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REPORT
On the Performance of Technical and Scientific Activities
Under the Project

EM-03-401

Assessment of the Current State of the Ukrainian Part of the Danube Biosphere Reserve (DBR)

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Abstract

Report on the Performance of Technical and Scientific Activities: 10 pages, 3 figures.

The activities were performed under Agreement #C-03/1505-1 on the development of scientific and technical products at the request of the Taras Shevchenko National University of Kyiv, which was preparing conclusions for the state environmental expertise as a part of the complex state expertise, in accordance with the requirements of Resolution № 483 of the Cabinet of Ministers of Ukraine, dated April 11, 2002.

This Report includes the information on the current state of the area of the Ukrainian part of the Danube Biosphere Reserve (DBR), as well as the changes that have occurred over the period from 1975 through 2001 under the impact of delta processes, identified using remote sensing and GIS technologies.

The Report also contains recommendations on the enhancement of the cartographic base of The Environmental State Assessment and the development of a special-purpose GIS of the region.

CONTENT

Introduction

The Ukrainian part of the Danube Delta continuously develops under the impact of the natural interaction processes between the stream and the riverbed.

The marine part of the Delta, least prone to human pressures, is formed under the influence of a large-scale interaction between the river streams and sea currents. At the marine part of the Delta, the river stream joins the seawater circulations, whose dominating direction is from the east to the west in the northwestern part of the Black Sea, and the river sediment flow joins the marine sediment flow along the shoreline. This process forms the marine delta and causes its intensive broadening. The interaction of the river streams and sea currents affects the water regime both in the sea and in the internal, upper and lower Kaliyska Delta of the Danube River.

1. Conclusions on the current state of the area of the Ukrainian part of the DBR and changes that have occurred under the impact of delta processes, identified using remote sensing and GIS technologies.

From the results of the analysis of Landsat imagery, acquired for different years (1975, 1988 and 2001), ULRMC identified that the Potapivske, Polunychne and Belgorodske Outlets became less active and more filled with silt, which can be clearly observed by the reduction of the sediment load (Fig. 1).

The Starostambulsky Arm system generally is becoming more active. The sediment yield increased in the Starostambulsky, Bystre and Tsyganka Outlets (Fig. 1). In some locations of the Bystre Outlet, marginal erosion processes occur.

Sediment accumulation resulted in the formation of islands to the south from the Bystre and Starostambulsky Outlets and in an increase of the size of the dry land area of the Tsygansky Kut Bay, as well as the area of the Kurylsky Islands. Due to these accumulation processes, the sea shoreline stretching from the Potapivske to Starostambulsky Outlet has expanded. To the south from the Bystre Outlet, there is marginal erosion on a small area (Fig. 2).

Due to the intensive accumulation processes, the area of the Prorvyn Island has increased. The Potapivska Spit Island is being eroded away by currents. The decrease in the activity of channels and river outlets in the northern part of the Danube Delta have caused a smaller sediment yield in the Zhebriyanska Bay and, along with the sea current, have smoothed the shore line of the Bay.

In its research, URLMC also used as auxiliary materials old archive Landsat satellite (photographic) data from 1975, and performed a comparison analysis of the data from 1975 and 1988. Through the image analysis, it was identified that the trends, described above, have been continuous for the last few decades.

The Environmental State Assessment's materials integrate the examples of the best findings of Ukrainian specialists and the conclusions on the impacts of each variant of navigation channel construction on the streamflow re-distribution in the outlets of the Danube Delta.

2. **Conclusions on the scientific validity of the established boundaries of the Ukrainian part of the DBR, taking into account an updated knowledge on the activity of the Danube Delta and its perspectives**.

The Environmental State Assessment materials prove that DBR management lacks a sufficient cartographic basis with a strong biological component, and that in some cases primitive approaches were used to explain powerful natural processes. The Environmental State Assessment does not have even fragments of thematic layers of digital maps, having only schematics instead. This means that there is still no state-of-the-art GIS of the Ukrainian part of DBR and, accordingly, there are no special-purpose cartographic materials, despite significant amount of in situ and remote sensing data [1].

The Environmental State Assessment also lacks cadastral maps, and restriction and servitude areas maps.

The zones boundaries, presented in the Environmental State Assessment, look like schematics, and should be improved according to their scientific validity, taking into account current dynamic changes of the land surface (e.g. disappearance or appearance of new land areas, deactivation of the river outlets, etc.). The Ukrainian part of the Danube Delta is very mosaic and has an abundant wildlife; therefore, it is reasonable to consider the issue of including some detached areas of specific nature conservation importance (which at present do not have a common border with the existing Danube Biosphere Reserve) into a protected areas system.

[1] In Section 1.1.4. Cartographic Materials (The Danube Biosphere Reserve. Management Plan. Kyiv: Fitosociocenter, 1999, - p.64) it was noted that for the DBR area, there are 1:200,000 topographic maps and a 1:10,000 map, created using aerial photography from 1997; satellite imagery from 1989, 1991 and 1993; 1:100,000 and 1:25,000 geo-botanical maps made "… using information technologies …"; a 1:10,000 soil map of the Zhebriyanske Range; and maps of pasturing load on the area, natural flora resources, etc.

General Conclusions

1. The Ukrainian part of the Danube Delta continuously develops. Such processes as new land areas appearance and hydro-morphologic changes occur here. The retrospective analysis of remote sensing materials from 1975, 1988 and 2001 proves that the Delta is being silted and the streamflow redistribution occurs in its outlets. The activity of the northern outlets (Potapivske, Polunychne and Bilgorodske) has reduced, and the southern outlets (Starostambulsky, Bystre and Zyganka) have become more active.

2. A large number of different types of materials on the Danube Delta complicates the analysis and modeling of the Delta processes. Therefore, a special-purpose GIS of the Ukrainian part of the Danube Delta should be developed using remote sensing materials.

3. Forecasting of the changes in the biota state in the Ukrainian part of DBR, including changes arising from the navigation channel construction, should be supported by special-purpose cartographic materials of an appropriate scale within the framework of a special-purpose DBR GIS, having a well-developed biological component.

4. A DBR functional zoning should be developed.

References:

1. *Danube Biosphere Reserve. Management Plan. Kyiv-Vylkove, 1999, 64 p.*
2. *Biodiversity of the Danube Biosphere Reserve: Conservation and Management. Kyiv. Naukova Dumka, 1999, -702 p.*
3. *International Natural Reserve Areas of Ukraine. Kyiv, 1998, p.30-47.*