A system of specially protected natural reservations in terms of the transition to sustainable development

L E Petrova, O A Sorokina, I V Fomkin, E A Zatsepina and Y I Rudinova
State University of Land Use Planning, 15, Kazakova str., Moscow, 105064, Russia
E-mail: kafzem@guz.ru

Abstract. The world community's awareness of the rapidly deteriorating environmental situation as a threat to the continued existence of mankind determined the formation and adoption of the Concept of sustainable development in the second half of the XX century. One of the mechanisms for solving the strategic task of environmental protection is declared to be the formation and ensuring the sustainable functioning of a system of specially protected natural reservations of different levels and categories, which would ensure the preservation of natural ecosystems, making them centres for preserving the genetic fund and restoring the original biodiversity. The land-use planning, formation of new and reorganization of existing specially protected natural reservations is a guarantee of creating optimal conditions for solving the tasks assigned to them. The analytical review of the adopted normative legal documents and implemented target programs at the international and national levels objectively shows that the development of the system of specially protected natural reservations is declared as one of the main mechanisms for ensuring the implementation of the Concept of sustainable development. The research showed that not all specially protected natural reservations provide the existence of viable populations of organisms for the saving of which they were created. For the development of the system of specially protected natural reservations in the Russian Federation, it is necessary to improve the theoretical and methodological tools of the land management that adequately reflects their uniqueness and diversity, methods of rational organization of their territory, during which the creation of a stable, self-regenerating ecosystem will be carried out, ensuring the solution of environmental and socio-economic problems at both the regional and global levels.

1. Introduction
On January 1, 2016, the document "Transforming our world: the 2030 Agenda for Sustainable Development", adopted at the UN Summit (25-27.09.2015, USA, New York) officially came into force. It involves the working to achieve 17 goals and 169 targets that are aimed at balancing all three components of sustainable development: economic, social and environmental.

By the system of legislation of the Russian Federation, generally recognized principles and norms of international law and international agreements with foreign states and international organizations are an integral part of its legal system. Therefore, following the adoption of the first documents in the field of sustainable development by the international community, Russia has also developed and adopted several documents that declare the need for the transition to sustainable development and ways to implement it.

By the adopted strategic documents and implemented target programs at the national and regional levels in the Russian Federation, the development and improvement of the system of specially
protected natural reservations are one of the main activities for the conservation, protection and restoration of the planet's ecosystems. Conservation of ecosystems, maintaining their integrity and life-supporting functions is considered as a necessary component to ensure the country's environmental security.

As the largest state in the world, the Russian Federation includes more than 1/5 of the land area with undisturbed ecosystems that form the world’s largest environmental stabilization zone that is a unique ecological resource to restore the Earth's biosphere.

2. Materials and methods
Statistical and analytical materials of Federal and Regional Executive Authorities of the Russian Federation, recommendations and reports of scientific organizations in the field of environmental protection and land management formed the database of the research. The subject of the research necessitated the use of various methods of collecting, processing and analyzing scientific information: abstract and logical reasoning, monographic method, statistical analysis (including the analysis of state statistics and data from the state information systems), analysis of key international and Russian forecast documents. When processing statistical and cartographic material, such as software applications as Microsoft Word, Microsoft Excel, and MapInfo Professional applications were used.

3. Results
The world community is on the way to develop and implement a comprehensive set of interrelated goals and targets in the field of sustainable development, aimed at meeting human needs and simultaneously solving problems related to environmental changes [1, 2].

The fragmentation of habitats and the disappearance of individual species as a result of human activity requires a review of existing patterns of consumption and production, which are the most important causes of declining in biodiversity on the planet.

Ecosystems have a certain degree of stability, which has a limit to the volume and nature of external influences, after passing through which they lose their ability to self-repair and self-regulation. The criteria for ecosystem stability are a high organization, intensive functioning and balance of functions, including biological productivity and renewability of vegetation cover. Despite the universality of the main ways of adaptation of all living organisms, the adaptive potential of each species, which characterizes its ability to adapt in ontogenesis, reproduction and genotypic variability, is specific and evolutionarily determined.

Multi-level systems of specially protected natural reservations are the basis for scientific, methodological and informational support of forecasts of the prospective state of ecosystems, development of a strategy for territorial nature protection, taking into account the identified trends as a result of the analysis of long-term observations of the dynamics of natural processes, phenomena and objects.

A key question for the organization of environmental activities is the territorial aspect to optimize the area and boundaries of specially protected natural reservations, the scheme of functional zoning, adequate natural and socio-economic characteristics of the region, peculiarities of usage of individual functional zones and their areas, create protected zones in the surrounding areas and the management of natural resources in them.

The practice of recent decades has shown that the lack of mandatory land management in the formation and reorganization of specially protected natural reservations has led to some problems that prevent them from fulfilling their tasks. In the above context, it is reasonable to say that no action related to the assignation, withdrawal, redistribution or management of land use should be carried out with a land management project. At the same time, it should be taken into account that the land management of specially protected natural reservations has some features:
- the earth simultaneously acts as a spatial basis and as a natural resource;
- it is impossible to use analogues since each nature protection area is unique;
- polyfunctionality of environmental land use, which requires the establishment of appropriate regulations for the use of land plots, depending on their purpose and attribution to a particular functional zone;
- it is impossible to move the conservation land use to another territory since there are no areas of the earth's surface that are identical in terms of biodiversity;
- the dominance of the environmental imperative over economic efficiency;
- the need to use knowledge in the field of ecology, biology, zoology, geography, hydrogeology, genetics and other natural sciences.

Also, the formation of specially protected natural reservations determines the need for land management of agricultural organizations located on neighbouring territories, since previously, when developing projects for on-farm land management, the presence of regime and regime-forming objects was not taken into account. The content of the adjustment of projects of on-farm land management of agricultural organizations involves changes in the structure of planted acreages, territory organization, organization of crop rotations, the introduction of restrictions in the system of crop protection from diseases, pests and the system of fertilizer application.

The possibilities for developing a network of specially protected natural reservations are determined by a combination of various factors: the physical and geographical conditions of the area, the nature of landscapes (ecosystems), their anthropogenic vulnerability and transformation, the presence of unique and threatened natural objects, and the general condition of nature use. Restrictions on this indicator, which theoretically can be very high, are imposed by the ability of the economy of the country and the region to function without these resources [5].

The indicator of 17% of the total area of the state is currently a generally accepted global reference point in the field of territorial nature conservation.

In our opinion, when determining the optimal area occupied by specially protected natural reservations in the region, it is advisable to adhere to the principles of necessity and sufficiency. Therefore, there is a need to determine and scientifically justify the optimal spatial relationships between natural and anthropogenic systems.

At the same time, specially protected natural reservations are considered as elements of the ecological system of the region, which includes other protected territories that are interconnected and complement each other.

4. Discussion
The modern system of specially protected natural reservations of the Russian Federation, which has been formed for more than 100 years, currently includes about 12 thousand objects of federal, regional and local significance, the total area of which as of 01.01.2019 was 237.7 million hectares (including the sea area).

The Russian Federation's ratification of a number of international agreements has contributed to the emergence of specially protected natural reservations recognized by the world community: biosphere reserves, world natural heritage sites, and wetlands of international significance. The complexity, versatility and impossibility of solving environmental problems within the borders of individual states make it necessary and appropriate for cross-border interaction and international cooperation [3, 4].

However, a significant number of different specially protected natural reservations in the Russian Federation is not enough to guarantee the conservation of biodiversity in such a huge country, and it determines the environmental conditions of each specific region, ensuring the stability of conditions necessary for human life. It is established that the environmental condition determines the state of human health by 20-25%.

Specially protected natural reservations of the Russian Federation are extremely heterogeneous formations both in their natural and territorial characteristics: the degree of complexity and organization of ecosystems, the size, number and mutual location of clusters, the configuration, and the features of borders. All these peculiarities significantly affect the ability to resist negative factors
of anthropogenic origin, contribute to or prevent from solving the main tasks set before specially protected natural reservations.

Principal permitted ways to use land plots located within the boundaries of specially protected natural reservations are defined by the regulations on the protected area, which may also provide accessory permitted ways to use them. In the case of zoning of a specially protected natural reservation, the main and auxiliary types of permitted use of land plots are provided by the regulations on the specially protected natural reservation in respect to each functional zone.

If the permitted use of land plots within the boundaries of a specially protected natural reservation allows building activity on them, then the Regulation sets the maximum (maximum and/or minimum) parameters of permitted construction work and reconstruction of capital construction objects.

Planning and organization of specially protected natural reservations involve the development of a set of interrelated documents that are ambiguous in their content, goals, tasks and degree of detail.

Different regions of the world are characterized by different numbers and relative areas of specially protected natural reservations. To determine the exact proportion of a territory or an area of an ecosystem that needs to be protected to prevent its further degradation or loss of natural biodiversity is a task that, due to the enormous complexity of natural systems, science has not yet completely solved. There are only approximate estimates of this percentage, which may differ significantly in each case.

Held in 1992 the IV World Parks Congress recommended each country to increase the area of protected areas to 10% as the nearest frontier. In 2010, in Nagoya (Japan), at the 10th Conference of the members of the Convention on biological diversity, countries committed themselves to increase the area of protected areas by 2020, and it was decided to protect at least 17% of the country's land area and 10% of the sea area to preserve natural complexes.

The optimal share of specially protected natural reservations, in our opinion, is not subject to clear regulation and depends on the specific conditions of the region.

5. Conclusion
A number of targeted programs and legal documents on environmental protection and sustainable development adopted at the international and regional levels indicate the Declaration by the world community of equal attention to the economic, social and environmental components and the recognition of the impossibility of human development in the degradation of the natural environment [6].

At the same time, the creation and development of a system of specially protected natural reservations are considered an integral part of the country's environmental system, which ensures the preservation and restoration of landscape and biological diversity sufficient to maintain the ability of natural systems to self-regulate and compensate for the consequences of anthropogenic activities.

The effective functioning of the system of specially protected natural reservations and the solution of the tasks assigned to them (preservation of biological and landscape diversity, preservation of the gene pool, and others) is possible only based on the correct organization of the territory within which they exist.

The main mechanism that will create optimal conditions for solving the tasks assigned to specially protected natural reservations is land management.

References
[1] Volkov S N, Shapovalov D A and 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
[2] Shapovalov D A, Klyushin P V, Shirokova V A, Khutorova A O and Savinova S V 2018 Problems and Efficiency of Land Use in the North Caucasian Federal District 18th International Multidisciplinary Scientific GeoConference SGEM2018 18(5.1) 667-674
[3] 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

[4] Klyushin P V, Lukyanova T S and Shirokova V A 2018 The Current State of Boggy Territories in the Meshchorya National Park GeoConference SGEM 18(2.1) 775–782

[5] 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 Baltic Geodetic Congress (BGC Geomatics) (BGC Geomatics) pp 181-185

[6] Semenova E P and Shirokova V A 2018 Assessment of the Adverse Effect Objects as a Starting Point for Ecological Reform Current Aspects of Natural Resource Management Problem Solving (Moscow: State University of farming) pp 431–437