NEW ATLAS OF BAIKAL AS A PART OF THE CARTOGRAPHIC INFORMATION SYSTEM FOR SUSTAINABLE DEVELOPMENT OF THE BAIKAL REGION.

A.V.Belov

Irkutsk Scientific Center SB RAS
P.O.B.1249, Irkutsk 664033, Irkutsk

1. The sustainable development of the Baikal region.

The United Nations Conference on Environment and Development (Rio de Janeiro, 1992) prepared the conception of sustainable development which represents in "The Agenda for the XXI century". This very conception assumes interrelated decision of ecological and social-economic problems of regions , where the former are prestigious. It defines the strategy of humanity surviving on global and regional levels.

This approach is particularly actual for Baikal region involving unique lake Baikal, which is of great value for the mankind. It contains 20 % of the world 's reserves clean, fresh drinking water. It is the oldest lake on the planet (aging more than 30 mln. years). 2000 species of plants and animals abound the lake, 2/3 of them are endemics, they never occur on the Earth, but the lake.

The Baikal region covers the area more than 1 mln.square km involving lake watershed and an area of atmospheric influence located north-westward. It is situated on the territory of Russia and Mongolia.

The sustainable development of Baikal region assumes the registration of ecological limits for social-economic programmes.These ecological limits are revealed through the necessity to protect biological variety of the region, purity of water and atmoshere, forests and etc., A great variety of ecological limits of the regional economic development should be co-ordinated with complex (system) basis. It provides more complete revealing of the environmental anthropogenic stability potential.Therefore ecological-geographical (ecosystem) approach is really important and perspective.

2. Cartographic database system of the Baikal region.

The solving of sustainable development problems of Baikal region is based on the appropriate database. The main goal is cartographic database. The system covers ecological, economic and social sections of sustainable development. Its structure comprises multisheet maps and their series, and complex atlases as well.

Among such types of maps are: maps of nature, economy and population of southern part of East Siberia at scale 1:1 500 000, prepared and published by the Institute of Geography, Siberian Branch, Russian Academy of Sciences in 1972-1982. On all the maps Baikal region represents the central place. Series of maps involves such types of maps as: economic, population, vegetation, landscapes and

land using. Series of agroclimatic maps at scale 1:2 500 000 has been published particularly for the abovementioned region.

Apart from the maps two complex regional atlases were published for the region - Atlas of Irkutsk region (1962) and Atlas of Transbaikalye (1975). The atlases provide the data on nature, economy and population of the region. There are maps focus the Baikal nature.

3. Atlas of Baikal as a main part of the database system.

New Atlas of Baikal is prepared and published by Russian Federal Service on Geodezy and Cartography together with Siberian Branch of Russian Academy of Sciences in 1993 and represents central place in cartographic database of Baikal region. The atlas generalizes the up-to-date information on parameters and functional regimes of unique Baikal ecosystem and natural conditions of the adjacent areas.The material was collected and processed by researchers of the Institutes of Irkutsk Scientific Center SB RAS, Irkutsk University, Irkutsk department of Roskomgidromet and etc.,

Atlas of Baikal contains 278 maps and 92 inlets of various scales and graphics. The main maps' scale is 1:2 500 000 - 1:3 000 000. The atlas includes the following large sections such as : geologic-geomorphologic structure, geophysical conditions, climate and waters, hydrochemistry, organical world, recreational conditions and natural resources, their usage and protection. The chief editor is well-known researcher of lake Baikal , academician G.I.Galazyi.

The atlas is significant in cartographic database on sustainable development of Baikal region as it contains the information on the recent state of the unique Baikal ecosystem on its structure features and functioning and may be used as the basis for the development of ecological limits of human being activity and correspondingly ecological parameters of the total process of region sustainable development.

The atlas is characterised by a great number of the map topics which allows to show on the system basis the structural and functional pecularities of Baikal macrosystem not only water ecosystem of the lake but surrounding landscapes providing its existence.The maps cover not only the area of the lake watershed , but the territory adjacent from north-west. This area significantly impacts on precipitation, temperature and moisture regimes both above the lake and its watershed due to prevailing western atmosphere transference.

Block-like structure of the atlas is specified by the necessity to demonstrate on the maps similar by scale the sets of abiotic and biotic components and factors of the regional environment. It permits to analize more effectively interrelation and interdependency between them which essentially increases data value of the atlas.

The maps of geological-geomorphological section display the genesis of the Baikal lake as central unit of Baikal rift zone and adequately reflect the recent processes of relief formation in the region as well. Particular emphasis has been placed on the characteristic of the seismotectonic conditions.The function of tectonic

factors clearly manifest not only in the history of Baikal formation but in the present high seismisity area.

Naturally, the construction , shore dynamics and bottom sediments of the lake are shown up in details at general geological background. In this case, the dynamics of Selenga river delta formation is depicted at the comprehensive plan-maps given for various temporal periods starting from the end of XIX century.

The maps of the atlas's section "Climate and water" give an insight into sinoptic processes determining general and local features of the climate in Baikal depression and the adjacent areas. Thorough characteristic of radiation, temperature, wind and moisture conditions in Baikal region is given here. The information is presented in seasonal dynamics.

Much interest is given to the maps of this atlas's section demonstrating snow and ice conditions in Baikal and its tributories. The features of winter regime of the lake are well visable there.

The maps of a hydrochemical section of the atlas are perfectly combined with the maps of the former section dedicated to surface-waters. The section covers characteristics of rivers run-off into Baikal lake and the temperatural and transparent features of the lake water. The chemism of the surface water of the whole of the region is shown here.The data on the various chemical components content in Baikal water, characterized as unique clean, is displayed in detail.

The unique organical Baikal world and adjacent area is thourogh exhibited at the maps of the "Organical world" section. The special maps illustrate geographical features of the distribution in Baikal lake the microorganizms, phytoplankton, zooplankton and benthos. The information on the lake ichthyfauna and its main river tributories is completely given.

There are two maps in this very section devoted to the land biota of the central area of Baikal region - vegetation and mammals. These maps fully reveal not only flora and fauna but biota coenotic features. Moreover the pecularities of altitudinal zonalty as main geographic regularity of special distribution of region biota are evident.

Two independent sections of the atlas show up nature resource potential of the region. Particular emphasis has been given to the description of recreational resources with an estimation of climatic conditions validity necessary for human beings' vital activity. The recreational volume of natural landscapes is revealed that provides the grounds for planning of rational development of ecological tourism including international one for this region. These sections also comprise the perspectives of natural resource using considering the necessity to preserve this unique natural object possessing all features to be included into the UNESCO world legacy.

All maps included into Atlas of Baikal present the complete database indicating the state of Baikal ecosystem for a certain period. It is the mark which may be used to observe the dynamic changes of natural and anthropogenic character to be occured in the future ecosystem and to develop a set of measures to protect it

for future generations. In this case the atlas information may be applied for developing the criterion of ecological limits for all kinds of human being economic activity which affects the Baikal ecosystem.

4. The next stage of the cartographic research of the Baikal region.

The publication of Atlas of Baikal made possible the transition to the next stage of cartographic data of the sustainable development of the region namely the making up of regional ecological atlases. Among the first atlases the ecological atlas of Irkutsk region as the most economically developed part of Baikal region was compiled by the Institute of Geography, Siberian Branch RAS in 1993. The maps of the above atlas give a detailed picture of anthropogenic influence on the economical activity on environmental quality and on various types of natural resources of the region including the parts of the region adjacent from west just to lake Baikal.

To increase the effeciency of cartographic database system in monitoring and management of the environment of the Baikal region within the region sustainable development it is essential to create operative GIS Baikal and electronic Baikal atlas with subsequent preparation of such database system for the whole of the region. It will require international cooperation of the cartographers' efforts.