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# USE OF GIS TO QUANTIFY THE LONG-TERM CHANGES IN NATURAL OBJECTS

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In order to take strategic managerial decisions long-term hydromorphological changes of boundaries and sizes of natural protected areas, such as nature reserves, national parks or game reserves should be traced. The most efficient method for quantitative assessment of parameters of long-term changes in spatial natural objects is the use of GIS and space imagery (Medinets, 2010).

In 2010 we tried for the deltaic part of the Dnister River, the major part of which in 2008 had been converted into the Lower Dnister National Park, the method of assessment and calculation of the long-term changes of boundaries and areas of the reed-bed zone for a long period (about 100 years). At that a combination of office analysis of historical maps, satellite images and real surveys was used. As the primary material for the office analysis historical topographic map (1895), digital map of the Lower Dnister basin (1984), Quick Bird satellite images of March and July 2007 were used, as well as the results of field survey of 2010.

Digital map (1895) was made using Arc-GIS 9.2 software. As a topographic base historical topographic map of 1895, referenced to the geographical system of coordinates WGS-84 was used, new shape file was created using ArcCatalog (including determination of system of coordinates), in which digitalization was carried out using editor menu and sketch instrument. Similarly digitalization of space images was done. The data from field survey were processed using SonarViewer122 software, from which export to Excel was done. For the future work depth was converted from feet into meters, as well as coordinates system was changed from

Mercator's to WGS-84, after which the file was converted into Arc-GIS 9.2 in shape format.

The results of areas and boundaries comparison have shown that from 1895 till 1984 (89 years) the area of reed-bed zone of the Dnistrovskiy Liman (estuary) grew  $3,21 \text{ km}^2$ , for the period from 1984 till 2007 (23 years) it decreased  $0,19 \text{ km}^2$ , from 2007 till 2010 (3 years) it grew  $2 \text{ km}^2$ . From these calculations we can see that from 1895 till 2010 (115 years) total area of the Dnistrovskiy Liman reed-beds grew  $5,02 \text{ km}^2$ , however in the north-western part of the Liman, near the estuary of the Kilira channel and in the Karagolskiy Bay it decreased  $1,25$  and  $1,29 \text{ km}^2$  respectively.

The experience of use of quantitative assessment method to estimate changes in areas and boundaries of the Dnistrovskiy Liman reed-beds had shown efficiency of the GIS to follow long-term and short-term changes of natural objects.