

ENVIRONMENTAL PROTECTION

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CURRENT SITUATION IN ASKANIA-NOVA AND BLACK SEA BIOSPHERE RESERVES

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The following information includes general data about both Askania-Nova and Black Sea biosphere reserves. It describes general climatic, ecological, geological and other conditions of reserves development. The main part is devoted to information about environmental problems of the reserves, including consideration of Black Sea environmental state. Also some political and geographical problems are represented in the presentation.

Описано екологічний стан біосферних заповідників Асканія-Нова, Причорноморський. Вказано загальні кліматичні, екологічні, геологічні та інші умови розвитку заповідників. Розглянуто екологічні проблеми Чорного моря як невід'ємної частини розвитку заповідників, а також політичні та географічні проблеми заповідників.

Introduction

The given material will state about environmental state of two Biosphere reserves, which are of tremendous importance in political, environmental, conservative branches. These two reserves include a high number of species that are under the thread of extinction.

Unfortunately, there exist a lot of negative obstacles that thread the reserves successful existence and development. The task of the given research is to consider more detailed all environmental problems of the given reserves and also to make some suggestions on preservation of boundaries and species variety of the reserves for satisfaction of first of all environmental demands.

Askania-Nova

Askania-Nova Biosphere Reserve is the oldest in Ukraine. It was started in the end of the XIX century as botanical garden and zoo. In 1919, Askania-Nova was declared the National Reserve Park. In 1921, Askania-Nova became the first national reserve, and in December of 1984 by the decision of the UNESCO Coordinating Council, it was declared the biosphere reserve. The reserve is subordinated to the Ukrainian Academy of Agrarian Sciences.

Askania-Nova Reserve represents the unique area of the virgin dry steppe grassland. It protects the only known in Europe area of Festuca-Stipa grassland community.

Nearly 50 animal species from all the continents of the Earth are grazing on the territory of the Great Chapelsk valley of the reserve including Przewalsky horses, zebras, bison, European bison, zebu, elks, steppe deer, deer, antelopes, and others. A great numbers of bird species nest in the steppe and other bird species use the reserve during the period of mass migrations.

Askania-Nova Biosphere Reserve is a representative of the Black Sea southern-steppe biogeographic province, situated 60 km south-east of the town of Kakhovka close to the Black Sea.

Within this area, the Festuca and Stipa steppe ecosystem has been conserved like an island in the Dniiper-Molochnoe lowland, which has otherwise intensive land use practices.

Status

Biosphere preserve "Askania-Nova" is a leading nature-protective scientific-investigative institution of state and international importance in the Northern Coastal zone of fundamental and applicable problems of nature preservation of typchacovokovilovyh steppe ecosystems, conservation and enrichment of park cultures in condition of irrigation on the South of Ukraine, conservation and enrichment of wild animals of steppe zone of Ukraine and other natural zones of the earth in half free and free and cage conditions of keeping, providing long-termed geosystem, regional and biocinotic levels of monitoring, conducting of periodical inventarization of natural resources, studying of social-economic aspects of people habitation on the territory of preserve, formation of the ecological consciousness. It works as methodological and scientific-organizational center of questions about environmental safety and tourist-excursion activity.

Territory

Total area of Biosphere preserve "Askania-Nova" is 33307,6 ha, 11054 ha is preserve zone, 6909 ha is buffer zone, 196,6 ha is dendrological park, 61,1 ha is zoo, 15344,6 ha is anthropogenic landscape. Preserve steppe consist of three parts with total area 9898 ha: Northern, Southern, and Big Chaply zone. Climate of the reserve is subcontinent with hot dry summer and mild unstable winter.

Average air temperature of the year is 9,8° C. Average month of the warmest one is 22,4°C, and the coldest – (3) °C. Amplitude of year temperatures is over 70°C. Winter in most cases is snowless or with snow cover – 4 cm.

Spring comes soon, accompanied with drought and long-termed cold.

Summer is long, hot and dry. In the second part it is noticed long air-soil drought that transfers to autumn. It is sunny, dry and warm in autumn.

Precipitation norm is 400 mm with frequency from 180–690 mm. In summer months it is evaporated in 5–6 times increase the amount of precipitations. Moisture lack and high isolation define very high air drying, that in the afternoon decrease to 10 %.

Dominate eastern air flows.

For spring and summer dry winds is the character feature.

At the end of winter and beginning of spring fine winds can be.

Preserve is situated in the borders of Prichernomorsky lowland in the center of Dniprovo-Molochna Rivers.

Division of relief is not significant: altitude above sea level is 20–32,6 m.

For this territory is characterized weak total slope in southern and souther-west direction. Flat territories are destroyed by numerous close hollows of different sizes, depth and shape.

Dendrological Park “Askania-Nova”

Askanian dendropark is of a great importance in the ecological respect, for its presence originated particular microclimate that influenced the process of adaptation of the fauna, birds in particular. Massive wooden plantations of the park have an average life span of 70–90 years; even so, some of the trees are more than 100 years old.

Dendropark is a genepool of which accounts 748 species and 190 sedimentary forms and sorts of wood, 1500 species of grass flower-decorative plants.

95 representatives are reliquary, rare and extincting wood and grass plants, three of them are included to International Red Book, 29 – to the Red Book of Ukraine.

There are 1 030 types of grasses in the dendropark. The dendrological collection is represented by the flora of 57 families and 168 genera from many botanic and geographic zones of the world.

In the dendropark, much work is done to take care of the plantations, an important scientific and research programme on introduction and acclimatization of plants, on the preservation of rare and disappearing types of local and introduced flora is also conducted.

Zoological park “Askania-Nova”

Zoological Park exists over 100 years. It differs from other zoological parks by keeping of animals, the majority of which the whole year exists in half-free conditions, on significant territories of artificially created ponds. Modern collection accounts already 5000 species of mammals and birds.

Its area is 61,1 hectares.

Animal collection accounts 112 species, subspecies, razes and types of mammals and birds of the number five thousand of individuals.

Among them are 27 species of rare animals that are included into International Red Book and 7 to Red Book of Ukraine.

This zoo is the basis for reaching of Ukrainian fauna, species variety of zoos, preserves, and hunting facilities.

Annually here is obtained over 1000 individuals of off-springs of 62 species of animals.

Black-Sea Nature reserve

Chornomors'kyi (Black Sea) Biosphere Reserve was established in 1927, and in 1984 it was declared the biosphere reserve by the decision of the UNESCO Coordinating Council.

The reserve is subordinated to the National Academy of Sciences.

It plays an important role in the protection of nesting and migrating birds. 300 bird species inhabit the reserve, including 22 rare species and several species of birds endangered with extinction. Ninety percent of the world population of the black-headed gull called a nurse of fields nest here.

Black Sea Nature Reserve (Chornomorskyi zapovidnyk). A state preserve located on the sandy banks of the lower Dnieper River and the coast and the islands of the Tendriv Bay and Yahorlyk Bay of the Black Sea.

The preserve was established in 1927. It covers 9,421 ha of dry land and 24,700 ha of water (in 1976, 64,806 ha). It was created to protect nesting, wintering, and migrating birds and to preserve the natural environment. The steppe section of the preserve – the Yahorlytskyi Kut Peninsula and Potiivka – consists of the remains of the Black Sea steppes and is inhabited by such rare birds as the great bustard (*Otis tarda*), the little bustard (*Tetrax tetrax*), and the white-tailed eagle (*Haliaeetus albicilla*) and smaller animals such as the acclimatized bobac (*Marmota bobak*).

It represents shallow coastal, estuarine and inland wetlands as well as marshes, shallow coastal bays, dune systems, halophytic seaside steppe and forest-steppe, which was once common in this region.

However, due to agriculture, pine plantations and other economic developments in the surrounding area, the biosphere reserve has an important conservation function for these ecosystem relicts.

There are no settlements within the biosphere reserve, however about 12,000 people live on a permanent basis beside the biosphere reserve boundaries, (15,600 people in the summer, 1998). Fishing is the only economic activity carried out in the biosphere reserve (buffer zone). The important kinds of economic activities outside the biosphere reserve borders are cattle breeding, forestry, salt extraction and irrigation farming. A nature museum provides environmental education activities to children and the general public.

The biosphere reserve also coordinates a Children's Ecological Society.

Territory of reserve presents whole diversity of living organisms of steppe south of Ukraine. The number of plants included into the European Red List gets fourth place in Ukraine. Black Sea Biosphere Reserve now is practically main centre with the richest nature associations of southern flora which before human beings were reaching from eastern to western border of Ukraine.

Dry land is only 14 148 hectares. It is the biggest reserve of Ukraine and includes some parts which represent diversity of seaside south-Ukrainian landscapes: azonal forest-steppe, azonal sand-steppe, zonal desert-steppe and seaside saline lands.

Relief of the reserve is mainly plain with numerous depressions along sea. The elevations resemble small hills.

The littoral bank formed by sand and shells is typical for the seaside. Sand lands are duty hollows and hills 3–5 m height.

Sands are spread beneath limestone. Land's and coastal sands are relatively young and very dynamic structure.

Climate of the reserve is temperate continental. The summer is hot and dry but winter is mild with thaws and unstable snow covering. Strong winds blow in winter and especially in early spring. Average temperature is $-2\text{ }^{\circ}\text{C}$ for January and $+24\text{ }^{\circ}\text{C}$ for July, precipitation – about 320 mm for year.

Major ecosystem types are temperate grasslands with marine component and wetlands.

The reserve is a inseparable system which combine not seen elsewhere different (marine, river, land and others) nature associations of forest, meadow, marsh, wetland, steppe and halophyte vegetation, diversity of animal associations in accordance with plant complexes. It seems a real par-adise for wildlife in the South.

The store of algae, for example Phyllophora, and water-plants like eel-grass *Zostera* in the marine ecosystems and bays is relatively big. It is main source of oxygen, substance cycle in water here, in one of the most important region of spawning 49% species of fish.

The land part of the reserve is covered by sheep's grass and wormwood landscapes, and remains of forests dominated by the common oak, warty birch, violet willow, and alder that occupied the vast areas in the Dnieper's delta in the past.

Relic groves is remains of the legendary Gileya – forest country in the lower reaches of the Dnipro River – glorified by Herodotus in V century Before Christ.

There are more then 700 species of vascular plants, 90 – lichens, 61 – mosses, 87 – fungi and 84 – fungi-parasitic.

It is only beginning, because algae and myxomycetes take not into account.

In all approximately 20 Red Book plant species are found in this territory, from them – 17 species include in European Red List that underlines its world importance.

Fauna representatives

The reserve plays special role in protection of rare bird species, forming about 18,7% of its species. It is centre of rare birds species have began to nesting. Numerous gulls, swallows, snipe, ducks, and grouse nest here.

300 bird species inhabit the reserve, including 22 rare species and several species of birds endangered with extinction.

Ninety percent of the world population of the black-headed gull called a nurse of fields nest here.

Fishing is the only economic activity carried out in the biosphere reserve (buffer zone). The important kinds of economic activities outside the biosphere reserve borders are cattle breeding, forestry, salt extraction and irrigation farming.

There are more than 4000 species of insects, more 250 species macro-zoobenthos, 10 – sponges, 64 – crustacean in the reserve now. Fauna is pre-sented: 452 – animals from them 68% – birds.

Reptiles have 9 species. The fauna is one of the richest in the Ukrainian reserves. The 74 species of fishes are found in the sea water during time exists the reserve. It is 49% of all species of Black Sea. Mammal fauna has 48 land and 3 marine species. The reserve is real bird kingdom. There are 305 species. Among them, 110 species nesting, others are wintering or situated here while the flight. The reserve is base place nesting of black-headed gull in Europe.

Environmental and industrial problems of the reserves

The water pollutants in the rivers and main tributaries like as a Danube River, Dniester River, Dniepr River etc., is affecting the Black Sea water quality and there is a need for further studies and improvements of water and sediment quality and water and sediment management. Special attention should be given to Danube River, as the main polluter of the Black Sea.

Both reserves are closely connected with Black Sea ecological system. As it is known nowadays there exist a great number of damages threading Black Sea environment. Examples of such thread are represented below.

The most significant process degrading the Black Sea has been the massive over-fertilization of the sea by compounds of nitrogen and phosphorus, largely as a result of agricultural domestic and industrial sources.

This over-fertilization, produces a phenomenon called eutrophication, which has changed the structure of the Black Sea ecosystem. The nitrogen and phosphorus compounds (termed as nutrients) enter the Black Sea from sources from the 17 countries in its drainage basin, particularly through rivers.

It is estimated that the six Black Sea countries contribute about 70% of the total amount of these substances flowing to the Black Sea as waste from human activities. Some of this amount and almost all of the remaining 30% (from other eleven non-coastal countries) enter the Sea via the Danube River.

Another problem of major general concern is the discharge of insufficiently treated sewage, which results in the presence of microbiological contaminants. Such discharges constitute a threat to public health and in some cases pose a barrier to the development of sustainable tourism and aquaculture.

Oil pollution continues to threaten Black Sea coastal ecosystems. Currently levels of oil pollution are not high in the open Black Sea but are unacceptable in many coastal areas and river mouths. Other toxic substances such as pesticides and heavy metals do not appear to pollute the entire Black Sea but appear as "hot spots" near well-identified sources. An unusual form of pollution from ships has seriously damaged the Black Sea ecosystem. This is the introduction of exotic species, species which are accidentally brought from another part of the planet and which adapt and flourish in the Black Sea, usually because they have no natural predators to control their numbers.

The problem is mostly caused by ships emptying their ballast water near Black Sea coasts. Ballast water is the water a ship may take on board to give it extra stability after unloading its cargo, often in some distant part of the world. It dramatically changed the structure of the ecosystem. The final class of problematic pollutants is solid waste, dumped into the sea from ships and some coastal towns. As an enclosed sea, the Black Sea is particularly vulnerable to this form of pollution. Any floating or half-submerged waste inevitably finds its way to the shore somewhere and Black Sea beaches tend to have a high accumulation of garbage. This is unsightly and presents a risk to marine animals and humans.

Unfortunately the reservation of genetic and coenotic diversity of coastal water associations is going to poor in connection with worsening ecological situation.

The main cause of it is pollution by raw sewage and irrigation water.

There also exist several problems with the saving of boundaries of the reserves. Unfortunately, our legal base is imperfect.

That's why the territories of the reserves are allowed to be rented by private persons. As a consequence the process of constant decreasing of reserves territories is taking place. There is no legal support from the side of government position for the protection of the reserves' territories unity. This is now the largest problem for the existence and successful development of both reserves.

Conclusions

Considering general characteristics of the reserves I've made a conclusion that environmental state of both reserves is worsening. It is caused by different problems, including as environmental, as questions about reserves lands rent.

For this problem to be dissolved there have to be sharp restrictions from our government and from the local power organs authorities for renting preservation lands for self-needs, that cause interruption into reserves ecosystem totality and can lead to decreasing of species variety.

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