ECOSYSTEM SERVICES OF THE WETLANDS IN THE MUNICIPALITY OF SHABLA

PESFOR – Forest for Water (Action CA15206)

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Shabla Municipality

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WETLANDS

- Territories where the water covers the soil or is present in its surface layer, all year round or seasonally.
- ✓ Water is the main determinant of the ecological conditions of ecosystems and their bio-syntheses formed by plants, animals, fungi and microorganisms.
- ✓ Types of wetlands: natural or artificial, permanent or temporary, static or flowing, sweet, brackish or salted, including seawater.

WETLANDS

- Natural wetlands are one of our most valuable natural resources.
- They are one of Earth's most productive ecosystems.
- They preserve irreplaceable habitats of rare animal and plant species.
- They play an extremely important role in the water cycle by rebuilding water supplies and nurturing groundwater.
- Particularly valuable is their ability to purify the waters passing through them. It is not by accident that many purifying stations imitate natural marshes are being built in many places around the world.

WETLANDS

* Wetlands are extremely vulnerable ecosystems - highly sensitive to pollution, changes in water currents and others.
* In the 20th century in Bulgaria and in the world many of them were drained or strongly altered.
* Today, these ecosystems account for only 0.1% of the territory of Bulgaria and are among the most priority conservation sites.
* Many of the organisms that rely on their survival mainly in wetlands are rare or threatened with extinction.

WETLANDS

- They also play a very important role in preventing floods by taking and retaining much of the surface water.
- They contain large amounts of carbon, making them extremely important for preventing climate change.
- They are important for the life of the local population as a water source, fishing ground, herb gathering, logging, etc.
- They offer good conditions for the development of different types of tourism.

PROTECTION

- The Ramsar Convention (Convention on Wetlands of International Importance and, in particular, as a Waterbird Habitats) - the only international agreement that concerns the conservation of these extremely valuable ecosystems - wetlands.
- The Ramsar Convention was signed on 2 February 1971 in the Ramsar town of Iran.
- The Convention is currently ratified by 158 countries, including Bulgaria.
- It comprises 1721 areas, or about 160 million hectares (1 600 000 km^2).

PROTECTION

* The Wetlands Convention aims at the conservation, rational use of wetlands and the cessation of encroachment upon them and their flora and fauna, especially waterfowl.
* It takes into account the fundamental environmental functions of wetlands as regulators of water regimes, important habitats and as resources of great economic, cultural, scientific and recreational value.
* Announcing the Ramsar site does not impose any specific restrictions on the exploitation of wetlands, on the contrary supports fishing and the use of all other resources - cane, mud, game, salt, etc., but within a reasonable range, ensuring their long-term and sustainable use in the future.

RAMSARIAN PLACES IN BULGARIA

10 Ramsar sites with a total area of 20,306 ha

- Belene Islands Complex - listed in 2002, 6 898 ha;
- Ibiza Island - listed in 2002, 372 ha;
- Lake Srebarna - in the list of 1975, 1 357 ha;
- Durankulak lake - in the list of 1984, 350 ha;
- Shabla Lake - listed in 1996, 404 ha;
- Complex Pomorie - listed in 2002, 814 ha;
- Atanasovsko lake - in the list of 1984, 1 404 ha;
- Vaya Lake - listed in 2002, 2899.9 ha;
- Poda - in the 2002 list, 307 ha;
- Ropotamo Complex - listed in 1975, 5 500 ha.

WETLANDS IN SHABLA MUNICIPALITY

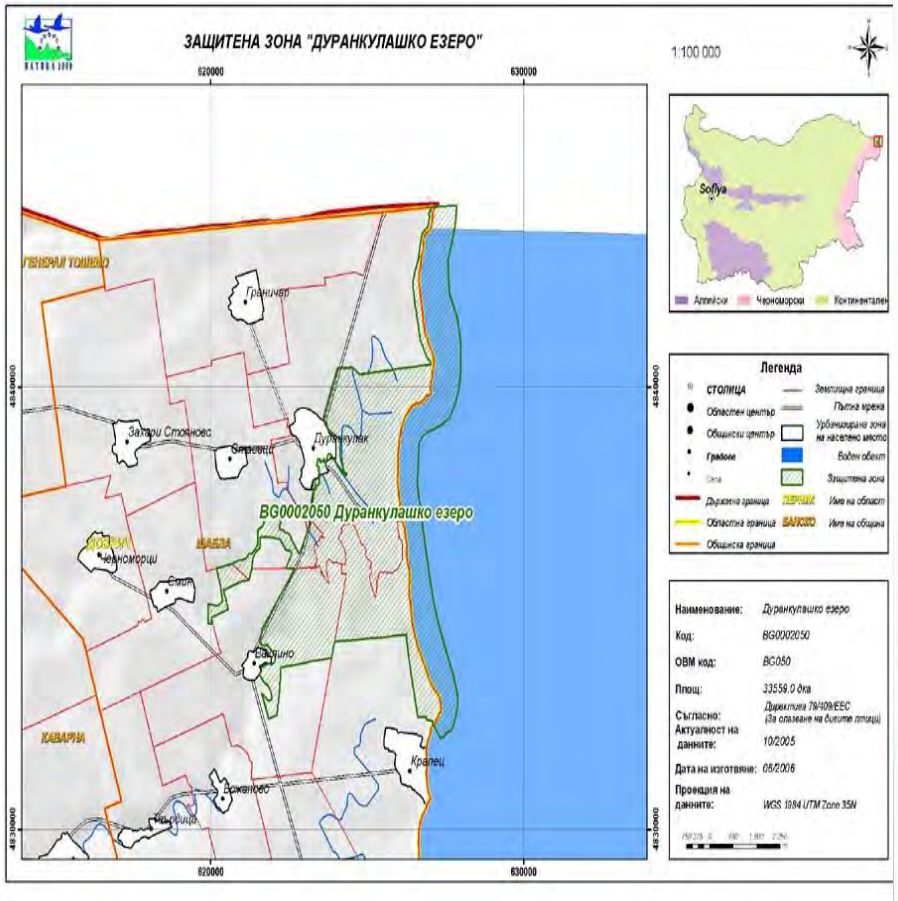
* Durankulak Lake
* Shabla lake
* Shabla Tuzla

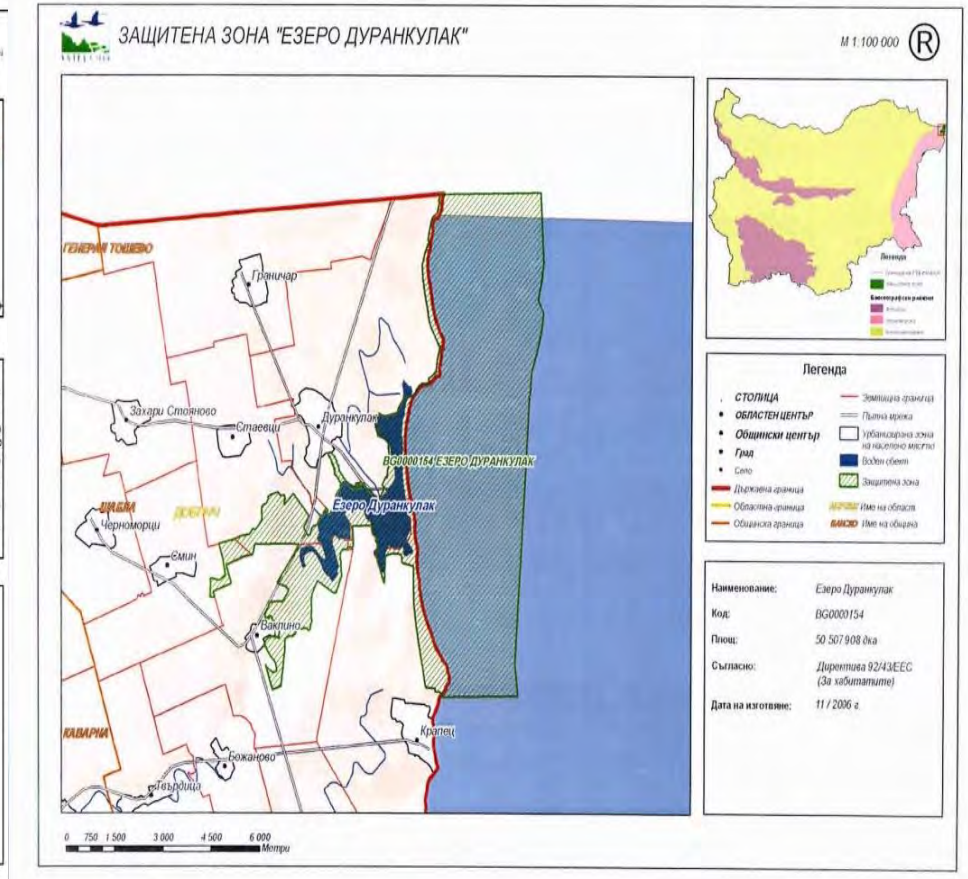
DURANKULAK LAKE

* Protected area "Durankulak Lake" / 4465.4 dka / is located in the northeastern part of Bulgaria, about 6 km from the Bulgarian-Romanian border and 15 km north of the town of Shabla.
* It was announced by Order No. 123 / 21.02.1980 of the Committee for the Protection of the Natural Environment.
* The management plan developed, approved by the MoEW in 2002.
* The lake is included in the list of the **Ramsar Convention** as a habitat for waterfowl of international importance.
* The entire territory is included in the **List of BirdLife International - Important Bird Areas in Europe, under the name** "Durankulak Lake".
* The site is part of the **Corine site according to the European program CORINE Biotopes with code F00008800**.
* The Protected Site, together with adjacent agricultural lands and marine aquatory, is the subject of the **European Ecological Network NATURA 2000** under the name "Durankulak Lake" (Directive 79/409 / EEC on the **conservation of wild birds**) and Durankulak Lake (under Directive 92/43 / EEC on the **conservation of Natural Habitats and Wild Fauna and Flora**).

DURANKULAK LAKE

PROTECTED ZONES NATURA 2000





DURANKULAK LAKE

- Durankulak Lake is a shallow, indoor liman, occupying the sloping low parts of deep drylands. It was formed about 10,000 years ago when a period of epherogenic decline and invasion of seawater in the river valleys occurred.
- As a result, bays are cut off later by the sea through sandy hair and turned into a lake.
- In the pruning parts of the drought, there have been formed rays of the lake in the dry land.
- In the southwestern part of the lake there are two islands - "Big hell" at an altitude of 12.4 m and "Little hell" at an altitude of 4.3 m. They are positive paleoelephic forms that have preserved the **remains of the oldest necropolis on our lands**.

DURANKULAK LAKE

- Durankulak Lake is one of the most significant and best preserved coastal wetlands in Bulgaria.
- It is of international importance for the conservation of more than **260 species** of endemic, rare and endangered plants and animals.
- It is a representative model of the natural coastal lakes of the linen type on the Western Black Sea coast.
- There are **244 bird species** in Durankulak Lake and its adjacent territories, of which:
- 67 are included in the Red Book of Bulgaria
- 23 are of European environmental concern.

DURANKULAK LAKE

- Durankulak Lake is a place of global importance for water birds during the winter.

Large geese aggregations are observed: the white-fronted goose, the red-breasted goose (almost the entire world population resides in the Durankulak and Shabla Lakes in January and February), a small white-fronted goose.

The lake is one of the places in the country with large aggregations of mallard duck in the winter.

DURANKULAK LAKE

* The lake is one of the five most important places in the country for the nesting of **Little bittern (*Ixobrychus minutus*), Kentish plover (*Charadrius alexandrinus*) and Lesser gray shrike (*Lanius minor*)**.

Even in smaller quantities, the world's endangered **Ferruginous duck (*Aythya nyroca*)**, as well as some other rare and endangered bird species such as **Eurasian bittern (*Botaurus stellaris*)** and **Common pratincole (*Glareola pratincola*)** breed in the lake.

Since the lake is located on the Via Pontica migration route and near the Danube Delta, it is one of the most important stations for bird migration on the Bulgarian Black Sea coast.

Particularly numerous are Ciconiiformes, Anseriformes and Charadriiformes birds.

It is used as a resting place during the flight from **Rosy pelican (*Pelecanus onocrotalus*), Pygmy cormorant (*Phalacrocorax pygmeus*)** and single species of **Greater spotted eagle (*Clanga clanga*).**

In smaller quantities, both in winter and during migration are marked **White-headed duck (*Oxyura leucocephala*)** and **Dalmatian pelican (*Pelecanus crispus*)**.

DURANKULAK LAKE

The lake is inhabited by 17 species of fish,

4 of which are globally threatened species, included in the Red Book of Bulgaria - **Caucasian dwarf goby (*Knipowitschia caucasica*), Three-spined stickleback (*Gasterosteus aculeatus*)** and others.

Durankulak Lake is the only modern field of **European carp (Cyprinus carpio)** in Bulgaria, scientifically proven.

Other representatives of fauna included in the Red Book are the **Syrian spadefoot (Pelobates syriacus)** and **Eurasian otter (Lutra lutra).**

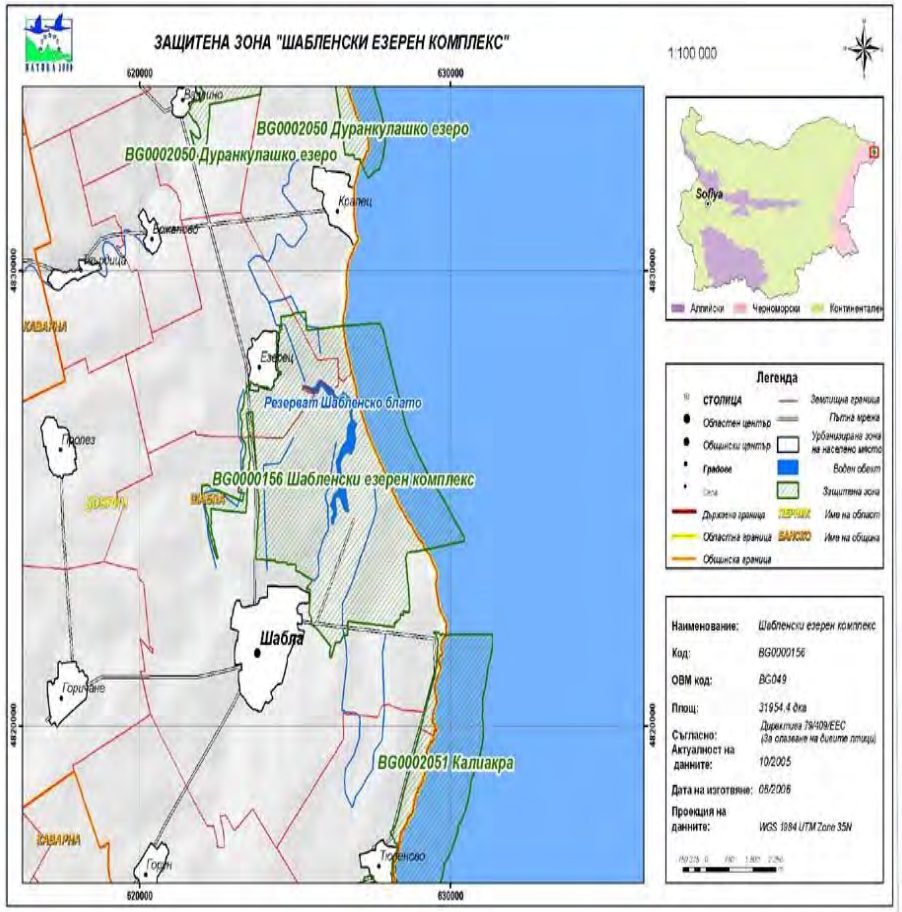
On the territory of the lake there are rare and endangered plants such as **Convolvulus persicus L., Linum tauricum ssp. bulgaricum, Goniolimon besseranum, Limonium latifolium and Limonium gmelinii.**

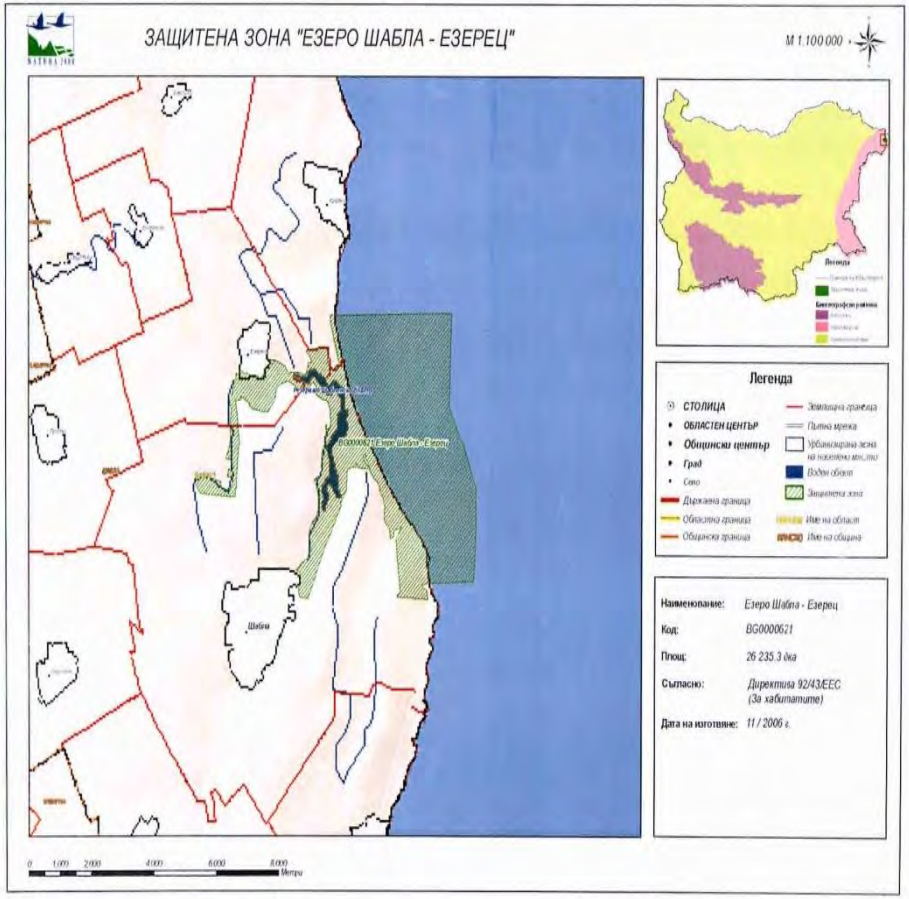
SHABLA LAKE

* Protected area Shablensko ezero (5,312.4 dka) is located in the northeastern part of Bulgaria, about 18 km from the Bulgarian-Romanian border and 3-5 km north-east of the town of Shabla.
* Declared by Order No. DS-31 / 24.01.1995 of the Ministry of Environment and Waters.
* It has a management plan developed,which was approved by the MOEW in 2004.
* A part of the PA without the cultivated land, with an area of 4037.4 dka is of international importance under the name "Shabla Lake".
* The whole territory is included in the **List of BirdLife International - Important Bird Areas** in Europe, under the name "Shabla Lake Complex".
* The site is part of the **Corine site according to the European program CORINE Biotopes with code F00008700**.
* The Protected Site together with adjacent agricultural lands, Shablenska Tuzla lake and marine aquatic environment is the subject of the **European ecological network Natura 2000** under the name "Shabla Lake Complex" (under Directive 79/409 / EEC for the protection of wild birds) and "Shabla Lake - Ezeretz "(under Directive 92/43 / EEC on the Conservation of Natural Habitats and Wild Fauna and Flora).

SHABLA LAKE

PROTECTED ZONES NATURA 2000





SHABLA LAKE

Shabla Lake is a wetland area including two coastal limestone - Shabla lake and Lake Ezerets, connected by a canal adjacent to sand dunes, grasslands, forest and shrub ecosystems and arable land.

They are enclosed limans occupying the sloping low parts of deep dry weather.

In practice, the lakes are a single unit, connected to each other by a shallow plume that is constantly flooded.

The shore is densely overgrown with reed massifs, through which a canal has been drilled (250 m long, 4-5 m wide and 1.5 m deep).

SHABLA LAKE

Shabla Lake is one of the most important wetlands in Bulgaria.

It is a representative model of the natural coastal lakes of the linen type on the Western Black Sea coast.

There are **247 bird species** on the territory of the Shabla Lake Complex, of which **69** are included in the Red Book of Bulgaria, 1985.

Of the birds present, 137 are species of European conservation importance.

SHABLA LAKE

- The lake is of strategic importance for the **Red-breasted goose (*Branta ruficollis*)** in the winter. Together with the Durankulak Lake, it accepts almost all of its world population.
- There is also a large concentration of **Greater white-fronted goose (*Anser albifrons*)** and single species of **Lesser white-fronted goose (*Anser erythropus*)**. The lake is one of the most important winter houses of these species of geese in the world.
- The lake is one of the places in the country with large aggregations of **Whooper swan (*Cygnus cygnus*)** and **mallard duck (*Anas platyrhynchos*)** in the winter.

SHABLA LAKE

* Two world-threatened species nest in the complex - the **Ferruginous duck (*Aythya nyroca*)** и **corn crake (*Crex crex*).**
* A number of other rare and endangered birds such as the **Kentish plover (*Charadrius alexandrinus*)** and lesser **Grey shrike (*Lanius minor*)** nest here.
* The lake complex is an important migratory station for the Ciconiiformes, Anseriformes and Charadriiformes birds.
* In the autumn-winter season there are a number of world-threatened species such as the **Dalmatian pelican (*Pelecanus crispus*), Pygmy cormorant (Microcarbo pygmeus), ferruginous duck (Aythya nyroca), Stiff-tailed *duck(Oxyura leucocephala)*** *and* **Greater spotted eagle (*Clanga clanga*).**

SHABLA LAKE

* There are **23 species of fish** in Shabla Lake, 7 of which are included in the Red Book of Bulgaria. Here is the only **Longtail dwarf goby (*Knipowitschia longecaudata*)** locality.
* Other rare and threatened representatives of the fauna - **Syrian spadefoot (*Pelobates syriacus*)** and **European otter (*Lutra lutra*)** - have been identified.
* There are about 10 species of rare and endangered plants listed in the Red Book of Bulgaria such as ***Hippuris vulgaris*, the Small Absinthe (*Artemisia pontica*)** and others.
* In places around the reed, there are small groups of **European white water lily (*Nymphaea alba*)** and **Yellow water rose (*Nymphaea lutea*).**

SHABLA DUZEL

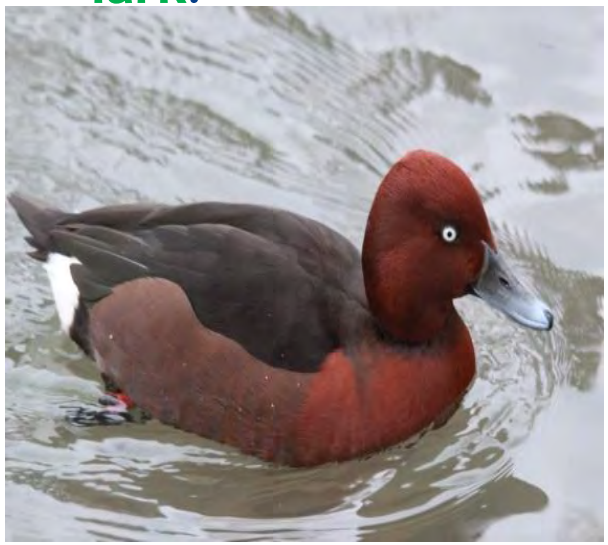
- Natural brackish lagoon with open water area 24.4 ha.
- The water basin is separated from the sea by a width of about 80 m of sandy hair, and here are the highest dunes on the northern Bulgarian Black Sea coast.
- It is a salt lake, formed mainly by the seepage of salt water under the sand dunes.
- Its average depth is 0.6 m, its average salinity is 0.004 millimeters.

SHABLA DUZEL

- Shabla Tuzla is an extremely important site in nature conservation.
- The wetland is part of the Shabla Lake Complex included in the BirdLife International - BirdLife International – Corine site according to the European CORINE Biotopes program with code F00008700.
- The Shabla Tuzla Lake together with the Shabla Lake Protected Site, the adjacent agricultural lands and the marine aquatory is a subject of the European Ecological Network NATURA 2000 under the name "Shabla Lake Complex" / under Directive 79/409 / EEC on the conservation of wild birds / and "Lake Shabla - Ezerets" / under Directive 92/43 / EEC on the Conservation of Natural Habitats and Wild Flora fauna /.

SHABLA DUZEL

* Located on one of the two main waterways in Europe, the tuzla and its adjacent territories give shelter to 198 species of birds (about 50% of Bulgaria's ornithofauna), marked during all seasons.
* As nesting, 41 species were found.
* The most important are the **Ferruginous duck, common pochard duck, Common shelduck, Black-winged stilt, Pied avocet, Kentish plover, Red-footed falcon, Paddyfield warbler, European calandra-lark.**



SHABLA DUZEL

* One of the most important water reservoirs on the northern Bulgarian Black Sea coast, where large flocks of birds stop for resting during their migration - a total of 28 Charadriiformes species, forming aggregations of hundreds of individuals.
* 16 species of gulls and terns migrate across the territory of the tuzla, sometimes reaching several thousand specimens.
* 7 species of herons use the pool for rest.
* The migration channels of 27 species of songbirds pass annually across the site.
* Representatives of globally threatened Pygmy cormorant can also be seen in the complex.
* For Anseriforme birds, Shabla tuzla is of major importance both during the migratory period and during the winter.
* From 25 floating birds, especially important are 3 species - white-headed ducks, Ferruginous duck and Red-breasted goose being.
* For Ferruginous duck, Tuzla is the water reservoir with the highest birds aggregation on the northern Black Sea coast during the migrations.

SHABLA DUZEL

Except for birds, this small wetland area also has a prominent role in preserving other valuable representatives of fauna: *Syrian spadefoot* and the *Eurasian otter*. The conservation significance of the site is complemented by some specific plant communities and 13 species of rare and endangered plants included in the Red Book of Bulgaria – Cladium mariscus, Peucedanum obtusifolium etc.

SHABLA DUZEL

The water balance of Shabla Salt Lake includes both marine and fresh underground waters of Sarmatian limestone, whose level here comes to the surface.

For thousands of years, aquatic flora and fauna have contributed to the formation of curative mud with unique qualities.

The great erosion susceptibility of the west bank provides the mud side with the necessary quantities of fine-grained clay material.

The mud reserves amount to about 200,000 t.

SHABLA DUZEL

The Shabla Tuzla mud acts favorably on diseases of the locomotor system, gynecological, skin, neurological, cardiovascular, gastrointestinal, liver-biliary, metabolic-endocrine, kidney-urological diseases, chronic heavy metal intoxications, inflammatory-degenerative gingival processes, respiratory organs, digestive tract, metabolism, chronic bronchitis, post-stroke, myocardial infarction, etc.

BENEFITS / SERVICES FROM WETLANDS

When ecosystems function well, they bring many benefits to humans - so-called ecosystem services. In general, they are divided into the following types:

- Provisional - products derived from ecosystems: food, water, wood, essential oils, genetic resources, and more.
- Regulatory (benefits of regulatory processes in ecosystems): air, water and soil purification, climate regulation, erosion, diseases and pests, reduction of damage from natural disasters, etc.
- Cultural (intangible benefits of ecosystems): Educational and aesthetic value, sense of belonging, recreation, etc.
- Supporting (services required to provide all other ecosystem services): soil formation, photosynthesis, circularity of substances, etc.

Why is it necessary to map and evaluate ecosystems and their services?

- Ecosystems provide services that are essential for the development of human society and its economic activity.
- Ecosystems provide a wide range of less tangible services such as pollination, erosion protection, waste disposal, carbon capture and even aesthetic, cultural and scientific interactions.
- These services are not fully accounted for in national accounting and statistics, and they are often underestimated in traditional economic activity.
- This leads to management decisions and social choices that promote unsustainable use of ecosystems and cause their degradation.
- Changes in land use, urbanization, industrialization, excessive exploitation of natural resources, population growth and other factors have led to over-exploitation and depletion of resources.
- These trends are exacerbated by the vague definition of ownership and the lack of markets for ecosystem services.

Why is it necessary to map and evaluate ecosystems and their services?

- Estimation of ecosystem services is an innovative way to address the environmental problems encountered and complements the existing range of instruments used to protect nature.
- Estimation and mapping of ecosystems and ecosystem services can inform decision-making in a number of related policies, such as water and agriculture, spatial planning, cohesion policy, development planning and maintenance of green infrastructure, etc.
- Spatial mapping and evaluation is necessary to show to what extent and where these processes are taking place.

Provisional Ecosystem Services of Wetlands

* Water use;
* Amateur fishing;
* Economic fishing;
* Agriculture;
* Livestock breeding;
* Hunting;
* Forestry;
* Cane yield;
* Healing mud.

Regulatory Ecosystem Services of Wetlands

* Restore water supplies and nourish groundwater;
* Purify the waters passing through them;
* They take up and retain much of the surface water, protect against flooding;
* They store large amounts of carbon, which makes them extremely important for preventing climate change;
* Habitats of rare plant and animal species;
* Winter place of many protected bird species;
* Key areas for resting during migration and migration of birds.

Non-provisional Ecosystem Services of Wetlands

* Educational activities;
* Ecological tourism - photographic, ornithological, botanical, etc .;
* Cultural Tourism;
* Health tourism;
* Recreation;
* Aesthetic value;
* Inspiration.

Supporting Ecosystem Services of Wetlands

* Primary productivity;
* Carbon capture;
* Generation of oxygen;
* Soil formation;
* Biogeochemical cycles;
* Water circle.

Supporting Wetlands Management

Adjustment of water exchange and maintenance of the water balance of wetlands by underwater reed mowing, discharge of lake water into the sea, mud extraction.

* In 2017, with a grant from Enterprise for Environmental Protection Activities, totaling BGN 377,000, Shabla Municipality purchased a multifunctional self-propelled cane mower.
* The management plans envisage the construction of hydro-technical facilities for the discharge of the waters from the Shabla and the Durankulak lake into the sea, for the realization of which funding is sought.
* Organized abstraction of medical mud from Shabla Tuzla is not currently done.

Supporting Wetlands Management

- **Growing appropriate fish species in accordance with the Management Plans.**
- In 2018, the Municipality of Shabla together with the Executive Agency for Fisheries and Aquaculture carried out fishing for the two lakes as follows: Durankulak Lake - 100 000 wild carp, 100 000 pcs. celtolab and 100 000 pcs. white amur; Shabla lake - 33 000 pcs. wild carp, 33 000 pcs. celtolab and 33 000 pcs. white amour.
- Financial support to farmers for the maintenance of habitats of wintering geese - Rural Development Program 2014-2020, measure 10 "Agroecology and Climate"
- Monitoring –hydrogeological, hydro biological, ornithological, monitoring of flora and vegetation;
- Establishment and maintenance of appropriate ecotourism infrastructure - tagging eco-trails, placing information boards, sheds, benches and waste bins.

Conclusions

* Ecosystem services from wetlands make a significant contribution to people's quality of life;
* Indirect benefits are times greater than the direct material benefits of ecosystems;
* All types of natural capital value should be included in the calculation of the benefits and losses of investment projects;
* The value of ecosystem services will increase in the future, mainly due to the loss of ecosystems and biodiversity.

THANK YOU FOR YOUR ATTENTION!