

MAPPING OF PHYTODIVERSITY WHEN DESIGNING THE BELOKURIKHINSKY NATURE PARK

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ABSTRACT

Mapping of the vegetation cover is of great importance for learning the geographical nature conditions, evaluation of nature resources, solving a great variety of practical tasks. Active development of tourist-recreational activity in the Altai Krai contributes to the expansion of the network of territories under special protection which are designed for regulated tourism and recreation. Such nature conservation territories are represented by state nature parks of regional importance. Belokurikhinskiy Nature Park, which is planned to be created, is aimed at preserving mountain-forest territory of the south-western part of the Altai Krai and developing tourist-recreational potential of the resort of federal importance “Belokurikha”.

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According to the state federal law of the Russian Federation “About Specially Protected Territories” a nature park is a specially protected territory of regional importance within which there are areas of ecological, cultural and recreational importance, so the prohibitions and restrictions of economic and other activities are set in accordance with the latter ones (Federal Law No. 33-FZ).

On the territories of nature parks various modes of special protection and usage are set dependent on economic and recreational value of the nature areas. The following zones can be found on the territories of nature parks: nature conservation, recreational, agricultural and some others including the areas of protecting historical and cultural complexes and objects. Any activity entailing alterations of historically formed nature landscape, decrease or destruction of ecological, aesthetic and recreational properties of nature parks, maintenance violation of historic-cultural monuments is strictly prohibited. The peculiarities, zoning and the routine of each nature park are determined by the regulations of the latter (Federal Law No. 33-FZ).

Mapping of the vegetation cover is of great importance for learning the geographical nature conditions, evaluation of nature resources, solving a great variety of practical tasks. Vegetation as the object of mapping has a number of features which determine principles and methods of its cartographic study and its specific character in comparison with the mapping of other nature components. Vegetation is of twofold origin and develops according to biological and geographical laws. This peculiarity is reflected in one of the basic principles used in geobotanical mapping. It is performed in accordance with the features of the vegetation cover but due to the geographical conditions (Rotanova, Gaida, 2014).

Vegetation is characterized by a complex hierarchical spatial structure:

- Floristic and phytocenological structure;
- Vertical structure – layerage;
- Synusia – the existence of a range of plants representing one or several life-forms;
- Horizontal extent – spatial, morphological structure;
- Functional structure.

It is difficult to depict all the components of the spatial structure of vegetation cover on one map, therefore, they constitute the subject of a series of maps. To create a map a GIS project is worked out; its functional potential enables to inventory, analyse, estimate the vegetation and phytodiversity of a nature park, to map the territory when zoning and running the tourist sphere.

The diversity of the tasks being solved makes it possible to use GIS at the stage of designing a specially protected nature territory, that is to provide advance geoinformational and cartographic support that allows optimizing the subsequent field study and complex evaluation of the environment (Rotanova, Popova, 2014).

Belokurikhinskiy Nature Park, which is planned to be created, is aimed at preserving mountain-forest territory of the south-western part of the Altai Krai and developing tourist-recreational potential of the resort of federal importance “Belokurikha”. The nature park is being created on the territory covering about 40,000 hectares, spanning the area from the spurs of the Anuiskiy Range in the West and South-West, and the spurs of the Cherginskiy Range in the East and South-East. The northern border lies along the front of the Altai Krai – a well-marked area of the tectonic zone separating the mountainous part from the plain one (the Prialtai Valley). According to the geobotanical zoning the territory belongs to the Altai mountain province, West-North-Altai mountain-taiga-scrub-steppe subprovince, Belokurikhinskiy-Chemalskiy mountain-taiga district of pine, birch and birch-larch grass forests. The vegetation is typical of South-Siberian mountain pine-birch-aspens-fir, larch and coniferous spruce forests. Also the poplar, elm, sea-buckthorn, oak, mountain ash, arrowwood, etc. grow there. There is a great variety of medicinal and melliferous herbs, a lot of fruit and berry plants growing wild, and mushrooms.

It is of paramount importance of nature protection activity in Belokurikhinsky Nature Park to preserve its phytodiversity; the following measures are included:

preservation of boreal mountain-forest vegetation with the features typical of low mountain-taiga forests; preservation of rare plants in their natural habitats; forming reserve population of rare flora specimen; expansion of the activities aimed at reintroduction of valuable flora species in their biotypical habitats.

It is possible to map phytodiversity in accordance with:

- Taxonomic system of vegetation cover;
- Ecological interconnection with physical-geographical factors of the environment;
- Properties of the communities of general scientific and practical importance.

The purpose of a map, a set of general and specialized maps is determined according to the first-priority approach.

General geobotanical maps comprise different information about vegetation. They are a basic source of information and are interesting for a wide range of users. General maps depict the regular character of distribution of vegetation categories, formed in the course of historical development as well transformations caused by human activity. The maps are categorised into the ones of vegetation recovery (indigenous) and of modern vegetation cover.

The explanatory notes of the general map of the nature park being designed is based on regional-typological approach of geographic-genetic classification and various principles of classifying plant communities on various taxonomic levels. To reflect the regular character of vegetation spread on the map, the explanatory notes are structured; a graphic model of the explanatory notes is designed with the help of the following graphic techniques: relative position and graphics of symbols, fonts and others. The structure of the explanatory notes is determined by botanic-geographic peculiarities of the territory, the concept and the purpose of the map, the scale. The general geobotanical map of Belokurikhinskiy Nature Park is being created on a scale of 1 to 50,000; according to the classification of geobotanical maps it is considered to be general and large-scale. The objects of mapping are associations and groups of associations (Atlas..., 1978).

The diversity of geomorphological conditions, peculiarity of hydrographical network, mosaic structure of soil cover, anthropogenic transformation determine a rather high level of phytodiversity of the territory of Belokurikhinskiy Nature Park. Forests comprise about 80% of its territory, meadows and valley complexes take up about 10%, secondary grown vegetation and scrubs occupy about 5%, and other lands comprise not more than 5%. Formation and typological structure of forests is determined by a combination of nature and anthropogenic factors. Due to the prevalence of low mountain steep sloped mild topography the greatest part of the forest covered territory is occupied by the formations of South-Siberian mountain-taiga pine and cedar-fur-spruce forests with typical valley clusters of birch and aspen grass (or swampy in some places) and fur-aspen-birch fern-grass forests.

Among the specialized maps the following ones are given: forest types, useful growing wild plants – alimentary fruit and berry and medicinal – percentage of forest

lands, distribution of forests according to their type, age, rare and extinct plants, growing wild ornamental plants, natural forage lands, etc.

The map “Forest Types” reflects a diverse characteristic of forests including the composition of the latter, the type of lower layers which demonstrate the bioecological potential of ecotypes, growth class and so on. To create the map, the plans of forestry enterprises and taxation descriptions were used. The main mapped units are the groups of forest types and their combinations which are typical of modern forest cover of the territory. The groups of forest types and their combinations are united into genetic cycles which reflect the modern stage of forest formation process manifesting itself in definite geographical environment. The cycles are named according to the names of wood species which comprise the so-called indigenous forest and semi-indigenous forest types.

Significant practical importance in terms of tourist-recreational activity in Belokurikhinsky Nature Park is ascribed to mapping the areas where growing wild alimentary fruit and berry and growing wild ornamental plants are spread. The territory of the park is rich in growing wild alimentary vegetation resources. In the map “Growing Wild Alimentary Fruit and Berry Plants” they depicted complexes of fruit and berry plants with prevalence of constant species and the data about accompanying species, the abundance degree of species and their classification into plant communities. The following complex-forming species are typical of the territory: raspberry, wild strawberry, dog rose, red currant, blackcurrant, mountain ash, bird cherry tree; in the valleys – blackcurrant, arrowwood, strawberrie.

The map “Growing Wild Ornamental Plants” gives information about the habitat of mainly flowering plants with the period of blossoming and division into cultivated and introduces species.

In the map of Belokurikhinskiy Nature Park the habitats of the following species are shown:

- ◆ Peony (*Paeonia anomala*), Siberian globeflower (*Trollius asiaticus*), Adonis Siberian (*Adonis sibirica*), meadowsweet (*Spiraea*), Siberian dame's rocket (*Hesperis sibirica*) and others – in birch-larch grass forests, scrubs, forest meadows;
- ◆ Yellow lady's slipper (*Cypripedium guttatum*), blue anemone (*Anemone caerulea*), corydalis (*Corydalis bracteata*), ladybell (*Adenophora liliifolia*), primrose (*Primula cortusoides*) – on the edge of birch-pine grass forests, in the meadows, in the scrubs, less often on the stone slopes;
- ◆ Martagon lily (*Lilium martagon*), aconite (*Acontium volubile*), Altai anemone (*Anemone altaica*), Sibirean atragene (*Atragene sibirica*), green violet (*Viola uniflora*), hairy spurge (*Euphorbia pilosa*) – in aspen-fur coniferous high-grass forests, scrubs, in the forest meadows;
- ◆ Clematis (*Clematis integrifolia*), Siberian dame's rocket (*Hesperis sibirica*), lychnis, Maltese cross campion (*Lichnis chalconica*) – in the river valleys (Atlas..., 1978).

At the stage of designing Belokurikhinskiy Nature Park, the maps of phytodiversity being designed with the help of GIS-technologies and the already created ones will contribute to collecting, systematization, storage, processing, access, mapping and spread of the information about the protected territory and will cause a thorough analysis of factors and conditions for creating it.

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