Environmental safety and the "green" economy in the context of the Baikalocentric model of territorial development

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Abstract. The results of ecological and socioeconomic scientific research within the central ecological zone of the Baikal natural territory (CEZ of the BNT) are presented, the legislatively fixed function of which is the preservation of the unique ecological system of Lake Baikal. It administratively includes the territory of three districts of the Irkutsk region (Irkutskii, Olkhonskii and Slyudyanski) and four in the Republic of Buryatia (Barguzinskii, Kabanskii, Severobaikalskii and Pribaikalskii). The research is based on the theoretical and methodological approaches of social geography; we applied the ideology of the "green" economy and the centrality of territorial development. For Lake Baikal as an object of the World Natural heritage (since 1996) on the basis of the adopted federal law "On the protection of Lake Baikal", three federal target programs for the protection of the lake and socioeconomic development of the Baikal natural territory have been developed. Based on the data obtained during the targeted research of the federal and regional level on the territory of the CEZ of the BNT, a matrix is proposed for assessing the location of economic activity objects (e.g. industry of specialization - the recreational sphere). Geographical features of the CES of the BNT and its modern functional purpose predetermine the Baikal-centric vector of economic activity, primarily recreational, and the growing role of the emerging environmental protection infrastructure (GIS). We consider the GIS as part of the environmental infrastructure from the standpoint of the "green" economy as a practical implementation of the principles of sustainable development. Methods of expeditionary research and sociology (questioning, survey) were used.

1. Introduction
The "green" economy is interpreted as an economy whereby people's well-being is increased and social justice is provided, environmental risks and degradation are significantly reduced. In the conceptual documents of international organizations, and developed countries, including Russia, the prospects for economic development in the 21st century are associated with the formation of a "green" economy and "green" growth. In the scientific and practical activity over the past few years, according to Bobylev, a consensus has actually been reached on the need to form a new type of economic development, and to develop a new "green" economic course [1]. The concept of environmental safety in the current domestic regulatory and legislative documents is interpreted as a state of protection of the natural environment and vital human interests from the possible negative impact of economic and other activities, natural and man-made emergency situations, and their consequences.
The central ecological zone of the Baikal natural territory is a functionally and legislatively allocated territory with special conditions for ecological, social and economic development. The main function of the central ecological zone of the Baikal natural territory is the preservation of the unique ecological system of Lake Baikal and its coastal environment. Ecosystem functions of the CES of the BNT also include resource (pure drinking water) and recreational (development and restoration of physical and spiritual forces of human being). Formation of a model for the development of the territory in the format of the "CEZ BNT + Baikal ecosystem", consistent and logically aligned, will enable implementation of the principle of sustainable development of the socioeconomic life of the society in relation to the World Heritage site Lake Baikal, to build the matrix of relations in the ideal format, when the population is interested in preserving landscape attractiveness, preventive measures for preserving forests, and demonstrates environmental behavior in practice.

It should be noted that Baikalocentrivity as a paradigm of harmonious and inexhaustible nature management is designated, actively promoted in the second half of the last century by academicians G.I. Galazii and V.A. Koptyug, and is fundamentally worked out by the scientific community of the Siberian Branch of the Russian Academy of Sciences [2].

2. Models and Methods
The study is based on materials obtained during expeditionary research in the context of municipalities of the low administrative levels.

To conduct a state environmental-oriented policy that could enable a comprehensive analysis of the possible impact of the proposed activity on the environment or facility construction, and also promptly identify the risks of adopting a decision, assess cumulative impacts, develop mechanisms for implementing programs and projects of different status in the CEZ of the BNT (state, corporate, and international), we developed a matrix on the methods of evaluation Two groups of criteria were used: sociolegal and environmental. Sociolegal group of criteria is based on the basic regulatory and legislative acts in the field of Lake Baikal protection in order to justify the permissibility of placing ecologically oriented types of economic activity. The main characteristics considered in the group of environmental criteria for assessing the permissibility of the location of facilities were as follows: the features of the production infrastructure used to reduce the environmental impact; the main factors of the negative environmental impact; peculiarities of methods for purification of discharges, disposal and utilization of wastes of main production, purification equipment; the probability events with adverse consequences for the environment and caused by the negative impact of economic and other activities, by emergency situations of natural and man-made nature.

3. Results and Discussion
The construction of a high-speed highway, the formation of the Eurasian Economic Corridor, that includes the CEZ of the BNT as its part, is a priority for the new powerful integrated development of the Transsib zone and adjacent territories [3]. The author's experience in the implementation of targeted research programs of federal and regional status in the territory of the CEZ of the BNT (1998-2003, 2016-2018, mainly expeditionary research), familiarity with foreign practices of economic development, similar in objects and their function, allow us to recommend a partnership format (co-development) "CEZ of the BNT + Baikal ecosystem". The priority is the "green" economy, which is the practical implementation of the sustainable development goals of this key site of the BNT, which is consistent with other researchers [4]. However, strict prohibitions of the titles on land use in the CEZ of the BNT, which are absolutely necessary concerning significance of Baikal's unique natural site and the "world well" of fresh water, did not achieve the expected result in practice. One of the reasons, the regulation of economic activity, continues to be a problem, without real compensatory mechanisms (financial, organizational and technical, etc.), without updating the whole complex of infrastructure - communal, transport, social, environmental protection, ensuring environmental safety [5].
The main function of the central ecological zone of the Baikal natural territory is the preservation of the unique ecological system of Lake Baikal and prevention of negative impacts of economic and other activities on its condition. Given the status of federal attention to the problems of Lake Baikal (included in the list of natural World Heritage sites in 1996), as well as the proclamation of the ideology of preserving this Great Lake in the economically well-founded Russia, a peculiar historical analysis of the institutions of interaction between the state, authorities and civil society is highly relevant. Its purpose is to identify and eliminate system failures that prevented, to implement projects of special economic zones of the tourist-recreational type (SEZ TRT) "Gate of Baikal" and "Baikal Harbor", and also the creation of a working scheme for handling waste in the tourist areas on the coast and the development of tourist zoning and the rules of recreational activities in the CES of the BNT in accordance with the Federal Law "On the Protection of Lake Baikal", etc.

The CEZ of the BNT administratively includes the territories of two constituent entities of the Russian Federation (Irkutsk region and the Republic of Buryatia) with seven municipal districts (Irkutskii, Olkhonskii, Slyudyanski in the region, Barguzinskii, Kabanskii, Pribaikalskii, Severobaikalskii in the Republic) and one city (Severobaikalsk) with an area of about 90 thousand km², where more than 140 thousand people live (as of 01/01/2018). At the same time, the annual flow of recreants exceeds 2.2 million people [6]. Therefore, placement possibility of various objects of the "hospitality industry" is represented on the example of recreational activities (generalized jointly with O.V. Evstropyeva), with a generalization of a number of known methods mainly in three positions: advantages, disadvantages, selection criteria, supplemented by legal regulations, significant for the actualization of the mentioned table 1.

The location of the CEZ is economically profitable, since it is the developed southern part of Eastern Siberia: along the southern part of the lake there is a section of the Trans-Siberian Railway, in parallel - the federal highway "Baikal", it is located in the zone of influence of the centers of the federation subjects - Irkutsk and Ulan-Ude, along the northern part of the lake the Baikal-Amur Mainline (BAM) is located; During summer water transport connection is provided along Lake Baikal and the Irkutsk reservoir. Geostrategically, this is a local crossroads between the west and east and an international one between the north and south (Siberia-Mongolia-China). A number of the most important factors of the expected qualitative change in the development of the CEZ of the BNT since the late 1980s can be formulated in several positions, under the stable interest of the state, including the regional authorities, municipalities, and civil society.

First, according to our expert assessments, the number of qualitatively developed normative and legislative documents and various proposals of the pre-project, project level, as well as territorial maps for the development of the federal status for the Baikal natural territory (including the CEZ), aimed at protecting nature, organizing economic activities in terms of environmental constraints, exceeds any domestic region for the last quarter of century. Thus, only the "Territorial Complex Scheme for the Protection of the Nature of the Lake Baikal Basin" (hereinafter the Scheme) was presented in the format of 69 volumes (approved by the Presidium of the Council of Ministers of the RSFSR on 14.04.1990), updated in 2009 by the Federal State Unitary Research and Production Enterprise "Russian Federal Geological Fund" commissioned by the Ministry of Natural Resources of Russia. Nevertheless, as a result of the legal inconsistency, the implementation of the Scheme regulating the given vector of the development of the CEZ of the BNT was not carried out [7]. During the reform period, three federal target programs for the protection of Lake Baikal and socioeconomic development of the Baikal natural territory were developed.

Secondly, the strict prohibitive nature of the legal documents (table 1) is absolutely necessary in the context of the importance of the unique natural site of Lake Baikal and the "world well" of fresh water regulating economic activity, has not any real compensatory mechanisms (financial, material, organizational technical, etc.) at the regional and municipal levels. The scale of "different nature" (interests) of government bodies and institutions of civil society causes, in turn, differences in understanding approaches to solving problems in this territory. As a result, the method of development of the CEZ did not work through the mechanism of the two major mega-projects mentioned (the
situation requires a separate analysis). Only the self-employment of the population and its entrepreneurial activity, mainly in the organization of various recreational activities, stopped the real increase in unemployment in most settlements, especially after the closure of logging enterprises, fishing enterprises, and the pulp and paper mill in Baikalsk.

**Table 1. Assessment of placement possibility of various recreational objects within the CEZ of the BNT.**

| Methods                        | Advantages                                                                 | Disadvantages                                                                 | Selection criteria                                                                 | Documents, rules                                                                 |
|--------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Special regulated impacts, the load method | Ratio of anthropogenic load and ecological capacity to local terrestrial systems in the context of local ecosystems. | The application of the standard ratios is possible as a result of detailed research on recreational areas, regular monitoring of recreational loads, the development of functional recreational zoning of the CEZ of the BNT and tourism rules, common for the Irkutsk region and the Republic of Buryatia. | The level of ecological and socio-economic parity | "On approval of standards for exposure limit on the unique ecological system of Lake Baikal" Order of the Ministry of Nature of RF of 05.03.2010 N 63. "On the protection of Lake Baikal. The federal law of 01.05.1999 №94-ФЗ. |
| Regulatory approach            | General principles of state policy in the field of tourism                  | Underestimation of regional socio-economic etc. features of territories of different hierarchical status. | Priority of central-peripheral development                                      | FL* "On the fundamentals of tourism in the Russian Federation" (as of 24.11.1996) |
| Departmental regulatory and legal approach | Regulated general principles of sectoral priorities (in the field of forest management, tourism policy) | Underestimation of regional socio-economic and other features of territories of different hierarchical status. | The parity of government-departmental interests                               | "Standard of the industry OST 56-100-95" Methods and units of recreational load measurements for forest natural complexes "(Order of the Federal Forestry Agency of July 20, 1995 No. 114) Forest management regulations "Pribaikalsky National Park" and others. |

Note: * - Federal Law

In the territory of the CEZ of the BNT, in the light of visible institutional deficiencies, specific ecological and economic problems in the field of the established specialization branch - tourism [8] were also attempted to reveal. Thus, in the field research on the federal target program "Lake Baikal Protection and Social and Economic Development of the Central Ecological Zone of the Baikal Natural Territory" (summer 2016), the heads of local self-government bodies, staff of specially protected territories, as well as representatives of the tourist industry were interviewed. As a result, specific problems related to the recreational activity adjustment in the CEZ of the BNT were revealed. The main part of the unsolved problems is related to the following major deficiencies: lack of cooperation between the tourist industry, local population, local authorities and specially protected territories, as well as infrastructure deficit, primarily in waste management; and a shortage of land for tourism development.

The main environmental problems of the CES of the BNT as a threat to environmental safety are: firstly, the discharge of insufficiently treated sewage into the lake and its tributaries by sewage
treatment facilities (STF); and low technical condition of the STF [9]. Secondly, the receipt of pollutants in the form of diffuse and dispersed runoff from recreational, residential, industrial areas and storage sites for production wastes; absence of storm, local and centralized sewerage systems in the majority of settlements and in recreational areas of the CEZ of the BNT. Thirdly, a large amount of biogenic pollutants enters the lake in discharges from the STF and with a dispersed runoff, which contributes to the eutrophication of the lake (at the peak of the summer season on the coast of Lake Baikal, about 20000 tourists can stay at any time, which produce equivalent volumes of solid municipal waste and liquid household waste (SMW and LHW, respectively). The prospects for the development of much-needed environmental protection infrastructure are associated with the creation of a network of waste collection and processing points, with the location of treatment facilities, as well as compliance with environmental regulations of permissible impact standards using environmentally friendly technologies for waste water disposal and utilization.

At Baikal, the processes of "infrastructural disruption" in handling waste have reached an almost catastrophic scale. Over the past decade, the main Baikal theme for obtaining grants is cleaning the coastal areas of Lake Baikal from garbage by domestic and foreign volunteers. One of the reasons is the lack of functioning environmental protective facilities (EPF) (only one polygon in the CEZ is included in the list of state waste disposal facilities); the available special technology for the disposal of consumer waste is only for the local population. Another reason is the increase in the specific accumulation of SMW due to the "packaging boom" and the destroyed system of selective collection of the utilized part of SMW. At the same time, the share of SMW from tourist facilities in the Irkutsk part of the CEZ, according to our calculations, exceeds one third of the total annual SMW flow (8642 and 24811 tons/year, respectively). The highest share of SMW from tourism in the context of municipal districts is in Olkhonskii (52%), and Irkutskii district (32%).

The basic function of the EPF corresponds with the main positions of promoting the ‘green’ economy: minimizing the impact of the deposited, recyclable and other production and consumption wastes on the environment, as well as involving additional resources in the economic circulation and improving the living conditions of population. The most important task for the CEZ of the BNT is the formation of a mesoregional cluster for waste management. The EPF cluster is a network of geographically localized interrelated economic agents of specialized services, infrastructure enterprises, thematic research institutes, universities and other organizations that complement each other and enhance the competitive advantages of individual territories. A necessary condition for the formation and effective operation of EPF: the creation of an institutional environment (socio-economic, regulatory, legal, cultural, educational, and eco-oriented).

4. Conclusion
Analysis of the ecological and socioeconomic conditions of the territory in the CES of the BNT revealed that theoretically there is an ideal situation for the implementation of the principles of sustainable development of the Lake Baikal as a World Heritage site, taking into account the developed strategic documents for the development of the Baikal natural territory, including its central ecological zone in the format promoted by the “green” economy.

The location of the CEZ of the BNT is economically profitable, since it is the mastered southern part of Eastern Siberia. Geostrategically, this is a domestic crossroads between the west and east and the internationally between north and south (Siberia-Mongolia-China). The solution of environmental problems today involves the development and implementation of a new policy, since it is the environmental requirements laid down as principles of the “green” economy that determine the strategic directions of innovative development and modernization of the economic complex of the CEZ of the BNT and further long-term favorable ecological, social and economic development of the territory.

Further development of recreational activities as one of the main branches in the visible perspective "initiates" the formation of environmental protection infrastructure. And the latter one ensures the
preservation of a favorable environment, including landscapes, attractiveness of the Baikal Territory as a whole.

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