Creation of specially protected natural territories as a factor of sustainable development of the territory

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Abstract. The article considers the issues of a comprehensive environmental survey of a territory promising for the creation of a regional nature monument “Batutinka River Valley and Lowland Marshes in its Basin”. Giving the territory the status of specially protected natural territory (SPNT) will make it possible to carry out measures for its protection, conduct research and environmental monitoring, as well as prevent unauthorized use of natural resources. The rationale for the concept is due to the presence of rare and endangered species of plants, mushrooms and animals (at least 23 objects of flora and fauna listed in the Red Book of the Russian Federation, Red Book of the Novgorod Region) and their places of growth (habitat). The profile of SPNT can be assessed as integrated (landscape), designed to preserve and restore natural landscapes; hydrological, designed to preserve and restore valuable water bodies and ecological systems, especially swamp massifs; biological, designed to preserve and restore rare and endangered species. Obviously, the listed groups of objects are diverse, interconnected, large-scale, have independent value, but their combined value is higher. They are components of a single natural-territorial complex, the preservation of which requires a systematic approach.

1. Introduction

Sustainable development is the result of environmental, economic and social changes aimed at the rational exploitation of natural resources, the conservation of the biological diversity of species, the development of a society that takes care of natural resources. [1] From the point of view of the environmental component, sustainable development should ensure the functioning of biological natural systems. Of particular importance is the sustainability of ecosystems, on which the stability of the biosphere as a whole depends. At the same time, one should not forget about homeostatic mechanisms that increase ecosystem resilience to changes of a natural and/or anthropogenic nature. Depletion of natural resources, environmental pollution, reduction of biological diversity certainly reduce the ability of natural ecosystems to self-regulation and self-healing. Therefore, the creation of specially protected natural territories (SPNT) are relevant.

2. Objects and methods of research

The creation of the PLO network is one of the priority areas for solving social, economic and environmental problems in the Novgorod region. Currently, the status of specially protected natural complexes in the region is assigned to 129 territories, including Rdeisky State Nature Reserve, Valdai National Park, 13 state nature reserves, and 114 natural monuments. These natural sites occupy just over 7% of the territory of the Novgorod region. The main task of all specially protected natural complexes is to preserve biological diversity, maintain the ecological balance of the territories [2, 3, 4, 5].
Numerous regional specially protected natural territories are endowed with international status as wetlands of international importance. Sites of the Emerald Network of territories of special environmental importance are the main ornithological territories of international importance. The inclusion at the state level of natural ecological systems in the composition of specially protected natural complexes of the Novgorod region confirms their status as territories of natural heritage.

The Ministry of Natural Resources, Forestry and Ecology of the Novgorod Region, together with Yaroslav-the-Wise Novgorod State University, are working on the design of a system of SPNT in the region. The work presents a designed natural monument of regional significance “Batutinka River Valley and Lowland Marshes in its Basin”.

3. Results and discussion

General information. To create SPNT, a unique plot of the natural complex was proposed. According to the regional typological landscape zoning, the territory of SPNT lies within the Kholm landscape of the Prevaldai okrug in the zone of mixed forests.

Geological structure and terrain. The bedrock of the study area are sandy-clay deposits of the Devonian period. Quaternary sediments are represented by the bottom moraine of the Valdai glaciation, which is overlain by lake-glacial sands. The modern topography of the territory inherited the surface of pre-Quaternary rocks and acquired the main features as a result of the activity of glacial reservoirs; in general, the terrain is characterized by a flat or slightly wavy surface.

Climatic conditions. By climatic conditions, the territory under consideration belongs to the most favorable V agroclimatic region with an average sum of active temperatures of more than 1950°C. According to the climatic zoning of the Novgorod region, this landscape is characterized by the South Predvaldai climate.

Surface water. The main watercourses in the territory under consideration are the Batutinka River and its tributaries: the Morokhovka River, the Kholodny Brooks, the Black Streams and several nameless streams.

The soil. The soil cover is represented by sod-podzolic and sod-podzolic-gley soils. These types of soils are characterized by a leaching regime. In the floodplain of the Batutinki River, alluvial soils are common. Since a significant part of the SPNT is occupied by bog massifs (the tract Solony Mokh, the marginal parts of the bogs Chisty Mokh, Barabansky Mokh, Orekhovoye bog), part of the territory is represented by peat, peat-podzolic-gley soils.

Species biodiversity. According to published data [6], 329 species, 82 families of vascular plants, were identified on the territory of the regional nature monument “Batutinka River Valley and Lowland Marshes in its Basin”. The richest species of the family: sedge (35 species), bluegrass (33 species), aster (27 species), pink (17 species), orchid (12 species), legumes, willow, norian (10 species each). 21 objects of the plant world that have the status of protected have been noted. Of these, 6 species are listed in the Red Book of the Russian Federation and the Red Book of the Novgorod Region, 15 species are in the Red Book of the Novgorod Region. In addition, 5 objects of the plant world are included in the List of objects of the animal and plant world that need special attention in the Novgorod Region on their state in the natural environment (Appendix 1 to the Red Book of the Novgorod Region). Of the plant species identified in the protected areas, the Red Books of the Russian Federation and Novgorod oblast include the common grass sword, Venus slipper, Baltic fingerwort, Traunsteiner fingerwort, Lezel’s calf and lung lobar lichen.

The following plant and lichen species are listed on the territory of the forest biogeocenosis of the nature monument, listed in the Red Book of the Novgorod Region: sedge spaced, short-legged forest, Beneken’s rump, broad-leaved cinnamon, scaly cross, curled ulcer, Bolander frulling, pulmonary lobaria.

In the meadow ecosystems on the banks of the Batutinka River, near the oak grove, “red-book” species of plants were found: axillary gentian, tiled fennel, styloid pleurisy.

Protected plant species identified on bog ecotopes (Solvency Mokh swamp) and listed in the Red Book of the Novgorod Region include common grass sword, five-flowered swamp, rusty venus, real
slipper, Baltic fingerwort, Traunshteler's fingercloth, lactiflora kokushnik, lokotsvetotsy, Siberian Buzulnik, low birch.

It is noteworthy that in the Batutinka River Valley 11 species of plants were registered that have no more than five identified growth sites in the region, of which 4 species have a single location here.

Brioflora is represented by the dominant species of mosses Limprichtia cossonii and Campylium stellatum, the share of species diversity of which in Russia is no more than 3%. [7] In addition, leafy mosses listed in the Red Book of the Novgorod Region grow on the territory of the monument: styloid pleuridium (Pleuridium subulatum) and curly ulota (Ulota crispa). As a part of lichen biota, a species of lichen pulmonary lobaria (Lobaria pulmonaria) was identified, listed in the Red Books of the Russian Federation and Novgorod Region.

The animal world is characterized by a peculiar combination of faunistic complexes. Investigations of the Batutinka River showed that the composition of the ichthyofauna is represented by 7 species of fish: roach, pike, minnow, chub, gudgeon, brownbird and common carp. Among these species, the status of the protected one is of the common sculpin, listed in the Red Book of the Russian Federation and the Red Book of the Novgorod Region.

Data on the theriofauna and avifauna are scarce, only the presence of large mammals (judging by the presence of traces of their activity) and the presence of hunting and fishing species of birds, among which the black stork (Ciconia nigra), listed in the Red Book of the Russian Federation and the Red Book of Novgorod, is noted area.

It should be noted that the great biological diversity of species (including those listed in the Red Books) convincingly proves the high value of this natural territory, including its forest, meadow and swamp complexes.

Anthropogenic impact. Currently, traditional economic activities are carried out on the territory of the monument: licensed hunting for game birds, recreational fishing, picking mushrooms and berries, haying, grazing.

Anthropogenic impact is manifested mainly in the form of logging. At the same time, the main source of atmospheric air pollution is fugitive emissions of the products of the combustion of fuel from working chainsaws and motor vehicles. Considering that the total air pollution from these sources is insignificant and temporary, we can conclude that the negative impact on the atmospheric air is within acceptable limits.

After giving the territory the status of specially protected, in order to protect it from potential adverse anthropogenic impacts, all types of logging are prohibited, with the exception of cases of sanitary and sanitary measures, clearing clearings, and carrying out work related to the construction of fire strips. Violation of the structure of the soil cover during sanitary felling of forest stands, construction of roads and other communications is not excluded, but this effect is insignificant and cannot have any effect on the main types of vegetation and wildlife [8].

Damage to natural complexes is caused by spring grass falls, and recommendations on the protection and use of SPNT include the installation of information signs containing information about liability for violations of fire safety rules and burning dry grass.

Pollution of surface and groundwater in the territory of the natural monument was not observed. Special measures for the protection of aquatic biological resources, in addition to the requirements of Article 65 of the Water Code of the Russian Federation “Water protection zones and coastal protective strips”, as well as requirements in the field of protection of aquatic biological resources, are not required. [9]

Analysis of the current situation allows us to talk about the absence of significant sources of pollution of atmospheric air, surface water, activities leading to a significant violation of the integrity of the subsoil, soil and vegetation, and wildlife.

4. Conclusion
The creation of a regional nature monument “Batutinka River Valley and Lowland Marshes in its Basin” allows for more effective use of a set of measures to protect its territory, conduct scientific research, and
monitor environmental components. In addition, recreational use of the landscape is possible with the aim of developing educational tourism and environmental education. [10] Since the natural complexes of the territory of the natural monument are characterized by high biological diversity and environmental significance, the status of SPNT ensures the conservation of plants, mushrooms and animals listed in the Red Books of the Russian Federation and the Novgorod Region, as well as their habitats.

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