A Socioeconomic Development Concept for Russia’s Specially Protected Areas to Address the Negative Anthropogenic Impact: Evidence from the Tunkinsky National Park

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Abstract. Russia’s natural parks (NP) are critical for the preservation and recovery of the natural environment and biodiversity. NPs were mainly created to preserve the landscape-forming biotopes. Siberian and Far Eastern NPs were founded in the late 1980s or early 1990s. As a result, previously human-populated or otherwise affected areas that contained settlements, logging sites, mining sites, collective farms, and other economic facilities were transformed into national parks. A national park is supposed to provide venue for research and recreation, which is at odds with the locals’ economic activities. Irrational recreational use of NP areas degrades the plant communities: vulnerable species vanish, less vulnerable replace them, and meadow species become widespread in forest ecosystems; it also negatively affects the soil cover as it destroys the ground litter of soils, makes the humus horizon shallow and too dense, ultimately killing the soil microflora. This is the case of nearly any NP in Siberia and the Far East, which calls for well-thought-out economic zoning of areas that would be environmentally, economically, and legally sound. It is on this basis that this paper proposes a socioeconomic development concept (the Concept) for the Tunkinsky NP.

1. Introduction

The Tunkinsky National Park was founded in the wake of Perestroika in 1991 to preserve the unique natural sites of Lake Baikal’s basin, the Tunka Valley, Eastern Sayan and Hamar-Daban (mountain ridges), as well as to further the ethnic culture and provide infrastructure for organized tourism [1]. The Tunkinsky NP lies within the Tunkinsky Municipality that borders the Okinsky and Zakamensky Municipalities, Republic of Buryatia, the Sludyansky Municipality, Irkutsk Oblast, and the Republic of Mongolia [2]. Economically, Tunkinsky is an agricultural municipality; before Perestroika, it had collective farms mainly specializing in farming cereals and potatoes; livestock farming was less developed. Besides, the area was a prominent logging site with Zun-Murinsky being a major logging enterprise. As collective farms collapsed, local economic activity partly took new forms such as private farms, individual entrepreneurship, limited liability companies, etc., now also specializing in livestock farming and horse breeding, which indeed was a positive trend as animal farming has historically been a traditional activity for the locals.
2. Relevance
As of today, the ever stronger human impact on NP geosystems causes the deterioration of terrestrial and aquatic geosystems. Intensive deforestation, unregulated recreational activities, wildfires, pollution, and land cluttering causes NP geosystems to digress [3,4,5].

3. Statement of problem
The key goal hereof was to assess the socioeconomic status of the Tunkinsky NP and to devise a concept that would address the negative human impact.

4. Research materials and methods
Evidence for this research was collected from the Tunkinsky National Park’s geosystems, see Figure 1. To assess the situation observed there, the research team applied a special methodological approach designed for researching human-affected natural systems, including the ecological-economic balance concept proposed by B.I. Kochurov [6].

Figure 1. Map and chart of the Tunkinsky National Park

5. Theory
The Tunkinsky National Park is Russia’s only national park whose boundaries match those of a municipality. Such localization could not but affect the municipal economy. Being a specially protected area, use of natural resources in the Park is strictly limited, which is at odds with the local economy as well as with the locals’ lifestyle [7,8,9]. For instance, some restrictions imposed by Federal Laws have deprived the Municipality of land titles. Apparently, the whole situation forces the locals to obey the NP rules. These rules more often than not limit the economic activity options for the locals. Therefore, it is the prospects of preserving the landscape-forming geosystems that should dictate the Municipality’s economic development.

6. Practical significance
The Park’s geosystems should sustain far lesser human impact than they do now if the Municipality is to develop as a recreational area, and its living standards are to rise. Combining the traditional agriculture with the protective functions of a national park means that the Tunkinsky Municipality’s
economic facilities, now dilapidated, should be restored, restructured, and upgraded with due adjustment for the restrictions on economic activity in the Park.

Tunkinsky has a complex geomorphology of mountains and valleys with distinguishing patterns of atmospheric air movement, solid and liquid runoffs, and specific temperature and wind patterns, erosion processes, and specific wildfire occurrence and development conditions. All of this calls for devising optimal methodology and tools for the preservation and recovery of this unique natural complex within the scope of its earlier, unaltered state, which should eliminate the signs of digression from the original landscape [10,11,12].

All of it raises legitimate concerns as geosystems continue to deteriorate into a digressive state as a result of them being naturally unsuitable for many years of recreational use, like in Northern Mongolia, when the burden of tourist influx is not accounted for, and the current capacity of geosystems is subject to no evaluation. Naturally, the degradation of a single geosystem component degrades the system as a whole. Consider the factors that affect the quality of geosystems:

1. Deterioration of the dark conifer taiga o the northern and western slopes of Hamar-Daban and Eastern Sayan, which are within the boundaries of the Tunkinsky National Park.

2. A possibly polluted site of internationally recognized value: the artesian thermal waters and the cold mineral waters of the Tunkinsky Rift that has no counterparts in the Baikal Rift Zone in terms of thermal and mineral springs.

3. The polluted basin of the Irkut River, which is the core river of the Tunkinskaya Valley; this pollution might significantly worsen the quality of the valuable freshwater from the Baikal-Yenisei water system.

These factors jeopardize the region’s ecosystems the most: the air emissions of the Angara-Irkutsk Industrial Hub, burning grass for agricultural purposes, the Siberian silk moth and the gypsy moth in April and May, uncontrolled deforestation, agricultural chemicals, and the wastewater of livestock farms.

Like in all of the Baikal Area, pollution poisoning the jewel that is the Tunkinsky National Park mainly comes from:
- non-ecofriendly obsolete technology used in manufacture, agriculture, construction, transport, and public utilities;
- businesspeople, farmers, and the general population being uneducated in how to handle the environment properly;
- lack of an effective environmental monitoring system and having no sound mechanism for regulated use of natural resources on a paid-for basis;
- agencies, authorities, organizations, enterprises, and individuals being not liable for breaching the environmental regulations, mismanagement, and use of non-ecofriendly technologies, nor for failing to comply with the government orders to restore the region’s ecology.

The Municipality’s economy should be based on agroindustry and recreation with a gradually increasing prevalence of the latter, transforming the area into a national and international center. The situation calls for well-thought-out economic zoning of areas that would be environmentally, economically, and legally sound. Zone 1 will then permit business activities that the locals need to live and to maintain the recreational facilities and economic facilities remaining here. Zone 2 will be for well-managed forestry with logging mainly intended for forest recovery, care, and sanitation; it is to be a zone that provides forest resources and controlled hunting, a boost in tourism and new health facilities. Zone 3 is to preserve nature pristine with ground and airborne protections in place.

To keep the local natural complexes intact, the Concept should:
- provide a local, Park-administered airborne defense against wildfires and poaching;
- promote making profit from commercialized, popularized, and strictly monitored recreational tourism en mass on short-term vouchers. For instance, one of the US National Parks in California has over 3 million visitors per annum, which brings considerable profits that partly go to the regional budget;
- promote sacred, cultural, and historical monuments in the valley with tourists.
At the same time, the agricultural production should be intensified and enhanced to double its gross product, while livestock farming should be made more productive by adopting best practices. It is also necessary to further dairy farming, horse and yak breeding whilst limiting the growth of sheep pasture land that cause soil erosion. Pig and poultry farming (including goose, turkey, and ostrich farming) should develop at an optimal place. Reduction in sheep herding will boost cattle and horse headcounts. A transition to contour strip cropping is imperative, as this method is less harsh on soils and landscapes. Of importance is to increase the processing of agricultural products and to begin making non-conventional products: kumis, novel poultry, souvenir dishes from birchbark, and original barrels. Equestrian, mountain, and water tourism may rise to prominence in the Park. It would be only logical not only to bring more tourists to the local spa facilities, but also to make more birchbark and cedar wood souvenirs, to sell photographs and paintings of the local fauna, to offer photo albums, maps, booklets, guidebooks, nature-themed essay books, history and tourism books about the region. Commercial ski resorts, hotels and campsites are needed as well. However, all of this is a matter of the future; for now, the priority is to build better road infrastructures and to further ecofriendly transports: horse-riding and biking.

Trades and services should develop as needed and suit the local economic specialization while also providing more jobs to the locals.

7. Conclusions

Given all the facts above that affect the geosystems of the Tunkinsky National Park, the authors hereof propose the following:

1) well-thought-out economic zoning that would be environmentally, economically, and legally sound;
2) more efficient forest protections in place based on research into ways to preserve the Park’s nature;
3) continuous tracking of forest resources and continuous forest management as part of the monitoring program;
4) developing a system for integrated monitoring of the Park’s geosystems.

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