Conditions for territorial biodiversity conservation affected by technogenesis in the North

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Abstract. The biological potential of the northern territories is enormous and diverse. Large areas of such resources and fauna are subjected to anthropogenic and technogenic pressure, causing pollution, destruction, and degradation of natural conditions and systems. The goal of studying changes in spatial landscapes is to preserve the natural resources of the North, to register the animal world, monitor forest lands and to organize nurseries for breeding productive forest species. It is necessary to clean the forests from dead wood, which creates unfavorable sanitary and hygienic conditions, forest inhabitants suffer and the food chain is disrupted. An analysis of the use of lands of the Beloyarsk forestry of the Khanty-Mansiysk Autonomous District is carried out, its natural and economic state and the uniqueness of the existing biological system are described. The recommendations for the preservation of species diversity and natural ecosystems are provided. It is necessary to protect and maintain the natural habitat of animals, increase the possibilities of restoration processes in the environment of vegetation and tree-shrub cover, and avoid soil erosion processes. Currently, reduction of the negative impact on nature, development of optimal solutions and innovative approaches to the rational and environmentally friendly use of resources, taking into account interests of all inhabitants are the primary tasks of society. Accounting for environmental changes aimed at ensuring the viability of society should include predictive estimates of decision-making consequences or redevelopment of land plots, based on the study of prevailing factors and natural conditions.

1. Introduction

The territorial biodiversity of the northern lands depends on climatic and natural conditions, which are poorly protected from theeconomic and industrial activities, which causes the so-called "conflict" over the use of landscapes [1]. The interests of society in the extraction of both fuel and energy resources, and timber harvesting, as well as the fur trade are also growing technologically. According to statistical observations of the land fund of the Russian Federation, the processes of erosional degradation and waterlogging are observed in the Siberian Federal District [2]. The adoption of effective management measures can reduce environmental risks, preserve the diversity of the animal and plant world. It is possible to adopt new legislative acts that can reduce negative consequences from human activities, as well as to use flexible financial and economic tools in order to renew and increase the resource potential of the territory.

The Beloyarsk District is the "youngest" district in the Khanty-Mansiysk Autonomous District, it
was formed in 1988, separated from the Berezovsky District. In this regard, there is a need to assess the natural, economic, legal and social conditions in terms of the land use in order to identify prospects for the development of the region [3].

In terms of forest vegetation zoning, the territory of the Beloyarsk district belongs to the zone of the north and middle taiga pine forests with an admixture of cedar and larch [4].

The lands of the forest fund occupy 93% of the area of the Beloyarsk district and are controlled by the forestry. On the territory of the district, there is one forestry - Beloyarsky, with a total area of 3941476 hectares.

2. Materials and methods

The research used analytical and cartographic materials on the area. The animal world was analyzed according to the data of hunting and forestry; statistical generalization of distribution of the range of animal species was carried out, and materials of the ground-based surveys of this territory were used.

3. The study of the land fund of the forestry

Within the Beloyarsk forestry, there are areas that have different natural and economic conditions, peculiar forest lands: forest-covered, not covered with forest, non-forest. The specific weight of forest lands is more than half of the area of the forest fund, and the territory of non-forest lands is mainly swampy. Lands not covered with forest can be used for reforestation. The characteristics of the forest lands are presented in Figures 1, 2, 3.

The distribution of forests by groups and categories of protection is of great importance. In the district, there are forests of the first and third groups. The forests of the first group have a protective value, the forests of the third group are the resource basis for the development of the timber industry [5]. The main forest species are pine, spruce, larch, cedar, birch, aspen. The main areas are occupied by conifers - more than 20 thousand hectares. Among conifers, the main species is pine (64.2%). Soft-leaved species occupy an area of about 300 thousand hectares; the main species is birch (97%).

The average age of coniferous trees is 140-182 years, deciduous trees - 87-91 years. By age, conifers are distributed as follows: middle-aged (17%), ripening (11%), mature (35%) and over-mature (33%). The stock of coniferous wood is 714.8 hectare per cubic. Deciduous species are overmature (60%), the stock of wood is only 252.2 per hectare per cubic meter. The productivity of forests is low (5 bonitet class). According to the forest economic zoning, the forests are classified as reserve territories (Figure 4).

![Figure 1. Lands of the Beloyarsk forestry covered with forest vegetation](image-url)
The data show significant reserves of forest resources. The natural resource potential for the development of the timber industry is significant. Deforestation is carried out annually with a sample of marketable timber in the amount of 21 thousand m$^3$. (1% of the allowable cut).

Figure 2. Lands of the Beloyarsk forestry not covered with forest vegetation

Figure 3. Lands of the Beloyarsk forestry: areas of reforestation, non-forest and other lands
In addition to the forest management, the lands are used in the traditional nature management and in the organization of subsoil use. About 4% of the forestry area is allocated for licensed areas; 29% of the area is allocated for traditional nature management. There is still no forestry land for subsoil use and traditional nature management. There are lands of specially protected natural areas: the Sorumsky reserve (159300 hectares), the natural park of district significance “Numto” (721767 hectares). The actual use of resources is shaped by other types of land use. A significant part of the forest fund with an area of 1,619,120 hectares was transferred to the Kazymsky reindeer herding enterprise for long-term use, and is used for reindeer pastures.

Natural resources of traditional nature management include wild plants, hunting resources and fish resources.

In addition to timber reserves, the forests of the Beloyarsk district are rich in other plant resources. According to the Institute of Geography of the SB RAS, potential reserves of berries are about 60 thousand tons, mushrooms - 30 thousand tons, nuts - 0.7 thousand tons, medicinal raw materials - 6 thousand tons, operational reserves of berries are slightly less than 25% of the potential, and only 0.04% of them is used (Figure 5).
The low degree of economic development of the district contributes to the preservation of the number of wild animals, valuable commercial species of mammals (elk, bear, sable, fox, squirrel, otter, arctic fox). Game birds (wood grouse, black grouse, hazel grouse, ptarmigan) and various types of waterfowl live in this district. The main route of passage of waterfowl is the floodplain of the Ob River in the northern and southern directions. The second corridor is a network of lakes in the NUMTO park area.

The district is inhabited by rare and endangered species of birds - the white-tailed eagle and the goshawk; During migrations, encounters with red-breasted and black-throated geese, white crane, and tundra swan are possible.

According to the regional hunting inspectorate, the number of most species is increasing. The main reason is a favorable habitat and good food supply.

The dominant fish resources are pike, ide, roach, dace, and ruff. The main fisherman is the Kazymsky enterprise, which is engaged in fishing in the upper reaches of the Kazym River and in the Kazym system of lakes in its upper reaches. The main types of fish caught are small pieces. Fishery reservoirs of the Kazym river basin are a rich reserve for increasing fish production in the Beloyarsk district.

The Gornaya Ob canal is one of the fishery reservoirs in the Beloyarsk district and the most important migration route for valuable fish species: muksun, nelma, sturgeon. The Gornaya Ob channel is a reservoir of the highest fishery category. The catch for three years was as follows: 2016 - 168.3 tons, 2017 - 148.8 tons, 2018 - 106.3 tons.

The changes in the dynamics of the number of animals are due to the following factors:
- Elk - favorable living conditions;
- Squeeze - migration, diseases;
- Snow hare - diseases (tularemia);
- Sable - good food base;
- Ermine - deterioration of the food supply;
- Otter - insignificant catch;
- Fox - deterioration of the food supply;
- Brown bear - favorable living conditions;
- Capercaillie - favorable reproduction conditions and good food supply;
- Black grouse - favorable reproduction conditions and good food supply;
- Grouse - unfavorable living conditions;
- White partridge - migration from the north.

The territory of priority nature management is lands with reindeer pastures, hunting and fishing, berry...
and mushroom, hunting and other lands transferred to the indigenous peoples of the North without taking them away from the main land users (forestry, agricultural enterprises). On these territories, industrial activities are restricted or prohibited [6].

Federal Law No. 82-FZ of April 30, 1999 "On guarantees of the rights of the indigenous small-numbered peoples of the Russian Federation" (as amended on July 26, 2019) establishes the legal basis for guarantees of the original socio-economic and cultural development of the indigenous small-numbered peoples of the Russian Federation, protection of their original habitat, traditional way of life, housekeeping and crafts.

The lands of the communal-clan farms account for 29%. In the district, there are 33 communal-clan farms. The areas of farms range from 1178 hectares to 293600 hectares. Plots of traditional nature management have boundaries confined to natural boundaries and are remote from settlements: 24% of farms are located at a distance of less than 10 km, 61% - 10-25 km and 15% - 25-50 km. Since the river network is well developed, almost all sections can be reached during the navigation period by waterways; in the winter – through temporary winter roads, in the spring-autumn thaw - by air (helicopter).

There are tractor roads to ten sections, communication with three communal-clan farms located along the main gas pipelines is carried out along the Urengoy-Sovetsky paved road [7]. The unique distribution of various types of nature management, including the traditional management of natural resources by the indigenous peoples of the North and specially protected natural areas, predetermines the complex nature of their location and a special legal status.

In particular, in the district, communal-clan farms are located on the federal lands and the lands of the Beloyarsk forestry. 256388 hectares of specially protected natural areas are included in the composition of communal-clan farms. There are no licensed plots as part of communal clan enterprises.

Two incompatible types of nature management (traditional and subsoil use) are not located on the same territory.

The placement of ancestral lands and specially protected natural areas on the same plot is not a disadvantage; however, it imposes restrictions on the traditional management of natural resources. In this regard, there is a need to develop methods in the management of generic farms to improve the land management system.

The specific weight of forest lands in the Beloyarsk forestry is more than half of the forest land area of the Khanty-Mansiysk district, and the territory of non-forest land is swampy. The natural resource potential is significant for the development of the timber industry. The forests are rich in wild plants and hunting resources. The low degree of development of the territory contributes to the preservation of the number of wild animals, game birds and waterfowl. The combination of different resources in one specially protected area predetermines the complex nature of land management.

4. Conclusion
The study of the forest fund of the Beloyarsk forestry allowed us to conclude that the specific weight of forest land is more than half of the forest land area of the Khanty-Mansiysk district, the territory of non-forest land is swampy. The natural resource potential is significant for the development of the timber industry. The forests are rich in wild berry plants (wild plants) and hunting resources. The low degree of development of the territory contributes to the preservation of the number of wild animals, game birds and waterfowl. The combination of different resources in one specially protected area predetermines the complex nature of land management.

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