

Evaluation of Natural Recreational Resources as an Information Basis for Sustainable Development of the Territory

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Abstract— This article discusses organizing issues of land use for outdoor recreational activities on the example of the Muromtsevo municipal district of the Omsk region. To do this, modern scientific ideas about the role and functioning of land as a recreational resource have been investigated – factors affecting the value of outdoor recreational land use. The study is aimed at improving the scientific and methodological provisions for conducting zoning of recreational territories for various types of outdoor recreational activities. A methodology has been developed for assessing recreational land use in terms of the value and suitability of the landscape for organizing recreation. The results of the study can find practical application in the work of local governments, legal entities in the process of organizing recreational activities, in the development of forecasting and planning documents for land use and protection, determining the main directions of recreation and organization of land use for recreation in a shared land for agriculture and recreation, preparation of land management projects of recreational territories. Introduction of research results into practice will make it possible to increase the socio-economic efficiency of land use, increase their investment attractiveness and create conditions for sustainable development of the territory.

Keywords—recreational resources, recreational assessment, recreational zoning, recreational activities.

I. INTRODUCTION

An urgent issue of the development of recreation today is the organization of recreational nature management. Methodically, recreational nature management should be considered from the point of view of organizing recreation of population using natural conditions and resources, preventing changes in the state of the landscape under the influence of recreation, meeting the needs of population in outdoor recreation. Since the use of the existing recreational potential of the territory occurs during environmental management, conditions must be created for the sustainable development of the territory, able to withstand anthropogenic impacts in the process of recreational activities.

Recreation refers to the type of human activity aimed at creating the conditions for normal human life, restoration of its performance. Human needs for recreation set the task of organizing optimal recreational land use, based on an assessment of available recreational resources. The solution to this problem is not only relevant, but also of undoubted practical interest.

Komarova S.Yu. and Rogatnev Yu.M. offer to consider the resources of recreational land use in terms of their natural, cultural, recreational, educational, historical value for the provision of recreational services [1]. Natural territories and resources that have recreational value include resort and health-improving zones, recreational, historical, cultural and partially nature conservation lands, separate plots of forest, water fund lands and other territories with recreational value. At the same time, Veselova M.N. notes that recreational land use can include land designed and used to organize recreation, tourism, fitness and sports activities of citizens. In the process of using these lands, their properties change and, therefore, the directions of outdoor recreational activities are determined [2].

Since the properties of recreational land use are the properties of a land plot associated with its functioning as a natural complex, changes in these properties can be caused by both external and internal effects on the land. Significant is the impact associated with a change in the natural properties of the land through the introduction of physical changes in the properties of the land and is the basis for changing the functions of the land as a means of recreation.

To organize outdoor recreational activities, an assessment of natural resources is required. It can be both qualitative and quantitative (expressed in points).

Oborin M.S. considers that, based on the analysis of the structure of natural territories, it is possible to logically substantiate valuation features during a qualitative assessment, while a quantitative assessment requires comparison with a standard. A scoring in this case makes it possible to compare indicators of the recreational value of lands, to rank them according to the degree of importance for creating recreational territories [3].

In this study, the assessment of recreational resources refers to the quantitative and qualitative characteristics of landscape parameters in terms of their suitability for organizing a specific direction of outdoor recreational activity.

To conduct an assessment of natural recreational resources, it is necessary to determine a list of indicators, to rank them according to the degree of importance for the organization of a particular type of recreational activity. To carry out such an assessment, a point-based approach can be

applied that will provide a complete picture of the degree of recreational potential of a land plot.

To ensure the comprehensive nature of land use for recreation purposes, methodological approaches to assessing the natural and recreational resources of the territory are proposed. The following factors were taken as assessed factors: topography and terrain conditions, water content in the territory, vegetation cover, presence and composition of specially protected natural territories. The results of factor assessment are reflected on the territory zoning maps of the Muromtsevo district of the Omsk region. Based on a comprehensive assessment of the natural and recreational potential, various zones and groups of rural settlements have been identified according to the suitability degree of natural potential for organizing outdoor recreation, according to the duration and directions of recreational activities.

Establishing the presence on the land plot of natural recreational properties and the degree of its suitability for organizing a certain direction of recreational activity allows us to create recreational land use, which will have its own characteristics in terms of natural resources used, functional value and area. Further, for a specific type of recreational activity, measures are taken for the intra-site organization of land use. Organization of the use of recreational land is an important condition for the preservation and enhancement of the natural and recreational resources of the territory.

To ensure the comprehensive nature of land use for recreation purposes, methodological approaches to assessing the natural and recreational conditions and resources of the territory are proposed. The following factors were taken as assessed factors: topography and terrain conditions, water content in the territory, vegetation cover, the presence and composition of specially protected natural territories. Based on a comprehensive assessment of natural and recreational resources, various zones and groups of rural settlements were identified according to the degree of suitability of the natural potential for organizing recreation, according to the duration and directions of recreational activities. The results of the factor assessment are reflected on the zoning maps of the territory of the Muromtsevo district of the Omsk region.

Using the results of the assessment of natural and recreational resources will reduce the cost of organizing recreational activities, establish the feasibility of its organization and improve the quality of design decisions.

II. RESEARCH METHODOLOGY

The authors developed a methodology for scoring the recreational potential of the territory by landscape components (climate, topography, vegetation, surface water, wildlife).

When assessing the climate, the duration of the comfortable and uncomfortable periods that affect the duration of a person's stay in the open air should be taken into account. A significant length of the uncomfortable period leads to a decrease in the recreational value of the territory.

Agreeing with Rybalova A.G., we believe that surface waters are important for organizing recreation as a component of the landscape that significantly affects the quality of human rest. The recreational value of the territory is significantly affected by the temperature regime of open water bodies, the area of the water area, the presence of river obstacles for playing sports, and water quality [4].

When assessing the relief, the picturesque and panoramic landscape, the steepness of the slopes are taken into account; when assessing vegetation and wildlife, the presence of rare and endangered species of plants and animals, the vegetation cover, and the presence of reserves are taken into account; when assessing hydro-mineral resources: their quantity and significance for recreation. When assessing territories and resources that have historical and cultural recreational value, the presence of unique cultural monuments and specially protected natural territories is taken into account.

As a result, the most attractive areas are those that have the widest possible development of recreational services, leaving the right to choose the type of vacation for a person. The recreational value of the territory decreases with a decrease in the diversity of landscape components and is of the least importance with a monotonous topography, harsh climate, which restricts outdoor activities, water scarcity, poorly represented flora, fauna and the absence of objects of historical and cultural heritage [5].

Assessment of the natural resource potential was carried out in the following sequence: selection of the subject of research; the selection of objects of study - natural landscape complexes, their components and properties; formulation of assessment criteria; setting the parameters of gradation scales [6]. In this work, the subject from whose analysis the analysis is performed is the territory of the Muromtsevo municipal district in the context of rural settlements, and the object of the study is natural landscape complexes. For each component of natural landscape complexes, its own criteria are formulated. The final scale includes the degree of favorable indicators for recreational use within rural settlements and gradations in three degrees: favorable; relatively favorable; unfavorable. After a recreational analysis of the individual components by applying scales, the degree of favorableness of the landscape as a whole for recreational use is shown.

The study proposed a methodology for assessing recreational land use, including an assessment of the suitability of the territory and recreational resources for organizing short and long-term vacations. It allows you to determine the direction of recreational activities depending on the available natural recreational resources and their qualitative and quantitative assessment. The difficulty in assessing the territory for recreational purposes is that different conditions and resources are needed for different areas of recreational activities. In the scales for assessing the territory, indicators that can be measured, as well as indicators subject to expert assessment, are used [7].

During the assessment of the recreational properties of the territory, the value of natural recreational resources is established by identifying the characteristics of a natural or anthropogenic landscape that can cause people to be interested in recreational activities.

The recreational value of the land is divided into specific (only to meet the needs of a very narrow circle of people) and general. Land plots with specific recreational value include attributed areas (hunting, fishing), as well as plots valuable in terms of the presence of mushrooms, berries, herbs. An example is the hunting areas of the Muromtsevo region. Land plots with a common recreational value include recreation centers, motels, boarding houses, forests and the banks of water bodies.

The recreational value of the territory is significantly affected by both natural and socio-economic factors. For example, the lack of transport accessibility may adversely affect the attractiveness of the territory for organizing recreational activities. Another important factor is the recreational capacity of the territory. The stability of the natural complex to anthropogenic impacts and the ability to recover affect the value of recreational land use. The intensity of recreational activities is characterized by the density of recreational impact on the natural complex; therefore, when organizing recreational land use, it is necessary to take into account the permissible recreational load on the territory depending on the type of recreational activity.

Thus, it has been established that the following land quality parameters influence the value of recreational land use: the area of land plots, their location, transport and pedestrian accessibility; ecological state; the stability of the natural complex to anthropogenic stresses and the ability to self-healing.

To optimize the recreational load on land, it is advisable to regulate the anthropogenic impact using engineering equipment (placement of travel routes, fencing, etc.), as well as determine the rules of behavior of visitors in recreational areas. Determining the permissible recreational capacity of the territory must be made for each site, depending on the seasons, this will allow regulating the conduct of environmentally safe and sustainable recreational activities. Landscape and recreational assessment is an integral part of the rational recreational use of the territory, since it is the unique landscape with its natural, cultural and historical attractions that attracts tourists. It is based on the landscape diversity and attractiveness of the territory, that is, the aesthetic qualities of the landscape [8].

During the study, methodological approaches to the assessment of the territory for the organization of short and long-term recreation for all areas of recreational activities were proposed. These methodological approaches make it possible to establish the presence (or absence) of natural recreational resources and the possible direction of recreational activities, not just to quantify, but give them a comprehensive description [9].

The scoring of recreational resources used makes it possible to identify the most significant indicators and rank them by the degree of favorableness for a particular type of recreational activity. The total sum of the assessment points obtained in the course of the assessment for the selected indicators is taken as an integral indicator of the recreational potential of the territory or a separate recreational facility.

The modern method of obtaining an integral assessment of a complex of factors is the method of point scales, which implies the compilation of an n -point scale of indicators for each parameter. Specific parameters are translated into relative estimates of the n -point scale, in the i -period of time. The parameters are converted to points based on specially justified criteria, and the year of zoning is taken as the reference point.

The graph-analytical method for the integrated assessment of recreational resources consists in the sequential superposition of analysis schemes for each factor (factor-by-factor systems) [10]. Based on the study of the conditions and factors of the recreational potential, zoning of the territory is

carried out according to its degree of favorableness for various types of recreational activities.

The practical value of the results obtained lies in the fact that the assessment can subsequently be used in the development of measures to improve the state of the most attractive natural sites, which necessitates a priority investment in their arrangement. The applied value of the proposed methodological approaches to the assessment of recreational lands is to obtain data that can be applied in the preparation of projects to improve the existing recreational land use, to identify promising areas of recreational activities, when drawing up land management projects for recreational lands of municipalities.

III. RESULTS

Field surveys, planning and cartographic material were carried out during the study; materials of various types of surveys were used: hydrological, geo-botanical, soil, landscape-ecological and other surveys.

Assessment of recreational resources includes the degree of favorable landscape parameters that affect the development of recreational activities. Therefore, such landscape parameters as climate, topography, vegetation, surface water and wildlife were chosen as the main indicators when conducting a recreational assessment of land. In order to improve the methodology used by I.S. Vovzhenyak [11], relying on personal research, additional indicators for assessing recreational resources and conditions for organizing recreational activities were introduced.

We characterize each of the introduced indicators:

1. Comfort – a set of natural conditions in which a person can be without physical and emotional discomfort for a long time. The comfort indicator consists of indicators of landscape and climatic comfort. Climatic comfort is considered in the basic methodology, using such characteristics as: number of warm days (with temperatures above 15 °C, number of sunny days, wind speed), degree of waterlogging of the territory can be attributed to the indicators of landscape comfort; presence of water bodies.

2. Aesthetic attractiveness of landscapes – appearance of a landscape, as a special type of renewable natural resource, affecting the psychological comfort of a person.

Based on the results of the assessment, territories with varying degrees of suitability of the hydrographic network for recreational use were identified. The territory of the Artyn rural settlement has the most developed hydrographic network and is rated as the most favorable; its area is 240 km² or 4% of the total municipality area. Relatively favorable conditions include the territories of the Muromtsevo urban settlement and Bergamak rural settlements with a total area of 893 km² (or 13%). The remaining rural settlements have unfavorable conditions, which is 83% of the total area.

When determining the recreational favorableness of water bodies, it was revealed that the considered region as a whole has a relatively favorable assessment of hydrography.

When assessing the recreational potential of water bodies, the assessment is carried out separately for each type of recreational activity. Surface waters are of great importance for the organization of recreational activities, but not all have favorable conditions for recreation. Large rivers and lakes are

valuable for organizing recreational fishing, but in most cases they have overgrown shores, are partially logged, and there is no road-path network. Shallow-water, well-heated zones of water bodies with a sandy beach are suitable for organizing a beach-bathing vacation.

The most favorable (8-10 points) in terms of hydrographic conditions are Kondratyevsky, Ryazan, Bergamak and Muromtsevo rural settlements. Relatively favorable (4-7 points) are Kamyshino-Kursk, Artyn and Nizov rural settlements. The remaining rural settlements are slightly unfavorable (1-3 points) for organization of recreational activities.

A quantitative assessment of the waterlogging of the territory was made depending on specific weight of swamps in the total area of a rural settlement, and a qualitative assessment characterizes the degree of favorableness for recreational use.

As a result of a recreational assessment of the territory by the degree of waterlogging, it was revealed that the territory of the Muromtsevsky urban settlement, Artynsky, Bergamaksky, Gurovsky, Kostinsky, Kamyshino-Kursky, Kurgan, Mokhovskiy and Porechensky rural settlements have the most favorable conditions for the development of certain types of recreational activities and is up to 44%. The territories of Kondratyevsky, Mysovsky, Nizovsky, Ryazan and Ushakovskiy rural settlements are relatively favorable conditions and make up 50%. Territory of the Karbiziz rural settlement is unfavorable, which has a degree of waterlogging of almost 43% of the total area of the settlement. With the further development of recreational activities, it is necessary to consider that the presence of swamps favorably affects only the development of extractive recreation, in connection with the berries growing on the swamps.

Assessment of landscape and aesthetic attractiveness was carried out according to the following factors: forest cover (forest cover is considered to be optimal at 30-60% and gives the best panoramas and viewpoints); nature of vegetation distribution; naturalness of the landscape; the presence of unique objects (natural and cultural attractions); nature of distribution and magnitude of water bodies; prevailing color gamut; colorfulness.

To assess the landscape-aesthetic attractiveness, rating scales were developed for each of the selected criteria [12].

The results of the assessment of the recreational attractiveness of landscape complexes in terms of aesthetic value showed that the most attractive are the Muromtsevo urban settlement, Artynskoye, Bergamakskoye, Kondratyevskoye, Porechenskoye, Ryazanskoye rural settlements that have rank I values. The second rank of value was received by all other rural settlements. There are no unattractive landscapes in the territory of Muromtsevo district.

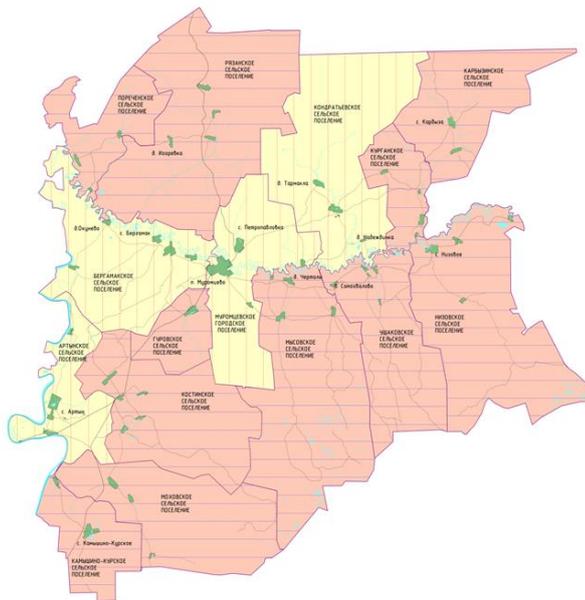
Assessment of the aesthetic resources of the territory is the final and most important stage of landscape-aesthetic research [13]. In the future, the data of these estimates can be used to determine the total natural resource potential of the study area. To the greatest extent, the results of assessments of the aesthetic attractiveness of landscape views of the territory can be applied in recreational planning.

To conduct an assessment of recreational lands, first of all, it is necessary to determine a set of assessment indicators, to identify their importance for the organization of recreational activities. Assessment of recreational resources allows you to get complete information about the degree of suitability of the land for the organization of recreational activities. Moreover, it should be noted that a low score cannot serve as a basis for classifying a land plot as unpromising for organizing recreational activities.

The results of a factorial assessment of each component of the landscape allows you to give a comprehensive assessment, determine the recreational potential of the territory and the main direction of recreational activities.

Based on the data obtained by the authors of the study, a zoning scheme for the natural and recreational potential of the studied area was compiled (Fig. 1). Landscapes with a high recreational potential include the territories of the central and western parts of the region: Muromtsevo urban settlement, Bergamak, Artyn, Kondratyev rural settlements. Landscapes with average recreational potential include the territories of other rural settlements.

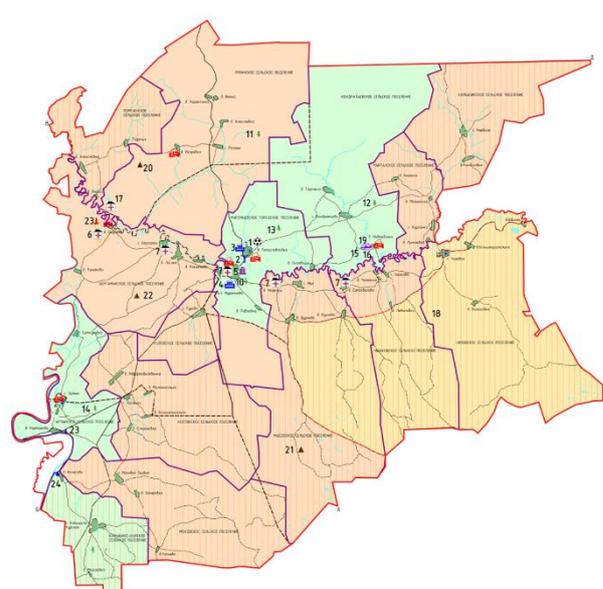
Zoning of the territory by the duration of recreational activities (Fig. 2) and areas (types) of recreational activities (Fig. 3) is associated with the need for functional zoning.



LEGEND
Boundaries

- Administrative district boundary
- Average potential
- High potential

Fig. 1. Zoning scheme of natural and recreational potential



LEGEND
Boundaries

- Municipal district
 - Rural settlements
 - Communities
- Road designation**
- Highways of regional importance
 - Local roads
 - Other roads

Road designation

- Other roads

Other areas

- Water bodies

Proposed projects

- Excursion recreation area
- Extractive recreation area
- Recovery recreation area
- Health-improvement recreation area

Objects of extractive recreation

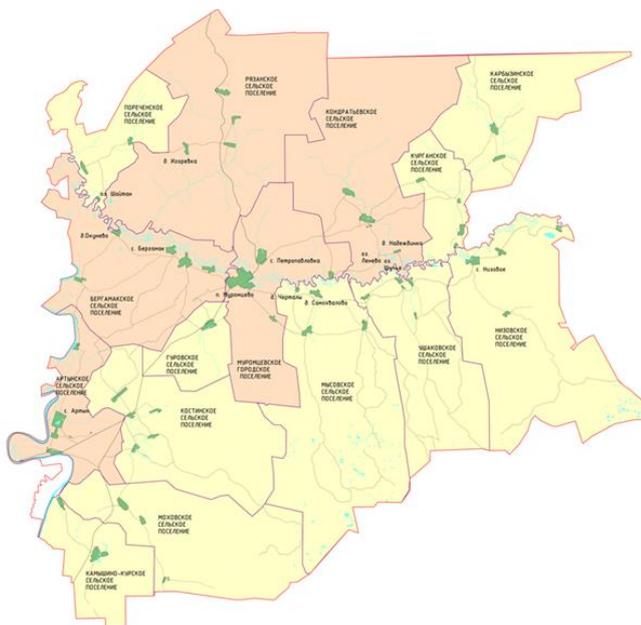
- Hunting sector
- Boundaries of hunting sectors

Objects of excursion recreation

- Architectural monument
- Boundaries of "Allapy" protected area
- Objects of pilgrimage and religious tourism

Objects of recovery recreation

- Pine forest
- Sport objects
- Objects of health-improvement
- Suburban recreation area "Lenevo"



LEGEND
Boundaries

- Administrative district boundary

Road designation

- Highways of regional importance
- Local roads
- Other roads
- Zones of short-term recreation
- Zones of long-term recreation

Fig. 2. Scheme of recreation zoning of the territory by duration of recreational activities

Fig. 3. Scheme of territory zoning in areas of recreational activities

Functional recreational zoning is carried out within the land in the process of its intra-site organization, in order to identify functional zones. Since recreational activities are variable both in space and in time, therefore, the boundaries of its functional zones are not strictly determined. A recreation zone may include subzones depending on the number of types

of recreational activities organized in a given territory, according to their intensity.

Thus, after conducting recreational zoning of the Muromtsevo district, it was revealed that it is advisable to create recreational zones of short-term rest on 67% of the area. In the rest of the territory (Artynskoye, Bergamaskoye, the southern part of Ryazan, Kondratyevsky rural settlements, Muromtsevsky urban settlement – 33%) it is advisable to create recreational areas for long-term rest. This zoning was determined on the basis of available accommodation facilities: recreation centers, campsites, holiday homes, guest houses.

During recreational zoning in areas (types) of recreational activities, the results of a recreational assessment of natural resources and an assessment of the favorable territory for the organization of recreational activities were used, which give reason to argue that the recreational potential of the studied area contributes to the functioning and development of all areas of recreational activities. The presented variant of zoning of the territory is not final; it can be modified, supplemented with the accumulation of new data and as a result of the development of the recreational complex of the studied region.

IV. CONCLUSION

The application of landscape design methods in land management makes it possible to assess the recreational potential of lands and to carry out their zoning, delimiting recreational land by type and direction of recreational activity, taking into account the recreational assessment of natural resources, resistance to anthropogenic impact and the current state of land use. At the same time, during zoning of the territory, intrazonal features are taken into account, which allow emergence of scientifically substantiated solutions to the issues regarding organization of recreational land use. The considered approach makes it possible to carry out measures engaging of unused and unsuitable lands for agriculture in order to organize recreational activities.

The assessment approach to a land plot selection for organizing recreational activities compared to the non-assessment one has a number of advantages. The assessment allows reducing the costs of organizing recreational activities, to establish the feasibility of its organization, to improve the quality of designed decisions.

The applied value of proposed methodology for calculating the recreational lands score is in obtaining data that can be used to determine promising areas of recreational activities, when drawing up land management projects for recreation, when drafting projects to improve existing land use, when conducting landscape and ecological zoning of the territory.

An integrated approach of organizing recreational land use can be implemented through a system of special land management documents of a prognostic nature. The main document covering all aspects of the land use organization, including recreational, may be the Scheme for forecasting and

planning the use and protection of land in the Omsk region, and as a separate component of it, the Scheme of organizing the use of recreational land. Such a purposeful organization of recreational lands will not only save these valuable objects for society, but also create conditions for the sustainable development of the territory.

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