

Remote Sensing (RS) and Geographic Information Systems (GIS) as New Tools for Improvement of Woodland Inventory, Management and Woodland Protected Areas Development in Ukraine

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The woodland of Ukraine continues to be a subject of dispute among three main groups of scientists and decision-makers: i) negative pessimists – who are not satisfied with all official statistics and prefer to hear something new and alternative – may be RS and GIS; ii) representatives of different environmental institutions, which use long-term statistics, mainly based on land observation – which have just started to apply RS and GIS in their work; iii) active environmentalists, including NGOs representatives, which prefer to discuss new approaches because of new information needs corresponding the European ecological network, certification, biodiversity conservation and indicators development.

It is logical result of specific history of the national forestry science and monitoring. In 1996 Grid/Arendal experts when analyzing the state of biodiversity and landscapes for 1991-1996 concluded that it was characteristic for CE-EE-NIS countries to use more references to quantity of hunting animals rather than to other parameters. Ukraine is not an exception in this respect till now. Theoretically, dynamics of number of woodland hunting animals could have been closely connected with the whole range of dynamic indicators of percentage of woodlands of Ukraine, integrity change of “green” (woodlands) areas. These RS data are available now for some regions only due to modern RS and GIS results (Crimea, Zakarpattia, Khmelnytsky, Kherson and Odesa Districts). This relation between animals’ quantity (density) and woodlands areas is performed in the nature in such a way that it is difficult to detect it by statistical means. For hunting species, this statistics is balancing between the natural parameters and the ones resulting from the statistic calculations.

There are constructive sings, which demonstrate that some progress has been achieved. The ten-year standard woodland husbandry 1: 10,000 headed by the State Forestry Committee took place this year in the Southern Ukraine including Crimea. It will be produced for the Northern Ukraine, and based on selective aerial photography. New modern RS and GIS (ArcView, ArcGIS) results were received by ULRMC in 2000-2002. The Center developed new support materials on woodland coverage changes in mountain areas especially during 1988-2000 based on Landsat 4 and Landsat 7 scene mosaic. The ERDAS Imagine software has been used for these purposes. About 2% of model woodland ¹ was deforested and 0,6% forested in Zakarpattia Region, and 0,4% and 0,4% respectively in Crimea. The deforestation occurred as a result of windfalls, human engineering (roads construction), spouts, woodcutting, landslides, floods, etc. In 2001-2002 ULRMC has developed the first land cover classifier (based on RS data) for the Southern Ukraine, including Crimea (fig.1), which contains 28 classes of land cover forms. The digital thematic map was appropriate for 1: 500,000 (or less). The wood area classes were titled as “coniferous forest”, “deciduous forest”, “bushes and sparse growth of trees”, “fire scars”, and “orchards”. Without doubt, these RS and GIS are useful for woodland key habitats monitoring or conservation purposes.

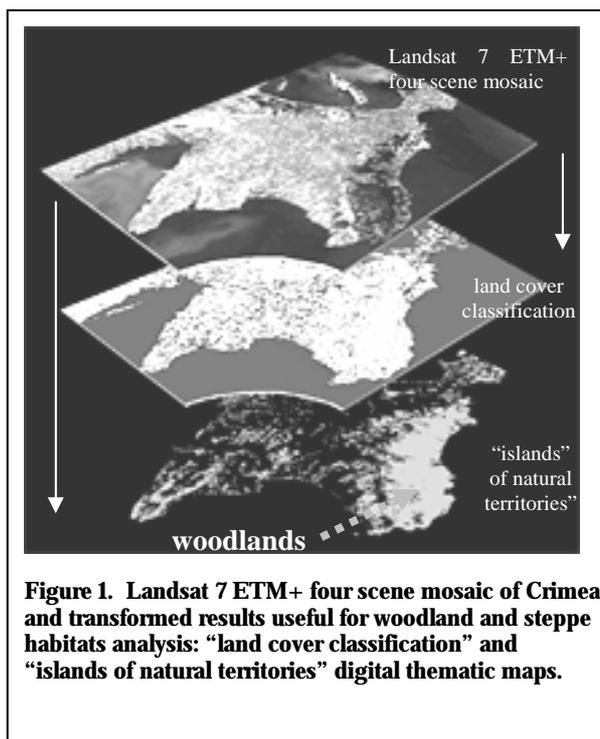


Figure 1. Landsat 7 ETM+ four scene mosaic of Crimea and transformed results useful for woodland and steppe habitats analysis: “land cover classification” and “islands of natural territories” digital thematic maps.

This year ULRMC and Tavria National University have developed a map of “islands of natural territories”. In addition, ULRMC continues to provide regular monitoring of woodland fires using NOAA data, and develop GIS with advanced woodland component.

What’s new? The Kyiv National Agrarian University is working on the analysis of the questionnaire (about 900 questions) regarding indicators to protect and conserve woodlands in Ukraine. The university will organize the International Conference «Forest Certification and Forestry Policy Under the Condition of Transfer to Market Economy» this October 24-26 in Kyiv (Ukraine). At present the scientific Ukrainian statistics argue about 200 landscape types, 420 ecosystem units (of the second, third, and fourth levels), the appropriateness of the map scale - 1:400,000, and that the basic digital cartographic maps for this purpose of ecosystem classification should be 1: 200,000 (*National ecological network: priorities of development, 2001*).

Future scale for woodland key habitats mapping will depend on this new statistics of 2002, which is a part of national strategy on development of ecological network till 2015. On the other hand the woodland theory is older than ecological network theory. Forestry specialists work with parcels of another nature – “kvartals”, or woodland parcels (WP), or geometrical figures, or polygons (which is good for GISs). The annual census of animals depends seriously on this approach: density of concrete specie is transformed into quantity of the specie in a concrete WP. However, the WP is not a woodland habitat – it is a geometrical figure. How to overcome this artificial data? Recently, GIS takes a chance to build a bridge between traditional practices on typology of woods in a WP, which has traditionally about 3 or 5 model plots (conservative land approach) and in the case when these plots could be defined distantly via modern IT methods like satellite images or aerial photography. GIS can help researches to cut parcels into natural sound model plots (or to update borders of existing plots). It looks very simple - nevertheless it is not applied on a bigger scale in Ukraine yet.

These and other results obtained by ULRMC were demonstrated during seminars, trainings and meetings in Ukraine and abroad, in particular at the 4th and 5th International GIS Conferences in Yalta (2001) and Partenit (2002). You can find this information and some articles on Internet – www.ulrmc.org.ua.

¹ 194 thousand ha in Zakarpattia, and 295 thousand ha in Crimea.