

## Functional Zoning as an Instrument for Sustainable Development of Tourism of Great Altai

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### ABSTRACT

The paper is relevant since tourism is considered as an element of sustainable development of the region, which means not only growth but also formation of a fundamentally new system of land use planning with tourism as its integrator. The purpose of the paper is development of theoretical-methodological and cartographic instruments for identifying homogeneous territorial complexes, which can be grouped based on the similar functional features and represented as strategic instruments for development of the region. The differential matrix method for distinguishing typological structures in the economic complex of the region is the basic research method. This method in turn is based on the targeting method for the purpose of planning development of a region, the structural method aimed at forming clusters on the branch principle and the forecasting method with an eye to determine whether implementation of suggested measures will cause an increase in Gross Regional Product. It's suggested to implement recreational monitoring based on the concept of recreational digression stages with diversification of tourist product in each natural recreational area and identifying a few cycles of recreational activity, which allow, if conditions changed, refocusing recreational activity to a different, optimum direction and creating cross-border protected areas, coordinating actions of existing near-border areas. Zoned territories can be useful for investment companies, economic associations. The territories, which could be designated as additional protected areas in the Ukok, Chuya-Kuray, North-South-Chuya natural recreational regions, can be included into the Golden Ring as far-reaching paths.

### KEYWORDS

Altai, environmental management, zoning, recreation.

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### Introduction

The Altai trans-border mountain region (ATBR) is a large part of the Altae-Sayan ecoregion is one of almost 240 regions of the world where over 80% of biodiversity of the planet are preserved. Its area is 175,6 thousand sq. m.

The concept of sustainable development is not without flaws, the main of them is complexity of its implementation in less-developed nations and transition economies. The concept of sustainable development is being implemented in some

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countries (Germany, Sweden, Denmark, etc.), where there are so-called “ecologically sensitive markets”. However, the feasibility of implementing the above-mentioned conception becomes evident if we analyze and assess social standard of living in these countries.

It's unclear to what extent the basics of sustainable development should be introduced to tourist activities. Certainly, considering the level of destructive environmental impact of tourist complex and other components of economic system (metal industry, coal mining, etc.) indicates that the impact will be negligible. However, if we take into account characteristics of tourism industry development, its dynamism, strong relation to social needs and social development, focus on natural recreational resources, which are usually exhaustible and nonrenewable, the growth of interest in the spiritual aspects of development of some or other territorial entities, the need for tourist industry's transition to the model of sustainable development becomes clear. This is because tourism, on the one hand, experiences the impact of social and environmental challenges and, on the other hand, could be a cause of that challenges. It is particularly noticeable at the local and regional levels. In addition, a particular territory is considered unstable, if the process of using its resources is ahead of the process of their recovery, if more wastes are generated than processed or used for other purposes.

The World Tourism Organization and World Wildlife Fund (WWF) suggested the basic principles of the conception of sustainable tourism:

1. The sustainable use of natural, social, and cultural resources.
2. Cutting down overconsumption and reducing hazardous emission (prevents the need for spending funds on the elimination of environmental disbenefits and improves tourism quality).
3. Preserving diversity (natural, social, cultural, etc.).
4. Due regard to the tourist concept in planning. Tourism should be integrated into national and local planning and assessed from an environmental point of view.
5. National economy support. Tourist activity should support national economy making allowances for ecological features of development of some or other region of the country.
6. Involvement of local communities to the tourism sector. Extensive involvement of local communities to the tourism sector not only has a positive impact on economy and environment but also improves the quality of tourist services.
7. Consulting concerned parties and society. It's necessary to prevent and solve possible conflicts of interest, including environmental issues.
8. Staff training. Involvement of trained, eco-conscious staff at all stages of tourist activities improves the quality of tourist product.
9. Tourism marketing. The complex of eco-oriented marketing provides comprehensive information on the features of the tourist industry, attracts attention to natural, social and cultural environment of particular regions and customers' satisfaction level.
10. Conducting research. Ongoing research and monitoring of the tourism industry contribute to problem solving, it particularly relates to environmental issues.

The following documents and regulations contribute to the model of sustainable development, in particular, at the international level.

- Charter for Sustainable Tourism adopted at the first World Conference on Sustainable Tourism, which took place in Lanzarote (the Canary Islands) (1995);

- The International Work Programme on Sustainable Tourism Development adopted by the decision of the General Assembly and UN Commission on Sustainable Development (1999).

- The Global Code of Ethics for Tourism adopted by the World Tourist Organization on October 1, 1999 in Santiago (Chile). The document contains a number of references to international forums, namely: Convention Concerning the Protection of the World Cultural and Natural Heritage (November 23, 1972), the Rio Declaration on Environment and Development adopted at the United Nations Conference on Environment and Development (June 13, 1992), the Convention on Biological Diversity (January 6, 1995), etc. and a number of articles, the third of which "Tourism, a factor of sustainable development" reads:

1. All the stakeholders in tourism development should safeguard the natural environment with a view to achieving sound, continuous and sustainable economic growth geared to satisfying equitably the needs and aspirations of present and future generations;

2. All forms of tourism development that are conducive to saving rare and precious resources, in particular water and energy, as well as avoiding so far as possible waste production, should be given priority and encouraged by national, regional and local public authorities.

3. The staggering in time and space of tourist and visitor flows, particularly those resulting from paid leave and school holidays, and a more even distribution of holidays should be sought so as to reduce the pressure of tourism activity on the environment and enhance its beneficial impact on the tourism industry and the local economy.

4. Tourism infrastructure should be designed and tourism activities programmed in such a way as to protect the natural heritage composed of ecosystems and biodiversity and to preserve endangered species of wildlife.

5. Nature tourism and ecotourism are recognized as being particularly conducive to enriching and enhancing the standing of tourism, provided they respect the natural heritage and local populations and are in keeping with the carrying capacity of the sites.

Tourist-recreational exploitation and sustainable development of mountain regions are closely interrelated. In this respect research in this field may be given priority both for that regions and surrounding areas. Unfortunately, today loosely controlled territorial organization of tourist facilities prevails. A substantial disparity in tourist exploitation of many mountain regions is typical (Dunets, 2011; Liszewski, 1995; Oyungerel, 2004; Pirozhnik, 2008; Mechkovskaya, 2011). The pattern of recreational-economic zoning of a territorial recreational system may undergo changes if social and economic, political or ecological conditions of its functioning change. Different zones may intercross, interpenetrate into each other and even be enclaves in each other. This is the case for mountain systems with their high-altitude differentiation of landscapes (Dirin, 2007). The basic principles of functional zoning are considered in numerous works of national authors (Znamenskaya, 1969; Preobrazhensky, 1972; Rodichkin, 1977; Dobrushin, 1990).

## Methods

The author based on known principles has developed a chart of recreational economic zoning for the region of cross-border Altai. For this purpose the territory is ranked from the perspective of potential development of different types of recreational activity, economic use and conservation status. The conducted assessment of the level of recreational friendliness of natural constituents (technological, physiological, psycho-emotional) of the environment, matching environmental restriction with recreational appeal of lands, identifying recreational specialization of natural recreational areas, as well as characteristics of natural economic systems of Russky Altai distinguished by D.V. Chernykh (2012) constituted a ground for zoning.

## Results and Discussion

Based on the carried out complex analysis, it was well established that the entire territory of the region has different level of friendliness for being involved into the recreational use of natural resources. In some regions it is priority type of using natural resources, while it's supplementary and secondary in others, but being present one way or another. It should be noted that similar work on the subject but with an economic focus was carried out by colleagues for the Altae-Sayan ecoregion (Dunets, 2011). They distinguished zones of pioneer exploitation, extensive/intensive exploitation, environment-oriented exploitation and innovation development.

After the manner of T. E. Isachenko and V.P. Chizhova (2012), we believe that one type of use of natural resources should supplements another, since the more diverse an economy, the more stable it is. Foreign colleagues also adhere to this opinion, arguing that tourism should be understood as one of numerous components in a differentiated economic structure and it's necessary to avoid mass-tourist "monocultures" (Monshausen, 2015). To maintain traditional land use under conditions of favourable natural recreational resources and vice versa. Besides, conservation status should be taken into account, since there are many protected areas of different levels in this region (Siegrist et al., 2009; Danielli and Sonderegger, 2009; Lanza et al., 2005).

This approach is reflected in the names of zones. The double names have an emphasis and sense-bearing focus on the first word, the second word reflects the secondary type of natural resource use.

For the purpose of zone classification we made a matrix of three basic types of natural resource use in the region (Table 1). The "economic use" should be understood as a complex of component-wise and branch resource use (forest management, crop growing, cattle breeding, mineral production).

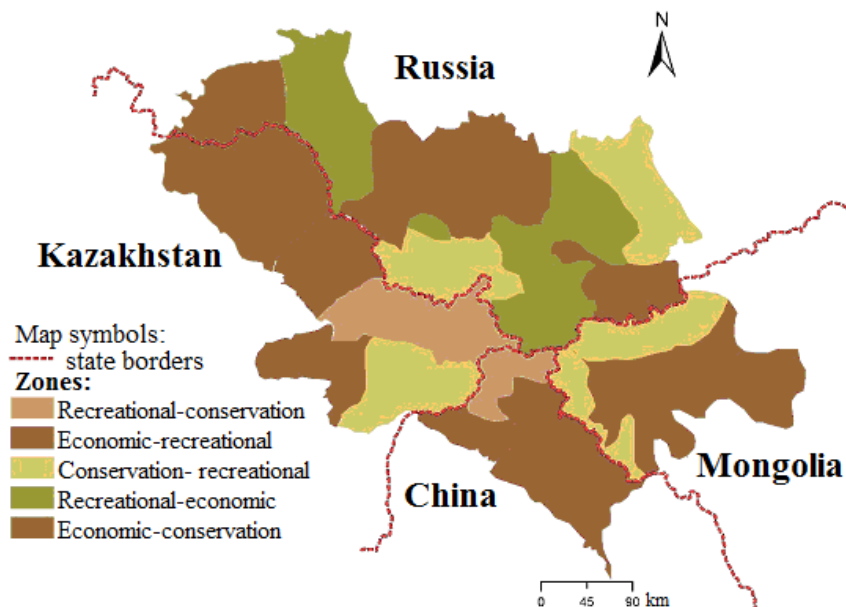
**Table 1.** The Matrix of Functional Zones

<i>Type of natural resource use</i>	<i>Recreational</i>	<i>Conservation</i>	<i>Economic</i>
Recreational	Recreational as such	Recreational-conservation	Recreational-economic
Conservation	Conservation-recreational	Conservation as such	Conservation-economic

Economic	Economic-recreational	Economic-conservation	Economic as such
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In our opinion, the following four out of nine intersections for identification of zones do not make economic sense: recreational as such, since there are no places in the region where recreation could be made the only industry; conservation as such, since today recreational activities are being developed even in reserves; economic as such, since according to the undertaken assessment the entire region is favourable to recreation in some or other way; conservation-economic, since protected areas enter a recreational-conservation or conservation-recreational zone depending on their status.

Thus, from a perspective of recreational zoning the modern natural complexes of trans-border Altay can be grouped into recreational-conservation, economic-recreational, conservation-recreational, recreational-economic and economic-conservation zones (Figure. 1).



**Figure 1.** Zoning of Altai Transborder Region (ATBR)

Recreational-conservation zone includes a part of South Altai (Katon-Karagay) and a part of Chinese (Kanas). These are generally territories with vivid and dynamic high-mountain landscapes, with established and developing complex of organized recreation. Tundras, Alpine, subalpine meadows are typical. Recourses are favorable to active health tourism and climbing. It's useful in the long view to make an emphasis on recreation as main type of natural resource use with associated conservation and maintenance of environment. The Katon-Karagay national park and the Kanas nature reserve are located there.

Conservation-recreational: a part of Yuzhny Altai with Markakol Lake, the Katun range, the Chulyshman highland and the Dzhulukulskaya Basin. Alpine, subalpine meadows, tundras are typical, there are also forest communities (larch, fir and larch). The Markakolsky, Katunsky and Altaisky conservation areas, the

Belukha natural park are located there. For that reason the development of recreational activity should be carried out here in a nature-oriented manner regarding natural and natural-cultural complexes.

A part of Rudny Altai, the south end of Mongolian Altai, almost completely North-West Altai, Chuya and Kuray steppes of South-East Altai, the Chinese part except Kanas are economic recreational areas. Tundra cryophyte steppes, desert steppes, mixed herbs-gramineous are typical, there are also tundra phytocenoses, dark coniferous forests, larch and birch-larch forests. These places with unique historical-cultural potential are favourable for keeping traditional husbandry (timber harvesting, red deer breeding and other branches of cattle breeding), therefore, it's reasonable to focus on the recovery of traditional economic complex with associated development of active health, sport and ethnographic tourism. The recreational use of natural resources in this area should become an impetus to and support of traditional use of natural resources.

Recreational-economic: a part of North Altai, the Uymon Valley, the Ukok Plateau, the North-South-Chuya ranges, the Ulagan highland. Steppe communities, tundras, Alpine and subalpine meadows are typical, there are also dark coniferous forests. In addition to recreational development, economic activities are being carried on. As a rule, it is distant-pasture cattle tending. Moreover, such constituents as the Abay, Uymon and Katandin Basins are most suitable for agriculture in inland Altai.

Economic-conservation: the Tigerek part of North Altai and the most part of Rudnu Altai. Taiga and meadow steppes are common. There are small-area Tigereksky and Zapadno-Altaysky conservation areas, that's why it's necessary to relate economic activities (agriculture, mining operations) to nature reserves.

Thus, economic-recreational zone, i.e. territories where many voluntary development centers can be established, make up 42% of the entire ATBR. 20% fall at conservation-recreational, development goals of which comply with development of recreational activity in a nature-oriented manner.

Different types of natural resource use are of different social significance, which should be recognized in economic practice. In each particular case a priority should be placed on particular types of territory use (recreational or conservation). In the districts of traditional resort use territory functions related, above all, to the need of preservation of its ecological harmony should be solved on a first-priority basis. The opportunity of most complete satisfaction of population needs should be pursued in the territories of new exploitation, these are usually most picturesque natural sites.

According to the identified priorities, functional zoning and management practices are an instrument for sustainable development of recreational natural resource use. Based on the carried out research and region analysis, we suggest ways for optimizing resource use in ATBR. The main of them are the following:

1. Recreational monitoring based on the concept of recreational digression stages. It involves observation on key sites, which are extensively used in recreational activity, and on standard sites. The observation programme includes recording the state of the basic constituents of a natural territorial complex – lithogenic base (development of erosion processes), soil (humus density and content), vegetable life (species composition, projective cover and grass stand phytomass, a share of stress tolerant species, timber stand and understory condition), wildlife

(presence of rodent and insect colonies). Recreational load is additionally recorded, which allows relating observable changes to the number of visitors.

Results of recreational monitoring allow elaborating a set of recommendations regarding regulation of recreational impact on natural territorial complexes for the purpose of preserving the natural course of landscape development. In particular, ultimate recreational load on routes, re-sizing of wooden covers as to prevent trampling of vegetation, regulated quota arrangement for citizens staying in the territory of protected area with scientific, educational or awareness-raising purposes are determined based on that data. Introduction of quotas and their annual redistribution allow not only monitoring recreational activities but also supporting protection regime.

2. Diversification of tourist product. Each natural recreational zone has a few cycles of recreational activity, which allow, if conditions changed, refocusing recreational activity to a different, optimum direction. Diversification is considered an availability of various directions of using recreational resources, increasing resistance of recreation as a system as a whole to external and internal destructive influence, creating conditions for most efficient use of resources if situation, system goals are changing (Sevastyanova, 2008).

3. Creating cross-border protected areas, coordinating actions of existing near-border areas. Protected area created and functioning on either side of the border can be an important tool for agreed measures on nature site protection and creating ecological corridors. The following reserves and parks are ideal for cooperation in ATBR: Saylyugemsky national park on the part of Russia and Silkhemin park in Mongolia, the Chinese nature reserve Kanas and the Katon-Karagaysky national park in Kazakhstan, as well as the Ukok natural park in Russia. It's efficient to create an ecological corridor between the Russian Tigireksky reserve and the Kazakhstan West-Altai reserve in the form of wildlife reserve.

4. The development of recreational activity in such protected areas as nature reserves should be carried out within biosphere proving ground. The territories of State natural biosphere reserves could incorporate the territories of biosphere proving grounds, including those with different level of protection and functioning, for the purpose of research studies, environmental monitoring, as well as testing and implementing methods of rational use of natural resources. The Altaysky and Katunsky reserves have a biospheric status.

5. Working out scientific and educational routes in the Ukok, Chuya-Kuray, North-South-Chuya natural recreational areas is of relevance. It's possible to include them into the Golden Ring as far-reaching paths. Preventing holiday-makers' activity by means of organizing eco-outreach groups under the watchful eye of a guide to prevent unauthorized campfires and domestic waste dumps.

## Conclusion

The analysis of the particular characteristics of manifestation of nature- and economy-driven processes in ATBR made it possible to divide its territory into five functional zones: recreational-conservation, economic-recreational, conservation-recreational, recreational-economic, and economic-conservation. Ways for optimizing resource use while maintaining the general stable strategy are suggested.

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### Disclosure statement

No potential conflict of interest was reported by the authors.

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### References

- Chernykh, D.V. (2012). Spatio-temporal design of inland mountain scenery (by the example of Russian Altai). PhD Thesis in Geographic Sciences. Barnaul: Altai State University, 368 p.
- Danielli, G., Sonderegger, R. (2009). *Kompaktwissen. Naturtourismus*. Zürich: Rüegger Verlag, 180 p.
- Dirin, D.A. (2007). Appraisal and recreational use of landscape scenic resources of the Ust-Koksinsky region of the Republic of Altai. Novosibirsk: Press of the Siberian branch of the Russian Academy of Sciences, 206 p.
- Dobrushin, Y.V., Somenkova, V.N. (1990). Land-use planning. In *Use of natural resources and environmental protection in the Baikal basin*. Novosibirsk: Nauka, pp. 167-173.
- Dunets, A.N. (2011). *Tourist-recreational complexes of a mountain region*. Barnaul: Altai State Technical University Press, 201 p.
- Isachenko, T.E., Chizhova, V.P. (2012). Transformation of natural culture complexes of mountain regions (by the example of the territory of Alaniya national park). *Herald of St. Petersburg State University. Series 7, 3*, 91-103.
- Lanza, A., Markandya, A., Pigliaru, F. (2005). *The Economics of Tourism and Sustainable Development*. Cheltenham, UK; Northampton, MA, USA.
- Liszewski, S. (1995). *Przestrzeń turystyczna*. *Turyzm*, 5(8), 87-103.
- Mechkovskaya, O.A. (2011). Particularities of development of Central and East European countries' tourist areas. *Belarus State University Herald. Series 2, Chemistry. Biology. Geography*, 2, 87-91.
- Monshausen, A. (2015). *Entwicklungsfaktor Tourismus. Der Beitrag des Tourismus zur regionalen Entwicklung und lokalen Wertschöpfung in Entwicklungs- und Schwellenländern*. Hg. Bundesverband der Deutschen Tourismuswirtschaft (BTW). Zeichen, Dezember, Berlin.
- Oyungerel, B. (2004). Integration of traditional method and modern technologies for sustainability of dry land ecosystems of Mongolia. *Combating Desertification-Traditional knowledge and modern technology for the Sustainable Management of Dryland Ecosystems*. In *Proceedings of the International Workshop, Elista, Republic of Kalmykia (Russian Federation)*, UNESCO-MAB Drylands Series 4, pp. 75-80.
- Oyungerel, B., Savenkova, T.P. (2004). The eco-geographical basis for organization of transboundary protected areas in Selenge river basin and their contribution on conservation of sustainable ecological balance in the Baikal region). In *Science for Watershed conservation: Multidisciplinary Approaches for Natural resource Management*. Ulan-Ude, Buryatia, Russia; Hovsgol, Mongolia, pp. 185-193.



- Pirozhnik, I.I. (2008). Structural and functional features of the recreational and tourist space, and formation of tourist product of Belarussia. In *Tourism and regional development*. Smolensk: Universum, pp. 124-136.
- Preobrazhensky, V.S., Zorin, I.V., Vedenin, Y.A. (1972). Geographic aspects of designing new types of recreational systems. In *Proceedings of Academy of Sciences of the USSR, Series Geography*, Issue 1, pp. 36-51.
- Rodichkin, I.D. (1977). *Human, environment, recreation*. Kiev: Budivilnyk, 160 p.
- Sevastyanova, S.A. (2008). *The ecological and economic evaluation of recreational resources*. St. Petersburg: St. Petersburg State Economic University, 190 p.
- Siegrist, D., Stremlow, M. (2009). *Landschaft, Erlebnis, Reisen. Naturnaher Tourismus in Pärken und UNESCO-Gebieten*. Rotpunktverlag, 280 p.
- Znamenskaya, E.A. (1969). Issues of resort designing. In *Resort siting, planning and provision of amenities*. Moscow: Stroyizdat, pp. 161-171.