary 7,500 ha; Dashte Nawar plain 70,000 ha.

Altitude: 3,200 m.

Overview: A shallow brackish lake, Ab-i Nawar, in the middle of a high desert plateau at 3,200 m in the Hindu Kush; the highest known breeding locality for *Phoenicopterus ruber* in the world, and an important staging area for migratory waterfowl. The lake was declared a Waterfowl Sanctuary in 1977.

Physical features: Dashte Nawar is a high desert plateau, about 40 km from north to south and up to 15 km from east to west, in the Koh-i Baba Range of the Hindu Kush. It is surrounded on all sides by mountains rising to peaks in excess of 4,800 m, and contains a shallow, brackish lake, Ab-i Nawar, which covers about 3,500 ha. The lake is approximately 14 km long by 3 km wide, and contains about 40 small islands varying in size from 35 sq.m to 500 sq.m. The water volume of the lake typically drops from nearly 20 million cubic metres in spring to only two million cubic metres in autumn, and the lake may dry out completely in winter. The water supply comes primarily from spring snow-melt from the surrounding mountains.

Summers are dry and relatively warm, and winters extremely cold. The average annual precipitation at Nawar, 20 km to the west of the lake, is 184 mm, of which 72 % falls as snow during the winter months. For most of the year, temperatures are low, with only three months of the year having a mean minimum temperature above freezing point. When not completely dry, the lake is frozen over and covered with snow throughout the winter months.

Ecological features: The lake bottom supports a dense cover of higher algae belonging to the family Characeae. The mudflats surrounding the lake are mostly devoid of vegetation, except at the outer edge where the herbs *Glazo maritima*, *Ciypsis aculeata* and *Polygonum sibiricum* become common. The surrounding plain consists of an extensive meadow of low grasses and herbs. Common grasses include *Bromus gracillimus*, *Puccinellia stapflana* and *Aelunopus littoralis*; common herbs include *Halocharis clavata*, *Polygonum paronychioides*, *Potentilla komaroviana*, *Gentiana kaufmanniana*, *Tragopogon* sp. and *Artemisia* sp. Dry, shallow stream beds support distinctive communities, with *Taraxacum bessarabicum*, *Triglochin palustre*, *Ranunculus* sp., *Juncus bufonius* and the grass *Eremopoa bellula* (Shank & Rodenburg, 1977).

Land tenure: State owned. Semi-nomadic people have traditional grazing rights.

Conservation measures taken: Dashte Nawar was declared a National Flamingo and Waterfowl Sanctuary by the Directorate of Wildlife and National Parks in 1974. The lake was approved as a Waterfowl Sanctuary (7,500 ha) in December 1977 by the Head of State, but it appears that the Sanctuary was never formally gazetted. The Sanctuary

includes the entire lake and a 1 km wide peripheral strip of land. A management plan was prepared in 1977 (Shank & Rodenburg, 1977). Principal objectives outlined in the plan include protecting birds from adverse influences of human origin and initiating a monitoring programme upon which to base future management decisions. In 1975, assistance was received from WWF to provide quarters for a resident warden and research facilities. Work was interrupted in May 1979 at the onset of hostilities in Afghanistan.

Dashte Nawar was identified as a wetland of international importance by Carp (1980), and has been identified as an Important Bird Area by BirdLife International (Evans, 1994).

Conservation measures proposed: Petocz and Habibi (1975) make a number of recommendations for the conservation of the site.

Land use: Dashte Nawar is relatively isolated and accessible only in summer. It is sparsely inhabited; in the 1970s, there were about 25 villages on the plain, with an estimated resident population of 1,200-1,500. In addition, an estimated 1,300 semi-nomadic people (260 families) traditionally used the area as summer grazing grounds for an estimated 5,000-7,000 sheep and goats and 700 camels (Shank & Rodenburg, 1977).

Possible changes in land use: None known.

Disturbances and threats: Overgrazing by domestic livestock has degraded the vegetation on the surrounding plains, and the collection of eggs and human disturbance are also reported to be problems (Shank & Rodenburg, 1977).

Hydrological and biophysical values: No information.

Social and cultural values: Dashte Nawar is an important archaeological site, exhibiting intact stratigraphic sequences. Several mounds representing early dwellings have been discovered with accompanying artifacts, which suggest occupation from Palaeolithic to Buddhist times (Shank & Rodenburg, 1977).

Noteworthy fauna: Dashte Nawar is probably the highest of all known regular breeding haunts of the Greater Flamingo *Phoenicopterus ruber*. Breeding was first reported in 1969 (Kiockenhoff & Madel, 1970), and between then and 1975, the number of adult flamingos at the breeding colony fluctuated between 1,300 (1974) and 12,000 (1970). Breeding is known to have occurred in every year except the drought years of 1971 and 1972, when the lake almost dried up (Savage, 1972b; Petocz & Habibi, 1975). Other species which are known to have bred at the lake include *Recurvirostra avosetta*, *Charadrius leschenaultii*, *Tringa totanus* and *Sterna hirundo* (Kiockenhoff & Madel, 1970). Over 40,000 waterfowl were present at the lake in September 1975; most were ducks (*Tadorna ferruginea*, *T. tadorna*, *Anas crecca*, *Aythya ferina*), but other species present included *Ardea cinerea*, *Grus virgo*, *Fulica atra*, *Charadrius dubius*, *C. alexandrinus*, *Tringa glareola*, *T. ochropus*, *Actitis hypoleucos*, *Larus genei* and *Chlidonias hybridus* (Petocz *et al.* 1975). Shank and Rodenburg (1977) list 31 species of waterfowl that are known to have occurred at Dashte Nawar.

Mammals recorded in the area include Long-tailed Marmot *Marmota caudata*, Fulvous Ground Squirrel *Citellus fulvus*, Jackal *Canis aureus*, Wolf *Canis lupus* and Red Fox *Vulpes vulpes*. A toad *Bufo andersoni* and a skink *Ablepharus* sp. are the only amphibians and reptiles known to occur (Shank & Rodenburg, 1977). There are no fish in the lake, but aquatic invertebrates and planktonic organisms are periodically abundant. Shank and Rodenburg (1977) give a list of aquatic organisms collected in the lake.

Noteworthy flora: None known.

Scientific research and facilities: The birds of Dashte Nawar, and particularly the Greater Flamingos, have been studied by Klockenhoff and Madel (1970), Nogge (1974) and Petocz *et al.* (1975).

Management authority and jurisdiction: The Directorate of Wildlife and National Parks in the Department of Forests and Range is responsible for management of the Waterfowl Sanctuary.

References: Carp (1980); Day (1988); Evans (1994); Klockenhoff & Madel (1970); Nogge (1971, 1974); Petocz & Habibi (1975); Petocz *et al.* (1975); Savage (1972a, 1972b); Shank & Rodenburg (1977).

Reasons for inclusion: 1a, 2c, 3a & 3c. A good example of a high altitude salt lake, important as a breeding and feeding site for *Phoenicopterus ruber*, and as a staging area for migratory waterfowl. Except for Ab-i Istada (Site 7), the nearest comparable staging area for waterfowl is 600 km away in the Seistan Basin.

Source: See references.

Wetland Name: Ab-i Istada

Country: Afghanistan

Coordinates: 32°30'N, 67°55'E

Location: 35 km south-southeast of the village of Moqur and 130 km south-southwest of Ghazni, Ghazni Province.

Area: Maximum area of lake c. 13,000 ha; Waterfowl Sanctuary 27,000 ha. Altitude: 1,968 m.

Overview: A large alkaline lake in the southern foothills of the Hindu Kush, famous for its breeding Greater Flamingos *Phoenicopterus ruber*, but also an important breeding area for several other species of waterfowl, and an extremely important staging area in spring and autumn for a wide variety of migratory waterfowl, including (formerly) *Grus leucogeranus*. The lake was declared a Waterfowl Sanctuary in 1977, but is threatened by dams and irrigation schemes on the rivers which feed it, and is much disturbed by hunters and egg-collectors.

Physical features: Ab-i istada is a shallow, alkaline lake of about 13,000 ha, measuring 16 km across at its widest point. It lies on a gently rolling plateau in the southern foothills of the Koh-i Baba and Koh-i Paghman ranges. The size and shape of the lake vary widely throughout the year and from year to year, depending on rainfall. During normal years, the lake's volume ranges from 270 million cubic metres in spring to about 140 million cubic metres in autumn, which results in a 1 m change in depth. At low water levels, the lake is surrounded by extensive mudflats, which extend for up to 7 km on the east side but only 0.5 km on the west. There are normally three small islands in the lake, but at high water levels, only one of these remains exposed. Winter rainfall and snow-melt enter the lake through a river at the northeast corner, formed by the confluence of the Gandez, Ghazni and Nahara rivers; this area supports a small marsh. The water level in the lake is also to some extent dependent on groundwater. The lake dried out almost completely in the summer of 1971, partly because of an exceptionally severe drought, but partly because of the construction of the Bandeh Sardeh Dam on one of the feeder rivers. In 1992 and 1993, the water level was exceptionally high, apparently because the local

government opened the sluice gates on Bandeh Sardeh Dam in 1992 following very heavy snowfall and rainfall in the catchment. This resulted in a sharp drop in salinity levels (Jamil, 1994).

Summers are hot and dry, and winters are cold. The average annual precipitation at Moqur, 30 km to the northwest of the lake, is 216 mm, of which 92% falls as snow during the winter months. Mean monthly maximum temperatures remain above freezing point year-round, but most of the lake freezes over in winter, with only tiny pools of open water remaining.

Ecological features: Stream banks and the marshy area at the river mouth support a lush growth of *Carex* sp. The only higher plant to be found in the lake itself is *Ruppia maritima*. In the 1960s and 1970s, the mudflats were almost entirely devoid of plant life, the only conspicuous vegetation being colonies of *Taraxacum monochiamydeum*. However, in the early 1990s, following exceptional flooding and a sharp drop in salinity, broad belts of reeds (presumably *Phragmites*) became established along the southern shore of the lake (Jamil, 1994). A sparsely vegetated transition zone between the mudflats and the steppe proper contains a diversity of small herbs such as the mat-forming *Psylliostachys beldushistanica*, which is usually associated with *Ranunculus* sp., clumps of *Asperugo procutnbens* in sheltered areas, and such common and widely dispersed species as *Valerianella cymbicarpa*, *Veronica* sp., *Eremopyrum orientala*, *Papaver* spp. and many species of the families *Crucifereae* and *Papillionaceae*. The steppe zone is represented by an *Amygdalus* shrubland community, with scattered thorny shrubs and dispersed grasses. Shrubs such as *Amygdalus* sp., *Cousinia* sp., *Tamarix laxa* and *Artemisia* sp. are predominant. *Bromus gracillimus*, *B. tectorum*, *B. danthoniae* and *Boissiera squarrosa* are common grasses (Shank & Rodenburg, 1977).

Land tenure: State owned. Semi-nomadic people have traditional grazing rights in the area.

Conservation measures taken: Ab-i Istada was declared a National Flamingo and Waterfowl Sanctuary by the Directorate of Wildlife and National Parks in 1974, and game guards were stationed on the shore of the lake to prevent local people from raiding the flamingo nesting colony. The lake was approved as a Waterfowl Sanctuary (27,000 ha) by the Head of State in December 1977. The sanctuary includes mudflats but not cultivated land within a 2 km-wide belt of land around the lake. A management plan was prepared in 1977 (Shank & Rodenburg, 1977). Principal objectives outlined in the plan include protecting birds from adverse influences of human origin and initiating a monitoring programme upon which to base future management decisions. In 1975, assistance was received from WWF to provide quarters for a resident warden and research facilities. Work was interrupted in May 1979 at the onset of hostilities in Afghanistan, and since then there has been no effective administration, management or control of the area (Jamil, 1994).

Ab-i Istada was identified as a wetland of international importance by Carp (1980), and has been identified as an Important Bird Area by BirdLife International (Evans, 1994).

Conservation measures proposed: Ab-i Istada has been proposed as a National Park (Shank & Rodenburg, 1977; Sayer & van der Zon, 1981). Petocz and Habibi (1975) made a number of recommendations for the conservation of the site.

Land use: In the 1970s, there were more than 15 villages within 10 km of the lake, with a total population of about 2,500. The major concentrations were about 8 km to the

northeast and 2 km to the west of the lake. In addition, there were some 200-300 people living in scattered settlements and about 300 semi-nomadic people (muldar or kuchis), who temporarily resided on the rolling plains in summer to graze their livestock (Shank & Rodenburg, 1977). During the thirteen year period 1978-1991, there was a military base at Taraki village, about 7.8 km from the lake. As a result of the war and local military operations, the local settled population abandoned their villages around the lake and fled to Pakistan and elsewhere as refugees. About ten families of nomads remained in the area throughout the conflict, and are now partially settled and cultivating land to within 500 m of the lake. As peace has returned to the area, some refugees have come back to their former villages (Jamil, 1994).

Possible changes in land use: No information.

Disturbances and threats: The greatest threat to the lake is dam-building, water diversion and irrigation schemes along the Ghazni and Gandez Rivers which flow into the lake. As the volume of water in the lake decreases, the salinity increases, affecting the ecology of the lake. The upper part of one of the rivers was dammed in about 1970, and this led to a reduction in the extent of flooding and disappearance of the swampy area at the northeast corner of the lake near the river mouth (Savage, 1972b). In recent years, returning refugees have started digging wells around the lake and using diesel pumps to pump water for irrigation. Other threats include overgrazing by domestic livestock on the lake shores, the collection of birds' eggs for human consumption, and hunting throughout the year (Shank & Rodenburg, 1977). When water levels were very low in the late 1960s and early 1970s, the flamingo colony became accessible to local inhabitants who shot adult birds and collected all the eggs. Hunting is reported to have been especially heavy during the war years (1979-1991), when a military garrison was stationed near the lake (Jamil, 1994). There are also reports of helicopter gunships bombing the lake and causing considerable disturbance to wildlife. Waterfowl hunting, almost entirely with shot-guns, was very much in evidence in November 1993, with many hunters shooting from blinds along the lake shore (Jamil, 1994). The rapid decline and eventual extinction of the Central Asian population of the Siberian Crane *Grus leucogeranus*, which formerly wintered in India, is now thought to have been at least partly due to hunting at Ab-i Istada, a key staging area for this crane flock in autumn.

Hydrological and biophysical values: No information.

Social and cultural values: Ab-i Istada is an important archaeological site, exhibiting intact stratigraphic sequences. Several mounds representing early dwellings have been discovered with accompanying artifacts, which suggest occupation from Palaeolithic to Buddhist times (Shank & Rodenburg, 1977).

Noteworthy fauna: Ab-i Istada is an important breeding area for Greater Flamingos *Phoenicopterus ruber*. The presence of vast flocks of flamingos at Ab-i Istada was perhaps first documented in the memoirs of the Moghul Emperor Babur the Great, who observed tens of thousands in 1504. Between 1969 and 1976, the number of adult flamingos at the breeding colony fluctuated between 1,000 (1971) and 9,000 (1974), but breeding is known to have been attempted only in 1969, 1970 and 1972, and successful only in 1969, when about 1,000 juveniles were reared (Petocz & Habibi, 1975; Shank & Rodenburg, 1977). Fluctuations in flamingo numbers and breeding success have been linked to the changes in water level and salinity, and increased accessibility of the breeding islands (and hence persecution by humans) at low water levels (Nogge, 1975;

Petocz & Habibi, 1975). When conditions are unsuitable at Ab-i Istada, the flamingos shift to Dashte Nawar (Site 6). Other breeding birds at Ab-i Istada include *Tadorna tadorna* (100 pairs), *Himantopus himantopus*, *Recurvirostra avosetta*, *Charadrius alexandrinus*, *C. leschenaultii*, *Larus genei* and *Gelochelidon nilotica*. *Glareola pratincola*, *Tringa totanus*, *Sterna hirundo* and *S. albifrons* have been recorded during the breeding season, and are thought to breed (Savage, 1972b; Shank & Rodenburg, 1977).

Ab-i Istada is also an extremely important staging area for migratory waterfowl, with smaller numbers of some species remaining throughout the winter in mild years. Wintering birds have included up to 263 *Ardea cinerea*, 188 *Casmerodius albus* and 1,457 *Anser anser* (Evans, 1994). Up to 50,000 or more waterfowl have been recorded on passage (Savage, 1972a). Counts of waterfowl on spring passage in 1969, 1970 and 1971 included up to 376 *Tadorna tadorna*, 480 *Anas penelope*, 40 *A. strepera*, 1,050 *A. crecca*, 3,100 *A. platyrhynchos*, 1,060 *A. acuta*, 1,600 *A. clypeata*, 200 *A. querquedula*, 15,000 *Aythya ferina*, 41 *A. fuligula*, 2,660 *Fulica atra*, 52 *Haematopus ostralegus*, 594 *Himantopus himantopus*, 258 *Recurvirostra avosetta*, 310 *Charadrius alexandrinus*, 91 *Vanellus leucurus*, 236 *Limosa limosa*, 124 *Numenius arquata*, 290 *Tringa nebularia*, 22 *T. stagnatilis*, 104 *T. glareola*, 6,300 *Calidris minuta*, 1,940 *C. alpina* and 1,300 *Philomachus pugnax* (Nogge, 1971). Over 20,000 waterfowl were present on the lake in November 1993, including at least 200 *Casmerodius albus*, 100 *Ardea cinerea*, 500 *Anas penelope*, 500 *A. strepera*, 3,000 *A. platyrhynchos*, 3,000 *Aythya ferina*, 7,000 *Fulica atra* and 5,000 *Larus ridibundus* (Jamil, 1994). Large numbers of Common Cranes *Grus grus* are also reported to use the lake on passage. *Oxyura leucocephala* was recorded at the lake in May 1977 (Anstey, 1989).

Ab-i Istada appears to have been a major staging area for the small Central Asian population of Siberian Cranes *Grus leucogeranus* which wintered mainly at Bharatpur in Northern India. Seventy-six Siberian Cranes were observed at Ab-i Istada in March 1970; three were again present in December 1970, and two were present in spring 1974 (Savage, 1972a; Shank & Rodenburg, 1977). Only five individuals were found in India in the winter of 1992/93, and none has been seen since, suggesting that this population may now be extinct. Shank and Rodenburg (1977) list 66 species of waterfowl that are known to have occurred at the lake.

Small mammals are numerous around the lake. The Fulvous Ground Squirrel *Citellus fulvus* and a jird *Meriones libycus* are common (Shank & Rodenburg, 1977). Red Fox *Vulpes vulpes*, Long-eared Hedgehog *Hemiechinus auritus* and Marbled Polecat *Vormela peregusna* have been recorded in the area (Niethammer, 1971).

Amphibians are apparently absent, but several species of reptiles occur, including the tortoise *Testudo horsfieldii*, the lizard *Agama agilis* and a small skink *Ablepharus* sp. (Shank & Rodenburg, 1977). There were no fish in the lake in the 1970s, but local people report having found live fish in the lake in 1992 and 1993, following exceptional flooding (Jamil, 1994). Invertebrates and planktonic organisms are seasonally abundant. Shank and Rodenburg (1977) give a list of aquatic organisms collected in the lake.

Noteworthy flora: None known.

Scientific research and facilities: Most of the research at Ab-i Istada has focused on the ecology of the breeding flamingos (Akhtar, 1947; Niethammer, 1970; Nogge, 1974; Petocz & Habibi, 1975). More extensive work on the avifauna was conducted by

Niethammer (1971), Nogge (1971) and Petocz *et al.* (1975). An ornithological survey, sponsored by the International Crane Foundation and BirdLife International, was carried out by Abdul Jamil, an agricultural officer with the International Rescue Committee, in November 1993 (Jamil, 1994).

Management authority and jurisdiction: The Directorate of Wildlife and National Parks in the Department of Forests and Range is responsible for management of the Waterfowl Sanctuary.

References: Akhtar (1947); Anstey (1989); Carp (1980); Day (1988); Evans (1994); Jamil (1994); Koning & Dijkzen (1971); Niethammer(1970, 1971); Nogge (1971, 1974); Petocz & Habibi (1975); Petocz *et al.* (1975); Savage (1968, 1972a, 1972b); Sayer & van der Zon (1981); Shank & Rodenburg (1977).

Reasons for inclusion: 1a, (2a), 2b, 2c, 3a & 3c. An outstanding example of a high altitude salt lake, important as a breeding area for *Phoenicopterus ruber* and extremely important as a staging area for migratory waterfowl. Formerly an important staging area for the globally threatened *Grus leucogeranus*.

Source: See references.

Wetland Name: Hamun-i Puzak

Country: Afghanistan

Coordinates: 31°20'-31°40'N, 61°35'-61°50'E

Location: In southwestern Afghanistan on the border with Iran, 100 km south-southwest of Farah, Nimroz Province.

Area: c.35,000 ha.

Altitude: 475 m.

Overview: The Afghani portion of the Hamun-i Puzak, a large, shallow, freshwater lake with extensive permanent and seasonal marshes in the Seistan Basin on the border with Iran; extremely important as a wintering area for migratory waterfowl and probably also as a breeding and staging area. The wetland is unprotected, and is threatened by dams and irrigation schemes on the rivers which feed into it. The adjacent Iranian portion of the Hamun-i Puzak was designated as a Ramsar Site in 1975, but is otherwise unprotected (see Site 48 in the Iran chapter).

Physical features: The Hamun-i Puzak is one of a group of three large freshwater lakes in the Seistan Basin, an inland drainage basin surrounded by desert on the border with Iran. These wetlands receive most of their water from the Khash River and Helmand (Hirmand) River, which originate in the Koh-i Baba, Koh-i Paghman and Siyah Band ranges in the Central Highlands to the northeast.

The Hamun-i Puzak is a large, perennial, freshwater lake with extensive reed-beds. The greater part of the lake and its marshes (about 35,000 ha) lies in Nimroz Province of southwestern Afghanistan, but in the southwest there are some 14,900 ha of shallow lakes and marshes in Sistan/Baluchistan Province of neighbouring Iran. The entire lake is very shallow, with the maximum depth probably not exceeding four metres. Much of the hamun consists of a complex of open-water areas with rich submergent vegetation and extensive reed-beds. It receives most of its water from the Khash Rud and the Parian branch of the Helmand River, which enters the lake in two distributaries, one in the north and one in the east. These river are nearly dry in summer, but in late winter and early

spring carry large quantities of floodwater from snow-melt in the Hindu Kush, raising the water level in the lake. Following the construction of the Kajaki Dam on the Helmand River in the 1970s and diversion of water for irrigation purposes, this river became less important as a source of water for the lake.

The Hamun-i Puzak has always been subject to wide fluctuations in size according to variations in rainfall and snowfall in the catchment. However, it is the first of the three hamuns in the Seistan Basin to fill during periods of flooding, and probably never dries out completely, even during the severest droughts. Most of the hamun dried out during the summer of 1971, following several years of exceptionally severe drought, and at this time, all of the wetlands on the Iranian side of the border were completely dry. During the drought years of the mid- to late-1980s, when the Iranian wetlands were again completely dry, satellite imagery showed that the Afghani portion of the Hamun-i Puzak remained flooded with vast reed-beds. In the early 1990s, following a series of very wet years, the Hamun was completely flooded and the wetlands were in excellent condition. The climate is hot and dry, with mean January temperatures of 15-20°C and mean July temperatures of 35-40°C. However, temperatures occasionally fall well below freezing in mid-winter. The average annual rainfall is about 100 mm, with most rain falling in winter.

Ecological features: Vast reed-beds of *Phragmites australis* cover much of the Hamun-i Puzak, and there are only relatively small areas of open water. These support a very rich growth of submerged vegetation, principally *Ceratophyllum demersum*, while the margins of the wetland are fringed with *Tamarix* thickets. There are several small villages along the edge of the marsh, and the adjacent land is degraded *Artenzisia* steppe and irrigated cultivation.

Land tenure: No information.

Conservation measures taken: None. The site has been identified as an Important Bird Area by BirdLife International (Evans, 1994). The greater part of the wetland on the Iranian side of the border (10,000 ha) was designated as a Ramsar Site in June 1975.

Conservation measures proposed: The Hamun-i Puzak was proposed for National Park status in the 1970s. Petocz *et al.* (1976) recommended that all future settlement along the lake shore be prohibited, that game guards be stationed in the marshes to prevent disturbance to breeding birds, and that only local residents be allowed to hunt waterfowl.

Land use: In the late 1970s, there were few permanent villages around the hamun, with an estimated total population of less than 1,000. The economy of the local Baluchi people is based largely on cattle breeding, with some supplementary income from fishing. Reeds are used for a number of purposes: as forage for domestic animals, for constructing boats (“tutans”), for fabricating wind-breaks for the mud houses, and as a source of fuel for cooking and heating. Waterfowl hunting was common in the 1970s, but the firearms were largely outdated, and harvesting levels appeared to be low.

Possible changes in land use: A proposal was made in 1976 to set up a paper factory in adjacent Helmand Province, and to use reeds from the Hamun-i Puzak as raw material (Petocz *et al.*, 1976). The impact of such a scheme on the wetland ecosystem is unknown but potentially very severe. A proposal has recently been made to build a new dam on the Helmand River in Afghanistan (the Kamal Khan Dam). On the Iranian side of the border, a major project, the “Seistan Drainage and Irrigation Completion and Rehabilitation

Project”, is currently being developed, and if it goes ahead, could result in a general lowering of water levels throughout the Hamun-i Puzak.

Disturbances and threats: Flood control projects and irrigation schemes on the Helmand River, both in Afghanistan and Iran, reduced the extent of flooding in the Hamun-i Puzak in the 1970s and 1980s, especially during years of below average rainfall. However, devastating floods in the spring of 1991 destroyed the Kajaki Dam and most of the other water control structures on the Helmand River, and the wetlands were then more extensive than at any time for over a decade. Recent developments on the Iranian side of the border likely to affect the Hamun-i Puzak wetlands include the construction of a number of major irrigation canals taking water directly from the Helmand River and its distributaries, and the construction of a large reservoir (Chahnimeh) in the desert east of Zabol, supplied by a feeder canal from the Parian branch of the Helmand River.

Parts of the wetland have been damaged by reed-cutting and burning, wood-chopping for fuel, and overgrazing. Vast areas of reed-beds are regularly burnt to improve the grazing for domestic livestock, and there is considerable disturbance to wildlife from fishing and hunting. In the 1970s, the shooting and netting of waterfowl were widespread and uncontrolled. However, as birds were being taken only by local people for their own consumption, the hunting was thought to be sustainable (Petocz *et al.*, 1976).

Hydrological and biophysical values: No information.

Social and cultural values: The reed-beds of the Hamun-i Puzak play a significant role in the economy of the local inhabitants who live in villages along the shoreline. Although primarily dependent on livestock breeding, the local people are increasingly taking advantage of the lake's rich fishery to supplement their incomes.

Noteworthy fauna: An extremely important staging and wintering area for migratory waterfowl of a wide variety of species, and also an important breeding area for many species, especially in wet years. Over 369,000 waterfowl were recorded during an aerial survey of the Afghan portion of the Hamun-i Puzak in January 1976, including 250 *Pelecanus onocrotalus*, 351 *P. crispus*, 1,400 *Phalacrocorax carbo*, 1,826 *Casmerodius albus*, 425 *Ardea cinerea*, 12 *A. purpurea*, 3,150 *Anser anser*, 5 *Cygnus cygnus*, 470 *Tadorna tadorna*, 11,050 *Anas penelope*, 12,050 *A. strepera*, 27,200 *A. crecca*, 21,300 *A. platyrhynchos*, 15,600 *A. acuta*, 10,100 *A. clypeata*, 55 *Marinaronetta angustirostris*, 2,500 *Netta rufina*, 50,000 *Aythyaferina*, 100 *A. nyroca*, 2,500 *A. fuligula*, 43 *Mergellus albellus*, 10 *Oxyura leucocephala*, 5 *Grus grus*, 175,000 *Fulica atra*, 175 *Vanellus vanellus*, 512 *Limosa limosa*, 1,400 small shorebirds, 100 *Larus ichthyaetus*, 600 *L. ridibundus/genei*, 100 *L. cachinnans* and 75 *Chlidonias hybridus* (D.A. Scott, *in litt.*). Notable observations during a ground count of a small part of the wetland in February 1971 included 1,260 *Pelecanus onocrotalus*, 87 *Phoenicopterus ruber*, 1,457 *Anser anser*, 6 *Cygnus cygnus* and 63 *Marmaronetta angustirostris* (Koning & Dijkzen, 1971). *Anser eiythropus* was listed as a winter visitor by Savage (1968), but there were no records of this species in the 1970s. Wintering birds of prey have included *Pandion haliaetus*, *Haliaeetus albicilla* (maximum 11), *Circus aeruginosus* (maximum 150), *C. cyaneus*, *C. macrourus*, *Aegyptius monachus*, *Aquila clanga* and *A. heliaca* (maximum 7). No waterfowl censuses have been undertaken during the migration seasons, but it seems very likely that the Hamun-i Puzak is used as a staging area by large numbers of migrating birds, especially in spring when water levels are high.

Very little is known about the breeding birds. Species known to breed in the marshes along the Iranian border include *Tachybaptus ruficollis*, *Podiceps cristatus*, *Ardea purpurea*, *Porphyrio porphyrio*, *Gallinula chioropus*, *Fulica atra*, *Vanellus leucurus*, *Sterna albifrons*, *Chlidonias hybridus* and *Acrocephalus stentoreus*. *Phoenicopterus ruber*, *Anser anser*, *Cygnus olor* and *Marmaronetta angustirostris* were found breeding in the wetlands at the turn of the century, and *M. angustirostris* was probably still breeding in small numbers in the 1970s (Savage, 1968; Green, 1993). *Botaurus stellaris* and *Aythya nyroca* probably breed, as they occur in summer in the reed-beds on the Iranian side of the border. *Oxyura leucocephala* is known to have bred in the marshes in the early part of this century, and may still do so; at least 10 were present on the main lake in January 1976 (Savage, 1968; Anstey, 1989). A subspecies of the Dead Sea Sparrow *Passer moabiticus yatii*, known only from the wetlands of the Seistan Basin, occurs in the marshes and breeds in the *Tamarix* scrub.

Mammals known to occur in the Seistan Basin include Wolf *Canis lupus*, Golden Jackal *Canis aureus*, Red Fox *Vulpes vulpes*, Striped Hyaena *Hyaena hyaena* and Wild Boar *Sus scrofa*. The latter was still common in the marshes in 1976.

Noteworthy flora: No information.

Scientific research and facilities: Petocz *et al.* (1976) carried out an ornithological survey of the Hamun-i Puzak in February and March 1976. A mid-winter waterfowl census was carried out in February 1971 (Koning & Dijkzen, 1971), and an aerial census was carried out in January 1976 as part of a joint aerial survey of the wetlands of the Seistan Basin involving the Afghani Directorate of Wildlife and National Parks and the Iranian Department of Environment. No surveys have been undertaken in the Afghani portion of the Hamun-i Puzak in recent years, but a mission from the Ramsar Convention Bureau visited the Iranian portion of the marshes in January 1992 (Scott & Smart, 1992).

Management authority and jurisdiction: No information.

References: Anstey (1989); Evans (1994); Green (1993); Koning & Dijkzen (1971); Petocz *et al.* (1976); Savage (1968); Scott (1975, 1993); Scott & Smart (1992).

Reasons for inclusion: 1c, 1d, 2a, 2b, 3a & 3c. The Hamun-i Puzak is an excellent example of a large, permanent, freshwater lake with extensive reed-beds in an extremely arid desert region. Spanning the international border between Afghanistan and Iran, the wetland plays a substantial hydrological and ecological role in the natural functioning of a major river basin shared between two countries. It supports an extremely diverse wetland fauna and flora, and thus plays an important role in maintaining the genetic and ecological diversity of the region. The wetland is extremely important as a wintering area, and probably also as a staging area, for migratory waterfowl; it supports wintering populations of at least three globally threatened species of birds, *Pelecanus crispus*, *Oxyura leucocephala* and *Aquila heliaca*, and probably also supports a small resident population of the globally threatened *Marmaronetta angustirostris*.

Source: See references.

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