

S O U T H A F R I C A

Lake Sibaya

Indian Ocean

0 2 4 Kilometres



23 Jul 1991



LAKE SIBAYA

SOUTH AFRICA

Lake Sibaya is narrowly separated from the sea by a range of high forested coastal dunes. The lake is home to large hippopotamus and crocodile populations, although their numbers have dropped over the last fifteen



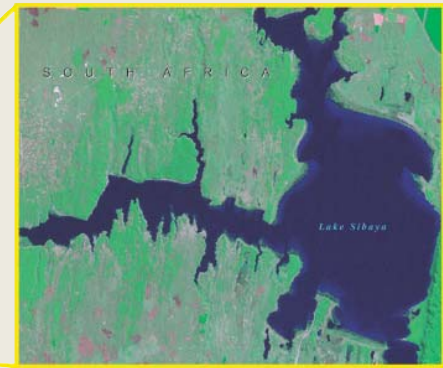
years due principally to poaching. The lakeshore is also home to the only known population of a rare climbing orchid. The yellow arrows vividly show the increase in cultivation of marginal lands around Lake Sibaya. Agriculture in the lake catchment and along its drainage lines may cause erosion, eutrophication, pollution,

and the drying up of wetlands around the lake raising concerns among environmentalists. Although Lake Sibaya has been designated a wetland of international importance, there has been little effort by communities around the lake to practice sustainable management or to protect the rare species found in the region.

Lake Sibaya

Lake Sibaya, situated on the coastal plain that makes up north-eastern KwaZulu-Natal in South Africa, is the country's largest natural freshwater lake, with an area of 60–70 km² (23–27 square miles). Surface water in the surrounding coastal plain often disappears completely during dry years, making the lake the only permanent source of water for mammals and birds. This wetland also supports several of the region's rural communities, which in many cases are totally dependent on its water and associated flora and fauna. A Ramsar conservation site, Lake Sibaya is also an important link between Kosi Bay and St. Lucia—providing a vital stepping stone for the extension of tropical elements down the east coast.

The lake system contains the second largest population of hippos and crocodiles in KwaZulu-Natal, together with 18 species of fish, one of which, a freshwater goby, is endemic to the system. Twenty-two species of frogs and eight reptile species are associated with the lake. Of 279 bird species recorded in the area, 60 nest and breed around the lake. Numerous threatened species occur within the lake system, including the only known population of



a particular species of climbing orchid, *Vanilla roscheri*.

Although Lake Sibaya has an abundance of coastal resources, it is also susceptible to pollution and siltation due to human influences and the endothechia mosses that grow around the lake. DDT spraying for malaria control in the area is a cause of concern, while more recently interest has been shown in spraying molluscicide in the wetlands to destroy the bilharzia snail known to carry *schistosomiasis*. However, molluscicide is a poison that is also known to kill invertebrates and small fish (World Lakes, 2005). Hippo and crocodile num-

bers have plummeted by 40 per cent over the past 15 years, principally due to poaching.

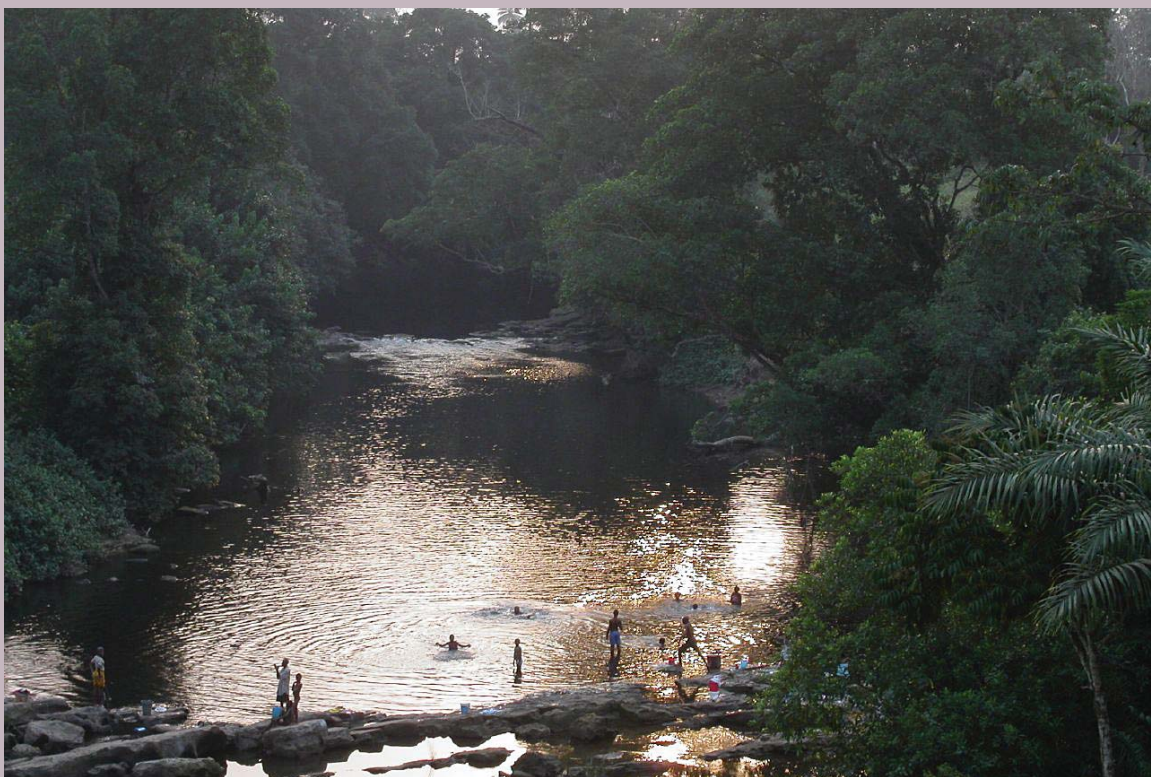
Since 1990, extensive cultivation and deforestation in the lake's catchment area has increased erosion and eutrophication in most of the drainage lines feeding the lake system. Many of the poor local communities see logging as a means of improving their standard of living, leading to the injudicious burning of large areas of forest. There is clearly a growing and urgent need to educate these communities on the sustainable use of their natural coastal resources.

Schistosomiasis (Bilharzia)

Schistosomiasis, also known as bilharzia (bill-HAR-zi-a) or snail fever, is a disease caused by a blood fluke—a parasite which has a life-cycle split between humans and freshwater snails. The adult flukes, up to 2 cm (0.8 in) long, live inside the blood vessels surrounding the gut or bladder of the human host.

Infection occurs when skin comes in contact with contaminated fresh water in which certain types of snails that carry *schistosomes* are living. This fresh water becomes contaminated by *Schistosoma* eggs when infected people urinate or defecate in the water. The eggs hatch, and if certain types of snails are present in the water, the parasites grow and develop inside the snails. The parasite leaves the snail and enters the water where it can survive for about 48 hours. *Schistosoma* parasites then can penetrate the skin of persons who are wading, swimming, bathing, or washing in contaminated water. The parasites can also enter through the lining of mouth or intestinal tract of people who drink untreated water. Within several weeks, worms grow inside the blood vessels of the body and produce eggs (MCW 1999).

The body's immune system recognises that the eggs of the fluke are foreign invaders and tries to destroy them. The side effects of this powerful immune response include anaemia, inflammation, formation



People washing and swimming in a river, a common means of *Schistosomiasis* transmission from snail to human hosts, often with serious health consequences.

Hans Kysberg/UNEP/Flickr.com

of scar tissue, dysentery, enlargement of the spleen and liver, cancer of the bladder, and cirrhosis of the liver. Some of these eggs travel to the bladder or intestines and are passed into the urine or stool.

Some 200 million people are thought to suffer from this disease in the tropics, and 750 000 people a year die. *Schistosomiasis* ranks second behind malaria in terms of parasitic diseases and is endemic in 74 developing countries, mostly in Africa.

Schistosomiasis is readily treated using a single oral megadose of the drug Praziquantel. While Praziquantel is safe and highly effective in curing an infected patient, it does not prevent re-infection and is not an optimum treatment for people living in endemic areas. As with other major parasitic diseases, there is ongoing and extensive research into developing a vaccine that will prevent the parasite from completing its life cycle in humans (Wikipedia n.d.).

Songor Lagoon

The shallow 74 km² (29 square miles) Songor Lagoon is situated to the west of Ghana's Volta River estuary, and is one of two large lagoon systems associated with this major river estuary. Comprising a brackish lagoon with extensive mudflats and islands, salt pans, a broad sandy beach, and a number of small streams, the open water of the lagoon covers about 11 500 ha and extends about 20 km (12 miles) along the coast and 8 km (5 miles) inland. It is separated from the sea by a narrow sand dune on which several small villages are situated. The lagoon's importance to birdlife and marine fauna, including several endangered species of turtle, earned its designation as a Ramsar protected wetland (Finlayson et al 2000; Piersma and Ntiamoa-Baidu 1995).

Human activities in and around the lagoon include farming, fishing and intensive salt extraction. Salt production, the main human activity, has led to the extensive modification of the ecosystem and the reduction of endemic fish and benthic fauna. As well as many waterbird species, the lagoon hosts several globally threatened turtles, including the Leatherback (*Dermochelys coriacea*), the Olive Ridley (*Lepidochelys olivacea*), and the Green Turtle



(*Chelonia mydas*). Some recreation and tourism occurs here, including bird-watching, turtle-watching, and boating.

Songor lagoon is the site of an artisanal salt industry dating back to over a century and continuously expanding. The lagoon is also convenient for tourism. Expatriates and Ghanaians go there for speed boating, recreational fishing and bird watching during weekends and public holidays. About 200 hectares of the Songor lagoon is also suitable for shrimp pond development (Ghana Tourism n.d.).

The land around the lagoon is low-lying, with the highest point less than 10m (33 ft) above sea-level. Channels, which in

the past provided direct connection with the Volta River, are effectively blocked. The lagoon has no direct access to the sea and seawater replenishment is from seepage through the sand-dunes. The main wetland vegetation-type is saline marsh, with degraded mangroves (mainly *Avicennia sp.*) and waterlogged grassland along the margins of the lagoon, and riverine woodland, scattered thickets of shrubs, climbers and small trees on higher ground. Terrestrial vegetation away from the lagoon is largely degraded coastal savanna. Human activities in and around the lagoon comprise mainly farming, fishing and intensive salt extraction (BirdLife International 2006).

A leatherback turtle comes in closer for a better look

Unknown/UNEP/Gulf of the Farallones NMS



G H A N A

Salt Extraction Site

Songor Lagoon

ATLANTIC OCEAN

0 2 4 Kilometres



25 Dec 1990



SONGOR LAGOON

GHANA

Songor Lagoon is one of the major lagoon systems, associated with the Volta river estuary, with a surface area of about 115 km² (44 square miles). These two images show a conspicuous reduction in the surface area

G H A N A

Salt Extraction
Site

Songor Lagoon

ATLANTIC OCEAN

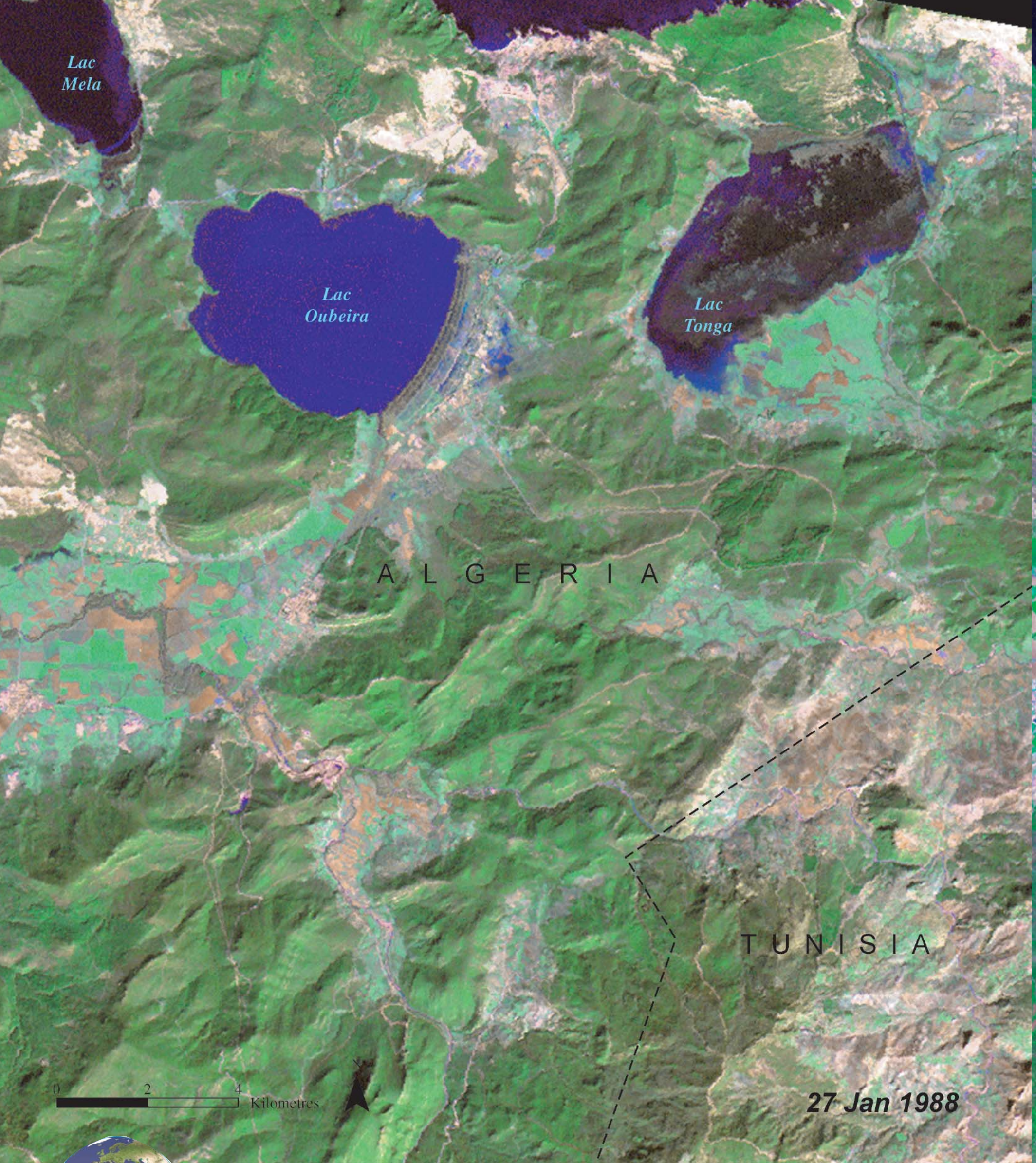
0 2 4
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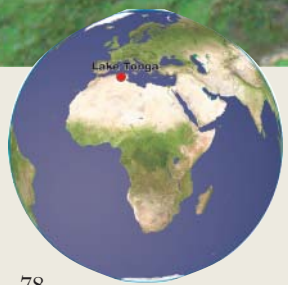
4 Feb 2000

of Songor Lagoon—and the environmental health of the wider region. The deep blue open-water area is dramatically reduced in the 2000 image, with large areas of bare ground exposed. Although some of these changes may reflect seasonal or annual

rainfall variability, closer analysis indicates a more permanent and significant decline in the lagoon's surface area. The two main reasons for this appear to be salt extraction at the western end of the lagoon and diversion of feeder streams for irrigation.



27 Jan 1988



LAKE TONGA

ALGERIA

These two images show the dramatic human-induced changes in and around Lake Tonga over the past 15 years. The damming of the feeder rivers of Lakes Tonga and Oubeira (shown in the bottom part of the 2000 im-



age) has resulted in increasing irrigation around the dams and a drastic reduction in the volume of water entering the lake. The 2000 image was acquired during the rainy season, showing an increase in the water volume after the 1999 drought, which had left the lake virtually dry. The widespread ecological changes caused

by the construction of dams around Lake Tonga should serve as an eye-opener to the community. Environmental Impact Assessments of the area could assist African policymakers with information to make informed choices about future projects.

Lake Tonga

Lake Tonga is one of the lakes in Africa that has been most dramatically affected by human influences and climate change. Situated east of the town of El Kala in the most northeastern part of Algeria, the lake dried up completely in 1999 due to the uncontrolled withdrawal of its water and the damming of its upper stream, following a serious drought in the area.

Lake Tonga's catchment area includes the natural wetlands of the Mediterranean region, and the lake itself harbours a significant variety of waterbirds, invertebrates, reptiles, amphibians and flora. It supports several endangered species, including the White-headed Duck (*Oxyura leucocephala*), the Ferruginous Duck (*Aythya nyroca*), and the otter (*Lutra lutra*). The lake is an important wintering and breeding area for numerous waterbirds, although their presence is threatened by its dramatically reduced water levels.

The state-owned lake faces numerous human-induced threats, including poaching, eel fishing, invasive weeds, siltation of its outlet river, wastewater disposal from surrounding settlements, and water extraction for irrigation and domestic supplies. Its microclimate allows some tropical species of vegetation to persist, although many may have disappeared as a result of drain-



age works over the centuries. Early drainage led to the replacement of much of the open water by dense emergent vegetation. In 1937, attempts to drain the marsh ceased. In the 1980s the outflow sluice was closed in winter to store water for irrigation and to improve lakeside grazing. The elevated water levels, however, also killed off up to 90 per cent of the alder forest (*Alnus spp.*) and some of the clubrush beds (*Scirpus lacustris*) in the northern half of the lake. The proposed planting of exotic poplars and cypresses on the shores of the marsh could also lower the water-table. There is also reported to be high hunting pressure around the lake, especially on weekends.

A Monitoring Procedure Mission to Lake Tonga in 1990 made several recom-

mendations, including establishing the lake itself as a zone of strict protection within the Parc National d'El Kala, with strict bans on hunting and eel fishing. It was reported that many birds and otters were being killed in eel fishing nets. The mission further recommended that surface and groundwater extraction from the lake should be strictly controlled, and that a regional plan should be drawn up for the conservation of the area's land and water resources. The site was added to the Montreux Record in 1993 because of concern about decreases in water supply to the lake and the spread of emergent aquatic vegetation in open water areas (BirdLife International 2005).

IBAs in Algeria

Algeria is the second largest country in Africa hosting over 400 species of birds. Algeria's wetlands, in particular those along the coast and on the plateau south of Constantine, are of huge importance for migratory and resident waterbirds including three globally threatened species: Marbled Teal (*Marmaronetta angustirostris*), Ferruginous Duck (*Aythya nyroca*) and White-headed Duck (*Oxyura leucocephala*). The coastal lagoons around El Kala are considered to be the most important site for breeding waterbirds in eastern Algeria and one of the most important in the Mediterranean. A total of 31 Important Bird Areas (IBAs) have been identified in Algeria which cover 130 000 km² or some 5.5 per cent of the land surface (although the exact boundaries of some sites remain undefined). Lake Tonga is one of the IBAs in this complex. The site comprises a marshy basin and a shallow, seasonal freshwater to brackish lake bounded in the north by an extensive sand dune system (Africa Bird Club 2006).



White-headed duck

Unknown/UNEP/Wikipedia



Marbled teal

O. Peyre and G. Durand/UNEP/Africa Bird Club



Black-shouldered Kite

O. Peyre and G. Durand/UNEP/Africa Bird Club



Spotted Flycatcher

O. Peyre and G. Durand/UNEP/Africa Bird Club

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