The role of landscape planning for the creation of UNESCO Baikal Geopark

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Abstract. In 1997, Lake Baikal was included in the List of World Heritage Sites. This resulted in the complication of management activities in the Central Ecological Zone. The Law on Lake Baikal protection, by-laws, statements and orders prescribe numerous limitations and do not promote the sustainable development of the Baikal Natural Territory. The idea of UNESCO geoparks is oriented essentially to the sustainable development of territories, comprising unique sites. The main task of land use planning in the central ecological zone of Lake Baikal is to keep Lake Baikal as a natural World Heritage Site and a strategic drinking water resource, taking into account the interests of the population living there. Institute of Geography of SB RAS performed landscape planning of Olkhon District with the establishment of development sites, but these plans are still not realized. This causes conflicts between Pribaikalsky National Park and the local population. A successful development of Basic Sites of Baikal Geopark on the territory of Olkhon District is aimed to solve numerous local problems oriented to the results of landscape planning.

1. Introduction

Geoparks appeared in Western Europe at the beginning of the 2000s. Nowadays, there is a UNESCO worldwide network of national geoparks. Geopark is a territory, which project of development includes environmental protection, presentation of unique objects informative for geology, hydrogeology, geography, archaeology, landscapes studies, ecology, hydrochemistry, hydrobiology, and other Earth sciences. The project must promote the strategy of sustainable social and ecological development and be implemented by local population and authorities, tourist companies, environment protection bodies in cooperation with scientific society.

2. Main statements

Reasons to choose the Tazheran steppe and Olkhon Island are as follows:
- Unique and well-studied geological, petrographic and mineralogical objects;
- Diverse landscapes;
- Hydrochemical and hydrobiological objects on the shore;
- Archaeology from lithic age to Iron Age;
- The necessity to assess ecological risk and ways for resolution of ecological problems.

3. Results and discussion

The territory of Pribaikalsky National Park almost coincides with the territory of Olkhon District.
Numerous natural monuments are located in the National Park. Some efforts for efficient joint work are required.

The territory of supposed Baikal Geopark is well-studied. Tens of monographs and hundreds of articles are published in different fields of geology, geochemistry, mineralogy, mineral products, landscape planning, archaeology, and other Earth sciences; conditional geological maps are published, and educative itineraries are developed [1-10].

The Tazheran steppe and Olkhon Island in the Pre-Olkhon region is a territory of well-studied unique geological objects. The Olkhon District not only corresponds to all standards of UNESCO Global geoparks but much exceeds these parameters, representing an integrated geological-geographic, archaeological and ethnographic Global Geopark.

The stony records in the region contain dolomites of Archaean, amphibolites, crystalline shales, platogranites of Proterozoic, Cambrian rocks, Mezozoic sedimentary beds, Tertiary and Quaternary deposits, reflecting the history of the development of the Baikal Rift system.

The Pre-Olkhon region is represented by magmatic rocks: from ultrabasites and gabbroids to alkaline rocks and granitoids. In the famous Tazheran massif of alkaline rocks 150 rare minerals, including some tens of unique ones, were found in an area of 1 km².

Thirty natural geological monuments are described and officially registered in Olkhon District. Institute of Geography of SB RAS performed landscape planning of Olkhon Province territory as well as determined ways of land use and activities for environment protection (figure 1).

![Landscape planning of Olkhon District territory (adopted from [6]).](image)

The Olkhon region is a human habitat since Paleolith, Mezolith, Neolith to bronze and iron ages. These sites are assumed to be a start site for migration of pre-ancestors of native Americans. People migrated from here eastward and southeastward. Hordes of Huns and Chingisids passed through these steppes.
More than 143 archaeological monuments are found on Olkhon Island, and there are 611 of them in the Tazheran steppe. There are no limits of the discovery of new monuments. All documented archaeological monuments must be protected; some activities urgently need to be performed.

Practically each Baikal bay of Olkhon District keeps traces of early men habitat. This is due to easy ways towards the water and access for fishing. Archaeological monuments include cliff images in Sagan-Zaba and Aya Bays, multi-layered settlement Ulan-Khada, numerous sepulchres and stone walls of ancient settlements. Unorganized tourists destroyed numerous monuments, and the petroglyphs are lost due to temporal and human impact.

On the territory of Pribaikalsky National Park, there are 51 caves, including 36 coves, 6 wave-cut ones, 4 weathered ones, 1 landslide one, 2 dumped caves, and 2 subsidence caves. There are archaeological remainders in 22 caves; permanent ice exists in 7 caves.

In 1997, Lake Baikal was included in the List of World Heritage Sites. This resulted in the complication of management activities in the central ecological zone. The Law on Lake Baikal protection, by-laws, statements and orders prescribe numerous limitations and do not promote the sustainable development of the Baikal Natural Territory. The idea of UNESCO geoparks is essentially oriented to the sustainable development of territories with unique sites.

The main task of land use planning in the central ecological zone of Lake Baikal is to keep Lake Baikal as a natural World Heritage Site and a strategic drinking water resource, taking into account the interests of the population living there.

Institute of Geography of SB RAS performed landscape planning of Olkhon District [6] with the establishment of development sites, but these plans are still not realized. This causes conflicts between the Pribaikalsky National Park and the local population.

A successful development of Basic Sites of Baikal Geopark on the territory of Olkhon District is aimed to solve numerous local problems oriented to the results of landscape planning:

1. Creation of natural infrastructure, including centralized water supply, stable electricity supply, sewage system and treatment of domestic sewage, collection, elimination and treatment of garbage;
2. Development of a program for construction of highways, bridges and crossings, bicycle roads and tourist pathways;
3. Organization of building industry, including ecological building;
4. Development of organic agriculture, modern greenhouse vegetable cultivation, meat and milk farms, and processing industries;
5. Preventing forest fires, protection and recovery of forests;
6. Activities concerning human safety, live protection and health;
7. Assistance in the formation of ecological teams and volunteers for public policy provision;
8. Protection of natural, historical and cultural monuments, foundation and management of new monuments;
9. Projection and building of geological, mineralogical, archaeological, regional environment protective museums on the park territory;
10. Providing infrastructure for international congresses and youth scientific-educative conferences and schools;
11. Territorial planning and control of appropriate land use;
12. Development of curative sites and sanatoria;
13. Establishment of a public information center and Internet sites to promote Baikal Geopark worldwide and develop ecological, informative and educative tourism.

4. Conclusion

For the organization of the Baikal Geopark, it is necessary to consider all mistakes committed during the inclusion of Lake Baikal in the UNESCO World Heritage List. The Law on Lake Baikal Protection and by-laws are quite prohibitive; they do not promote sustainable development of the Baikal Natural
Territory. There is still no integrated program for the protection of Lake Baikal and sustainable development of the territory.

The creation of Baikal Geopark can be performed in the same way. Unique Geopark parameters will allow obtaining its rapid approval. Geological tourist companies are to be established. Unique sites are to be explored. Lack of environment protection infrastructure leads to rather rapid destruction of the objects. Conflicts between local population, tourist companies, the National Park and environment protection institutions restrict the development of this territory. The only real way for its solution is to perform a detailed landscape planning with a mapping of natural monuments, creation of environment protection infrastructure as well as the development of roads and a structure for monuments and museums protection.

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