

PRESERVED NATURAL TERRITORIES IN A CITY

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Abstract

Preserved natural territories – reserves and the natural parks - execute some nature protection tasks. They are the natural standards at monitoring observations, serve for conservation of natural resources, and help to rebuild disturbed ecosystems. If they are in city, they also execute environmental-creating role, being frequently alone sanctuary of migrant birds and area of infrequent species of plants. However such territories frequently are unlawful used by citizens for rest. One of such objects is Untolovsky reserve that taking place in St.-Petersburg. It is a unique part of an inshore wood kept in an invariable state from a beginning of XVIII century. Now its territory is surrounded urban districts and suffers from anthropogenic influences. For an estimation of variations going in reserve's ecosystem, in 2002-2003 the studies of soils, snow and vegetation were carried out. The preliminary analysis has shown increase of snow' acidity and increase of sulphate-ion' concentration in plants in comparison with neighbouring territories.

Introduction

A network of Protected Areas (PAs) is being created in most countries in the world. With the help of PAs an attempt is made to preserve rare and typical areas of forest, meadows, mires, water reservoirs and other natural ecosystems, rare and common species of animals and plants in their natural distribution areas, bird migration routes and winter quarters, fish passage ways and spawning-grounds, other natural processes and phenomena. The foundation of a network of PAs can no longer lie postponed in those places where anthropogenic stress on nature is particularly high. This is especially true for St. Petersburg. St. Petersburg, one of the major European cities, is situated in the Leningrad Region. It has a population of five million and is surrounded by a number of satellite towns which have a high industrial and agricultural potential. Within a distance of 100-150 km from St. Petersburg or its suburbs natural ecosystems occupy under 20% of the area (1). The existing PAs occupy about 340,000 hectares, which is 3.9% of the region's surface area. The implementation of all PAs projects would almost double the present protected territory.

In administrative boundaries of St.-Petersburg now are 6 PAs: Zakaznik (Sanctuary) "Yuntolovsky" in Primorsky district; Dudergofskiye Heights; Komarovsky Coast; Strelinsky Coast; Sergiyevka Park; Complex Sanctuary "Gladyshevsky". Agree of "The law about Protected Areas" of Russia, *Zakazniks* are established in order to preserve or restore several or all natural components and to generally maintain the ecological balance. Certain kinds of economic activities are restricted in the territory. Usually only federal sanctuaries have security staff. As a rule the land is not withdrawn from tenure. The surface area can vary from a few to thousands of hectares.

From all enumerated PAs "Yuntolovsky" sanctuary is the most unique, because that is the plot of inshore wood which kept in a not resized kind from beginning of 18 century. The sanctuary occupies the so-called Lakhta Depression on the northern coast of the Gulf of Finland formed in the estuary of the Pra-Nevala Valley. The territory is a lowland around the Lakhta Bay, with forest tracts, mesotrophic and eutrophic mires. Pine and birch forests

prevail, but there are patches of alder and birch swamps in places. The Lakhta Bay shore is bordered by a tussock-sedge fen, with a predominance of the smallreed (*Calamagrostis neglecta*), water horsetail, dropwort, individual willow bushes, birch and alder. All over the area, the bog-myrtle thrives bearing plenty of fruit. The central part of the sanctuary is covered with transitional and raised bogs. The bog-myrtle, alternating with the bog bilberry, dwarf birch and sparse pines, is abundant here as well. It should be mentioned that individual bog-myrtle bushes are also to be found in the forest, where they are up to 1m high, sparsely covered with leaves and hardly ever bear any fruit. The total amount of the wax-myrtle is quite large, so the area is the largest reserve of this species at the eastern limit of its distribution area. The flora totals 331 vascular and 53 leafy moss species (2).

The Lakhta Bay is a spawning ground and fattening place for many marketable fishes of the eastern part of the Gulf of Finland: the bream, pike, roach, perch, etc. Considering the location of the sanctuary within the city boundaries, the fauna of terrestrial vertebrates is surprisingly rich: 27 mammal and 147 bird species have been found here. The following species are worth special mention: the water shrew, hedgehog, mountain hare, European brown hare, ermine stoat, weasel, polecat, wild boar and elk. As for birds, the kestrel, merlin, water rail, corncrake, great snipe, Ural owl, white-backed woodpecker, river and grasshopper warblers, reed and great reed warblers and yellow-breasted bunting nest there. The area of the Lakhta Bay is extremely important as a resting and feeding site of migratory waterfowl.

Now territory of sanctuary is surrounded with proprietary houses and block-flats-houses from all directions. In a buffer zone of reserve the industrial platforms are posed, the proprietary building, country leases, and also goes building urban houses, as a result of which beaches of reservoirs and rivers, and also roadsides driving through sanctuary, are strongly contaminated. The rivers and reservoirs are used as sources of industrial water facilities, they accept sewages. On the data of studies water in the Lakhta Bay is polluted by sodium, potassium joints, sulphate, nitrates, and also pathogenic flora. On hydrochemical indexes of Bay' water is date from IV-th class of purity ("contaminated"), and water of the river Kamenka – V-th class – "dirty" (3). The soil overlying strata very disturbed owing to conducting civil work and active recreational load.

For an estimation of variations going in the ecosystem, in 2002-2003 the studies of soils, snow and vegetation in 50 plots both in territory itself sanctuary, and in its buffer zone were carried out. As the held studies showed, the contents of sulphate in a snow of territory is very little and changes from 0,001 up to 0,05 mg/L growing from the central part sanctuary to its north-east boundary. It proves to be true also by values of pH (they vary from 2,71 in snow of the plot on north boundary of territory up to 6,15 in the central part). The concentrations of phosphorus in snow of the most part sanctuary are changed from 0,05 up to 0,07 mg/L. The exceptions compound only plots in a south-west part, where the concentrations of phosphorus grow up to 0,15-0,3 mg/L. This variation is conditioned by a deposition on western plots of atmospheric aerosols acting from city Kingisepp.

The analysis of sanctuary soils has shown, that the soils on its boundaries strongly differ from soils of internal territory under the physical-chemical characteristics. It is connected as to various conditions of forming and progressing of soils (regimen of humidification, various rock bases etc.) and with anthropogenic affecting (long-term recreation, partial displacement of natural soils by wash-over ground). According to obtained results the main part of district soils are characterized by acid reacting of solution (pH changes from 4,2 up to 5,35), that is normal for natural region soils. The content of sulphate in soils is inflected from 15 up to 100 ppm, that much below limited concentrations and for today does not cause an essential decline of ecosystem condition. The presence of minute quantities of sulphate was revealed also in a bark of a pine *Pinus silvestris*, that is connected with deposition of sulfurous joints from proximate boiler-houses.

As have shown visual observations today mechanical affecting is the basic kind of affecting on sanctuary vegetation. For north plots it is a problem of a constantly growing recreational load. The territories along east and north-east boundaries of sanctuary and separate plots of a pine wood inside a protected zone suffer from illegal cuttings down of trees. On plots in a

buffer zone along east boundary of sanctuary the domestic population will utilize ground for a part-time farm and for a building. As a result of these failures of a protected regimen there is a degradation of grassy species, is destroyed of understory trees, in the spring-summer period there are fires. So in the territory of sanctuary the occurrence anthropogenic barren ground and active growth of species-anthropochorous is marked.

Conclusion

Despite of existing failures the ecosystem of sanctuary has enough high capacity to selfrecovery and keeps the natural performances. Now territory of the sanctuary is given the status of wetland of international importance as a habitat of waterfowl ("Ramsar Sites") and so regimen of protection becomes stricter. Agrees recently accepted program of sanctuary progressing conducting regular scientific studies of influencing of anthropogenic activity on ecosystem of territory is planned. All this will allow to save a unique nature of sanctuary from a degradation.

References:

- (1) "Protected Areas" Red data book of nature of the Leningrad region. Vol.1., St. Petersburg, Russia (1999)
- (2) Essays of vegetation of Protected Areas of the Leningrad Region Trudi BIN RAN, 5. St.Petersburg, Russia (1992) (in Russian)
- (3) E.G. Krilova. "Surface water (hydrology, hydrography, hydrochemistry)", General plan of Yuntolovsky" sanctuary. Vol.2, St.Petersburg, 1992 (in Russian)