

Information Sheet on Ramsar Wetlands

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties.

NOTE: It is important that you read the accompanying *Explanatory Note and Guidelines* document before completing this form.

1. Date this sheet was completed/updated:

October 12, 1998

FOR OFFICE USE ONLY.

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Designation date

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Site Reference Number

2. Country: Armenia

3. Name of wetland: Lake Sevan

4. Geographical coordinates: 40°24'N 045°17'E average ca. 2250 m a. s. l.

5. Altitude: min. 1897 m, max 3597 m

6. Area: 489,100 ha

7. Overview: (general summary, in two or three sentences, of the wetland's principal characteristics)

Lake Sevan is one of the largest freshwater high mountain lakes of Eurasia. The lake is of crucial importance for the country as a source for drinking and irrigation water, cheap electricity and fish, recreation and tourism development. Lake Sevan and its basin are famous by unique diversity of plants, endemic ichthyofauna, as an important resting and wintering area for waterfowl.

8. Wetland Type (please circle the applicable codes for wetland types as listed in Annex I of the *Explanatory Note and Guidelines* document.)

marine-coastal: A · B · C · D · E · F · G · H · I · J · K

inland: L · (M) · N · (O) · P · Q · R · Sp · Ss · (Tp) · (Ts)
· U · (Va) · Vt · W · Xf · Xp · Y · (Zg) · Zk

man-made: (1) · (2) · 3 · 4 · 5 · 6 · 7 · 8 · 9

Please now rank these wetland types by listing them from the most to the least dominant: O-M-Va-Tp-Ts-1-2-Zg

9. Ramsar Criteria: (please circle the applicable criteria, see point 12, next page.)

1a · 1b · 1c · 1d | 2a · 2b · 2c · 2d | 3a · 3b · 3c | 4a · 4b

Please specify the most significant criterion applicable to the site: 1c

10. Map of site included? Please tick **yes** -or- **no**

(Please refer to the *Explanatory Note and Guidelines* document for information regarding desirable map traits.)

11. Name and address of the compiler of this form:

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12. Justification of the criteria selected under point 9.

(1c) The lake is of crucial importance in the economy of the country and plays a great role in the natural functioning of own basin and River Razdan (Armenia) - River Arax (Armenia, Azerbaijan, Iran, Turkey) - River Kura (Azerbaijan, Georgia) - Caspian Sea (Azerbaijan, Iran, Kazakhstan, Russia, Turkmenistan) system.

(1d) Lake Sevan is the greatest inland water body of the Transcaucasus Region, the greatest freshwater lake in the Minor and East Asia and one of the greatest high mountain freshwater lakes in the world.

(2a) The lake and its basin supports at least 48 species of vertebrates and 48 species of plants included in the Red Data Book of Armenia, i. e. 48% of rare, vulnerable and endangered fauna and 12% of flora.

(2b) In the basin of the lake about 1600 species of vascular plants has been registered, i. e. 50% of Armenia's flora. The fauna of vertebrates consists of 6 species of fishes (21% of Armenian ichthyofauna), 4 species of amphibians (57% of Armenian batrachofauna), 18 species of reptiles (42% of Armenian herpetofauna), 210 species of birds (60% of Armenian ornithofauna), 38 species of mammals (45% of Armenian mammofauna).

(2d) Such kind of plants as *Isatis arnoldiana*, *Alyssum hajastanum*, *Acantolimon gabriljiana* have not been found elsewhere in the world except the basin of Lake Sevan. Of fish species the famous Ishkhan (*Salmo ischchan*) and Beghlu (*Barbus goktchaikus*) are endemic.

(3a) During the autumn migration the area supports from 10 to 30 thousands waterfowl.

(3b) It regularly supports during the seasonal migrations substantial numbers (until 20 thousands) of *Anatidae*.

(3c) The area regularly supports to more than the half of the total population of Armenian Gull (*Larus armenicus*).

(4a) Besides the endemic fish Ishkhan and Beghlu the lake and its tributaries support during the whole life cycle an endemic subspecies Sevan Koghak (*Varicorhinus capoeta sevangi*).

13. General location:

Lake Sevan is situated in the north-eastern part of Armenia in the Gegharkounik Region close to the border with Azerbaijan. Geographical coordinates of Lake Sevan are 40°08'N-40°49'N /044°58'E-45°42'E. The lake is 60 km far from the capital city Yerevan. It should be mentioned, that the boarder of Lake Sevan Ramsar Site coincides with the boarder of the basin of Lake Sevan and almost coincides with the boarder of Gegharkounik Region. Town Gavar, the capital of the region is situated in the Ramsar Site 6 km far from the shoreline.

14. Physical features:

Geology The site is young in geological scale and is of high seismic activity. The bed-rocks are formed from tufa (volcanic stone), clinker, porphyrite and limestone.

Geomorphology Mountain ridges up to 3597 m height are surrounding the Lake Sevan. On the northern part the watershed is close to the lake (2-3 km), the slopes are steep. On other parts the watershed is 30-40 km away and slopes more gently towards the lake. While it remained undisturbed, the lake located 1916.2 m above sea level, had a

maximum depth of 99 m, a surface area of 1416 km² and a total volume of 58.5 km³. At present (1998) the water-level has dropped on 19.5 m, the lake surface has shrunk to 1242 km² and the volume to 33.5 km³. Morphologically the lake consists of the deeper Minor Sevan (average depth 39 m, surface 328 km²) and the comparatively shallow Major Sevan (average depth 24 m, surface 914 km²).

The lake is of tectonic origin. The age of Major Sevan is about 1,000,000 years. The age of Minor Sevan is not more than 100,000 years. Under the natural conditions the lake was permanent with insignificant annual fluctuations of the water-level and had a surface area 450 ha with a volume of 5 million m³ and an average depth 1.6 m. A dam was built in 1946-1950 for irrigation purposes.

The natural soil is chernozem (black loam). In some parts the soils are sandy, clayey or peaty. Soil formation is in progress on the former lake bed.

Hydrology The catchment area covers 3649 km². Twenty eight rivers and streams flow in the Lake Sevan and one, Hrazdan River flows out. Since 1933 the outflow from the lake is artificially regulated. The hydrological balances for the different period of water management strategy are given in the *Table 1*. The use of the water for hydropower generation and agricultural purposes reached maximum level in 1953 (1751 million m³). In 1993 another maximum (1643 million m³) has been recorded during a sever energy crisis soon after the collapse of the USSR. Under the natural conditions the lake iced over every 15-20 years, but this has occurred almost every year since the 1970's. The ice-cover period is from the end of January to the beginning of April. The water temperature in July-August is over 18°C and up to 22-24°C in shallow parts.

Table 1.

Water balance of Lake Sevan in different periods, 10⁶ m³ year⁻¹

Years	Inflow	Precipitation	Arpa River	Summary income	Evaporation	Outflow	Summary outcome	Discrepancy	Water-level m a. s. l.
'27-32	811	542	0	1353	1136	126	1262	91	1915.89
'33-48	755	508	0	1263	1083	472	1555	-292	1912.64
'49-64	740	492	0	1232	1035	1354	2389	-1157	1899.16
'65-81	845	501	0	1355	1000	458	1458	-107	1897.26
'82-97	922	480	204	1606	1085	546	1631	-25	1896.70

The water is carbonate with total mineralization about 680 ml l⁻¹. Pollution peaked in 1985, and dropped to its lowest levels in 1995, when industrial enterprises had practically ceased to function and irrigated lands were down to minimum. The water quality at present generally seems to be of satisfactory quality, although the situation could easily changed.

The climate is cooler compared to other areas in Armenia. Mean temperatures range from -6°C in January to +16°C in July with average annual temperature +5°C. There are 240 days with annual daily temperature over zero, the duration of vegetation period is about 190 days. The duration of solar hours per year varied from 2600 to 2800 depending on location. Annual precipitation ranges from 340 to 720 mm of which 17% falls in the winter, 37% in the spring, 26% in the summer and 20% in the autumn. The weather is usually windy, average speed of the wind is more than 4 m sec⁻¹. Winds are stronger in winter (6 m sec⁻¹) and lower in spring and autumn (3 m sec⁻¹).

15. Hydrological values:

Lake Sevan is of great importance for groundwater recharge. During the recent 5 years the groundwater inflow is equal to 94.2 million m³ while outflow 14.4 million m³. It is shown the dependence of the level of the groundwater in Ararat Valley from Lake Sevan.

16. Ecological features:

The ridges surrounding Lake Sevan rising up to 1700 m above the level of the lake. Alpine meadows formed by undersized grass and heavily damaged by grazing are situated at the absolute altitudes from 2500-2800 m a. s. l. The rest part of the basin of the lake is high-mountain steppes with significant areas of arable land. In the north-eastern part of the basin are some relict oak forests.

17. Noteworthy flora:

The most characteristic herbaceous plants are *Campanula tridentata*, *Bromopsis variegatus*, *Festuca valeslata*. Arboreous plants are junipers *Juniperus spp.*). The dog rose (*Rosa canina*) is common everywhere.

On the former bed of the lake artificial forests of pine (*Pinus caucasica*), poplar (*Populus canadensis*, *P. simoni*), acacia (*Caragana brevespina*, *C. frutex*), willow (*Salix viminalis*) have been planted. The Sallow Thorn (*Hippopae ramnoides*) formes almost impenetrable thickets.

Vegetation in surrounding bogs and ponds is mainly made up from reeds (*Phragmites spp.*), sedges (*Carex spp.*) and duckweed (*Lemna spp.*).

The littoral zone of the lake is covered in moss (*Fontinali antipiretica*), *Chara spp.*, *Potamogeton spp.*, *Spirogira spp.*

Of endangered species the following should be mentioned in the first instance: *Astragalus goktschaikus*, *A. schuschaensis*, *Convolvulus calvertii*, *Dactylorhiza cataonica*, *Prangos arcis-romanae*.

18. Noteworthy fauna:

The fauna of vertebrates consists of 6 species of fishes (2 endemic, 2 in the Red Data Book of Armenia, 3 alien), 4 species of amphibians, 18 species of reptiles (2 in the Red Data Book of Armenia), 210 species of birds (36 in the Red Data Book of Armenia, 83 in the Agreement on the Conservation of African-Eurasian Migratory Waterbirds of the Bonn Convention on the Conservation of Migratory Species of Wild Animals), 38 species of mammals (8 in the Red Data Book of Armenia).

The endemic Ishchan nowadays is at the edge of extinction. The quantity of other endemic fishes, Beghlu and Sevan Koghak is declined. Almost 90% of fishery consists of invader white-fish (*Coregonus lavaretus*).

Amphibians are abundant everywhere where small ponds are available.

The diversity of herpetofauna is higher on the on the north-eastern part of the basin, and only grass-snakes (*Natrix tessellata* and *N. natrix*) are common everywhere.

Artificial water-level decrease influenced first of all on the quantity of breeding waterfowl. From approximately 60 breeders only about 25 are registering during the last years. Eurasian Coot (*Fulica atra*), Mallard (*Anas platyrhynchos*) and Armenian Gull (*Larus armenicus*) are common at present. The last surveys (1987-1989) showed their quantity 6,000, 5,000 and 16,000 respectively The lake is important passage for migratory birds, especially in from October until ice-cover. Such a rare birds as Great Egret (*Casmerodius albus*), Glossy Ibis (*Plegadis falcinellus*), Whopper Swan (*Cygnus*

cygnus), Demoiselle Crane *Grus vigro*) are registered here regularly during the migrations.

The most typical mammals in the basin are hare (*Lepus europaenus*), fox (*Vulpes vulpes*), wolf (*Canis lupus*), weasel *Mates foinea*), and most of the redents. The jackals (*Canis aureus*) are on the increase. Among the mammals which are ecologically depended on wetlands, the Water Vole (*Arvicola terrestris*) is common. The last record of European Otter (*Lutra lutra*) is going back to 1960's.

19. Social and cultural values:

The lake causes an interest of local inhabitants mostly because of fish resources. In the EPZ there is an interest in productive agriculture, especially cattle breeding. The industrial enterprises are declined.

Archaeological, historical and architectural relics from the early Stone Age until the late Middle Age (the cliff drawings of hunting scenes of 7,000 B. C., the ruins of citadel of 600 B. C., early Christian shrine and funerary steles of 4th century, the monastery of 9th century, etc.) are of especial importance for all Armenian living in the country and abroad.

Beautiful landscapes, cool water, fresh air and close location to the capital attract dozens thousands people every weekend during hot summer. There is an interest of local administration to develop tourism industry.

20. Land tenure/ownership of:

(a) site & (b) surrounding area

Of the land territory (25,800 ha) of the *Sevan National Park* (SNP) 3400 ha are reservations and the rest recreation and economic zones. The land, with a small exceptions is in a property of the SNP. Owners of external protective zone (EPZ) of the SNP which consists of 339,000 ha, are mostly private farmers. Some lands are government reserves, some others are property of the local administration.

21. Current land use:

(a) site & (b) surrounding area (ranked from the most to the least important)

In the territory of the SNP: recreation - fishery - tourism - cattle watering - arable.

In the territory of the EPZ: arable - industry - grazing - hay cutting - recreation.

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

(a) at the site & (b) around the site

High location of the Lake Sevan over the fertile but arid Ararat Valley attracted engineers to elaborate a projects of using the water of the lake for irrigation. The outflow has been increased artificially and the country obtained cheap water for irrigation and electricity. The negative aspects of the water-level drop were so strong that the initial plan the level of the lake on 50 m has been canceled. Nevertheless, the limits of acceptable change were already crossed.

The ecological relationship of Lake Sevan exist hydrology and trophic status and depends on human activity. The following human induced activities negatively affect the ecological status of the lake: sewage, agricultural and industrial pollution, soil erosion, illegal fishing, unauthorized logging, overgrazing.

Artificial lowering of the water-level by 19.5 m during the last 2/3 century and above mentioned driving forces had an effect on the ecosystem of the lake, from primary production to fish community as it is shown in *Table 2*. A project to increase the water-level of the lake at least on 6 m should be implemented in nearest future.

Table 2.

Changes in primary (PP), secondary, i. e. zooplankton and zoobenthos (SP) and fish (FP) production in Lake Sevan (average for decade in Joule m⁻²)

	1920's	1930's	1940's	1950's	1960's	1970's	1980's	1990's
PP	2400	2400	4100	4600	12700	19000	11600	18800
SP	620	690	620	520	740	1330	630	890
FP	34	43	43	45	46	53	81	60

In the EPZ the privatization process of the agricultural land is now complete.

The Office for the development of the Lake Sevan Environmental Action Program is working under the authority of the Ministry of Nature Protection and is financially supported by the World Bank. The main objectives of the program are:

- Development of Lake Sevan protection policy;
- Strengthening of institutional capacities within the country for sustainable use of the natural resources of Lake Sevan and its basin;
- Identification of priority environmental protection issues.

23. Conservation measures taken:

To maintain the natural resources of Lake Sevan, the *Sevan National Park* (SNP) has been established in 1978. The SNP is government institution protecting an area of 150,100 ha, of which 125,300 ha is water.

24. Conservation measures proposed but not yet implemented:

farther strengthening current conservation measures.

25. Current scientific research and facilities:

Lake Sevan is one of the well investigated large lakes of the world. The most important studies had been carried out in the field of hydrology, botany, hydrobiology, ornithology. Many aspects had a history of long term monitoring. The inventory of many systematic groups of animals and plants is already completed. There are still many issues to be studied, particularly the ways of the restoration of the waterfowl habitat, recreation management, fishery management, etc.

26. Current conservation education:

absent

27. Current recreation and tourism:

is declined because of blockade, shortage in important facilities and economy and energy crisis.

28. Jurisdiction:

Existing legislation, particularly environmental legislation of the Republic of Armenia, i. e., the Law on Protection and Use of Wild Life (1981), the Principles on Nature Protection Regulation (1991), the Low on Especially Protected Natural Areas (1991), the Land Code (1991), the Water Code (1992), the Forestry Code (1994), the Low on Environmental Impacts (1995), Regulation of the Sevan National Park (1996).

29. Management authority:

The territory of the SNP managed by SNP under the subordination of the Ministry of Nature Protection of Armenia.

The territory of the EPZ managed by the regional and local authorities.

30. **Bibliographical references:**

Agricultural Map of Armenian SSR, 1984. Moscow-Yerevan: 190 pp. [in Russian]

Adamian, M., 1985. The Birds of Armenia. Vol. 1, Yerevan: 232 pp. [in Armenian]

Adamian, M., 1988. The Birds of Armenia. Vol. 2, Yerevan: 192 pp. [in Armenian]

Adamian, M., & D. Richman, 1997. Pocket Guide to Birds of Armenia. N.-Y.: 265 pp.

Dahl, N., 1948. The Animals of Armenian SSR. Vol. 1, Yerevan: 416 pp. [in Russian]

Jenderedjian, K., 1997. Draft Management Plan for Sevan National Park.

WATC/RIZA: 26 pp.

Lake Sevan: Problems and Strategies for Action. Proceedings of the International Conference, 1998. Yerevan: 214 pp.

Red Data Book of Armenia. The Animals. 1987. Yerevan: 124 pp. [in Russian]

Red Data Book of Armenia. The Plants. 1989. Yerevan: 284 pp. [in Russian]

State of the Environment: Country Overview Armenia, 1998. The EU's TACIS Programme / Ministry of Nature Protection of Armenia: 44 pp.