

## REMOTE SENSING AND GIS FOR ENVIRONMENTAL IMPACT ASSESSMENT IN WESTERN SIBERIA

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Developed oil and gas deposits in the Western Siberia are considered regions with the most polluted and disturbed environment in Russia and in the world. It <sup>has caused</sup> causes large negative effects on the local population, especially on the aboriginal northern peoples, which is expressed, in particular, in the higher rate of diseases and mortality of the people. To prevent negative effects of industrial development of a large Priobskoe (near the Ob' River) deposit in the Khatyn-Mansi National Okrug, joint project of the Nefteyuganskneftegas Company and Amoko suggests extensive research program containing comprehensive environmental impact assessment and development of GIS using remote sensing data obtained from satellites and planes.

For this purpose, first of all, available cartographic information and photos of the former years were collected. They were the base for large-scale mapping. GIS development plan includes compilation of maps: geological, geomorphologic, soil, geobotanic maps, maps of the areas of valuable and protected plants and animals, areas of highly productive communities, land use, use of water resources, location of industrial objects. To obtain new information in summer 1994 special aerial photos of the territory were taken on scale 1: 50 000. Obtained false color and black and white pictures with high resolution after numbering are used for the compilation of detailed maps. At the same time complex field observations were made to get additional information about the state of the environment and to make decoding of the photos easier. The program of ecological research pays special attention to the study of the valuable species status, first of all, commercial fish and Siberian pine (*Pinus sibirica*), and protected species, in particular the endemic beaver (*Castor polluos*), as well as their habitats. And in passing it helps to solve the task of choosing the region where the regime of strict protection of nature will be established as a compensative measure for possible damage from the development of the deposit.

From the cartographic point of view an interesting problem of compiling a series of maps is in showing the phenomenon of the extremely high percent of bogs in the region, which does not have any analogues in the world. The maps are to help to reveal spatial bounds of the draining effect of the grandiose Ob' River on the adjacent territories, and the opposite effect in the zone of the mutual backwater of Ob' and its tributary Irtysh. At the same time it is necessary to find specific means of cartographic depiction of both natural trends conditioned by progressing bogging of the territory, and natural periodical fluctuations connected with the natural changes in the rivers' runoff. This will open a possibility of a more reliable identification of the expected anthropogenic impacts.

From the practical point of view one of the important functions of GIS is to facilitate search for the best alternatives of location of oil wells, oil pipelines and other industrial objects, environmental factors taken into account. The role of GIS is also significant in the working out of a plan of the activities in the extreme situations, which requires that areas with high risk of accidents are to be revealed beforehand. The system which is being developed now will be used also to organize ecological monitoring of the stages of construction, development of the deposit and restoration of the disturbed lands. The nearest pragmatic task of the work is to map areas of disturbed and contaminated lands aiming at assessment of the scale of the previous damage.

In all combination of the methods of remote sensing, field research and GIS allows one to significantly improve quality of the research attending to the practical needs and to create informational prerequisites for the environmentally sound industrial development in the sensitive regions.