



The Management of River Basins and the Black Sea Coastal Zone by Landscape Planning Instruments (the Crimea, the Voron River Basin as an Example)

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Abstract

The scheme of basin territories and coastal zone management by landscape planning instruments was considered on the example of Voron river basin (Crimea, Ukraine). The functional zones in this territory are picked out: the areas requiring special protection, extensively used areas, especially vulnerable areas and the intensively used areas. Allocation of zones provides the complex of actions on stabilization and improvement of the ecological situation in the coastal zone.

Keywords: Territorial management, landscape planning, sustainable territory development.

Introduction

In the last decades much attention was paid to the sustainable development of territories and water areas. The sea and the rivers flowing into it are interdependent systems, and water is the main integrating element. The quality of water in the Black sea (especially near the coast) depends on the river flows and ecological state of the rivers basins. Therefore, to protect the Black Sea ecosystem it is necessary to maintain stability of the ecological state of river basins and coastal zone.

To provide good quality of water it's necessary to organize the territory of the basin and coastal zone as efficient as possible. The concept of Integrated Coastal Zone Management (ICZM) is one of ideas of the Bucharest Convention, signed by the Black Sea countries, the principles of river basin management are set out in Water Frame Directive of EU. The method, which provides implementation of river basins and coastal zone management is landscape planning.

Materials and Methods

Landscape planning is a methodological tool used to construct such a spatial organization of society in specific landscapes, which would ensure the sustainable use of natural resources and preservation of the basic functions of these landscapes as life-support system. Landscape planning is based

on an assessment of functions and features of the landscape, the development of proposals for the preservation of its components and aesthetic qualities (Antipov *et al.*, 2002). Geographic information systems (GIS) for data receiving, processing and updating are used in landscape planning and for territorial management (Yarmak *et al.*, 2004, Antonidze, 2010).

In territorial management it is necessary to take into account features of different territorial systems: hierarchical character of the organization, organizational levels (components, complexes), polystructural organization of territory (Karpenko *et al.*, 2002). The river basins and coastal zone are unique natural systems which requires special management and special approaches in planning. Landscape planning of basin territories is carried out concerning characteristics of river basin as paradyamic and paragenetic system. Environment-forming territory framework is formed by the system of protection zones along the main river, its branches and reservoirs, coastal protective zones along the sea and also especially preserved territories (reservations). In the process of planning of river basin territories estimations of hydrological functions (drain forming, drain regulating and water-protecting) are carried out, methods of landscape-hydrological zoning are applied. The analysis of the hydrological information is carried out, the characteristic of complex landscape differentiation of territory is drawn up. The received data are translated in criterion

of 'significance' and 'sensitivity', and functions of territory using are determined. Landscape planning procedure is based on functional zoning of the area, its stages is well developed (Yarmak *et al.*, 2004). The result of research would be the program of the actions realizing objects in view of water resources condition. Usually there are 3 forms of basin territory using: preservation, development and improvement.

The functions of basin territorial management are closely connected with landscape organization process. The scheme of connection of river basin management with the landscape planning stages (modules) and its implementation is shown in Figure 1.

Results

The scheme of basin management for water resource quality conservation and sustainable development of coastal ecosystem was examined on the example of the Voron river basin (Crimea, Ukraine). The basin (52 km²) is located in east part of the South Coast of the Crimea, in the sub-Mediterranean zone. Sub-Mediterranean forests and scrubs are particularly valuable. The coastal zone is formed by cliffs and gravel-sandy beaches. The territory is used in agriculture and recreation, there are conflicts in land-use. The landscape structure of the basin, its hydrological functions and anthropogenic landscapes were considered.

The landscape plan of the Voron river basin was drawn (Figure 2) and the following functional zones

were picked out:

Zone 1 - the areas requiring special protection as environment-forming territory framework (priority areas of conservation importance, areas of highest species richness and endemism, econet). The preservation of these areas involves the prohibition of their using.

Zone 2 - extensively used areas with a high degree of cultural landscapes (reservoirs, protection zones). To maintain ecosystem resilience is recommended a temporary prohibition of economic use.

Zone 3 - protection of especially vulnerable areas with development of negative processes: landslides processes, erosion, mudflow, abrasion. Such territories are sensitive to anthropogenic pressure, so these landscapes need to be restored, it's recommended to reduce the intensity of economic activity.

Zone 4 - intensively used areas. It is the most problematic environmentally transformed territories where natural functions were disrupted, and landscapes have high economic and aesthetic value: settlements, agricultural lands, the elements of the transport network. Protection of this zone provides for complex measures to improve ecological state. In the river valleys introduction of contour and drainage organization of agriculture is optimal.

Allocation of zones provides the complex of actions on stabilization and improvement of the ecological situation in the basin.

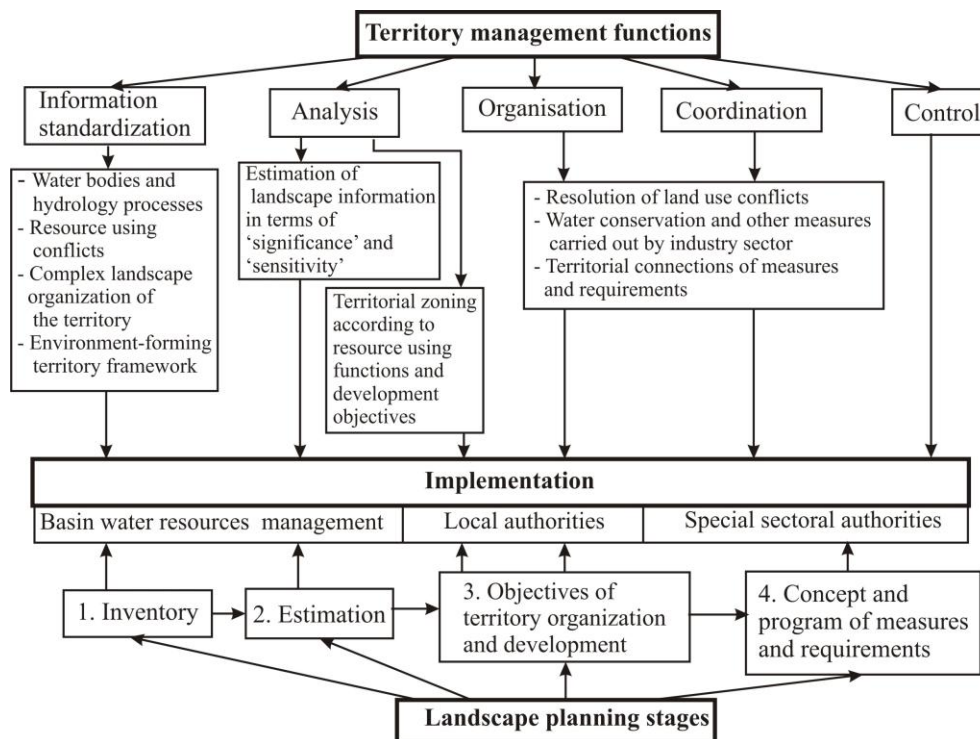


Figure 1. The scheme of river basins and coastal zone management by landscape planning instruments.

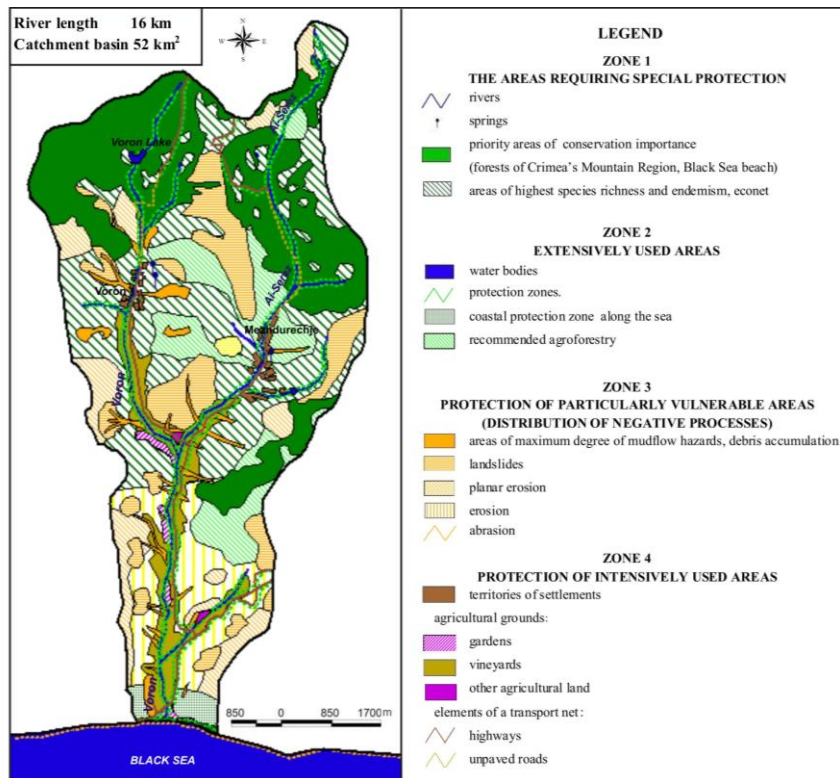


Figure 2. Landscape plan of the Voron river basin

Discussion

Maintenance of quality and quantity of water resources can be carried out by various ways. In our opinion, basin conception of nature resources management is naturally caused and can be successful realized on different river basins. The combination of basin approach with environmental management and organization of the territory by landscape planning methods will allow providing the quality of water resources in the Crimea and sustainable development of river basins and coastal zone.

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