Land management support for formation of specially protected natural reservations system

L E Petrova, E A Zatsepina, E A Chibirkina and E E Mamedova
State University of Land Use Planning, 15, Kazakova street, Moscow, 105064, Russia
E-mail: l_petrova.08@mail.ru

Abstract. Special-purpose programs and documents on environmental protection and sustainable development adopted at the international and regional levels demonstrate the world community's equal attention to economic, social and environmental components as well as their recognition that with the degradation of natural environment human society's development is impossible. At the same time, creation and development of a system of specially protected natural reservations is an integral part of the country's nature protection system, which ensures preservation and restoration of landscape and biological diversity sufficient to maintain natural systems ability to self-regulate and compensate for the consequences of anthropogenic activities. The real mechanism for organizing the rational use of land territories and regulating land relations is land management, which solves the entire range of legal, socio-economic and environmental issues. Therefore, all actions related to the formation of some new and reorganization of existing specially protected natural reservations, organization of land rational use should be carried out only in accordance with land management procedures. The inconsistency and unsystematic nature of land management work in recent years, the involvement of incompetent organizations in implementing that work led to the fact that decisions related to the land use were made without appropriate legal, economic and environmental justification, without compliance with requirements for rational use of territories and their protection. The above-mentioned actions resulted in a number of problems in organization of rational use of territories of all categories, including land of specially protected reservations and objects. The above said statement determines the need to improve the regulatory and methodological support for formation and functioning of specially protected natural reservations of federal, regional and local significance.

1. Introduction
In 2019, the modern system of specially protected natural reservations of federal, regional and local significance in the Russian Federation included 11.8 thousand objects with the total area of 238.8 million hectares. The number of specially protected natural reservations of federal significance was 295 units (nature reserves - 108 units, national parks - 63, state nature reserves - 60, monuments of nature - 17, dendrological parks and botanical gardens - 47), with the total area of 73.8 million hectares (including marine areas) (Fig. 1). Despite the fact that specially protected natural reservations of federal significance make up less than 3% of the total number, they account for more than a quarter of the total area of protected territories and 97% of the area of protected marine reservations.
Specially protected natural reservations of regional significance were predominant in numbers, including 10,446 units, with the total area of 117.5 million hectares. There were 1,081 specially protected natural reservations of local significance, with the total area of 47.5 million hectares.

Analysis of dynamics in the number and area of specially protected natural reservations of federal, regional and local significance in recent years indicates a steady trend of their increase (Figure 2).

2. Materials and methods
An analytical review of organizing and functioning of specially protected natural reservations in the Russian Federation has shown that there is a need to improve the regulatory and methodological support for this process, since a number of issues are currently unregulated in the legal field and require synchronization of legislation to avoid ambiguity in the interpretation of terminological apparatus and approaches to the formation of their land uses.
The object of the study determined the use of various methods of collecting, processing and analyzing data that formed the information base of the study: abstract-logical, monographic, statistical, cartographic.

The increasing importance of protected areas in society’s life at different territorial levels stipulates updating of theoretical and methodological tools of land management, which adequately reflect their uniqueness and diversity, ensuring synchronization of the system of specially protected natural reservations in space.

3. Results
In accordance with the UN General Assembly resolution A/RES/71/313 of July 06, 2017 on the development of national sets of indicators for the Sustainable Development Goals, the Russian Federation developed a list of national indicators that characterize achievement of the Sustainable Development Goals, taking into account national priorities, local conditions and available statistical capacity. To specify the degree of achievement of Goal 15, which is formulated as "Protection and restoration of terrestrial ecosystems and promotion of their rational use, rational forest management, combating desertification, stopping and reversing the process of land degradation and stopping the loss of biological diversity", a number of indicators are also provided that reflect the need to increase the area and financing of specially protected natural reservations as one of the main elements of achieving the Sustainable Development Goals, which requires appropriate information, methodological support and economic mechanism for their functioning.

Land management support for the rational use and protection of lands of specially protected natural reservations of federal, regional and local significance involves the following:
- ensuring preparation and updating of schemes for the placement of specially protected natural reservations;
- identification, establishment of borders, location of lands of specially protected natural reservations which are in other categories of land;
- establishment of restrictions and encumbrances in the use of land plots included in specially protected natural reservations and their protected zones without withdrawal in accordance with procedures of land management;
- development of projects of on-farm land management of agricultural organizations included in specially protected natural reservations and their protected zones without withdrawal;
- development of measures for recultivation of disturbed land, protection of land from erosion, flooding, waterlogging, pollution by production and consumption waste, radioactive and chemical substances, contamination and other negative impacts.

The inconsistency and unsystematic nature of land management work, recruiting incompetent organizations for the work resulted in decisions related to the land use being made without appropriate legal, economic and environmental justification, without compliance with the requirements for the rational use of land territories and their protection. The above-mentioned actions led to the land allocation for collective gardening, dacha construction and other purposes on the lands of specially protected natural reservations, in protected zones. The vast majority of issued documents certifying the rights of citizens and legal entities to land failed to reflect restrictions and encumbrances of rights in the use of land.

4. Discussion
Unlike the traditional understanding of specially protected natural reservations as areas of the biosphere (ecosystems of various ranks), completely or partially, permanently or temporarily excluded from economic use, such territories have come to be considered as the most valuable natural assets of humanity, which play a significant role in sustainable development, representing an important component of natural (ecosystem) capital. The Millennium Ecosystem Assessment states that natural (ecosystem) capital, as a combination of ecosystems, biological species and natural resources, not only
serves as the foundation of all economies and societies, but also forms the basis of individual well-being of each person, which determines its critical importance for survival and well-being of mankind. Planning and organization of specially protected natural reservations of federal, regional and local significance requires the development of interrelated and mutually complementary documents that are multivalued in their content, goals, objectives and degree of detail. Land use of specially protected natural reservations is the result of a compromise between the preservation of natural ecosystems and the pragmatic use of the territory considering regional socio-economic development. To ensure the viability of specially protected natural reservations for a historically long time, their design should be linked to both the current and future planned spatial organization of all types of economic activities in the region.

Specially protected natural reservations are essential when developing the territorial planning scheme and the General Scheme of Land Management of the territory of the Russian Federation, territorial planning schemes and land management schemes of the subjects of the Russian Federation. Based on the adopted schemes for the development and placing of specially protected natural reservations or territorial schemes for nature protection, the state authorities of the subjects of the Russian Federation make decisions on the reservation of land plots that are supposed to be declared specially protected natural reservations, and on the restriction of economic activity on them [1, 2]. In the absence of such documents, they develop proposals to organize new and record existing specially protected natural reservations based on the suggestions of state authorities, local self-government, scientific, public and other organizations considering:

- creation and development of specially protected natural reservations of federal, regional and local significance to form the natural reserve fund of the Russian Federation as an integral component of the socio-economic development of regions, the preservation of unique natural complexes;

- preservation and restoration of the integrity of natural systems, including their fragmentation prevention in the course of economic activity during the construction of hydraulic structures, communication routes, pipelines, power lines and other linear structures;

- preservation and restoration of natural biological diversity of landscapes in intensively used and urbanized areas;

- rehabilitation of territories and water areas that have been negatively affected by anthropogenic activities;

- meeting the needs of the regions of the Russian Federation in solving health, recreational, historical, cultural and environmental conservation problems;

- ensuring and preserving national, historical, cultural and other traditions of the population living within a certain territory.

When determining the land reserve to create new and regulate existing specially protected natural reservations, it requires to complete the task of creating their protected zones with a regulated regime of economic activity in them.

Proposals to locate and reorganize specially protected natural reservations included in the Land Management Schemes are detailed and implemented through the development of inter-farm land management projects when creating and reorganizing specially protected natural reservations, as well as working projects when eliminating the causes of violation and degradation of natural complexes, that is, during soil remediation, implementation of measures to protect land from water and wind erosion, mudslides, flooding, waterlogging, secondary salinization, desiccation, compaction, pollution with chemicals, including radioactive, other substances and microorganisms, pollution by production and consumption waste and other negative effects [3, 4, 5].

The formation of land-utilization of specially protected natural reservations requires taking into consideration of a number of aspects:

- location of specially protected natural reservations is confined to the natural habitat of certain animal and plant species that require protection, or to territories occupied by typical or unique landscapes that may be destroyed as a result of anthropogenic activities;
- optimal area of a specially protected natural reservation is determined by the need to preserve genetically determined number of individuals of the protected species necessary for successful reproduction;
- priority of arranging a specially protected natural reservation as a single compact site; the protected territory as part of several small, separated, typologically complementary sites is considered as an alternative in conditions of poor preservation of indigenous plant communities; at the same time, the placement of protected reservations should involve and maintain the possibility of free exchange of organisms between them in order to minimize the effect of their isolation;
- setting external and internal borders along natural boundaries with a minimum number of turnings;
- minimization of the negative impact of anthropogenic activities on a specially protected natural reservation by establishing land use regimes in accordance with the purpose of functional zones and mandatory creation of protected zones in the adjacent territory;
- formation of a system of specially protected natural reservations, in which each protected territory complements the existing ones with a new missing link and ensures in the future the formation of such a system of specially protected natural reservations that reflects the biological and landscape diversity of the country as a whole [6, 7].

According to the legislation of the Russian Federation, there is a possibility for land plots and water areas adjacent to specially protected natural reservations to create protected zones on them with a regulated mode of economic activity. The establishment of protected zones entails changes in the regime of land use: they prohibit activities that have a negative (harmful) impact on natural complexes of specially protected natural reservations. Land plots within the boundaries of protected zones are not seized from owners and tenants of land plots but must be used by them in compliance with the established restrictions.

The document defining the relationship between protected areas and exploited ones can be applied, in particular, as methodological recommendations for drawing up land management schemes of the region and the district, projects of inter-farm and intra-farm land management supplemented by provisions regulating an environmentally sound land use regime.

5. Conclusion
The formation of specially protected natural reservations and objects should result in their rational system elaboration, which ensures conservation and reproduction of natural resources, regulation and compensation of negative anthropogenic impacts, as well as in combination with other environmental measures, contributes to maintaining ecological balance and creating an optimal environment for modern and future generations lives. An analytical review of the management process of specially protected natural reservations of different levels and categories has now shown that separate departments implement it, which does not ensure the formation of a system of specially protected natural reservations in which all categories are interrelated and complement each other, so it is advisable to talk about creation of a single management body, which will eliminate conflicting goals and duplication of functions.

One of the key principles of land legislation is the priority of protecting human life and health, according to which, when exercising activities for the use and protection of land, such decisions should be made and such activities should be carried out that would ensure the preservation of human life or prevent negative (harmful) effects on human health, even if this could require large costs. Thus, the priority of environmental requirements over economic feasibility of land use determines the decision - making on certain projects implementation.

References
[1] Volkov S N, Cherkashina E V and Semochkin V N 2020 Unused agricultural land: problems and solutions IOP Conf. Series: Earth and Environmental Science 579 012121
[2] Petrova L E, Sorokina O A, Fomkin I V, Zatsepina E A and Rudinova Y I 2020 A system of specially protected natural reservations in terms of the transition to sustainable development *IOP Conf. Series: Earth and Environmental Science* **579** 012072

[3] Shirokova V A, Khutorova A O, Gurov A F, Shirokov R S and Yurova Y D 2018 Environmental Assessment of Anthropogenic Effects on Recreation Zones: Osetr River in the Moscow Region *2018 Baltic Geodetic Congress (BGC Geomatics) (Olsztyn, 2018)* pp 181-185

[4] Semenova E P and Shirokova V A 2018 Assessment of the adverse effect objects as a starting point for ecological reform, in: *Current aspects of natural resource management problem solving* (Moscow: State University of Farming) pp 431–7

[5] Volkov S N, Shapovalov D A and Fomin A A 2020 Development of cartographic materials for optimal placement of objects and lands using the information logical system of automated land management design *IOP Conf. Series: Earth and Environmental Science* **579** 012155

[6] Volkov S N, Shapovalov D A, Klyushin P V 2017 Solutions of problems in defining indicators of agricultural land within the framework of activities for the implementation of the concept of development monitoring in the Russian Federation *GeoConference SGEM 17(52)* 819–828

[7] Petrova L E, Sorokina O A, Fomkin I V and Mamedova E E 2019 Transboundary protected areas *IOP Conf. Series: Earth and Environmental Science* **350** 012042