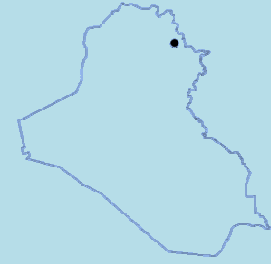


Dukan Lake (S2)



Surveyed in winter and summer from 2007 to 2010.

Admin Area: Sulaimani

Coordinates: N 36° 05' 33" E44° 56' 09"

Area: 47,281 ha

Altitude: 400-1300 m

KBA Criteria: V

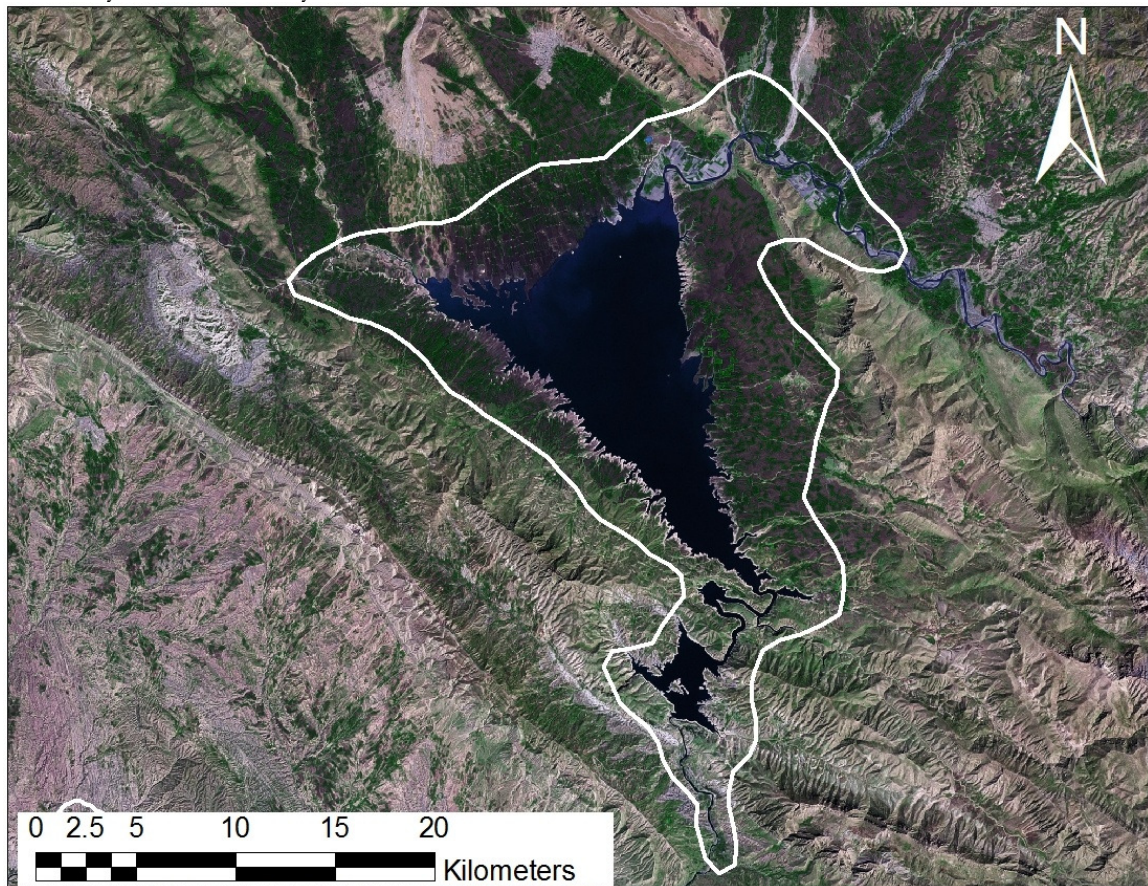
IBA Criteria: A1, A3, and A4i

IPA Criteria: Under assessment

Status: Unprotected (except for summer fishing moratorium)

Ecoregion: Zagros MountainsForestSteppe (PA0446)

Directional information: This reservoir site is located 55 km northwest of the city of Sulaimani. It is formed by a dam in the city of Dukan.





Northern section of Dukan Lake and the surrounding area facing northwest (Photo by Korsh Ararat, 2011)

Site Description: This site is a large reservoir of about 25,000 ha that is fed by the Lesser (Little)Zab River from the northeast and the Hizop stream from the northwest. The lake is formed by the Dukan dam, built in 1959 upstream of the town of the same name. Dukan was listed as an IBA by Evans (1994). The rivers are fed by rainfall and snowmelt, leading to peak discharge in spring and low water in summer and early fall. The lake itself is divided into two parts; a larger lake to the north and a smaller lake to the south separated by a winding gorge (see map).

The Rania Plain, where the lake is located, is the largest valley in the Lesser Zab basin. Most tributaries join the Lesser Zab upstream of Dukan, the largest being the Baneh River and Qala Chwalan. A number of smaller streams join the Lesser Zab in the Rania Plain, which is now partly inundated by Dukan Lake. More than 65 villages and six towns are located around the lake, including Rania, Chwar Qurna, and Qaladza. Much of the land around the lake is used for agriculture and grazing is practiced extensively. There are some small mineral ponds between Rania and the lake on the north side, close to Qurago and Bemushen villages.

The Zagros Mountains, in which the basin is situated, have been occupied since at least the Lower Paleolithic, and an early archaeological site in the Lesser Zab basin, Barda Balkha, dates to the Middle Paleolithic. The lake is surrounded by mountains (Sara and Qarasird to the southeast, Assos to the northeast, Kosrat to the southwest, and Barda Rash to the northwest), hills, and lowland areas characterized by oak forests and steppe ecosystems. To the north, the Lesser Zab basin is bordered by the Greater Zab basin while on the south it is adjoined by the basins of the Adhaim and Diyala rivers.

Key Biodiversity Area Criteria	Notes
V. Vulnerability Criteria: Presence of Critically Endangered and Endangered species – presence of a single individual or Vulnerable species – 30 individuals or 10 pairs.	
<i>Rafetus euphraticus</i>	Euphrates Softshell Turtle was observed in mineral ponds in the northern section of the site. During a 2-day survey looking for this species we found 3 specimens. Based on field survey we assume that the lake is a suitable habitat for this species.

Important Bird Area Criteria	Observations made 2007-2010. Unless stated otherwise numbers are estimates based on extrapolations using area/transect counts and area of known habitat. (see methodology on p. XX).	
A1. Globally threatened species		
	Breeding	Wintering/ Passage
Egyptian Vulture <i>Neophron percnopterus</i> (Summer visitor)	3-6 pairs (counts)	
Lesser White-fronted Goose <i>Anser erythropus</i> (Winter visitor		410-630 (counts, 2009-2010)
Red-breasted Goose <i>Branta ruficollis</i> (Winter visitor)		2 (count, 2010)
A3. Biome-restricted species		
Irano-Turanian biome		
	Breeding	Wintering/ Passage
See-see Partridge <i>Ammoperdix griseogularis</i> (Resident)	250 pairs (2008-2010)	
Upcher’s Warbler <i>Hippolais languida</i> (Summer visitor)	6 pairs (2009)	
Menetries’s Warbler <i>Sylvia mystacea</i> (Summer visitor)	10 pairs (2010)	
Eastern Rock Nuthatch <i>Sitta tephronota</i> (Resident)	250 pairs (2008-2010)	
White-throated Robin <i>Irania gutturalis</i> (Summer visitor)	15 pairs (2010)	
Finsch’s Wheatear <i>Oenanthe finschii</i> (Resident)	30 pairs (2008-2009)	
A4i. 1% or more of biogeographical population of a congregatory waterbird species		
	Breeding	Passage/Wintering
Lesser White-fronted Goose <i>Anser erythropus</i> (Winter visitor)		410-630 (counts, 2008-2010)
Slender-billed Gull <i>Chroicocephalus genei</i> (Summer visitor)	2250-2400 pairs (counts, 2008-2010)	
Greater White-fronted Goose <i>Anser albifrons</i> (Winter visitor		240-552 (counts) (1.6%-3.7% of the biogeopgraphical population)
Great Cormorant <i>Phalacrocorax carbo</i> (Winter visitor)		1100-3200(counts) (1.1%-3.2% of the biogeographical population)
Common Shelduck <i>Tadorna tadorna</i>		1200 (highest count, 2008, 2010) (1.5% of the biogeographical

(Winter visitor)		population)
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Additional Important Bird Observations: During the surveys 181 species were recorded. In addition to those in the table the following were observed at levels that did not meet the IBA criteria: in winter Marbled Duck *Marmaronetta angustirostris* (Vulnerable), Ferruginous Duck *Aythya nyroca* (Near Threatened), Eastern Imperial Eagle *Aquila heliaca* (Vulnerable), Pallid Harrier *Circus macrourus* (Near Threatened) and Little Bustard *Tetrax tetrax* (Near Threatened); breeding European Roller *Coracias garrulus* (Near Threatened). The site held breeding populations of four Mediterranean and one Sahara-Sindian Desert biome-restricted species (table xx) but these did not trigger inclusion under criterion A3. In winter the site also held up to 1500 (over 2%) of the *armenicus* race of Yellow-legged Gull *Larus michahellis*.

Other Important Fauna

Mammals, Reptiles, and other Fauna: Data on mammals are only for 2008-2010, with more specific information collected in 2010. Local fishermen reported observations of two globally Near Threatened species: Eurasian Otter *Lutra lutra* and Striped Hyena *Hyaena hyaena*. One local reported the hunting of an Otter in the year 1996. There also have been reports of wolf attacks on local animal herds.

Fish: Data were collected for the years 2007 and 2008 only, during which 21 species were reported. According to Coad's (2010) criteria, the following species are economically important and of conservation concern: *Acanthobrama marmada*, *Barbus subquincunciatus*, *Luciobarbus esocinus*, *Luciobarbus xanthopterus*, *Squalius cephalus* and *Tor grypus*. Economically important species were: *Alburnus mossulensis*, *Carassius auratus*, *Cyprinus carpio*, *Hypophthalmichthys molitrix*, *Heteropneustes fossilis*, *Gambusia holbrooki*, and *Cyprinion macrostomum*. The following species are of no economic importance but their conservation status in Iraq is unknown: *Alburnus caeruleus*, *Barbus lacerta*, *Capoeta damascina*, *Mastacembelus mastacembelus*, *Mystus pelusius*, *Silurus triostegus*, and *Squalius lepidus*.

Plants & Habitats: This site contains a high number of plant species (225 identified). Two waypoints were surveyed around the lake, both in similar habitat: Forest Vegetation- Mountain Riverine Forest. One (N 35° 57' 38" E 44° 58' 27") was at the outlet of lake on the Lesser Zab River, and the second (N 35° 56' 29" E 44° 57' 34") was at the cliffs near the dam. Characteristic species were *Salix acmophylla*, *S. babylonica*, *Populus euphratica*, *Populus alba*, *Platanus orientalis* (trees), *Nerium oleander*, *Rubus sanctus*, *Vitex pseudo-negundo*, *V. agnus eastum*, *Vitis vinifera* (shrubs), and *Lythrum salicaria* (herb), as well as some other associated plants such *Phragmites australis*, *Typha domingensis*, *Juncus effusus*, and *Juncus diffusissimus*. As the lake is a reservoir, the lake level is unstable and the lake edge is vegetated only by sporadic annuals. Across the site, the dominant tree was *Quercus aegilops*, the dominant shrub was *Thymus syriaca*, the dominant herb was *Sinapis arvensis* and the dominant grasses were *Aegilops crassa*, *A. umbellulata* and *Poa bulbosa*.

The ecological condition varied between very disturbed, with an ecological scale of four (especially near the lake) to moderately disturbed, with an ecological scale of three. The terrain at the two waypoints was dominated by the cliffs that surround portions of the lake's edge and the ecological condition in both cases was very disturbed, with an ecological scale of four, which was true of the site in general. The slope was between gentle (0-5°) and somewhat steep (15-26°). The site is located in the foothills of Zagros range, where the geology is sedimentary limestone, and the soil type is sandy clay. 60% of the area was non-vegetated.

Conservation Issues: Hunting and fishing constitute a very significant threat to the area. Hunters were observed during winter in Dukan, especially in the northern part of the lake near the place where the Lesser White-Fronted Goose *Anser erythropus* was observed. In Rania district, several pools have been constructed with bird hides to attract water birds. As hunting is a popular activity in the area, its practitioners need to be educated to prevent them from killing globally threatened bird species (Ararat et al., 2009). To protect fish spawning in the area the Kurdistan Ministry of Agriculture prohibits fishing from mid-May to the end of July. When the team visited the site in summer it relied on interviews with local fisherman to gather information on fish species in the lake, such as *Aspius vorax*. Coad (2010) noted that this fish was commonly caught by

American soldiers throughout Iraqi waters as evidenced by photos he received for identification in 2004. Fishing, when allowed, is usually done with nets whose mesh size ranges from 30 mm to 80 mm. Individual anglers have also been observed.

Dukan is one of the most popular picnic sites in the area, particularly during spring and summer and parts of this site are heavily impacted by picnickers and tourist activities and the trash they generate. Regulations for development and trash collection are limited, so the volume of visitors presents a significant threat.

The road to the lake from the town of Dukan was widened in 2010/2011, which caused a high level of erosion into the lake itself. The dam continues to raise environmental concerns downstream due to fluctuating water levels, the entrapment of sediments and creation of almost zero sediments downstream, which increases the erosion potential and decreases biodiversity below the dam.

Pollution from industry and agriculture is another very significant threat. Farmers in the northeastern part of the site near Rania were observed using poison to kill mice in their fields. In 2009, just in the Rania district alone (which contains part of the site and contains an important bird area especially for raptors) farmers were provided with 120 kg of bromadiolone rodenticide, and 997 lt of malathion, another pesticide (both are slightly to moderately toxic to many birds).

There are many gravel mines along the Lesser Zab River above and one below the lake within the delineated area that negatively affect the ecosystem of the river and cause destruction to the riparian zone. The mines collect gravel from the river banks or the river bed, which has significant effects on the river morphology, sediment loads, and water speed in addition to habitat destruction and direct pollution caused by these activities. Other human impacts at this site include animal grazing, urban planning and the expansion of surrounding cities, garbage and sewage from various towns that affect the lake and the Lesser Zab.

Recommendations: In order to protect the lake fishery, the timing of fishing prohibitions may require greater study to improve spawning success and the maturation of fish eggs (Ararat et al., 2008). It is recommended that educational campaigns and outreach programs are held in to raise public awareness about the importance of this lake as a future Ramsar site. It is also important that regulations and controls are implemented on gravel mining, poor land use and development in this area.

References

- Ararat, K. Abdulhasan, N. Abdul Rahman, S. (2009) Key Biodiversity Areas Survey of Kurdistan, Northern Iraq: 2009 Site Review. Sulaimani: Nature Iraq. Publication No. NI-1209-03.
- Coad B. W. (2010). Freshwater Fishes of Iraq. PENSOFT Publishers, Sofia-Moscow. No. 93.
- Evans, M. (1994). Important Bird Areas of the Middle East. (Birdlife Conservation Series, No. 2). Cambridge, UK: BirdLife International.