Some peculiarities of functional zoning in specially protected natural territories: case study of the Tunkinsky National Park, Russia

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Abstract. As the global ecosystem protection agenda continues to unfold, the topic of functional zoning of protected areas’ remains the subject of intensive discussions. The paper discusses the essence, specific features, key factors and actions taken to improve the functional zoning of national parks in Russia. On the example of the national park “Tunkinsky” it is shown how the functional zoning has changed since its creation and what factors influenced this process. The paper presents analysis of natural, historical, cultural, socio-economic, tourist-recreational and organizational conditions for functional zone allocation in the Tunkinsky National Park, as well as changes in the composition, naming, and area of the functional zones in the national park. Using the data from geolocation services, such as photos with a given geolocation posted by tourists in social networks, and GPS tracks of tourist routes, the authors prove the validity of changes in the functional zoning of the National Park, with an increase in the recreational zone, providing an optimal combination of nature conservation, tourist and recreational and economic functions was proved.

1. Introduction

In line with the implementation of the new paradigm for the development of specially protected natural areas (SPNAs), declared at the 5th World Congress on Protected Areas in 2003 (Durban, South Africa) many national parks aim to achieve a balance between nature conservation and recreational opportunities, or between the interaction of people with nature in the landscapes of which they are part, expanding the relationship between nature conservation and the socio-economic development needs of the areas. The transformation of approaches to the development of protected areas brings certain changes in their development processes, which is reflected in the functions, objectives and management mechanisms of national parks.

In this context, functional zoning is undergoing significant changes as a management tool for protected areas, establishing spatial and regime limitations and allowing for an optimal combination of conservation and development objectives for protected areas. Despite the importance of this tool, functional zoning is increasingly recognised as a key issue for national parks in developed areas characterised by large areas, uncertain boundaries and sizes of protected areas, presence of human settlements, landscape and biological diversity, high recreational value and difficulties in organising monitoring and protection of the area.
The study of the features of functional zoning of a number of Russian national parks allows us to trace a diverse pattern of transition from formal designation of reserves to zoning that contributes to the fulfilment of the main tasks of protected areas for the conservation and restoration of natural complexes and historical and cultural objects, for environmental education of the population and scientific activities, for creating conditions for regulated tourism and recreation [1-3].

Researchers note that after 10-15 years the zoning of national parks requires adjustment due to the accumulation of objective changes in the situation [4]. Over time, the national park may reach a point where no amount of flexibility and adaptability in the zoning system can bring it into line with the rapidly changing realities of the natural or socio-economic environment [5].

A critical reflection and study of the accumulated experience of changes in the functional zoning of national parks shows that the changes have taken place and are taking place in connection with the improvement of legislation on protected areas [6]. In addition – with the policy of ensuring the protection of natural and historical and cultural values of protected areas [5], with the formation of a new concept of development of protected areas, expanding cooperation with the local population in solving social and economic problems [7], with the emergence of high-profile conflicts associated with the infringement of rights of citizens living within the borders of national parks [8, 9], with the creation of ecological tourism infrastructure [10].

It is believed that one of the objective reasons for the changes in the zoning of national parks is the non-compliance of the previously conducted zoning with the basic provisions of the Federal Law “On Specially Protected Natural Areas” of 14 March 1995, which established the composition of functional zones in the national park and the main objectives of their allocation.

The process of involvement of Russian protected areas in the development of ecotourism that began in 2011 according to the Concept for the development of specially protected natural areas of federal importance for the period up to 2020, approved by the Russian Federation Government decree № 2322-r, dated 22 December 2011, has also prompted changes in the functional zoning of parks with the specifics of emerging tourist and recreational services [11].

Since 2019, the improvement of state policy in the development of ecotourism in SPNAs has been implemented through the national project “Ecology”, under which measures to preserve biodiversity and create conditions for the development of ecotourism will be implemented in the national parks of Russia by 2024. This is expected to increase the number of protected areas by 8%, the area of protected areas by almost 4 times, and the number of visitors to national parks by 2.2 times by 2024 compared to 2018. The achievement of the latter indicator is associated with the organization of effective commercial activities of national parks [12].

In 2020 the All-Russian competition to identify pilot areas for the creation of tourist and recreational clusters as part of the integrated development of specially protected natural areas, covering 231 PAs, of which 63 are of federal importance, 168 - of regional importance (www.priroda.life). This competition has exposed the problems with the functional zoning of specially protected areas, primarily in terms of the allocation of zones in which investment projects to create ecotourism infrastructure can be implemented.

It is obvious that during the implementation of state policy on the development of SPNAs, the analysis of the specifics and validity of the ongoing/planned changes in the functional zoning of national parks, which is an essential tool, acquires particular importance. Therefore, this case study uses the example of the Tunkinsky National Park, one of the largest and most developed national parks in Russia, to analyse how functional zoning, the composition of functional zones and compliance with established regimes have changed since its establishment to the present day. In addition, it examines what government decisions and other transformations have influenced the current transformations in the park’s functional zoning system.
2. Models and Methods
The processes of change in the functional zoning of national parks are driven by a variety of factors: natural and recreational, historical and cultural, political and administrative, infrastructural, socio-economic and ecological. At the same time, each particular national park may have its own specific combination of these factors and, accordingly, a “personal” list of evolutionary changes in functional zoning. On the basis of methods of geoinformation mapping the analysis of spatial regularities at change of structure of functional zones and conformity to the established modes is carried out. GPS track data obtained from open GPSies spatial information service (www.gpsies.com) were used to assess spatial distribution of popular tourist routes.

In order to identify places of tourist activity, information sources based on photo-sharing services posted in the VKontakte social network with geo-referencing, which was chosen due to its accessibility and lack of resource fees (although it is known that visitors to the park may use other social networks and post photos there were used).

The study site, Tunkinsky National Park, established in 1991, is located in the southwest of the Republic of Buryatia, 40 km west of the southern tip of Lake Baikal. Covering the entire territory of the municipality “Tunkinsky District”, the national park has a complex land use structure. The total land area of the park of 1,118,662 hectares is divided into forest lands of 1,071,809 hectares (90.6%) and lands of other owners, including lands of agricultural producers, settlements, transport etc. At present, there are 35 settlements located within the park's boundaries, grouped into 14 rural settlements with a population of up to 20,106 people.

3. Results and Discussion
The first steps to the functional zoning of the park were taken in 1993-1994 as part of the comprehensive appraisal of the territory of the Tunkinsky National Park performed in accordance with the Regulations on National Natural Parks of the Russian Federation approved by the Russian Federation Council of Ministers-Governmental Decree No. 769, dated 10 August 1993. In 1994, the Regulations on the Tunkinsky National Nature Park was approved, which established the functional zoning with the following zones: protected area, reserved area, economic zone, visitor service zone, medical and recreational zone, educational tourism zone and recreational use zone (Table 2). A separate agro-landscape area of 111,853 ha, or 9.45% of the national park’s area, has been allocated, including land of other owners.

Figure 1. Functional zoning of the national park (2017).
Since 2011, the task of developing educational tourism as one of the special types of ecotourism in federal protected areas has been accompanied by changes in the functional zoning of the park, which was reflected in the Regulations of the Tunkinsky National Park, approved in 2017 (www.tunkapark.ru). In the updated Regulations, new zoning was established: protected areas, specially protected areas, recreational areas, and economic zones; the composition of the zones was reduced, and they were renamed.

The ‘Wildlife reserved zone’ has been renamed to the ‘Specially protected zone’; the ‘Educational tourism zone’ to the ‘Recreational zone’. The ‘Visitor service zone’ and the ‘Therapeutic zone’ have been incorporated into the recreational zone as ‘Recreational zones on the plots of other users’ (Figure 1).

The protected area covers mountain natural complexes not affected by economic activity, which are located along the Khamar-Daban watershed ridges, and a reference section of cedar forests located in the interfluve area of the Zun-Murin and Tumusun rivers. The territory’s protection status is due to the fact that the rocky natural complexes provide almost 60% flow of the mountain rivers, which are the main artery of the Irkut River. According to the new zoning, the area of the protected area has increased by about 0.6 % by including part of the territory of the protected area in the Tunkinsky mountains near the village of Arshan. At the same time, part of the protected area in the Khamar-Daban mountain complexes has been transferred to the recreational zone.

The specially protected zone (formerly the wildlife reserve zone) includes the rocky natural formations of the Tunkinsky mountains and the Badary area, which is a typical section of intermountain light coniferous forests preserved in their natural state. As a result of the new zoning, the area of the specially protected zone has decreased by about 6.1% due to the transfer of two plots to the recreational zone and of one plot – to the economic zone. The area of the popular tourist routes along the Tunkinsky Rocks and the Badara section has been transferred to the recreational zone. The areas in the north-west of the park, including rocky and mountain taiga complexes, have been transferred to the economic purpose zone. Taking into account that these sites are rare plant habitats (in particular, 15 rare species grow in the vicinity of the village of Mondy [13]), special attention must be paid to their protection while organizing economic activities, which should be minimal.

When designing the park, part of the forest fund in the areas of traditional nature use by the local population (logging, picking wild plants, hunting, grazing cattle) was assigned to the economic purpose zone. According to the new zoning, the economic zone area increased by 8.7 %. The previously separate agricultural landscapes area, consisting of other users’ lands included in the park without withdrawal from economic activity, has been also transferred to the economic purpose zone.

As a result of the new zoning, the educational tourism zone has been transformed into a recreational zone with an increase in area by 6.2%, which was removed from the protected, wildlife reserve, economic, therapeutic and recreational, and visitor services zones. Currently, the recreational zone occupies 57.4% of the national park’s territory. It covers mainly the mountain-taiga slope parts of the Tunkinsky rocky mountains and the Western Khamar-Daban, with some areas in the sub-mountain part, where some of the park's unique natural, historic, and cultural objects are concentrated.

The digital activity analysis, which was performed through the study of photos posted by the national park visitors on VKontakte social network, has helped us to determine the most frequently visited routes and objects. Thus, digital activity is traced along the federal A-333 highway from the settlement of Mondy to the Russian-Mongolian state border and to the border with the neighbouring Okinsky district (the Republic of Buryatia), along the road to Khongor-Uula and Sharmak mineral springs, on the tourist trails running along the southern slopes of the Tunkinsky rocky mountains to Shumak mineral springs, along the trail to Munku-Sardyk mountain peak, and the route to Mount Hulugaisha and the Badary area. These areas of the park were transferred to the recreational zone as a result of the new zoning (Figure 2). Two-thirds of all photos were taken in the vicinity of the Arshan resort, and the remaining photos were distributed among the settlements of Mondy, Nilovka, Kyren, Zhemchug, Zaktui, Zun-Murino, and Tori. Such a high photo-taking activity is due to the fact that these localities have accommodation facilities for vacationers, as well as popular tourist attractions near these localities, for example, a Buddhist temple near the village of Nilovka.
Data analysis of the distribution and number of GPS tracks has showed their location on the most popular trails. The routes mainly run along the northern part of the national park and along the federal A-333 highway. The most frequently visited trails are along the Tunkinsky rocky mountains, in particular, to the Shumak mineral spring (22 tracks), to Munku-Sardyk mountain peak (20 tracks), and to the cross-border trail leading to lake Khubsugul in Mongolia (automobile and cycling tourism) with 19 tracks each. The mentioned above areas with these routes have been transferred to a recreational zone as a result of the new zoning.

There have been recorded 15 tracks to Arshansky peak and 10 tracks – to the Lyubvi Peak in the Arshan resort vicinity. The analysis revealed tourist activity in the areas that have been transferred to the protected area (6 tracks), on the tourist trails along the upper reaches of the Tolta, the Barun-Khandagai, and the Zun-Khandagai rivers. These sites require specific approaches to organizing environmental activities.

The changes that have occurred in the composition, naming, and area of functional zones comply with the provisions of the Federal Law “On Specially Protected Natural Areas”. During the 30-year period of its development, the park faced some discrepancies in its zoning system caused by the changing realities in the natural environment, as in some areas natural complexes have been transformed and their structure – changed as a result of anthropogenic impact. The recreational zone has been significantly increased (by 6.2 %) as a result of adding some lands from the protected, wildlife reserve, economic purpose, and visitor service zones, thus amounting to 57.4% of the national park’s area.

The digital activity analysis was based on determining the most popular photography locations and user ‘picture routes’ created from a sequence of photographs taken within a short period of time and tracks of sports and educational routes obtained from the site data GPSies.com. This analysis confirms the validity of changes in the functional zoning of the Tunkinsky National Park with the assignment to the recreational zone of areas previously belonging to the protected zone, the zone of the custom regime and the zone of economic purpose.
4. Conclusion
The concept of functional zoning has long been used as a standard tool for managing a specially protected natural area. At the same time, functional zoning is not a static concept that once and for all establishes the ratio of sites and measures for the use and special protection of natural objects. We have shown that the actions taken to adjust the functional zoning are determined by the legislative conditions, state policy in the field of conservation, territorial sustainability of natural and historical and cultural values. And also – the goals of socio-economic development of the territory, life experience and interests of local residents, the need to combine environmental, recreational and educational functions of SPNAs.

The study uses the example of the Tunkinsky National Park to analyse how functional zoning has changed since its creation and what factors have influenced this process. It reveals changes in the composition, name and area of the functional zones of the Tunkinsky National Park, which were substantively related to the procedure of bringing the park into conformity with the legislation due to the fact that it was established before the Federal Law “On Specially Protected Natural Areas” (1995) was adopted.

Overall, the results of the study indicate that decisions on the functional zoning of the Tunkinsky National Park are justified, allowing for an optimal combination of conservation of natural and historical and cultural complexes with increasing tourist and recreational activities and economic use of the area. Recognising that the real “picture” of the functional zoning of the Tunkinsky National Park is still far from ideal, we hope that this study contributes to the debate on the justification and validity of changes in the functional zoning of large and developed national parks within the new paradigm of protected area development.

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