

Lomonosov Moscow State University

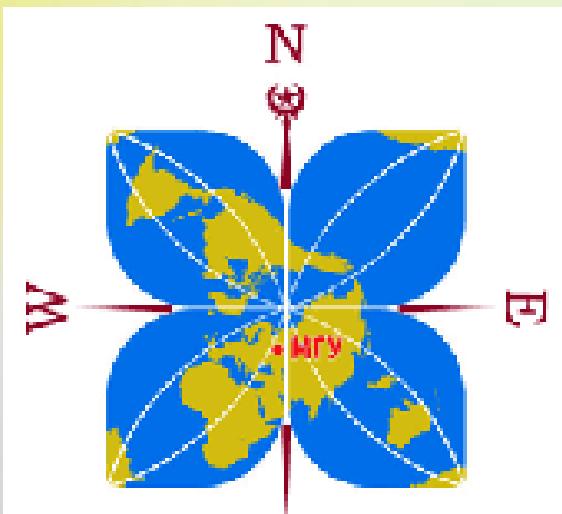
Faculty of Geography

Department of Environmental Management

Water quality management in the Lake Baikal region of Russia

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Lake Baikal is a UNESCO World natural Heritage Site. It is the deepest lake in the world and the largest natural reservoir of fresh water.

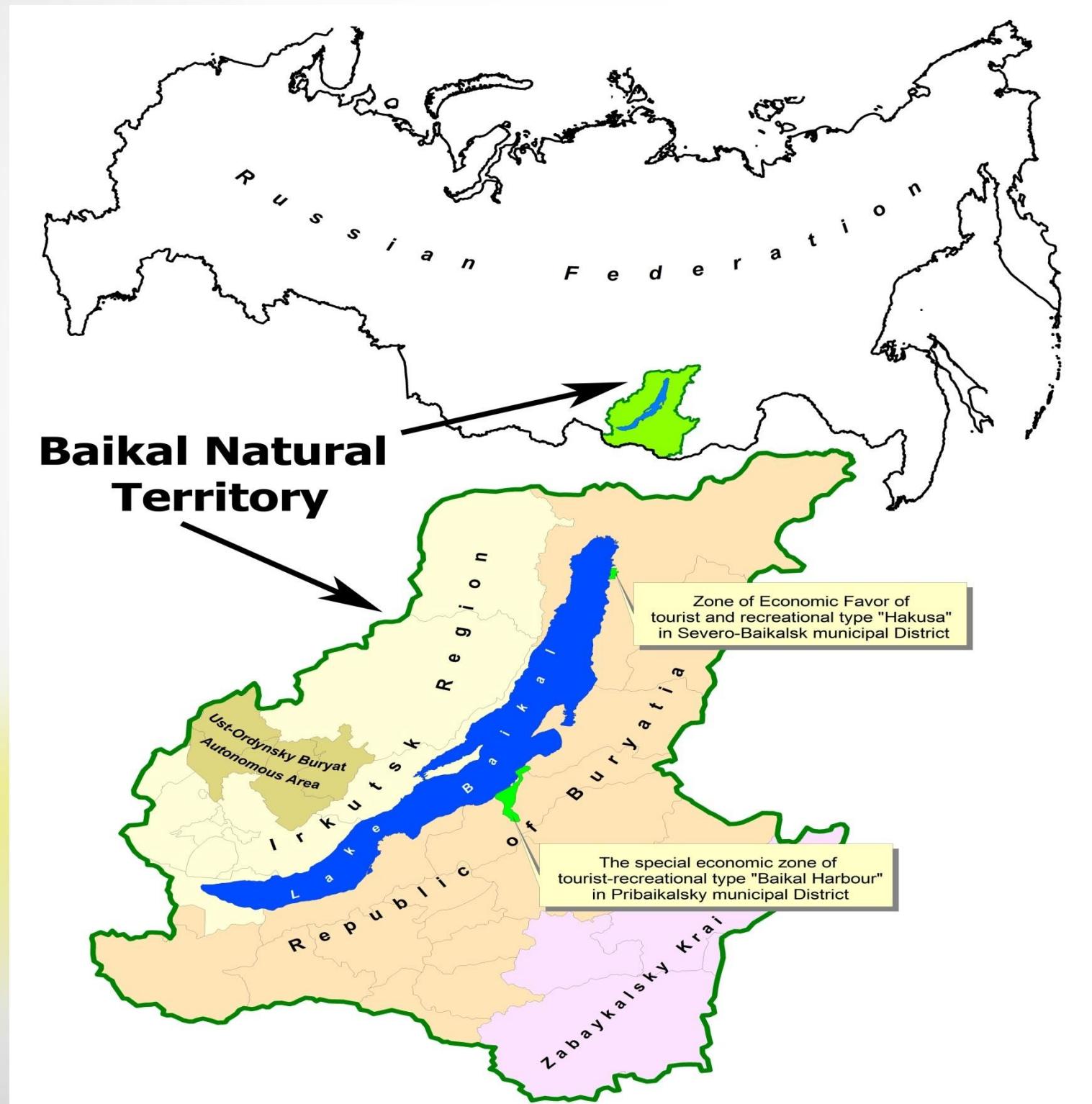
The research is devoted to the foundation and development of proposals for the improvement of the economic and organizational activities and legislative measures that would ensure the preservation of Baikal.

The **main aim** of the present research was to reveal the trends in sustainability changes of the BNT development by analyzing the current contradictions between environmental protection and economic activities.

To achieve this aim during the research the following **problems** were being addressed:

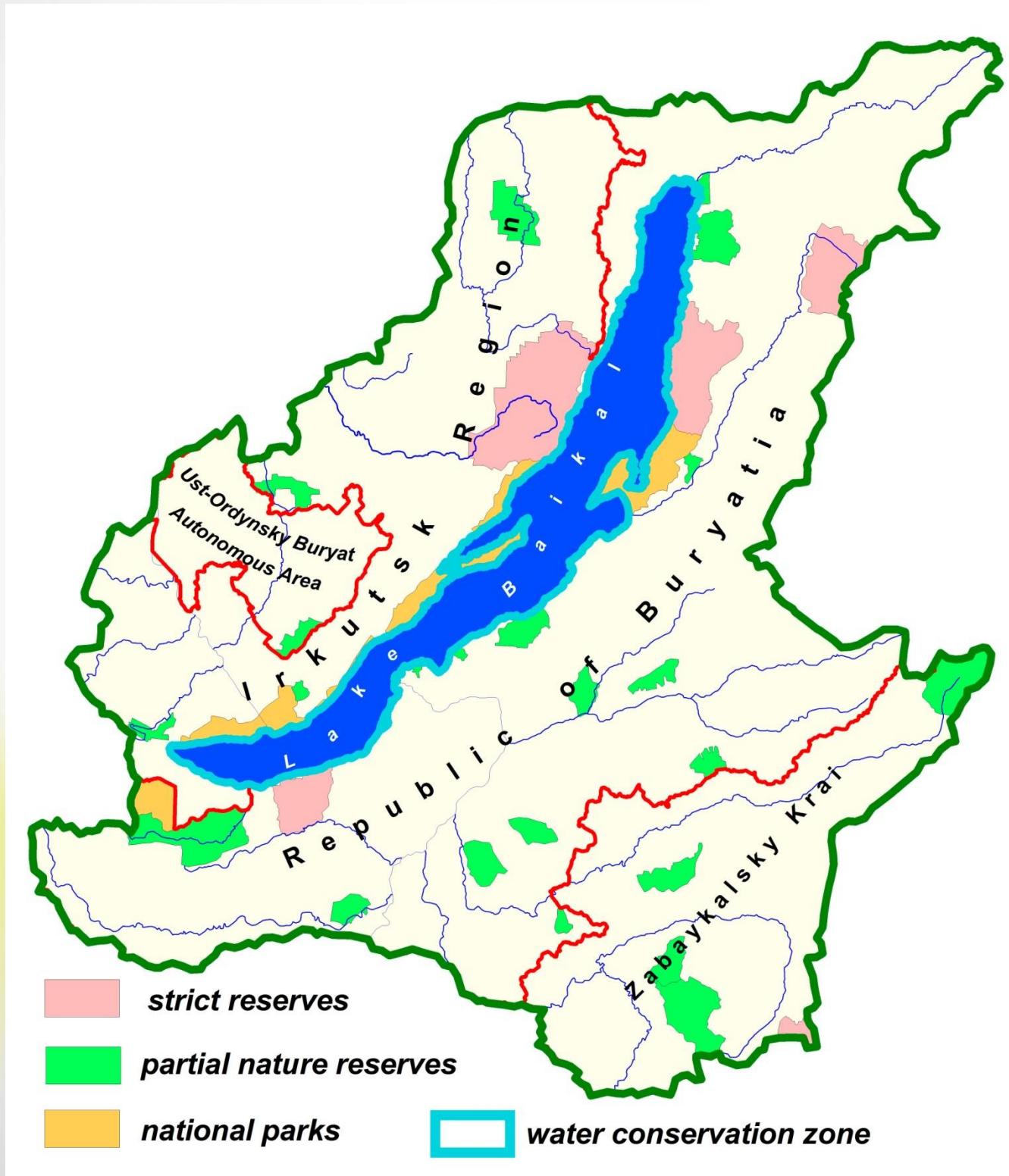
- 1) the impact of modern economic activities on BNT sustainable development has been characterized,
- 2) the primary threats to BNT sustainable development and to preservation the unique ecosystem of Lake Baikal, associated with changes in the mode of water consumption and climate, have been identified,
- 3) the perspectives for the development of tourism and recreation cluster as one of the most important factors for BNT sustainable development were treated, and some ways to the development of organized tourism and tourist infrastructure within the special economic zone "Baikal harbor" were suggested.

Study Area



The Baikal Natural Territory includes Lake Baikal, coastal water protection zone of the lake, its drainage basin within the territory of the Russian Federation, special protected areas adjacent to Baikal, and also a 200 km wide territory adjoining the lake in the west and north-west.

Protected areas of BNT



Twelve special protected areas, including 3 nature reserves, 2 national parks, 6 sanctuaries adjoin Lake Baikal coast (Fig. 2). Besides them there are 23 special protected areas and over 400 natural monuments on the BNT.

Economic activity and the BNT sustainability

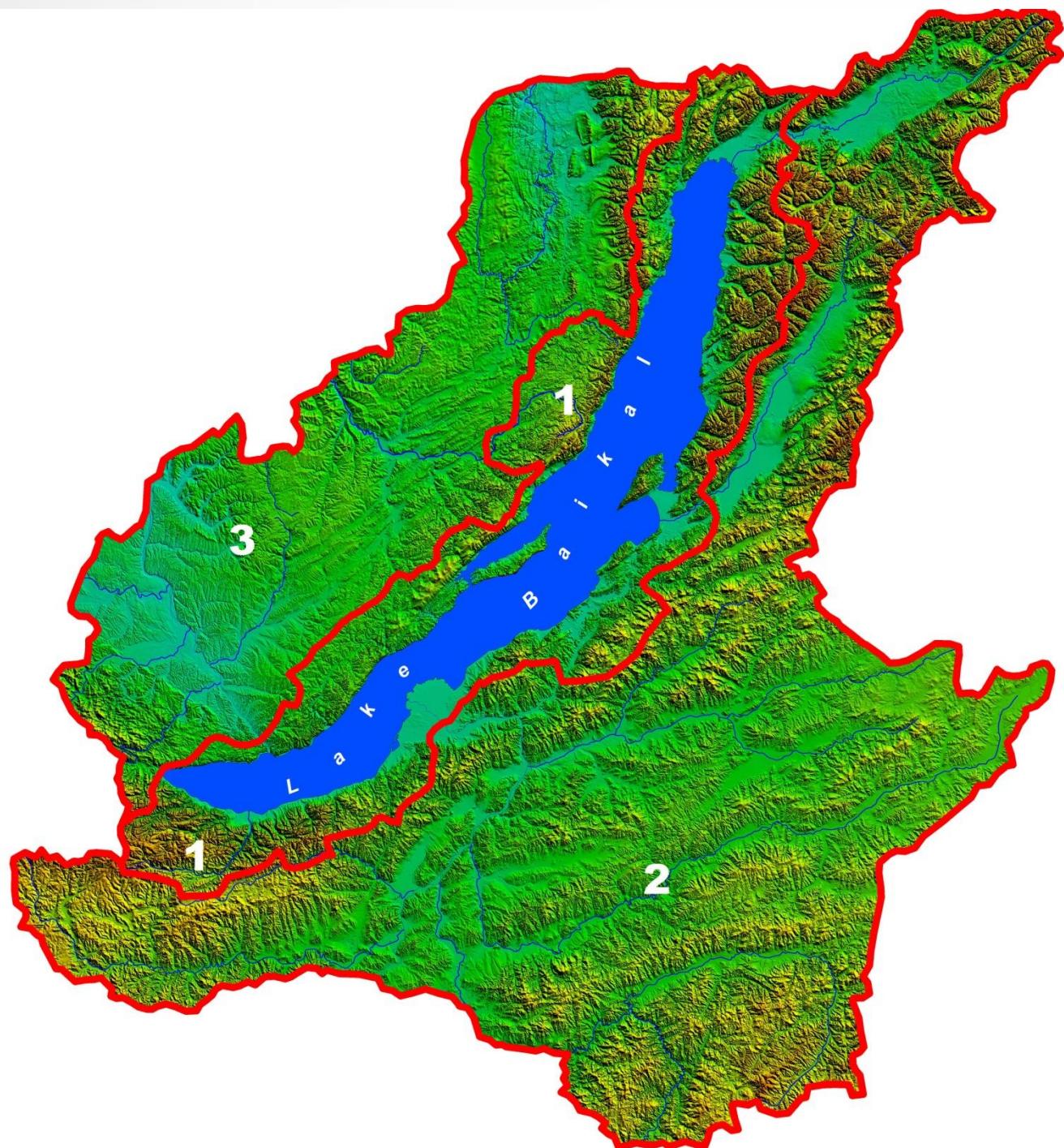
Special regime causes **damage and losses of profit** for the region's economy:

- prohibits or limits over **50 kinds of economic activity** on the BNT;
- charges for using water resources in Baikal basin **1.7 times** exceed the average rate for Russia;
- charges for the negative impact on the environment are **2 times** higher;
- agriculture carries losses because of the requirements limiting the use of **fertilizers and pesticides**.

All this creates difficulties for economic activities and people living conditions.

As a result, annual population outflow from the region is **12-15 thousand people**.

BNT ecological zones



Legend:

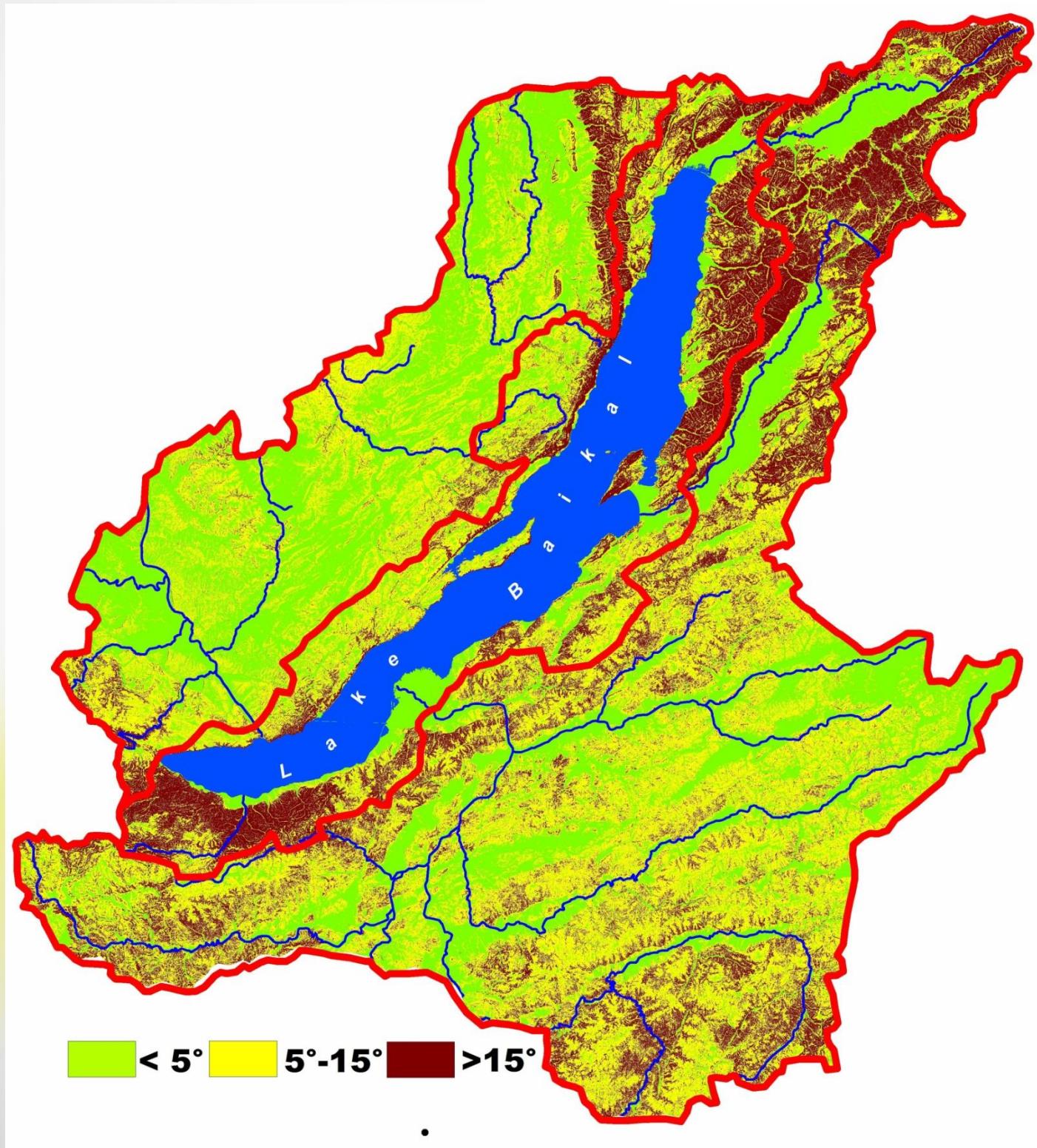
- 1 – central ecological zone,
- 2 – buffer ecological zone,
- 3 – ecological zone of atmospheric influence

Within the limits of the CEZ the Lake Baikal Law prohibits conversion of lands under forest into other categories of land use.

Clear felling is prohibited in the CEZ forests. In the Republic of Buryatia the CEZ forests cover over 3 million ha.

Creating infrastructure for the life support of the CEZ inhabitants and the development of Special Economic Zone of Tourism “Baikal Harbor” is becoming almost impossible because of these prohibitions, because building roads, power and communication lines, water and heat supply lines requires clear felling.

Slopes steepness on the BNT



Clear felling in places with slope angles up to 5° will have less serious implications than on slopes up to 15° and steeper slopes. Besides, gentler slopes are more suitable for development and economic activities.

The BNT geology is well studied. According to the Federal Agency for Mineral Resources **420 deposits** are discovered and explored, and over 1,000 mineral showings are discovered on the BNT.

The BNT subsoil has large potential reserves of different mineral resources, e.g. natural gas, black and brown coal, non-ferrous and rare-earth metals, gold, nonmetals, ground water.

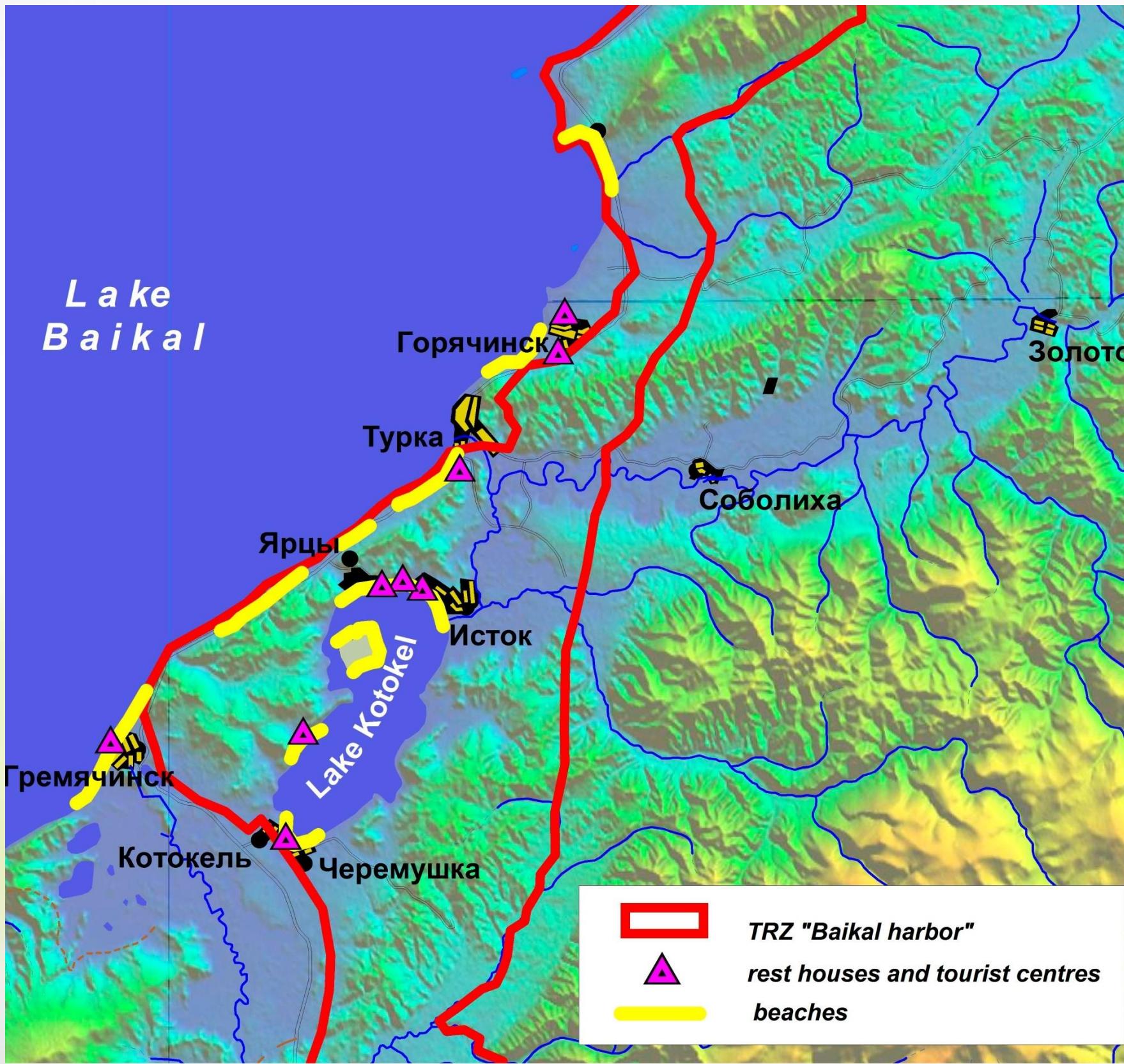
Mining creates numerous environmental problems, which depend on the scale of mining, kind of minerals and mine sites nearness to Lake Baikal.

Environmental damage caused by the activities of unorganized tourists consists of cutting down trees for cooking and putting up tents, littering, poaching. Most forest fires are caused by unorganized tourists.

The solution of the problem is in the development of tourism infrastructure and creating **tourism and recreation zones** (TRZ). At present one of the most actively developing ones is **Special Economic Zone of Tourism and Recreation “Baikal Harbor”**. It is being created with the aim of becoming a center of international tourism in eastern Russia on Lake Baikal, a unique natural site, and attracting Russian and foreign tourists.

The government of Buryatia expects the number of tourists to increase four times from **500 thousand to 2 million** when the TRZ is open.

Special Economic Zone of Tourism and Recreation “Baikal Harbor”



The total area of the TRZ is **3,613 ha**. In the south the zone borders the Khaim River valley.

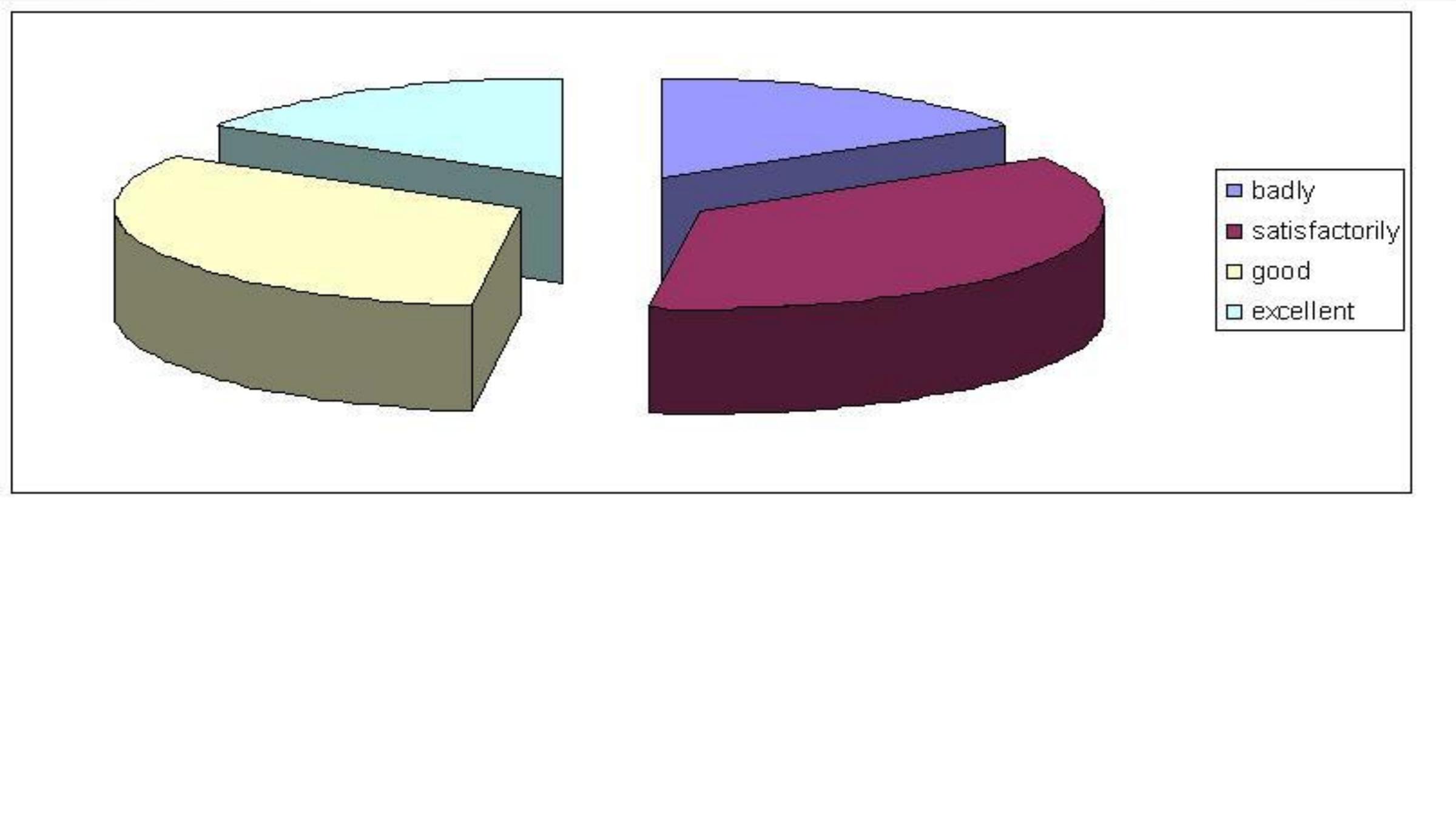
The length of Baikal coast is **60 km** from the village of Gremyachinsk to Katkov Cape.

Lake Kotokel is located in the TRZ and 20 km to the south there is Mount Bytchiya 1,771 m high.

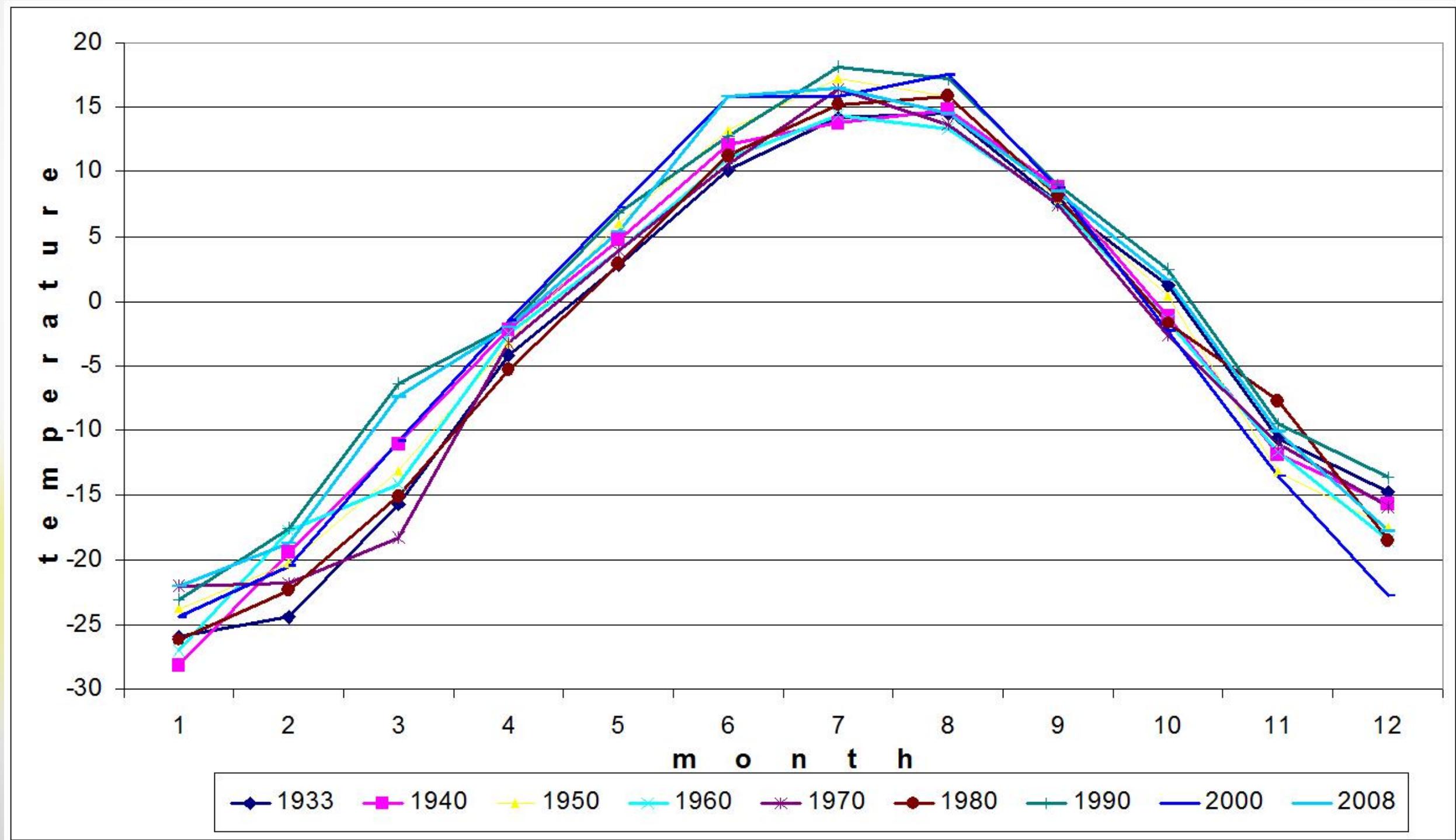
Health tourism, ecotourism, alpine skiing, cruising, excursion, ethnographic and religious tourism are supposed to be developed in the TRZ.

The territory will be treated against mites. Equipped car parks and camp sites, tourist equipment rental, rescue and medical help will be available. Rest houses and tourist centers will be reconstructed.

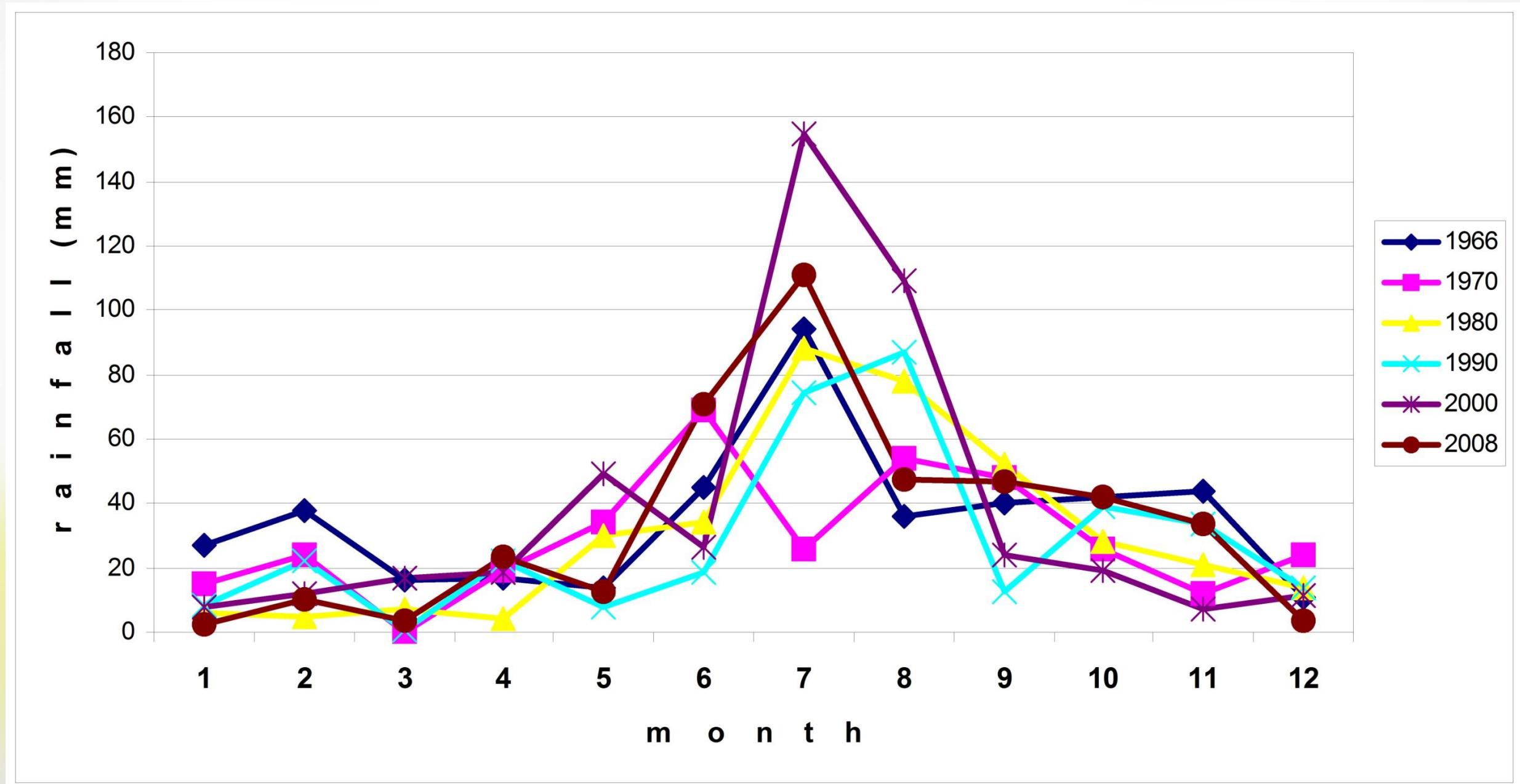
Evaluation of tourism development level in Pribaikalsk and Severobaikalsk districts of Buryatia by respondents



Time series of monthly temperature (at 2 m level) at Russian
“Nizhneangarsk” station (of World Meteorological Organization index –
30433) of Global Climate Observing System.



Time series of monthly precipitation at Russian “Nizhneangarsk” station
(World Meteorological Organization index – 30433) of Global Climate
Observing System.



Average annual temperature anomalies of surface layer of air (Co),
1936-2011 (RosHydroMet 2012)

Anomalies are calculated as deviations from average values in 1961-
1990. Smoothed curve is obtained by 11-year moving averaging. Linear
trend is drawn according to 1976-2011 data.



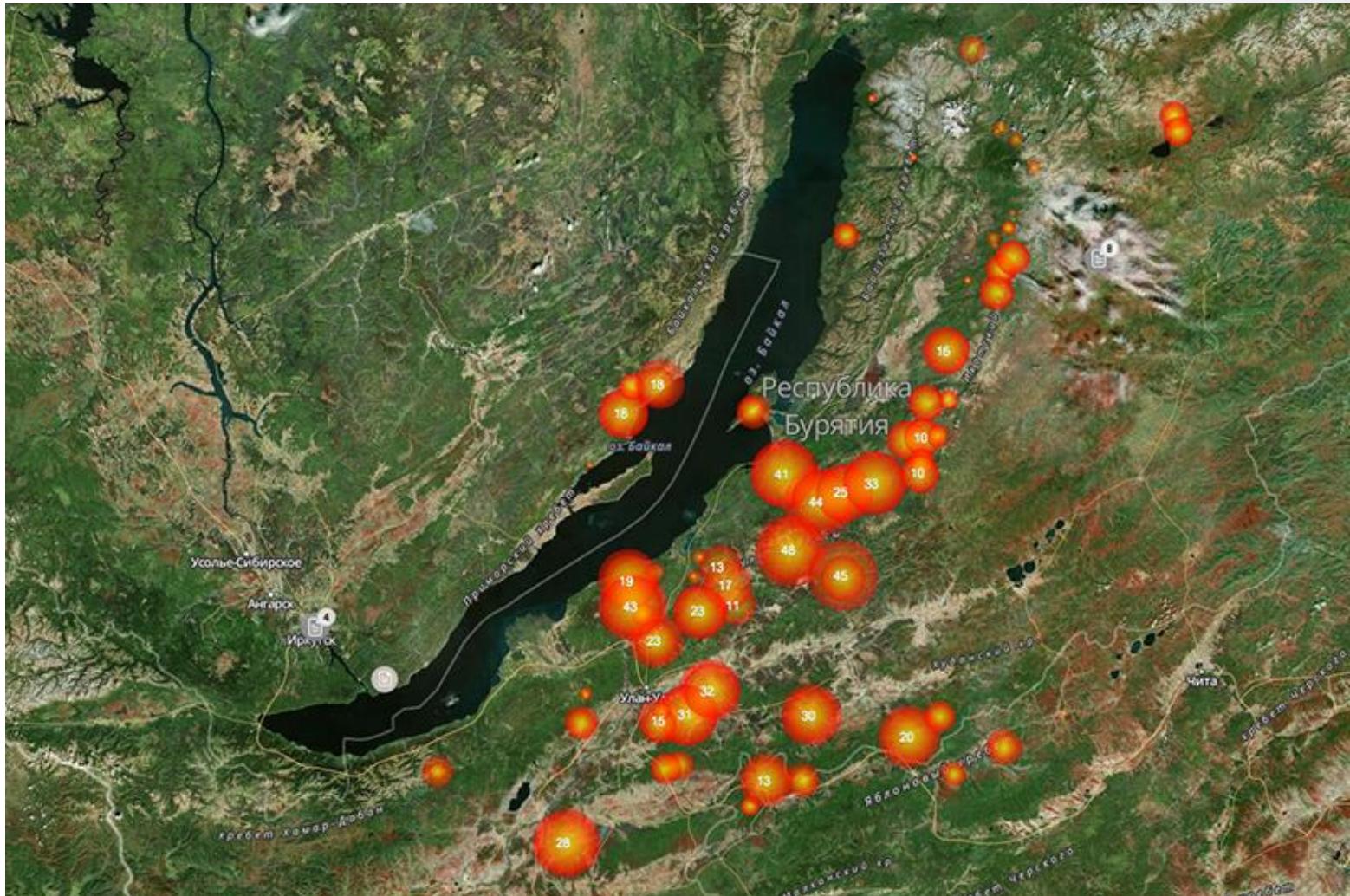
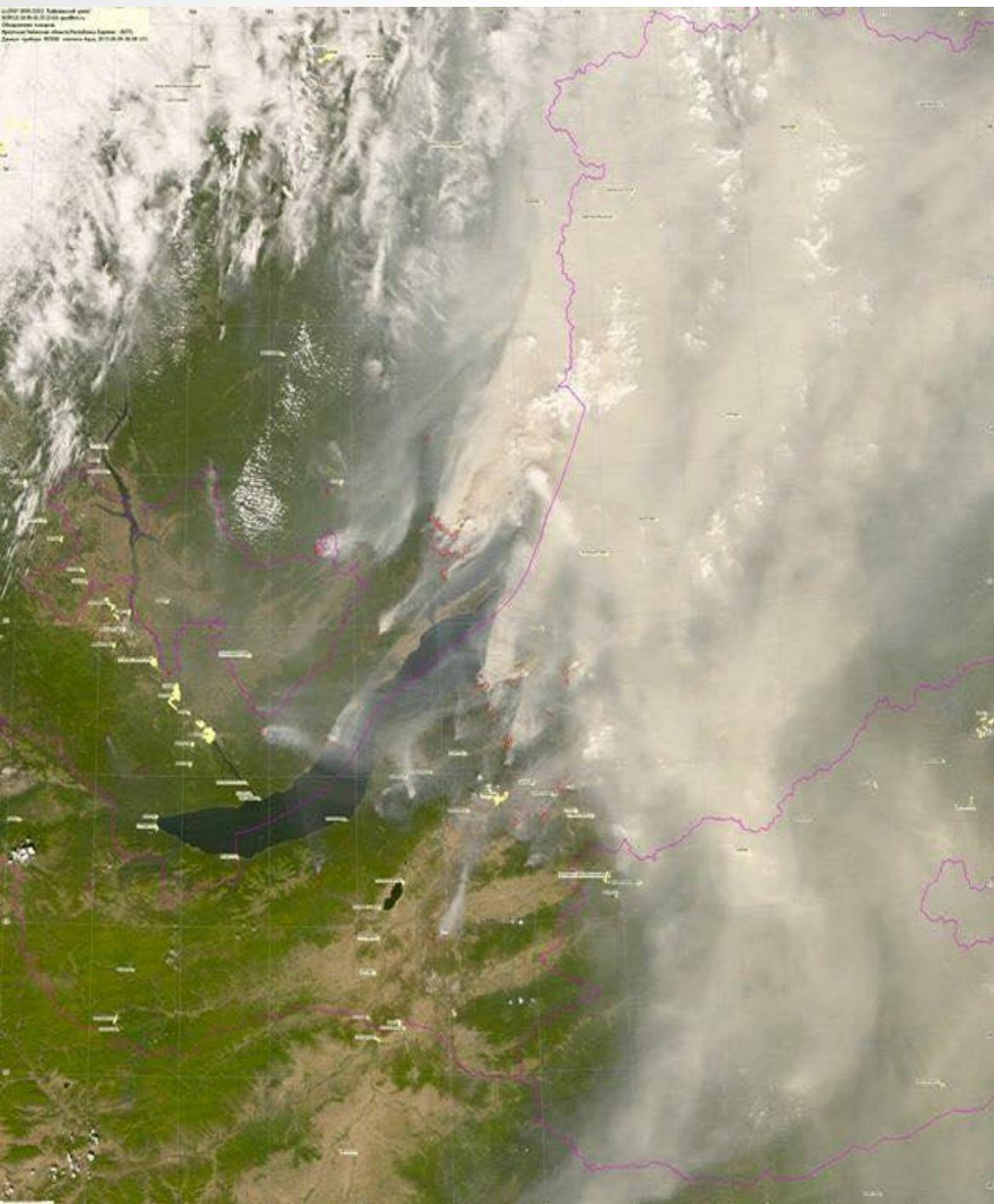
Near town Severobaikalsk treatment facilities can not cope with the load.

The algal bloom in Lake Baikal for 5 years produces a stench along the coast due to the development of algae and higher water temperatures in summer.



www.nat-geo.ru

Forest fires in 2015



<http://www.baikal-daily.ru/news/20/161508/>

The construction of ***Shuren hydropower plant*** with 400 MW capacity on the Selenga River is being discussed in Mongolia.

The new dam should solve the problem of power deficit and pollution of the atmosphere by the products of coal burning in heating stoves. Besides, this will allow Mongolia to save 300 thousand tons of coal annually.

On 27 December 2012 the government of the RF approved the **Federal Target Programme** (FTP) “Protection of Lake Baikal and Socio-economic Development of the Baikal Natural Territory in 2012-2020”, which foresees allocation of **1.4 billion euro** for solving environmental problems of Baikal region.

FTP aims at decreasing by **50% the discharge of pollutants** into Lake Baikal and its coastal area, **restoring up to 80%** of BNT which was polluted. The programme is also aimed at eliminating earlier environmental damage, reducing current negative impact, improvement of the system of monitoring the state of BNT environment.

FTP includes a system of measures on preserving biodiversity, minimization of natural risks and development of ecotourism.

To implement the programme the scientific community and public environmental organizations dealing with conservation and sustainable development of Lake Baikal must be involved.

Thank you for
attention!

