

Information Sheet on Ramsar Wetlands (RIS)

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

1. Date this sheet was completed/ updated:

March 2002

2. Country: BULGARIA

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Designation date Site Reference Number

3. Name of wetland:

BELENE ISLANDS COMPLEX

4. Geographical coordinates: 43°40'06" / 25°10'54"

5. Elevation: 50 m

6. Area: 6,897.58 ha

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

A group of islands between km 560 and 576 of the River Danube, covered by seasonally flooded forest of *Alnus*, *Salix* and *Populus*. The western part of the Belene Island is a sandy clearing, covered by a plantation of *Populus*. Human activities include intensive forest management in the plantation. The islands support the largest nesting colonies of herons and cormorants in the country, being especially important for its large numbers of *Phalacrocorax pygmeus*, *Nycticorax nycticorax*, *Ardeola ralloides* and *Platalea leucorodia*.

8. Wetland Type (please circle the applicable codes for wetland types; in the present document, the "Ramsar Classification System for Wetland Type" is found on page 9)

marine-coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

inland: L • M • N • O • P • Q • R • Sp • Ss • Tp

Ts • U • Va • Vt • W • Xf • Xp • Y • Zg • Zk(b)

human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

Please now rank these wetland types by listing them from the most to the least dominant:

Xp-Tp-M-4-9

9. **Ramsar Criteria:** (Please circle the applicable Criteria; the *Criteria for Identifying Wetlands of International Importance* are reprinted beginning on page 11 of this document.)

1 • **2** • 3 • **4** • 5 • 6 • 7 • **8**

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

10. **Map of the site included?** YES

(Please refer to the *Explanatory Note 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, on previous page.**

Criterion 1 – Belene Island Complex is a particularly good representative example of a natural riverine wetland complex in the Danube Catchments area. It is also unique combination between flooded forests, marshes and river stream within complex of islands.

Criterion 2 -

The protected areas keep both the only wetlands in an island in Bulgaria and the largest flooded island forests along the Bulgarian part of the Danube River. The Belene islands complex is recognised by two international programmes as site of international importance for birds and habitats. The largest Bulgarian stand *Nymphaea alba* is located in Duloва Bara Marsh, and the largest area of *Nymphoides peltata* occurs in *Peschina Marsh*. The rare *Marsilea quadrifolia* grows there, and the *Leucojum aestivum* still rarely occurs in the eastern part of the island.

The ecological value of the wetland before the human impact of the island was determined by high biodiversity of species, variety of vegetation communities and habitats as well as an important ecological functions and processes. Because of the inundation of the area in spring, large numbers of fish go into the marshes for breeding. The same applies for birds. It is formerly one of the most important breeding places both in Bulgaria and in Europe for Pygmy Cormorant (*Phalacrocorax pygmeus*), Glossy Ibis (*Plegadis falcinellus*) and Squacco Heron (*Ardeola ralloides*). At present because of human impact and lack of food (fish) colonies of birds dependent on fish have disappeared. At present the complex still supports 5 species, included in the IUCN Red List – Ferruginous Duck (*Aythya nyroca*), White-tiled Eagle (*Haliaeetus albicilla*), Corncrake (*Crex crex*) (during the breeding season), Aquatic warbler (*Acrocephalus paludicola*) (during migration) and Pygmy cormorant (*Phalacrocorax pygmeus*) (at all stages of its life cycle). Those species, as well as

the Glossy Ibis (*Plegadis falcinellus*) and the Spoonbill (*Platalea leucorodia*) are listed in the annexes of Bern and Bonn Convention.

Another globally threatened species occurring there is *Hirudo medicinalis*.

Criterion 4 –

The Belene Island complex is still used as migratory stop over site for more than 20 species of birds and after restoration of the marshes it is expected that complex will restore its importance as wintering ground for waterfowl and as breeding site for heron/ibis/cormorant colonies.

Criterion 8 –

Before 70-thies the marshes on Belene Island were extremely important for fish as a nursery site. Shallow inundated areas were suitable for fish to grow. About 20 fish species were able to enter marshes and one of four of them are key-stone species as food for birds and peoples. The fish *Esox lucius* is a food for the Dalmatian pelican, the White-tiled Eagle and the Black Stork. Three other fish species are very important part of the diet of the Dalmatian Pelican and the Pygmy cormorant - *Scardinius erythrophthalmus*, *Ciprinus carpio* and *Carassius carassius*. After the restoration of the hydrological connection between marshes and Danube it is expected that this important role of the complex will be restored.

13. General location: (include the nearest large town and its administrative region)

A complex of three islands located between km 560 and 576 of the Danube River, opposite of the town of Belene and 18 km west from the town of Svistov.

14. Physical features: (e.g., geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth; water permanence; fluctuations in water level; tidal variations; catchment area; downstream area; climate)

➤ Origin – the islands have natural origin

➤ Geology & geomorphology (including soils)

The Belene islands have originated as a result of the simultaneously creative and destructive influence of the river stream. They evolve due to the sand and mud sedimentation in the parts where the stream is slower. Most often this occurs around stranded stumps, trees, sunk vessels, etc. Belene is the largest island group along the Bulgarian part of the Danube. At present it consist of two larger and 15 smaller islands. The Belene Island is the largest one not only in this group but along the whole Bulgarian course of the Danube. Most probably it has originated after separate smaller islands merged, evidenced by the several marshes existing here. As other Danube islands, Belene island has front (western) part, which is higher with maximum elevation 6 meters. The eastern part is characterised by low and flat areas with longitudinal depressions. The soils are sandy-clay rich in organic substances. The marsh beds are overlaid in mud.

➤ Hydrogeology & hydrology

During the period of spring high water level of Danube river lower parts of the island are flooded. The flooding usually starts in March and continues until June when the water level of Danube reaches its maximum. The duration of the inundation of the islands depends on the elevation of the land (see table 1). The area with elevation up to 2 meters above average river level are long term inundated.

Table 1. A duration of the inundation of the Danube islands in Svistov region (Tzanov, 1992)

Meteorological station	On kilometre of Danube	Average Danube level / sm.	Water level above the average Danube level / m.					
			0	+1	+2	+3	+4	+5
			Average duration of inundation (days)					
Svistov	554,3	357	179	117	61	24	6	0

There are three large marshes in the Belene Island - Peschina, Martvoto and Dulova bara. They drain into the river trough a canal. Through the same canal water from the river penetrate into the marshes during the period of high water levels and inundates surrounding meadows and woodlands. The water level of the marshes depends on Danube water level and underground waters as well. The depth of the marshes is between 1 and 2,5 m at high spring water levels. During the summer they gradually become shallow and often totally dry up. During the winter, in January and February marshes often freeze. In the beginning of seventies was built the “Iron Gate” Dam in Serbia, which influence on the downstream water level of Danube. In 1970 the island was separated from the Danube with an embankment. At the end of the canal was build a sluice, allowing regulation of the water level in the marshes. Small dikes were build between the marshes separated them one from another. In the beginning of 1980 a drainage system with 3 pumping stations was build and start to operate. The water level is maintained very low (0,5 - 0,6 m. depth in maximum) and the marshes dry up every year, usually in the middle of August. This has resulted in the fast overgrowing of the banks with rush, reed and willows, so that presently they cover more than 1/3 of the total area of the marshes.

➤ Climate

The climate in the Belene Islands Complex is temperate continental. The average monthly maximum temperature (August) is 36,8°C and the minimum temperature (January) is 14,7°C below zero. The average annual rainfall is 571.8 mm with February minimum and May or June maximum. The average monthly rainfall in June for the period 1896-1979 is 76,45 mm.

15. Hydrological value: (groundwater recharge, flood control, sediment trapping, shoreline stabilisation, etc.)

The most important functions of the complex are: waterfowl stopover site, water retention (in the past), fish nursery (in the past), supporting biodiversity. The wetland almost lost its ability to support biodiversity.

Before the embankment of the Belene island the marshes had a significant role for flood control, sediment trapping, as well as maintaining the normal biological cycle of Danube river and especially for supporting of plankton density and plankton exchange.

16. Ecological features: (main habitats and vegetation types)

The formation of plant communities is directly related to, and in most cases is determined by the water regime of the Danube River. The high spring waters do not allow the complete development of the spring vegetation, and this phase of the ontogenesis of the terrestrial vegetation here is significantly reduced. The withdrawing of the waters is actually coinciding with the high summer temperatures, and exuberant summer vegetation emerges on the island.

Alluvial forest and a large number of rare plants still occur there. Of a special value are the willow tree associations, preserved here in their whole diversity - from the initial to the climax stages of the succession. They do not exist in such composition on any of the islands of Danube. The *Salicetum albae rubosum* association is located in the eastern part of the island is considered the climax one, the dominant species in it being *Salix alba* and *Rubus caesius*. Smaller spots of it occur in other parts of the island. Probably they are remnant of a former vegetation cover. Certain patches of the climax associations occur on the Kitka and Milka Islands too. In most cases this association has been deteriorated or did not reach its climax stage and is represented by the following associations instead:

- *Salicetum euphorbio-rubosum*, with predominance of *Euforbia lucida* in the second stage, *Rubus caesius*; *Salicetum albae althoherbosum*, where the blackberries play an insignificant role and different high grasses dominate in the second stage;
- *Salicetum albae agrostidosum* the second stage of which is *Agrostis alba*.

Near the Peschina Marsh a relatively small *Salix alba* forest, without any second stage of *Salicetum albae nudum*, is located. An association of *Salicetum purpureae* is located along the northern bank of the Martvoto Marsh, and *Salicetum triandrae* bushes spread along the island's banks. Some smaller patches of the *Populetum albae rubosum* association - also considered a climax stage of the development of the island plant communities, have remained in the north-western part of the Belene Island. The grass communities are represented by several groups which often merge into each other. The more important of them are the following: *Cynodonetum dactylis*, covering the most elevated parts of the island; *Agrostidetum albae* and *Crypsidetum aculeate*, located in the lower parts and *Scirpetum michelinae* - in the lowest and permanently wet parts. The banks of the marshes are covered by *Phragmites australis*, *Alisma plantago*, *Sparagnum ramosum*, *Sagittaria sagittifolia*, *Butomus umbellatus*, etc.

Typical marsh communities have developed in the marshes: *Nuphar lutea* in the Martvoto Marsh, *Potamogeton natans* in the deeper ones and *Nymphaea peltata* and *Trapa natans* in the shallower marshes. A typical formation for the marshes here is the one of *Azola filiculoides*. The western part of the Belene Island is covered with agriculture lands, and the typical willow bushes with *Amorpha fruticosa* from the inside grow along the banks. Of a special value are the willow tree associations, preserved here in their whole diversity - from the initial to the climax stages of the succession. They do not exist in such composition of any of islands of Danube (Michev, 1993).

17. Noteworthy flora: (indicating, e.g., which species/communities are unique, rare, endangered, or biogeographically important, etc.).

More than 55 plants species occurs on Belene Islands Complex. A specific characteristic of the island trees and bushes vegetation is its poor species composition compared to that along the banks. Of the totally 55 species only 8 are common for the islands and the high riverside terraces, 18

species grow on the islands only. The plant species listed in Bulgarian Red Data Book are *Nymphaea alba*, *Nuphar lutea*, *Marsilea quadrifolia*, *Leucojum aestivum*, *Potamogeton natans*, *Nymphoides peltata*, *Trapa natans*. The largest Bulgarian stand *Nymphaea alba* is located in Dulova Bara Marsh, and the largest area of *Nymphoides peltata* occurs in Peschina Marsh. The rare *Marsilea quadrifolia* grows there, and the *Leucojum aestivum* still rarely occurs in the eastern part of the island (Michev, 1993).

18. Noteworthy fauna: (indicating, e.g., which species are unique, rare, endangered, abundant or biogeographically important; include count data, ect.).

Invertebrates - The hydrofauna is presented by *Hirudo medicinalis* (designated as globally threatened), *Coretus corneus*, etc. The insects are presented by *Lestes dryas*, *Sympetma fusca*, *Gomphus flavipes*, *Gomphus vulgatissimus*, etc. (Naidenov, 1978; Rusev, 1978).

Fish - Some 20 fish species enter the marshes on the island when the sluice of the canal is open - *Esox lucius*, *Scardinius erythrophthalmus*, *Tinca tinca*, *Abramis brama*, *Cyprinus carpio*, *Carassius carassius*, *Pungitius platygaster*, *Gasterosteus aculeatus*, etc. They use the shallow water as spawning and nursing area.

Amphibians and reptiles - The amphibians occurring here are *Triturus cristatus*, *Pelobates syriacus*, *Bufo viridis*, *Hyla arborea*, *Bombina variegata*. The dominant reptiles are *Emys orbicularis*, *Natrix natrix* and *Natrix tessellata*.

Birds - Until 1971 here were situated the largest colonies of Herons (*Ardea cinerea*, *A. purpurea*, *Egretta alba*, *Ardeola ralloides*, *Nycticorax nycticorax*), Cormorants (*Phalacrocorax carbo*, *Ph. pygmeus*), *Platalea leucorodia* and *Plegadis falcinellus*. Their numbers varied between 6000 and 9000 pairs (Ivanov, 1985). It was also an important breeding area for many ducks (*Anas platyrhynchos*, *A. strepera*, *A. querquedula*, *A. clypeata* and *A. nyroca*, *A. ferina*, *Netta rufina*) and *Anser anser*. The regular drying of the marshes and swamps in the last 30 years had a negative influence of the colonies; the number and the species composition of which are dramatically changed. About 10 years after building the embankment the number of the breeding birds in the colonies decreased to about 400 (Table 2.). In the end of the 1980s (10 years after building the drainage system) the colonies of herons, cormorants, ibises and spoonbills disappeared.

Bird species which used the area also as a source of food are Grebes, Cormorant and Pygmy Cormorant, Dalmatian Pelican, White-tailed Eagle, Herons, Black Storks on migration, Spoonbills, Ibises, Swans, Ducks and Waders.

At present 104 bird species occur on the Belene island. Twenty one of them are included in the Red Data Book of Bulgaria and 44 are species of European conservation concern (SPEC) according to "Birds in Europe: Their conservation status, 1994 - SPEC1 - 3 species, SPEC2 - 7, SPEC3 - 16, SPEC4 - 18. The area is important for *Haliaeetus albicilla* (the only breeding pair along the Bulgarian stretch of the Danube) and *Phalacrocorax pygmeus*. In small numbers here are still breeding *Aythya nyroca* (8-10 pairs) and *Crex crex*. The population of *Podiceps griseigena* here is the largest in the country. *Chlidonias hybrida* and *Podiceps nigricollis* nest on the *Trapa natans* and *Nymphoides peltata* cover. The Belene island is of local importance during the migration for Black

Stork *Ciconia nigra*, ducks and geese and of international importance for the wintering of *Anas platyrhynchos* and *Anser anser* (Ivanov, 1979; Koceva, Petkov, Yankov, 1997).

Table 2. Dynamic of population of the indicator birds species occurred in Belene island last 30 years (Ivanov, 1985)

Species	1968	1969	1970	1971	1977	1979	1983	After 1990
<i>A. cinerea</i>	-	-	-	2	3	-	4	-
<i>A. purpurea</i>	4	8	-	70	15	20	1	-
<i>A. ralloides</i>	5197	4917	380	2770	150	+	58	-
<i>E. garzetta</i>	730	2048	391	956	85	+	60	-
<i>N. nycticorax</i>	215	1190	514	1412	128	+	82	-
<i>P. carbo</i>	-	-	138	60	-	-	125	-
<i>P. pygmeus</i>	11	1	-	-	-	40	19	-
<i>P. leucorodia</i>	38	22	-	61	-	-	-	-
<i>P. falcinellus</i>	558	695	-	695	-	60	-	-
Colonies – total	6753	8917	1423	6027	382	1200	349	-

Mammals

The mammals occurring here are *Capreolus capreolus*, *Mustella nivalis*, *Putorius putorius*, *Felis sylvestris*, *Vulpes vulpes*, *Arvicolla terrestris*, etc. Relatively new inhabitants of the island are *Sus scrofa* and *Canis aureus*.

19. Social and cultural value: (e.g. fisheries production, forestry, religious importance, archeological site, etc.) Until 1947 the area was used by local people for cattle grazing, fishery, and forestry (very restrict). The cattle grazing was possible only during the dry period of the year. Since 1948 the island has been used as a state prison. Due to the human impact the area lost its socio-economic value and a significant part of its ecological value. At present we can see the loss of economically valuable natural resources. In 1989 the total fish yield from the Danube amounted to 360 tonnes only, three times less than the fish caught in the forties and fifties. The reason for this is the destruction of the shallow waters and marshy areas, where the fish bred, including marshes on Belene island. The disappearance of the habitats of the *Leucojum aestivum* is causing losses running into thousands of dollars from the inability to produce medicine Nivalin, which was discovered in Bulgaria and which is known world-wide. No special investigation on fishery production of the island and use of *Leucojum aestivum* has been done. At present the plantation and timber activity on the island provides only 6% of the timber production along the Danube, including islands, but this activity has a high negative impact on the ecosystem.

20. Land tenure /ownership of: (a) site (b) surrounding area

(a) site – state property

(b) surrounding area – state, municipality, private property

21. Current land use: (a) site (b) surroundings/catchment**(a) site**

The western part of the island is still used as a prison. The prisoners can walk around and are doing jobs in agriculture and handicrafting. The western part of the island is used for agriculture by the prison administration. The meadows in the buffer zone and the Natural Monument are used by Prison administration as pastures for sheep and cows. A part of it is being planted with hybridised poplar. Reaching the mature stage they are cut and re-planted afterwards. Arable lands and poplar plantations are located in the vicinity of the site. Intensive cattle- and sheep grazing (estimated 400 cows and 700 sheep in 1992) and silviculture (2.000 m³ per year) in buffer zone and the Natural monument areas can be a problem for conservation issues. Actually even poplar forests on the island are used for grazing. No land use is allowed in the Strict Reserve except fishery and harvesting of reed.

(a) surroundings/catchment

The River Danube is used for shipping and fishery. It is state border area with Romania. The land along the Danube is used for agriculture.

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**

- Artificial drain of marshes and alluvial forests-
No water come unto marshes and fish can not go in and lost their spawning grounds and habitat. Lack of fish food causes extinction of bird colonies and the area is not feeding place for Dalmatian Pelican and White-tiled Eagle. The breeding areas become accessible for predators. Typical water plants are threatened of extinction (speed of succession is very high). Fishery is not possible in the marshes any more because of lack of fish. Fishery in the Danube become limited.
Leucojum aestivum lost its habitat, which has negative economical effect as well.
The vegetation associations adapted to the higher soil moisture are threatened of extinction
- Cutting of alluvial forests and turning into poplar plantations (unsustainable forest management) - Progressive deterioration of the vegetation association; the association of *Populetum albae rubosum* is totally destroyed; Birds lost their breeding ground and their nests become accessible for predators.
- The abundant population of the wild boar facilitates deterioration processes by digging in the meadows, forests and in the dried up marshes
- Disturbance to nesting birds caused by people visiting the island during the breeding season. There is some illegal cutting of trees in the reserve.

(b) around the site / catchment area

- After building of "Iron Gate" Dam and embankment of the Danube river banks the quantity of the zooplankton of the river has decreased. The correlation between different taxa and dominant species was changed as well. The quantity of crustacean species has increased. The effect of all

these changes on the ecosystem is not inventoried. After embankment of the Belene island, exchange of zooplankton between river and marshes was not possible any more.

23. Conservation measures taken: (national category and legal status of protected areas – including any boundary changes which have been made; management practices; whether an officially approved management plan exists and whether it has been implemented)

“Belenski Marshes” Reserve and the Natural Monument “Persina - East” are managed by the administration of the prison, while the “Kitka Island” Reserve is managed by the local Forestry Department of the Ministry of Agriculture. The protected areas are under control of the Ministry of Environment and Water. No any special management of the Belene Island Complex from conservation point of view. After the designation as protected area in 1980 a prescription of the Ministry of Environment and Water were made to the prison administration for flooding the marshes every year. This prescription didn’t consist any concrete recommendations as adequate water level and duration of inundation of the area. Unfortunately the prescription is not regularly followed, and when it is, the extend is not adequate. In 1993 the Belene Island Complex was included in the National Action Plan for the Conservation of the Most Important Wetlands in Bulgaria. This document as some other documents since 1990 recommend restoration of the wetland, but the acceptable ecological changes are not mentioned. There are different proposals: to remove the embankment and to separate western and eastern part of the island; to remove only the dikes between the marshes and to control the water level by the sluice. All these proposals are not supported by figures and prediction of the future changes.

In 2000 “Belenski Marshes” Reserve was categorised as Managed reserve and whole the area was included in the “Persina” Nature Park

Restoration of the marshes in Belene Island has started in 2001 as a part of big project on reduction of sediments and pollution along Bulgarian part of Danube. The project is funded by the World Bank and Bulgarian Government.

24. Conservation measured proposed but not yet implemented: (e.g. management plan in preparation; officially proposed as a protected area, etc.):

- Restoration of the marshes in Belene Island
- Development of Management Plan for the “Persina” Nature Park, of which the Belene Complex is a part.

25. Current scientific research and facilities: (e.g., details of current projects; existence of field station, etc.)

The access to the Belene Island is difficult because of the restrictive regime of the prison. The bird fauna and plant communities in the area are well studied. Other issues are soils, hydrology, invertebrates and microfauna, as well as the relationships and the processes in the ecosystem as a whole are not studied. Nevertheless the ecosystem is of great scientific interest because of different processes and relationships could be studied.

26. Current conservation education (e.g. visitors center, hides, info booklet, facilities for school visits, etc.

Very limited because of the restrictive regime of the prison. The area was included in the special brochure produced and in the slide show by the Bulgarian Society for the Protection of Birds about Important Bird Areas along the Danube. They are spreaded in the main Bulgarian towns along the river.

27. Current recreation and tourism: (state if wetland is used for recreation/ tourism; indicate type and frequency / intensity)

No

28. Jurisdiction: (territorial, e.g. state/region, and functional, e.g. Dept of Agriculture/Dept. of Environment, etc.)
The Belene Island is under the responsibility of the administration of the prison, which is situated in the west part of the Island, the local department of Forestry Committee and under the control of the Ministry of Environment and Water.

29. Management authority: (name and address of local body directly responsible for managing the wetland)
Directorate of the Nature Park "Persina", under National Forestry Department, Direktor - Mr. Atanas Popov / **DPP "Persina", ul. Georgi Benkovski N: 1, grad Belene - 5930, Bulgaria**

30. Bibliographical references: (scientific/ technical only)

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