

## Hiking tourism in Siberian **protected areas**

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**Keywords** | Protected area, Trail hiking tourism, Nature reserve, Siberia.

**Objectives** | Federal Protected Areas (further PA) within the Central Ecological Zone (further CEZ) of Lake Baikal Nature Territory have additional responsibility in the process of nature preservation and sustainable tourism development because of their location within the Lake Baikal watershed and, thus, special international and national recognition. Due to the Federal Law on "Lake Baikal" and the UNESCO World Heritage status, hiking tourism can be considered as an environmentally friendly type of recreation within Strict Nature Reserves and National Parks on the shores of the greatest Siberian Lake. In order to justify a complex geographical and engineering approach for hiking trail management following objectives have been considered for each PA:

- i) To evaluate possibilities of hiking tourism development including consideration of landscape limitations for trail constructions;
- ii) To define zones of opportunities and limits for trail planning, constructions, maintenance;
- iii) To implement the algorithm for the development of each trail;
- iv) To analyse practical results contributing to the methodology improvement for its further application.

**Methodology** | In order to link theoretical research and practical implementation for the managerial optimization in hiking tourism development geographical, ecological, mapping, landscape planning and engineering methods were combined.

First, the general trail construction algorithm was designed. It comprises ten consistent stages where three primary (concept, scouting and trail class selection) are united in the planning part, with emphasis on detailed engineering and geographical field data collection. The definition of the trail purpose with a PA staff, followed by soil, vegetation, relief, hydrology analysis, is combined with terrain construction possibilities (transportation access, slope steepness, watercourse density, etc.). After the results of investigation are evaluated, the trail building costs for possible trail classes are calculated and several scenarios are proposed. Regardless of a selected trail class, seven construction stages (general flagging, corridor clearing, detailed flagging, trail bed building, structure installation, site restoration and cleaning, maintenance) are implemented under scientific supervision. Here, the trail classification plays an important role as a management tool proposing five classes with difference in the trail bed steepness, width, structures, frequency of maintenance and other criteria. Supposedly, each trail class attracts a different target audience and provides its level of development from extreme to accessible trails whilst limiting impacts on surrounding nature by putting all the users on the linear objects.

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Second, justification for complex development of hiking tourism within a PA can be evaluated. It consists of four stages:

- i) Analysis of geo-ecological and social-economical factors of the PA;
- ii) Zoning of limits and possibilities for different trail classes;
- iii) Implementation of the trail construction algorithm;
- iv) Application of the trail classification for parameter identification for each trail.

The analysis provides the data of where the infrastructure is more favourable and suitable within the territory and along its borders. For the zoning, a close look is taken to each landscape evaluating it from three points: geographical features, transportation access and construction cost for each of the five classes. A zoning map including limits and possibilities for different trail classes shows the long-term plan for trail constructions and their use. Finally, the trail-building algorithm is used for the determined trails and their upgrade.

**Main results and contributions** | Baikalsky Nature Biosphere Reserve, with an area of 165,000 hectares in the Khamar-Daban mountains in the south of the CEZ, served as a model territory. Hiking tourism was seen as the most adequate type on its territory with five main proposed trails of 77 km total length. The research demonstrated that the northern slope of the range facing the Lake was more suitable for hiking trail construction because of easy access from transportation veins and existing tourism infrastructure in settlements despite of the fact that, from the geographical point of view, hiking trails were more suitable in the southern slope due to the steepness, season length, etc. Seven zones of limits and possibilities were determined based on scale rating. The zoning showed that certain landscapes were suitable only for extreme or trekking trail development and accessible trails are suitable mainly on the northern border of the reserve. Based on field work, classes one, three and five were justified to different sections on a complex trail along the Osinovka River giving detailed engineering specifications.

Similar research has been duplicated in the territory of Zabaikalsky National Park north to Baikalsky Reserve. The PA is more accessible and the demand for established hiking trails is higher due to high summer visitation. Currently, four hiking trails are officially established, however, the zoning proposal can help making a management decision on the further trail system development and the algorithm can support the upgrade of existing trails.

**Limitations** | The economical evaluation of zoning proposals and calculation of possible expenses for trail constructions are limited due to the lack of professional trail building projects in Russia.

**Conclusions** | Hiking tourism attracts thousands of trail users to PAs. Simultaneously, regarding its sustainability, a combination of geographical and engineering methods is needed. The use of the trail construction algorithm and its practical implementation as a part of hiking tourism justification brings a background for the strategic development of a territory and provides practical steps for planning, construction and maintenance of each trail. The results of the research from Baikalsky Reserve can be implemented in other territories of the CEZ, including Zabaikalsky National Park with acceptance of its own special features.