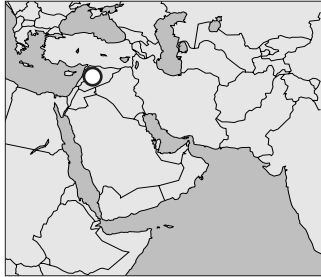


Sabkhat al-Jabbul, a Threatened Ramsar Wetland in Syria

GIANLUCA SERRA, DAVID MURDOCH, FRANCIS TURKELBOOM, FRANÇOIS TRAVERT, YASEEN MUJAWER AND DEREK A SCOTT



Sabkhat al Jabbul is a large wetland lying between the fertile cultivated areas around Aleppo, the Euphrates basin and the Syrian steppe. In the last 20 years, it has been modified from a typical seasonal saline lake (*sabkhat*) to a complex wetland eco-system with three separate waterbodies that vary from saline to brackish. The maximum water surface is now 270 km². The major causes of these changes are the construction of dykes and the expansion of irrigation schemes that use the *sabkhat* as an outlet for irrigation drainage water. Some shores of each of the lakes have recently developed large reedbeds. Ornithological records are limited, but there is good evidence that this is the most important wetland in Syria, with large numbers of wintering and migrant waterbirds and substantial breeding populations. *Sabkhat al Jabbul* nowadays seems to support more than 1% of the world population of a range of waterbirds, including Greater Flamingo *Phoenicopterus roseus*, the globally threatened White-headed Duck *Oxyura leucocephala*, possibly also Greater White-fronted Goose *Anser albifrons*, globally threatened Marbled Duck *Marmaronetta angustirostris* and the near-threatened Ferruginous Duck *Aythya nyroca*. Its geographical position makes it of great importance for a wide range of migrant species. It was designated as a Ramsar site in 1998, but it seems still seriously threatened by uncontrolled water pollution, fluctuating water and salinity levels, degradation of shore vegetation and by hunting. One of the key underlying causes has been the limited coordination of planning and management between the relevant governmental institutions, but there is some hope that the recent establishment by the Aleppo Governorate of a steering committee for the *Sabkhat al Jabbul* will overcome this issue.

Gianluca Serra, via Giambologna 20, 50132 Florence, Italy. e-mail puffo_blue@hotmail.com. David Murdoch, Flat 3, 5 Eaton Crescent, Bristol BS8 2EJ; email damurdoch@doctors.net.uk. Francis Turkelboom, International Centre for Agricultural Research in Dry Areas (ICARDA), PO Box 5466, Aleppo, Syria; email F.Turkelboom@cgiar.org. François Traver, La petite rivière 61570 Vrigny – France. E-mail franctra@ifrance.com, franctra@laposte.net. Yaseen Mujawer, Jabbul village, Governorate of Aleppo, Syria. Derek Scott, e-mail derekscott@eircom.net

INTRODUCTION

Sabkhat al Jabbul is a large wetland with saline and brackish bodies, partially surrounded by reedbeds, situated in northwest Syria (Figs 1 & 2). Its importance as a staging and wintering area for waterbirds, particularly Greater Flamingo, was recognised as long ago as the 1960s (Savage 1968). LK Dijkzen and FJ Koning carried out mid-winter waterbird counts in December 1971 and December 1972 (Dijkzen & Koning 1972, Koning & Dijkzen 1973); they recorded maximum counts of 1600 Greater Flamingo, 2030 Greater White-fronted Geese, 20 Ruddy Shelduck *Tadorna ferruginea* and 115 Common Cranes *Grus grus*. These observations led to its identification as a wetland of international importance by Carp (1980) and Scott (1995) and its description as an Important Bird Area (IBA) by BirdLife International (Evans 1994). It was officially designated as a Wetland of International Importance (Ramsar site) under the Ramsar Convention in 1998. Biologists from the Faculty of Agriculture, University of Aleppo, made further counts in the early 1990s (Scott 1995). A partial survey during the Syrian Wetland Expedition of 2004 led to its recognition as the most important wetland in Syria (Murdoch *et al* 2004). There have been a few informal visits, usually by holidaying birdwatchers (Wester 1998, Vandemeutter & Soors 2001, Murdoch 2003). Though the available data are limited, there are strong indications



Figure 1. Map showing the position of Sabkhat al-Jabbul within Syria.
© Rene Hofland

that the populations of wintering and breeding birds have increased over the last 10 years. Since 1991, when the *sabkhat* became officially protected under Syrian law, a number of uncoordinated conservation measures have been taken. However, these seem to be largely inadequate in view of the increasing threats facing the *sabkhat* that would severely compromise its value for wildlife and seriously impact on the livelihoods of the surrounding villages.

This paper aims to describe the hydrology, habitats and birdlife of *Sabkhat al Jabbul*, assessing its conservation importance for birds, discussing known and potential threats, and presenting some key recommendations for its conservation. We request that the Syrian authorities consider these proposals and conserve this outstanding wetland for the benefit of present and future Syrian generations. Further, we wish to stimulate the international birding community to organise comprehensive surveys to confirm its importance before it is irreparably damaged.

DESCRIPTION, CLIMATE AND HYDROLOGY

Sabkhat al Jabbul lies at an altitude of 312m asl south-east of Aleppo (*Haleb*), the second city of Syria (**Fig 1**). It has a moderate continental climate with a temperature range from 2 to 10°C in January and 21 to 37°C in July. The average rainfall is 200–350mm, most falling between October and April.

The *sabkhat* has formed in a closed basin of 5075 km², with the river Euphrates to the east and the river *Qwayq*, which passes through Aleppo, to the west. It is a natural sink for rainfall runoff and sediments from the surrounding areas, which reach the *sabkhat* via *wadis* (*ie* river beds dry for most of the year) during heavy winter rainstorms. As in most dry areas, the runoff water carries small amounts of salts and minerals, mainly sodium chloride, which concentrates in the natural closed basin by evaporation during the summer. As a result, a large, dry, saline depression or *sabkhat* forms every year during the hot summer months.

A seasonal river, the *Nahal al Dahab* (Golden River), once drained into the *Jabbul* depression, but water abstraction for irrigation lowered the water table; the river ceased flowing into the lake in the 1960s. The inflow of water into the *sabkhat* declined until the 1980s. However, in 1979 a large-scale irrigation scheme began to abstract water from the Euphrates to irrigate the dry lands north and west of the *sabkhat* (Evans 1994) and significant amounts of drainage water from the irrigated fields started to flow into the basin of the *sabkhat* (source: General Organization of Land Development of Aleppo, Ministry of Irrigation). Work was completed in 1997, on the western side. As a result, the number of months that the *sabkhat* holds water has increased signifi-

cantly over the last 15 years, drainage water becoming significant in the mid 1980s. The maximum area of the waterbodies now reaches 270km² and all three lakes in the *sabkhat* hold limited areas of water throughout the summer. By the early 1990s, contamination of the salt by urban and agricultural pollutants had become a major concern. To protect the northwest part of the *sabkhat* from further pollution, a dyke was built in 1996 connecting *Jabbul* village on the northern shore to *Haqlah* village on the south-western shore. A canal was then dug to channel effluents from *Sfirah* town and nearby agricultural land directly into the central lake near *Haqlah*.

The *sabkhat* now consists of three semi-independent water bodies with markedly different ecosystems whose water and salinity levels fluctuate independently (Fig 2):

- *The northwestern lake* (maximum surface area [msa] 47km²). This is the most saline and is the official site for salt extraction. Its water comes from irrigation channels and groundwater from the northern side of the lake. A state company produces salt by evaporating lake water in cement ponds close to *Jabbul* village.



Figure 2. Map of Sabkhat al-Jabbul. © ICARDA, courtesy Piero D'Altan

- *The central lake* (msa 194km²). The largest lake, it receives natural runoff from the slopes of the nearby *Jabel al Hoss*, drainage water and groundwater from the surrounding irrigation schemes, and sewage water from nearby cities and factories. It is brackish in the north, inflow from channels entering the north and the north-east corner (**Plate 1**) seemingly resulting in a local decline in salinity and saline in the south. The central lake has nine permanent islands (whose total surface area is c18km²), of which *Jabbrin* is on the *Jabbul-Haqlah* dyke and *Haqlah* island is accessible from a causeway.
- *The southeastern lake* (msa 29km²). This lake (officially called *Hussayn sabkhat* but locally known as *al Hamrat*) is fed by natural runoff from the slopes of *Jabel al Shbeith* and by drainage water (from irrigation schemes east of the *sabkhat*) which enters the southeast corner by an artificial channel. An earth dam controls water flow into the central lake by culverts, the southeastern lake being at a higher elevation. Paradoxically, the water level in the south-eastern lake apparently increases in the summer. When the cotton-planting season begins in April, farmers abstract large amounts of irrigation water, resulting in increased flow into the south-eastern lake and a substantial rise in its water level.

LAND USE, VEGETATION AND HABITATS

Areas round the sabkhat

The *sabkhat* is surrounded by distinct farming communities and systems which have a significant impact on its vegetation and habitats:

- Northern and western shores: relatively densely populated agricultural plains, intensively cultivated throughout the year, whose farmers rely heavily on irrigation. Villages are relatively prosperous. Income is mainly from agriculture.
- Southwestern shores (the villages of *Haqlah* to *Umm Amud Saghir*): mixed income from salt extraction, agriculture and off-farm activities.
- Southern shores (the northern part of the *Khanasser* valley): relatively poor communities dependent on dry-land farming (rain-dependent cropping that does not make use of irrigation), sheep-rearing and off-farm activities.
- Eastern shores: settled Bedouin villages at low density that depend on raising sheep and salt extraction. This area has little infrastructure and is the poorest area around the *sabkhat*.

Salt extraction is a traditional economic activity for the villagers round the *sabkhat*. Though it was officially banned in 1984, it continues to generate important income for some villages. The impact of salt collection on biodiversity appears to be negligible as it occurs in areas where the lake has completely dried up.

The sabkhat

Short halophytic communities supporting low biomass dominated the shores of the original saline *sabkhat*. The developments in agriculture and livestock over the last 15 years have led to major changes in the shoreline vegetation:



Plate 1. The central lake seen from the northeastern shore, *Jebel al Hoss* in the background. © *Gianluca Serra*



Plate 2. Rush *Juncus* sp at the northern shore of the central lake, May 06. © Francis Turkelboom



Plate 3. From Jabbrin island towards Hamra island across the dyke, May 06. © Francis Turkelboom



Plate 4. From NW Sabkhat al-Jabbul to Jabbrin tell, Feb 06. © Francis Turkelboom



Plate 5. Halophyte vegetation on the eastern shore of the central lake. © Francis Turkelboom



Plate 6. White-tailed Lapwing *Vanellus leucurus* chicks, southeast lake, 13 May 06. © David Murdoch



Plate 7. Shot Little Tern *Sternula albifrons*, May 06. © David Murdoch

- Northwestern lake: the shoreline is mostly bare, particularly along the steeper, stonier stretches in the south, which have often been degraded by agricultural or pastoral activities. Stands of *Phragmites* are now developing along the gentle gradients of the north and west shore.
- Along the northern shore of the central lake and the two major inflow channels; here the water is less saline and there are now extensive reed beds, probably an indication of water that is merely brackish. Areas of emergent vegetation, mainly Rush *Juncus* spp (**Plate 2**), have spread rapidly in the last three years to cover several square kilometres between the islands of *Hamra* and *Jabbrin* in the central lake (**Plates 3 & 4**). The reedbeds and other emergent vegetation are very important for nesting and feeding waterbirds.
- Southern and western shores of the central lake: overgrazing along the shore-line has led to the disappearance of the native vegetation cover in some areas such as around the village of *Haqlah*. Beyond a small strip of grazing land along the shore, this area is usually used for extensive barley cultivation and is the preferred foraging area for geese during the winter. 'Grazing' by geese on cereal shoots may cause economic loss for local farmers.
- Eastern shore of the central lake (**Plate 5**): salty west winds result in small dunes and salinisation of the land, preventing agriculture in a band about 1km wide along the shore; this land is used mainly for grazing. Sand or ooze formations and the wet interdunal areas generate unusual habitats and attract birds typical of steppe environments.
- The islands: some Bedouin families have traditional grazing rights for the larger islands (*Haqlah*, *Qrayn*, *Jabbrin*, possibly *Hamra*), which in spring support large flocks of sheep. Where slopes are steep, as on the central islands, kingfishers and other hole-nesting birds can find breeding sites, but the shores are usually bare. Huge colonies of birds breed on small bare islands or thinly vegetated islands in the central lake and on small reedy islands in the south-eastern lake.
- Southeastern lake: there are reedbeds along the southern shore and the channel in the south-eastern corner. In December 2005 and March 2006, many of the reeds appeared dead and waterbird numbers had fallen dramatically, though the reeds along the channel were still healthy. The likely cause was a fall in the water level (of perhaps 1m) linked to increased salinity. In May 2006, the water level had risen and some reeds were recovering.

AVIFAUNA

Sabkhat al Jabbul was listed as a Ramsar site in 1998 because it fulfilled three criteria for recognition as a 'wetland of international importance for water birds':

- Criterion 1: it contained a representative example of a natural wetland type.
- Criterion 5: it regularly supported 20 000 or more waterbirds.
- Criterion 6: it regularly supported 1% of the individuals of a flyway population of one species or subspecies of waterbird.

It was described as "a large, permanent saline lake designated... for providing an important staging, wintering and breeding area for large numbers of waterbirds and supporting more than 1% of the world population of Greater Flamingo."

There have been 18 visits or partial surveys between 1998 and 2006 with 168 species of bird recorded (see summary in **Table 1**). The most significant results are as follows:

- observations of at least six globally threatened or near-threatened species (as defined by BirdLife International 2006):
- White-headed Duck (Endangered)

- Marbled Duck (Vulnerable)
- Greater Spotted Eagle *Aquila clanga* (Vulnerable)
- Pallid Harrier *Circus macrourus* (Near-threatened)
- Ferruginous Duck (Near-threatened)
- Dalmatian Pelican *Pelecanus crispus* (Conservation Dependent)
- Recent observations of internationally significant numbers of White-headed Duck, representing perhaps 5–10% of the world population (Porter & Scott 2005)
- Confirmation of internationally important numbers of Greater Flamingo with up to 15 000 individuals in winter 2004 and spring 2005 - a breeding colony was located in May 2006.

Sabkhat al Jabbul may now be one of the most important wintering sites in the world for White-headed Duck. This species has recently undergone a dramatic decline in south-west Asia after the drainage of *Burdur Golu*, a Turkish wetland previously its most important wintering site; the global population is estimated at 8000 – 13 000 individuals, of which 5000 – 10 000 are in the East Mediterranean & West Asia (Wetlands International 2002). Porter and Scott (2005) recorded 725 White-headed Duck on 25 January 2005 in the north of the central lake. These observations were confirmed by others in the same location made in December 2005 and January 2006 (see **Table 1**). It appears that White-headed Duck did not previously occur in such numbers at *Sabkhat al Jabbul*; Baumgart *et al* (1995) listed two records of single birds, in March 1965 and June 1994, while Scott (1995) reported its occurrence in small numbers on spring passage. The influx of irrigation water and the development of large reedbeds appear to have created more suitable conditions for this duck than in the past. In the breeding season, adults can be seen along the dyke, along the northern shore of the central lake and near the reedbeds of the southeastern lake. Breeding was proved on 25 May 2005 when local children caught a female and five ducklings along the dyke. The birds were housed overnight and returned to the water the next morning.

Greater Flamingos are difficult to count on the *sabkhat*. Some are scattered over a vast area but others form dense flocks. However, estimates of about 7500 – 15 000 in February 2004 (Murdoch *et al* 2004) and May 2005 (Murdoch & al-Asaad, pers obs) suggest the wetland holds one of the largest populations in the Middle East. Breeding was proven in May 2006 on a small island in the central lake south of *Haglah* island, but this site accounts only for a small proportion of the huge numbers present – other colonies may await discovery.

There have been few visits during the breeding season, but the *sabkhat* may be one of the most important breeding areas for waterbirds in the Middle East. Species present include Little Egret *Egretta garzetta* and Great Egret *Ardea alba* (present in hundreds); Little Bittern *Ixobrychus minutus*, Purple Heron *Ardea purpurea* and Squacco Heron *Ardeola ralloides* (all common); Common Shelduck *Tadorna tadorna*, Mallard *Anas platyrhynchos*, Garganey *A. querquedula*, Northern Shoveler *A. clypeata*, Northern Pintail *A. acuta* and Common Pochard *Aythya ferina*; Greater Sand Plover *Charadrius leschenaultii*, Pied Avocet *Recurvirostra avosetta* and 5 tern species: Gull-billed *Gelochelidon nilotica*, Common *Sterna hirundo*, Little *Sternula albifrons*, Caspian *Hydroprogne caspia* and Whiskered *Chlidonias hybrida* (Murdoch 2004) Little Grebe *Tachybaptus ruficollis* and Great Crested Grebe *Podiceps cristatus* are very common along the northern shore. In 2006, six ‘white islands’ in the south of the central lake were probably huge colonies of Slender-billed Gull *Larus genei*, which is abundant on the *sabkhat*, but they may hold large tern colonies as well. White-tailed Lapwing *Vanellus leucurus* breeds locally (**Plate 6**). The reedbeds hold large populations of passerines,

Table 1. Selected significant observations from Sabkhat al Jabbul, 1998 - 2005

Species	Breeding status	Observations, dates	Observers	Comments
Greylag Goose <i>Anser anser</i>	Possible 2005	190, 10–11.2.04 5, 4.5.05	Andrews <i>et al</i> / Murdoch & Asaad	Record from SWE; small wintering population First breeding season record for Syria
Greater White-fronted Goose <i>Anser albifrons</i>	–	>5,000, SE lake, 11.2.04 7,600, SE lake, 27.2.04	Andrews <i>et al</i> / Hofland <i>et al</i>	Records from SWE
Common Shelduck <i>Tadorna tadorna</i>	Possible	>13,000, 10–12.2.04 14, 4.5.05 >1,000, 31.3.06 10, 12–13.5.06	Andrews <i>et al</i> / Murdoch & Asaad Murdoch & Asaad Murdoch & Asaad	Record from SWE No regular Syrian breeding sites
Northern Shoveler <i>Anas clypeata</i>	Likely	50+, SE lake, 8.5.05 10,000 – 20,000, 31.3.06	Murdoch & Asaad Murdoch & Kullman	No Syrian breeding records yet
Marbled Duck <i>Marmaronetta angustifolia</i>	Proven 2006	>200, 4.5.05 >300, 31.3.06 21, 12–13.5.06 Breeding proven 04.07.06	Murdoch & Asaad Murdoch & Kullman Murdoch & Asaad Turkelboom	No records during SWE; probably absent in winter
Red-crested Pochard <i>Netta rufina</i>	Proven 2005	50 pairs with nests, 3.5.05	Murdoch & Asaad	First Syrian breeding records
Ferruginous Duck <i>Aythya nyroca</i>	Very likely, not yet proven	42, 10–12.2.04 ~200, 3–4.5.05 40+, 31.3.06 22, 13.5.06	Andrews <i>et al</i> / Murdoch & Asaad Murdoch & Kullman Murdoch & Asaad	Record from SWE
Red-breasted Merganser <i>Mergus serrator</i>	–	1 female, 10.2.04	Andrews <i>et al</i>	Record from SWE; third Syrian record
White-headed Duck <i>Oxyura leucocephala</i>	Proven 2005, 2006	170, SE lake, Feb 2003 725, central lake, 25.1.05 15, central lake, 3.5.05 >380, central lake, 9.12.05 >350, central lake, 6.01.06	Serra Porter & Scott Murdoch & Asaad Serra & Turkelboom Serra & Bruschin	5–10% of world population may winter Second known Syrian breeding site

Horned (Slavonian) Grebe <i>Podiceps auritus</i>	–	1, 17.2.98	Wester	Sole Syrian record
Black-necked Grebe <i>Podiceps nigricollis</i>	Possible	50, 10–11.2.04 15, SE lake, 8.5.05 1, dyke, 1.5.06	Andrews <i>et al</i> Murdoch & Asaad Murdoch & Asaad	Record from SWE No Syrian breeding records yet
Greater Flamingo <i>Phoenicopterus roseus</i>	Proven 2006	~12,000, 10–12.2.04 >9,800, 27.2.04 >10,000, 3.5.05 >10,000 with 500+ prs breeding, 12.5.06	Andrews <i>et al</i> Hofland <i>et al</i> Murdoch & Asaad Murdoch & Asaad	Records from SWE First Syrian breeding record
Eurasian Spoonbill <i>Platalea leucorodia</i>	Proven 2005, 2006	68, 10–11.2.04 50 pairs, SE lake, 8.5.05 >300, 50+ pairs, SE lake, 13.5.06	Andrews <i>et al</i> Murdoch & Asaad Murdoch & Asaad	Record from SWE; only Syrian wintering site First Syrian breeding records
Great White Pelican <i>Pelecanus oncorotalus</i>	–	14, 10–11.2.04 8, 3.5.05 4, 31.3.06	Andrews <i>et al</i> Murdoch & Asaad Kullman & Murdoch	Record from SWE Scarce winter visitor / passage migrant
Dalmatian Pelican <i>Pelecanus crispus</i>	–	1, 27.2.04	Hofland <i>et al</i>	Record from SWE
Greater Spotted Eagle <i>Aquila clanga</i>	–	1, SE lake, 11.2.06	Andrews <i>et al</i>	Record from SWE
Purple Swamphen <i>Porphyrio porphyrio</i>	Proven 2005, 2006	>100, 3–4.5.05 >300, spring 2006	Murdoch & Asaad Murdoch & Asaad	Abundant in emergent vegetation along the dyke
Pied Avocet <i>Recurvirostra avosetta</i>	Proven 2005, 2006	40, 10–12.2.04 5 nests, NW lake, 3.5.05 50 nests, NW lake, 12.5.06	Andrews <i>et al</i> Murdoch & Asaad Murdoch & Asaad First Syrian breeding records	Record from SWE
White-tailed Lapwing <i>Vanellus leucurus</i>	Proven 2005, 2006	2 nests, SE lake, 8.5.05 10 pairs, SE lake, 13.5.06	Murdoch & Asaad Murdoch & Asaad	Range extension; most westerly site in Syria
Grey Plover <i>Pluvialis squatarola</i>	–	1, 31.3.06	Kullman	First spring record for Syria?

	Proven 2003	Very common with groups of 20+, NW lake, 13.6.2003	Murdoch	Several pairs nesting
Greater Sand Plover <i>Charadrius leschenaultii</i>	–			
Bar-tailed Godwit <i>Limosa lapponica</i>	–	3, 31.3.06	Kullman	Two previous spring records for Syria
Whimbrel <i>Numenius phaeopus</i>	–	3, 31.3.06 1, 13.5.06	Kullman & Murdoch Murdoch & Asaad	Possibly the first Syrian records
Mediterranean Gull <i>Larus melanocephalus</i>		1, central lake, 12.5.06	Murdoch & Asaad	Very rare in Syrian interior
Gull-billed Tern <i>Gelochelidon nilotica</i>	Proven 2003	>100, W side of NW lake, 13.6.03	Murdoch	Active nests, freshly fledged young
Little Tern <i>Sternula albifrons</i>	Proven 2005, 2006	Colony of >50 pairs, dyke, 3.5.05	Murdoch & Asaad	Probably scattered colonies throughout <i>sabkhat</i>
White-winged Tern <i>Chlidonias leucopterus</i>	Possible	>10,000, 31.3.06	Murdoch & Kullman	Most or all on migration
Iraq Babbler <i>Turdoides afitrostris</i>	Presumed	1, SE lake, 27.2.04 Common, SE lake, 31.3.06 1, north shore, 1.5.06 3, dyke, 12.5.06	Hofland <i>et al</i> Murdoch & Kullman Murdoch & Asaad Murdoch & Asaad	Record from SWE Most westerly known site
Citrine Wagtail <i>Motacilla citreola</i>	–	10, 17.2.98 5, Jabbul village marsh, 10.2.04 3, Jabbul village ponds, 25.1.05	Wester Andrews <i>et al</i> Porter & Scott	Regular winter visitor

notably warblers such as Savi's *Locustella luscinioides*, Moustached *Acrocephalus melanopogon* and Great Reed *Acr. arundinaceus* and Bearded Reedling *Panurus biarmicus*, Spanish Sparrow *Passer hispaniolensis* and Dead Sea Sparrow *Pa. moabiticus*. Iraq Babbler *Turdoides altiostriis* is widely distributed in the reedbeds; *Sabkhat al Jabbul* is the only known site west of the Euphrates basin. Most of these species have not yet formally been proven to breed – several would be first breeding records for Syria.

Data comparing breeding seasons are limited. In May 2005, large numbers of waterbirds on the southeastern lake included at least 140 Eurasian Spoonbill *Platalea leucorodia* (with 50 nests) and ten species of duck, notably 100 Marbled Duck and 200 Ferruginous Duck. Repeat counts in spring 2006 were dramatically lower, probably linked to the apparent die-back in the reeds round the lake. In May 2005, when there was little human disturbance, large numbers of waterbirds were feeding along the north shore, but in 2006 they were much scarcer when several Bedouin tents were pitched nearby.

There are few migration data so far, but spring brings a huge passage of waders and terns, notably tens of thousands of White-winged Terns *Chlidonias leucopterus*, Little Stints *Calidris minuta* and Ruff *Philomachus pugnax*; at least 25 species of wader can be seen in a morning along the north shore. There appear to have been no observations yet from autumn.

Observations made in February 2004 by members of the Syrian Wetland Expedition (SWE) (Murdoch *et al* 2004) revealed an impressive range of wintering raptors and huge numbers of geese, ducks and waders (**Table 1**); the numbers of Greater White-fronted Goose and Common Shelduck were of international significance.

Thus today *Sabkhat al Jabbul* fulfils Criterion 6 for a Ramsar site for a range of waterbirds; these include Greater Flamingo, Common Shelduck and White-headed Duck, and possibly also Greater White-fronted Goose, Northern Shoveler, Marbled Teal, Ferruginous Duck and Little Stint. However, visits so far have been unsystematic; informed conservation of the *sabkhat* requires regular data collection and organisation of comprehensive surveys.

THREATS

Direct threats

a. Water pollution. Pollution of the water entering the *sabkhat* is generally recognized as a major threat to the integrity of the ecosystem. Agricultural, urban and industrial developments round the *sabkhat* have resulted in increased inflow of human effluent, fertilizers and pesticides, and chemical waste from factories (these include a sugar-beet factory and a chlorine factory under construction). As the *sabkhat* is a closed depression, polluted particles will continue to accumulate until their inflow is controlled. Pollution has already made the salt from the central lake unsuitable for any use and salt collection by villagers has been officially banned. However, the salt is still used. Local villagers have regularly reported finding dead fish and dead young flamingos in recent summers; possible causes would include pollution, drying up of the lake or increased salinity.

b. Fluctuating water and salinity levels. There is at present no management plan to regulate water levels and salt content, which therefore depend on the quantity of rainfall runoff, sewage water and drainage from irrigation. Sudden changes in water level and salinity can have adverse affect on the reedbeds and ecological value of the *sabkhat*, as noted in the southeastern lake in March 2006 (see above). There are now

plans to divert irrigation water to the *Khanasser* valley rather than to the *sabkhat*; the ecological and economic effects of these proposals are unknown and need thorough investigation before any investment is made.

c. *Mismanagement and degradation of shore vegetation.* The reedbeds are crucially important as safe feeding, breeding and resting areas for a wide range of birds, notably herons and ducks. It is likely that both the local community and relevant authorities are unaware of the reedbeds' ecological importance. This makes the reedbeds vulnerable to random interventions such as garbage dumping or burning. It is vital to include the reedbeds in the protected areas and to police their protection adequately. The shorelines with salt-tolerant vegetation may be important for a number of bird species, but overgrazing and regular disturbance make them unsuitable for nesting birds and reduce their ecological value.

d. *Uncontrolled hunting and fishing.* Hunting and fishing were banned in 1991 when the *sabkhat* became a protected area and a national hunting ban declared in 2001 now runs until 2010. Its enforcement is the responsibility of local police officers, but it is not implemented; shooting can be heard on almost every visit to accessible areas such as the northern shore (Plate 7). There may be less hunting in the breeding season when birds are fewer in number. It is also forbidden for four months by an Islamic restriction. The southeastern lake is more remote and has three guards employed by the Department of Agriculture. The protection they confer may be limited but their presence probably has significant deterrence value; for instance, White-tailed Lapwing *Vanellus leucurus*, a vulnerable ground-nesting species, was breeding around the southeastern lake in 2005 and 2006. There is some fishing by villagers in the north of the central lake and in the southeastern lake but at present disturbance seems to be limited; major increases in fishing activity could have conservation implications.

e. *Introduction of invasive alien species.* Alien species have caused massive loss of biodiversity worldwide (Lowe *et al* 2000). There is no evidence so far of such introductions in the *sabkhat*, but introduction of alien fish for economic purposes has occurred in other Syrian wetlands (Serra, pers obs). This practice can cause irreversible damage to the whole ecosystem and should be strongly discouraged.

Underlying causes

The above-mentioned direct threats have their roots in a complex array of underlying causes, among the most serious being: weak coordinated management and protection of the site (mainly due to overlapping responsibilities between government institutions), limited availability of expertise in wetland management and conservation, limited integration of biodiversity conservation into district policies (such as rural development, agriculture and irrigation). The diversity of *Jabbul's* birdlife still finds little appreciation at local level, both among authorities and among local community. However, the relevant numbers of flamingos, in particular, are an attraction even to non-birdwatchers. The lack of information in Arabic on wildlife conservation or ecology undoubtedly contributes to the lack of awareness. On the other hand, some local people seem to enjoy the landscape and the spectacular flocks of flamingos; family parties can be seen picnicking on Fridays on *Jabbrin* island.

CONSERVATION RECOMMENDATIONS

Observations over the past seven years have confirmed the international conservation importance of *Sabkhat al Jabbul* and the justification for its Ramsar status. It is crucial to stress the importance of this environment also for the welfare of the local community

and of its future generations. During the past 15 years a number of uncoordinated conservation measures have been taken for the sake of *sabkhat* conservation, but so far without significant and obvious results. In order to further promote and intensify the conservation effort in the *Sabkhat al Jabbul* and to support the welfare of the local community we recommend the following key measures (in no particular order):

1. Surveying the site thoroughly to define its ornithological importance for threatened species particularly White-headed Duck. To obtain baseline data, a comprehensive breeding season survey is urgently needed – winter and migration surveys should follow in time. ¹A medium-term goal should be to carry out annual midwinter waterbird counts as part of the International Waterbird Census (IWC) co-ordinated by Wetlands International.
2. Strengthening the regular monitoring of water pollution, water levels and salinity to establish their impact on human health and on wildlife.
3. Strengthening the institutional, management and scientific capacity of the *Sabkhat al Jabbul* steering committee, recently established under the leadership of the Aleppo Governorate.
4. Ensuring regular and active participation by the local community in the planning and decision-making processes relating to *sabkhat* conservation, so that they can see that they have a worthwhile stake in the management of the *sabkhat* for people and for conservation. Subsequent local community control of hunting would then be a more practical aim, given precedents elsewhere. The basis of such participation lies in the preparation of a 5-year scientifically based and socio-economically sensitive management plan for the *sabkhat*.
5. Ensuring allocation of adequate government funds to staff and manage the protected area properly and to provide suitable equipment to do so. At the same time, international assistance should be sought specifically to train staff to a high degree of capability (eg to produce wetland management expertise and to train a site manager and the rangers) and to obtain basic optical equipment.
6. Developing awareness campaigns, locally and nationally, to impress the unique value of *Sabkhat al Jabbul* on the consciousness of the local and national communities.
7. Raising awareness amongst international conservation organizations and agencies about *Sabkhat al Jabbul* with the aim of attracting the financial resources needed to implement these recommendations.

CONCLUSION

Sabkhat al Jabbul has been aptly described as ‘a paradise and a nightmare’. At present it is one of the most important wetlands in the Middle East but the entire *sabkhat* could become an ecological nightmare if the related processes of water pollution, fluctuating water and salinity levels, vegetation degradation and hunting are allowed to continue. However, there is enormous potential for the *sabkhat* and for the local community if its riches can be used sustainably and equitably. *Sabkhat al Jabbul* could be a showcase for the successful combination of development and conservation in the Middle East, but

¹ The survey tasks will not be easy. Many areas are difficult to reach and often vast numbers of birds are often at extreme range, making the counting task formidable. Any full-scale survey will probably require not only an experienced team of observers, but also access to boats for at least a week.

it will require sustained effective co-ordination between local and national authorities. Coordination requires the preparation of an integrated scientifically-based and socio-economically sensitive management plan. This plan will have to show that active participation is linked to clear benefits for the local community, but it will also need the support of the international conservation community.

ACKNOWLEDGEMENTS

Richard Porter's advice in writing this paper was much appreciated. We are very grateful to Kasem al Ahmed (International Center for Agricultural Research in the Dry Areas, ICARDA) for interviewing farmers; Borhan Kasmoo (Ministry of Irrigation), Zuhair Masri (ICARDA), and Imaad Dahman for providing valuable information; Adeeb al Asaad and Ahmed Abdallah and Anssi Kullberg for their support and observations; and the farmers from around *Sabkhat al Jabbul* for their hospitality and openness. Piero D'Altan of ICARDA very kindly produced the map for us. Sponsors of the Syrian Wetland Expedition included the van Tienhoven Foundation, Ornithological Society of the Middle East, African-Eurasian Migratory Waterbird Agreement (AEWA) and Avifauna.

PRIMARY REFERENCES

- BAUMGART, W, M KASPAREK AND B STEPHAN. 1995. *Die Vögel Syriens: eine übersicht*. Max Kasperek Verlag. Heidelberg, Germany. (English version published by OSME in 2003).
- CARP, E. 1980. *A Directory of Western Palaearctic Wetlands*. UNEP. Nairobi. Kenya. & IUCN. Gland. Switzerland. 506pp.
- DIJKSEN, LK AND FJ KONING. 1972. IWRB Mission to Syria – December 1971. *IWRB Bull.* 33: 34–37.
- EVANS, MI. 1994. *Important Bird Areas in the Middle East*. Birdlife Conservation Series No. 2. BirdLife International, Cambridge. UK.
- KONING, FJ AND LK DIJKSEN. 1973. IWRB Mission to Syria – December 1972. *IWRB Bull.* 35: 57–62.
- LOWE, SJ, M BROWNE AND S BOUDJELAS. 2000. *100 of the World's Worst Invasive Alien Species*. IUCN/SSC Invasive Species Specialist Group (ISSG). Auckland. New Zealand.
- MURDOCH, D. 2004. Observations from Syria with notes on 11 new breeding species. *Sandgrouse* 27(1): 37–45.
- MURDOCH, D, I ANDREWS AND R HOFLAND. 2004. The Syrian Wetland Expedition 2004: a summary. *Sandgrouse* 26(2): 94–104.
- SAVAGE, CDW. 1968. The wildfowl and wetland situation in the Levant. In: Elliott, HFJ. (Ed). *Proc. Tech. Meeting on Wetland Conservation, Ankara-Bursa-Istanbul, October 1967*. IUCN Pubn. New Series No 12: 134–138.
- SCOTT, DA. 1995. (ED.) *A Directory of Wetlands in the Middle East*. IUCN. Gland. Switzerland. & IWRB. Slimbridge. U.K.
- WETLANDS INTERNATIONAL. 2002. *Waterbird Population Estimates – Third Edition*. Wetlands Int. Global Series No 12. Wageningen, The Netherlands.

SECONDARY REFERENCES

- BIRDLIFE INTERNATIONAL. 2006. *Threatened Birds of the World*. Downloaded from <http://www.birdlife.org> on 30.06.06.
- MURDOCH, D. 2003. Informal Syria Trip Report. OSME website www.osme.org.
- PORTER, R AND DA SCOTT. 2005. *Report on the environmental training programme for Iraqis and birds recorded in Syria, 20–29 January 2005*. Birdlife International. Internal Report 16 pp.
- VANDEMEUTTER, F AND J SOORS. 2001. Informal Syria Trip Report. OSME website www.osme.org.
- WESTER, J. 1998. Informal Syria Trip Report. OSME website www.osme.org.

APPENDIX 1

Visiting the site at *Sabkhat al-Jabbul*

Information on this huge and complex wetland is largely incomplete but the best birding areas appear to be the dyke, the northern shore of the central lake and the southern shore of the southeastern lake, particularly where the channel carries fresh water into the lake. The mouth of the channel at *Haglah* village can be good. Some shores, for instance the southern tip of the northwestern lake, are stony and are of little interest.

To reach the northern shores of the *sabkhat*, there are turnings off the main Aleppo–Raqqa highway south to the villages of *Jabbul* and *Deir Hafer*, and a road east from the town of *Sfirah*. *Jabbul*, about 45 minutes' drive from the centre of Aleppo

(about 40–50km), is the best access point to the north shore and the dyke. There are excellent views of the north of the *sabkhat* from two hills (*tell*), one near the northern end of the dyke and the second about 3km south of it (the ‘*tell* on the dyke’, on *Jabbrin* island). A very poor track with limited visibility runs along the northern edge of the central lake; 4WD vehicles are essential after any rain. The dyke between the northwestern and central lakes runs south for 8.5km from *Jabbul* village to *Haqlah* village on the southern shore. A locked gate at its northern end prevents access by car but Mr Yaseen (see below) is usually able to obtain the key; it is then an easy drive. Semi-permanent obstacles prevent access by car from its southern end. A walk along the dyke, especially starting from the *Jabbul* end, is a pleasant and relaxing experience.

The southwest shores of the northwestern lake and the southern half of the central lake are best reached by a road from *Sfirah* that runs 20–25km from northwest to southeast, roughly parallel to the lake. *Haqlah* island, a large, arid island in the central lake with many bays, is accessible by a causeway that starts just east of *Haqlah* village. It is easy to drive across the island and views are good but there are many fewer birds than along the north shore. The island is still a military area and there is usually a guard at the entrance. It was previously used as a firing range and there is always the danger of encountering an unexploded shell, but there are many Bedouin on the island with large flocks of sheep, so the risks are probably small.

The southeastern lake is about 70km from the centre of Aleppo. A good road runs west-east several km south of the lake and poor tracks run north across fields to its southern shore. It is possible in dry conditions to drive a saloon car round the west and most of the southern side, though it takes great skill to drive over the dam onto the north side. The eastern shores of both central and southeastern lakes are very inaccessible, with very poor roads, although not impossible with 4WD and a knowledgeable driver (via *Rasm an-Nafl* village in the south or *Shrayma* village along the railway in the north). There are still very few ornithological observations from this large area.

The large distances involved require careful planning and clear communication with local guides beforehand. In wet weather, 4WD vehicles are essential to go off-road. The shores of the southeastern lake should be avoided completely; many visitors have become stuck, sometimes for long periods! Visitors are advised to travel with Syrian nationals away from asphalt roads to avoid potential misunderstandings at military sites. Moreover, national and local guides are generally very helpful and knowledgeable. It is important to remember that contact with foreign eco-tourists greatly encourages Syrian conservationists. Mr Yaseen Mujawer, also known as Abu Qalil (tel. 021-6820065) welcomes overnight visitors to his house in *Jabbul* village close to the entrance to the dyke; this option is recommended for those who do not have transport or who do not want to stay in Aleppo. He speaks little except Arabic but he is an invaluable source of information about the *sabkhat*'s birds. Mr Ibrahim Waqqas (Abu Steif), also based in *Jabbul* village, appears to be a guard appointed to keep the key of the gate at the entrance of the dyke. Mr Mohammed Abu Nasr (no phone) lives in the enchanting village of *Shalale Saghira* to the southwest of the southeastern lake; visitors are welcome to his beehive home, which is more convenient for the southeastern lake, but facilities are limited.

How to submit records.

All data from Sabkhat al Jabbul are valuable and we ask visitors to send them to OSME. Significant observations will be published with permission in *Sandgrouse*.