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Land use changing and land use optimization of Lake Baikal basin on the example of two key areas

S. Solodyankina
Russian Federation (sveta@irigs.irk.ru)

Lake Baikal contains roughly 20% of the world's unfrozen surface fresh water. It was declared a UNESCO World Heritage Site in 1996. Today levels of urbanization and economic stress on environmental resources is increasing on the shorts of the lake Baikal. The potential of economic development (industry, local tourism, and mining) of the Severobaykalsky and Sludyansky districts is rather high although they are characterized not only by beneficial features for local economy but also by considerable disadvantages for nature of this world valuable territory.
This investigation show human-caused landscape changes during economic development of the two key areas in Baikal water catchment basin during 10 years (point of reference is 2000 year). Key areas are 1) the Baikalo-Patomskoe highland in the north of the Baikal catchment basin (Severobaykalsky district, Republic of Buryatia); 2) Khamar-Daban mountain system in the south of the Baikal catchment basin (Sludyansky districy, Irkutsk region). Since 2000 year land use of the territory has changed. Areas of agriculture were reduced but recreation activity on the bank of the lake was increased.
Methods of GIS analysis and local statistic analysis of landscape characteristic were used. Nature, rural and urban areas ratio are estimated. Vegetation and soil condition assessment were made.
The essence of this research is in helping to make decisions linked to upcoming problems: situation identification, evaluation and forecasting of the potential landscape condition, optimization of land use, mitigation of impact and mapping of territories and nature resources which have a high ecological value or endangered by industrial impact. For this purpose landscape maps of the territories on the base of the remote sensing information and field investigations were created. They used to calculate potential landscape functions of the territory without taking into account present impact of anthropogenic actions. Land use maps for years 2000 and 2010 were created to show: 1) how many landscape functions (ecosystem services) have been missed in time period of 2000-2010 years; 2) trends of land use changing. The nature-anthropogenic landscapes classification is developed, where natural and anthropogenic factors are taken into account in one system. It used to considerate of cumulative impacts of anthropogenic actions for each relevant resource, and to analyse of all past, present, and reasonably foreseeable future condition of whole landscape and its components (parent rock, surface and ground water, soil, flora and fauna, air).