

LARGE-SCALE MAPPING OF THE LAND USE CONFLICTS ON A NATURAL LANDMARK IN A STAGE OF DEGRADATION USING GIS AND REMOTE SENSING METHODS*

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Clarifying the ecological aspects of nature use is one of the most important criteria for assessment of the territory's sustainable development. This is a comparatively new trend in nature sciences. The paper presents methods for creating a thematic database aimed at processing and retrieval of information from remote sensing data for the purpose of analyzing and large-scale mapping of land-use conflicts for catchments mapping level. Remote sensing methods and GIS technologies make it possible to identify the areas with strongest manifestation of land use conflicts and determine their spatial parameters.

The developed methods were approbated on the territory of the *Kutina* catchments located in the north-west part of the Metropolitan Municipality. One of the major emphases is placed on land use conflicts of the *Kutina Pyramids* natural landmark, located in the studied territory. It was announced as natural landmark in 1962. The *Kutina Pyramids* represent a group of earth pillars in a stage of accelerated destruction and loss of morphological expression, as a result of the anthropogenic activity and lignite coal excavation, carried out in its immediate vicinity. The changes of the spatial range and manifestation of land use conflicts over a 65-year period (1940-2006) on the territory of the *Kutina* catchments, Metropolitan Municipality, were investigated. Local complex geomorphological analysis and monitoring of modern morphodynamics are being carried out to clarify the reasons for the pyramids' degradation.

The thematic database created for the purpose includes archive panchromatic aerial photographs and high spatial resolution satellite images for various years, large-scale topographic maps, data from terrain studies and GPS measurements, photos, thematic maps and other department databases. The data organization is based on 12 classification indicators of land-use conflicts, where each class describes specific conflict characteristics, such as conflict source, affected object conformity with the land use categories, arising of the conflict, manifestation, duration, development stages, development trends of the conflict, degree of the conflict's impact, shape of the outlining contours, border character, conflict groups, undertaken measures for solving the conflicts.

The information about all these main conflict parameters, required to develop land-use management plans or landscape-ecological plans, is difficult to be represented on a single map. Two groups of parameters are usually represented on the maps of conflict-situations in land-use: the sources of the conflicts and the affected objects. Based on the created thematic database and some of the classification indicators, a number of thematic cartographic models, tables, and graphs were produced. It is suggested to compose two maps: inventory and analytic. The first one represents the localization of the concrete conflict sources and the conflict areas according to the source. The second map represents areas with typical combinations of the conflicts, different development tendencies, conflict duration, conflicts' shape of the outlining layout contours, border character, degree of the conflict's impact, and conflict groups.

The composed database serves as a main source of information in preparing suggestions to remove or mitigate their influence. It provides for quick retrieval of unbiased information on land use conflicts and their spatial parameters. The producing of such type of maps may be of use in landscape planning, which will help the local self-governing bodies and the natives to make everything possible for the conservation and preservation of the natural landmark.

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