The complex problem of biodiversity on international, national and regional levels: paradigm and approaches

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Abstract. The article discusses the multidimensional problem of biodiversity: its description, mission statement on the global arena and on the national level in the Russian Federation. The purpose of the research is to reflect global agenda on the issue as well as the situation in the RF. The political and legal efforts which have been made not to lose national biodiversity are being discussed. The classification of state protected natural areas in the RF is given, and by an example of one natural park “Deer Streams” in Sverdlovskaya oblast achieving of sustainable goals on protecting biodiversity in Russia is being demonstrated.

1 Introduction

Researchers state that even if the world’s biodiversity is complex, humankind has made progress in understanding its multidimensionality and breadth. Anyway, only a small part of all biodiversity is considered in applied conservation programs. Integration of statistical modeling of biodiversity and conservation planning could combine all their datasets and techniques which would lead to compilation of a much broader set of taxa. Such integration could improve the process of evaluation and extending it to the many different facets of biodiversity that are important to ecosystems. Different systems of international assessments already exist, e.g. the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) that provides scientific knowledge for safeguarding the diversity. It was preceded by the Global Biodiversity Assessment (GBA) and the Millennium Ecosystem Assessment (MA) as well as the Global Biodiversity Outlook (GBO) and the Global Environmental Outlook (GEO). Still the acute need for further designing of digital tools exists because methods of data storage, analyzing and evaluating of diversity should develop to provide realization of diverse national and international programs in the field of biodiversity.

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2 Methods, results and discussion

2.1 International approach to biodiversity protection

International Mother Earth Day 22 April 2024, stated that “biodiversity is the heartbeat of Mother Earth”. He reminded everyone about “The Biodiversity Plan” or “The Kunming-Montreal Global Biodiversity Framework”, which aims to restore and protect nature, to invest and collaborate for nature. The goals of the Plan are supported by 23 action targets that concern the drivers of biodiversity loss. This Plan was agreed in December 2022 in Montreal, Canada. Its targets are so complete that the world has not ever seen such an approach. The Plan includes 15 pages and considers the development of the post-2020 global biodiversity framework. The Kunming-Montreal Global Biodiversity Framework was built on the Strategic Plan for Biodiversity 2011–2020: achievements, lessons and experience learned. It sets out a very ambitious plan to transform societies’ relationship with biodiversity by 2030, according to the 2030 Agenda for Sustainable Development and its Sustainable Development Goals, and ensure that, by 2050, the shared vision of living in harmony with nature is fulfilled.

2.2 National peculiarities: Russian approach to biodiversity protection

In this part, we would like to consider the approaches to the problem of biodiversity loss in the Russian Federation. To do a research such methods were used as review of studies and official documents, description and grouping as well as context analysis, statistics and comparison methods. Texts of the research papers, international conventions, the Federal law of the Russian Federation on specially protected natural areas, news releases, informational materials provided by the Natural Park “Deer Streams” were analyzed as materials and sources.

The Russian Federation took part in the process initiated by the UN, which was described in the part 2.1. In 2014 our country introduced on the global arena the Strategy and Action Plan on conservation of biological diversity in Russian Federation. It was an impressive document containing 258 pages. It includes the main features of biodiversity in the country, threats, principles and 20 tasks, detailed action plans, monitoring, analysis and other relevant information. The Ministry of Natural Resources of the Russian Federation worked on this Strategy in coordination with some world organizations, which nowadays are not the partners of Russia anymore. However, the Russian Federation has its own framework concerning biodiversity in our country and develops policies, measures and checkpoints in this field, analyzing problems and improving methods.

Russia occupies 1/8 of the planet’s landmass—the most part of extratropical Eurasia.
different flora and fauna representatives are found, constituting from 1 to 20% of the world diversity for individual taxa. Anyway, biodiversity here is relatively low compared to more southern regions, unlike landscape diversity which clearly stands out.

The conservation and restoration of the biodiversity, taking care about rare and endangered wildlife, the formation of a regulatory legal and methodological framework as well as planning and implementation of measures in this field are the priority areas of activity, according to the Russian Ministry of Natural Resources.

Moreover, by the Decree of the President of the Russian Federation No. 204 issued on May 7, 2018, the conservation of biological diversity is included in the national goals and strategic objectives of the development for the Russian Federation until 2024.

Since 2019, the federal project “Preservation of Biodiversity and Development of Ecological Tourism” of the national project “Ecology” has been implemented. Particular attention has been paid to 11 objects of the animal world that require priority measures for restoration and reintroduction. Among them are such species as polar bear, Central Asian leopard, Far Eastern leopard, snow leopard, Amur tiger, bison, Przewalski’s horse, Siberian crane (white crane) and the others. The Ministry of Natural Resources is engaged in developing conservation strategies and recovery programs for these species.

Deputy Minister of Natural Resources and Ecology of the Russian Federation Elena Panova stated that businesses were offered a modern methodology for preserving biodiversity as part of the federal project. Priority indicator species of animals were identified for corporate programs, and the structure of programs as well as requirements for their content were unified. As the work’s curator, Elena Panova added that working groups had been created, which ensure the effective implementation of measures adopted by the Russian Ministry of Natural Resources for the conservation and restoration of the relevant rare species.

Anyway, the basic springboards for the implementation of conservation and reintroduction measures aimed at endangered wildlife are specially protected natural areas of federal significance. The federal project suggested creating more protection areas (wildlife sanctuaries, conservation areas etc.) that include the main habitats of rare animals and plants.

The main document containing all the information about rare and endangered species of animals and plants is the Red Book of the Russian Federation. Based on its data, scientific researches and practical measures are developed. They are aimed at the protection and reproduction of these species. The Red Book is regularly upgraded. The latest edition of the official protective list is dated April 2, 2020: 43 new species were included.

Actually, today this document with a complete list of animals and plants is the only one supported and protected at the federal level. In addition to plants, the list includes fungi and a variety of microbiota. The important thing is that protection applies to all inhabitants, regardless of their place of residence — “in” or “outside” the protection area.

- state nature reserves (including biosphere reserves);
- national parks;
- natural parks;
- natural sanctuaries;
- natural monuments;
- dendrological parks and botanical gardens.

It is not always easy to understand what makes the difference between natural areas mentioned above, especially taking into account different terms and collocations which...
exist in English and in Russian. Federal and regional regulations can differentiate from country to country, so only descriptions and additional explanations can define these differences more precisely. In English we can also find plenty of names, which serve to distinguish between protection areas all around the world, e.g. Animal Sanctuary, Anthropological and Forest Reserve, Aquatic Reserve, Conservation Area, Area protected for habitat and species, Biological and Ecological Interest Site, Biosphere Park, Bird Refuge, Nature Reserve, Conserved habitat, County Nature Center/Preserve and many more [10].

Each of the protection areas has its own features, goals and objectives. Firstly, we will consider state nature reserves (including biosphere reserves) which are defined in Russian legislation as specially protected natural areas of federal significance. Within the boundaries of state natural reserves, the natural environment is preserved in its natural state. Economic and other activities are completely prohibited, except for the cases provided by the Federal Law.

State nature reserves are assigned the following tasks: a) protection of unique and typical natural complexes and objects, flora and fauna, natural ecological systems, biodiversity in order to maintain them in their natural state; b) organization and conduct of scientific research; c) implementation of state environmental monitoring; d) environmental education; e) assistance in training scientific personnel and specialists in the field of environmental protection; f) organization and implementation of tourism [11].

The first state reserve appeared in Russia on January 11, 1917. It was Barguzinsky Nature Reserve. In 1986, UNESCO awarded the Barguzinsky Nature Reserve the biosphere status and included it in the international network of biosphere reserves, making it part of the world natural heritage.

According to the UN International Convention of November 16, 1972 “Natural heritage” means: natural monuments created by physical and biological formations or groups of such formations, having outstanding universal value from an aesthetic or scientific point of view; geological and physiographic formations and strictly limited areas representing the range of threatened animal and plant species of outstanding universal value from a scientific or conservation point of view. In 1997, the Nature Conservation Center and the World Wildlife Fund proposed making January 11 Nature Reserves and National Parks Day in Russia [12].

The number of state nature reserves is not constant. According to the valid Order of the government dated December 31, 2008 N 2055-r, there are 202 state reserves under special protection in Russia [13]. However, some protected natural areas of federal significance are not included in this list because separate decisions of the Government were made in their regard. According to the UNESCO list, about 11 natural monuments and protected areas belong to the world heritage, e.g. Baikal Lake, Kamchatka volcanoes. There are also other lists that try to embrace as many protection areas as possible. For example, the website Protected Planet provides the World Database on Protected Areas (WDPA) and effective area-based conservation measures (OECMs) globally. Governments and other stakeholders make the extensive efforts to map, monitor and report data on such areas. Through the Protected Planet website, users can also get information from the Global Database on Protected Area Management Effectiveness (GD-PAME), and other associated information.

According to WDPA, the Russian Federation has 8,763 terrestrial and inland water protected areas as well as 95 marine protected areas [10]. This number, in general, correlates with the number in the official Order of the government of the RF mentioned above [13].

Apart from state nature reserves, there are a lot of national and natural parks in Russia. National parks are also classified as specially protected natural areas of federal significance.
Unlike in state nature reserves, within the boundaries of national parks special zones are distinguished in which the natural environment is preserved in its natural state and the implementation of any economic and other activities that contradict the goals and objectives of the national park is limited.

The tasks of national parks are similar to those of state nature reserves but concentrate on preservation of natural state of unique and typical natural complexes and objects, flora and fauna, natural ecological systems, biodiversity as well as historical and cultural objects. They also include environmental education, organization and implementation of tourism, scientific activities in the field of environmental protection, state environmental monitoring.

National parks as well as state nature reserves are in federal ownership. Unlike the territories mentioned above, natural parks are specially protected areas not of federal but regional significance, within the boundaries of which zones with ecological, cultural or recreational purposes are identified, and accordingly, prohibitions and restrictions on economic and other activities are established.

In these parks, various regimes of special protection and use are provided depending on the ecological and recreational value of the natural areas. Activities that entail changes in the natural landscape, reduction or destruction of the ecological, aesthetic and recreational qualities are prohibited as well as violation of the regime for maintaining historical and cultural monuments.

Natural parks along with state protected nature reserves, national parks and other special protected areas are perhaps the only way to protect at least a small part of the wildlife from destruction. That is why it is so important to develop them and support their activities at all levels: from governments to individuals.

2.3 An example of a natural park: its features, work and role

In the Urals in Sverdlovskaya oblast we have several national and natural parks, the best of them are listed on the website of the Public Chamber of Sverdlovskaya oblast: "Deer Streams", "Bazhov’s Places", "Pripyshminskie Forests", "Chusovaya River". We would like to consider one park in Sverdlovskaya oblast which is known as one of the most popular destination in the region where people can not only enjoy the beauty of nature, but also see a large number of valuable natural attractions: the “Deer Streams”.

There are more than a hundred caves, picturesque rocks, the Karst Bridge, the Perun sanctuary, the Mitkinsky mine and the sculpture of the Angel of One Hope, which has already become a symbol of this park.

To tourists have several routes to choose from. They all amount 45 km and include large, medium and small itineraries. Each of them is equipped with gazebos, observation decks and hanging bridges. The park is located 120 kilometers from Yekaterinburg in the south-west direction, near the town Nizhnye Sergi. This area of wilderness retains its natural appearance. However, following the special walking routes throughout the Park visitors can immerse in this nature without harming it. The park is rich in plants, animals; and natural monuments.

To enjoy the nature without doing any harm to it visitors should use special walking paths covered with rubble or sift and stay only at places designed and equipped for this purpose. Of course, no litter is allowed: it should be carried away. It is a general rule – do not leave anything behind, like drawings in gazebos or on walls of caves. In order to save the natural beauty you have to be as careful as possible because noise, vehicles, pets can disturb wild animals and destroy the flora.

If you go off-trail, the relicts – plants preserved from previous climatic eras – could be damaged. The park is inhabited by a number of species listed in the Red Book of Russia and the Urals, e.g. Alpine aster, Ural thyme (thyme), hairy lily (curly), finely reticulated onion (ramson), Ural cicerbita, Podolsk shiverekia, Krylov’s lily, Tatarian bark, snow-white and tetrahedral water lily, dark red sedum, winter sedum, evasive peony, spring Adonis, Ural anemone, etc.
There are also more ancient relics in the park–more precisely, entire relict communities left over from the era of mammoths and woolly rhinoceroses (10-15 thousand years BC). These are areas of dry, cold tundra-steppes that once covered vast areas, but now have found refuge on coastal cliffs. Steppe swallowtail, Sievers wormwood, bent wheatgrass, and crenate spirea grow here.

The border state of the territory between the southern taiga subzone and the forest-steppe has led to a record diversity of flora: about 800 species of higher vascular plants, including endemics and relics. 38 species of rare endangered angiosperms are listed in the Red Book of the Sverdlovskaya oblast.

Not only the flora, but also the fauna of the park is valuable. You can meet animals which are typical for taiga here. Mooses, bears, bobcats, beavers, squirrels, hares and other animals live in the Park.

In total, ornithologists in the park have noted about 150 species of birds. The largest from them is the gray crane, the least—the wren and the long-tailed tit.

The river Serga is also filled with life. There are representatives of the ichthyofauna of the taiga zone: perch, bream, crucian carp, pike, chub, burbot, asp, loach, bleak. In recent years, the river has become noticeably cleaner; grayling, which is demanding of water purity, has become more common here.

Below there are only several examples of animal species from the Red Book of the Sverdlovskaya oblast, which live in the park and are subject to protection:

Mammals: river otter and European mink, flying squirrel;

Birds: steppe harrier, peregrine falcon, goshawk; eagle owl, long-tailed owl; gray woodpecker;

Reptiles: Brittle spindle, common copperhead.

Insects: Butterfly caddisfly, nigella Cyclops, common Apollo, black Apollo or Mnemosyne.

Everywhere in the park visitors can find information about rare and typical species, geographical and climate features of the area. Thus, it serves as a recreational and educational platform for people of different ages as well as a significant conservation area, where the wildlife is protected, reintroduced, researched and looked after.

3 Conclusion

The researchers state that culture shapes the way people perceive and value the nature, and how these values are expressed in a society\[16\]. In this respect, educational work of the Natural Park “Deer Streams” which shapes environmentally-friendly attitudes, respect and conception of the conservation work in the field of biodiversity should not be underestimated. This multidimensional work forms cultural norms and values which will enable people to save natural environment for their descendants.

Therefore, a lot of work aimed at the protection of biodiversity can be done on regional, national and international levels. Nowadays, cooperation between the Russian Federation and Western countries on the international level is complicated due to political issues, but the Russian government does a lot to implement the elaborated strategies aimed at supporting protected natural areas and expanding them in Russia, also in cooperation with friendly foreign partners. Of course, all the interested countries have to work in this field on the national as well as on the global levels together to overcome difficulties. Developing new integrated digital tools which could be used worldwide, technical help and coordination, scientific assistance, mutual research projects can contribute to improvement of the situation and provide further accomplishment of sustainable development goals.
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