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**LANDSCAPE AND RECREATIONAL MICROZONING
AS A BASIS FOR CREATION OF NEW RECREATIONAL\TOURISM
OBJECTS EVIDENCE FROM CRIMEA, UKRAINE**

**WYDZIELANIE MIKROSTREF KRAJOBRAZOWYCH I REKREACYJNYCH
JAKO PODSTAWA KREOWANIA NOWYCH
REKREACYJNYCH/TURYSTYCZNYCH OBIEKTÓW I OBSZARÓW
(NA PRZYKŁADZIE KRYMU, UKRAINA)**

Key words: landscape-recreational micro-zoning, recreational infrastructure sites, landscape park, Crimea

Słowa kluczowe: strefa krajobrazowo-rekreacyjna, infrastruktura rekreacyjna, park krajobrazowo-rekreacyjny, Krym

Abstract

This article elaborates on the following: using ArcGIS 10.1 and a number of maps, we developed methodological approaches to landscape-recreational micro-zoning of Crimea's territory, created a database of territorial sites used for recreational purposes. Based on the results of the micro-zoning and recreational zoning (information layer "Natural complexes used for recreation") we defined the sites that can be used for recreation, i.e. landscape parks.

Streszczenie

Przy pomocy oprogramowania ArcGIS 10.1 opracowano metodyczne podejścia oraz zrealizowano krajobrazowo-rekreacyjną mikroregionalizację obszaru Krymu, stworzono bazę danych obiektów wykorzystywanych w celach rekreacyjnych. Na podstawie krajobrazowo-rekreacyjnej mikroregionalizacji oraz regionalizacji rekreacyjnej (warstwa informacyjna „Kompleksy przyrodnicze wykorzystywane w celach rekreacyjnych”) Krymu wyróżniono obszary i obiekty, które mogą być wykorzystane w celach rekreacyjnych jako parki krajobrazowo-rekreacyjne.

INTRODUCTION

Sustainable development of landscapes within active use for recreational purposes presents an important problem both at the end of 20th century and at the beginning of 21st century. Recreational load and conservation of natural sites depends on landscape's potential, their resilience to external load and on the types of activities that already exist in the given landscape. Therefore it is reasonable to conduct landscape-recreational micro-zoning of territories and, using the result of it – plan tourism and recreational activities.

Using Crimea (Ukraine) as an example, we conducted landscape-recreational micro-zoning and provided substantiation for further use of micro-zones in tourism and recreational activities.

METHODS

Zoning was conducted with software bundle ArcGIS by ESRI based on digital topographic and landscape maps of 1:100 00 scale (Modern Landscapes (Modern landscapes of Crimea ..., 2009) and geoinformational data base that included the following macro-layers:

- administrative division of the region (specifying the borders of village and settlement councils and localities);
- modern land use, obtained from deciphered 10-meter satellite images and land management data (leading type of use according to form 6-ZEM);
- the Plan of territorial management of Crimea until 2026 (plan for prospective territorial development until 2026, approved by local authorities);
- Plan of environmental network of the Autonomous republic of Crimea (bio- and ecocenters, environmental corridors, existing and planned environmental and nature conservation facilities);
- sites not used in intensive agriculture (based on data from deciphered 30-meter spot image of Crimea), distribution of these sites reflects preserved natural and quasi-natural territories in steppe Crimea with low level of anthropogenic activities;
- recreational infrastructure of Crimea, presented by 110 camping sites, 219 camping routes, 37 picnic sites, 89 touring attractions (including protection and conservation sites), 128 geological landmarks, 47 religious landmarks currently used in recreation and also major recreational facilities;
- borders of forest compartments (specifying predominant species composition and age of plantation);

Interdependant coordination and overlapping of the above-mentioned informational layers allowed for creation of the plan for recreational micro-zoning of Crimea. This plan is crucial for assessment and real-time monitoring of anthropogenic load in natural complexes of Crimea (tourists per hectare\recreational micro-zone). Total number of landscape-recreational micro-zones in the plan is 398 (see fig. 1).

Visualization of the plan for landscape-recreational micro-zoning of Crimea (with detailed view for micro-zone № 392) is shown on fig. 1.

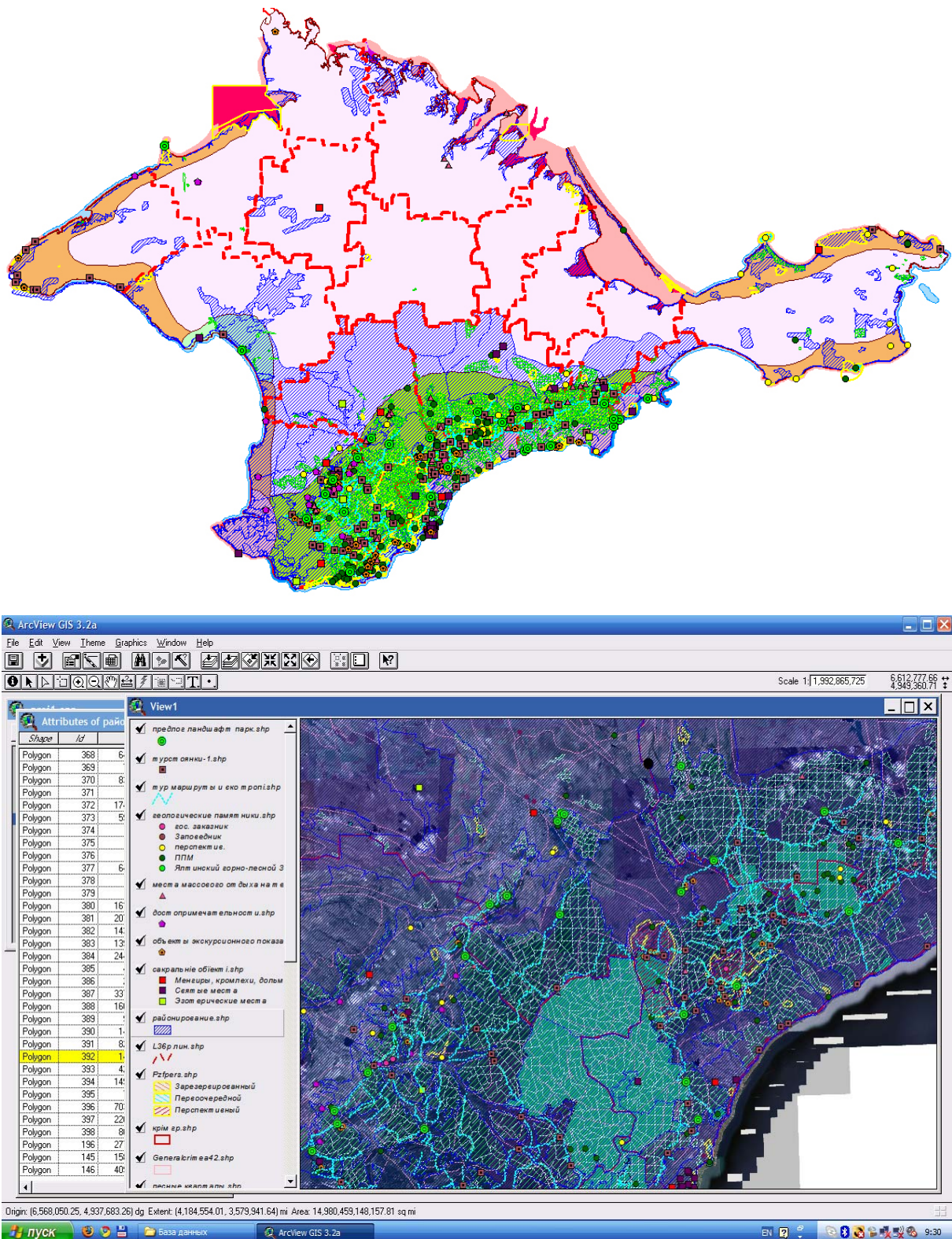


Fig. 1. Plan of landscape-recreational micro-zoning of Crimea (specification of informational layers for micro-zone № 392).

DISCUSSION OF RESEARCH RESULTS. LANDSCAPE-RECREATIONAL MICRO-ZONING

Landscape-recreational micro-zoning of Crimea is based on the following principles:

- landscape uniformity that defines typical resistance of the landscape to external stress;
- presence of sites with recreational capacity (natural, historical, cultural landmarks, etc);
- uniform type of environmental protection;
- belonging to the same administrative unit;
- uniformity of economic activity;
- type of recreational use that provides closed cycle of recreational activities (group of tourists stationed at the designated camping site with radial day-long trips within 10-15 km).

In order to create the integrated informational layer “Natural complexes, used for recreation” we conducted recreational zoning of preserved natural landscapes of Crimea, and, as a result, specified elementary tourist districts (areals). This districts reflect the particular characteristics of spatial development for active tourism kinds (trekking, sport, hiking, etc.) on different territories. One of such active tourism kinds is hobby hunting and fishery that are quite popular in Sivash region.

It is also very common for natural complexes in the coastal zone and outside of urbanized zones to show high level recreational use due to beach tourism. Such natural territories with preserved natural complexes can be found in western Crimea (Shtormovoe, Molochnoe, Uytne village councils, Chernomorsky, Razdolnensky, Leninsky districts).

With detailed zoning at the local level, coastal areas within one micro-zone can be divided into elementary recreational sectors (up to 1-2 km in length). An example of such detailed zoning in western Crimea is shown on fig. 2.

Territories of widespread active tourism such as mountains, foothill areas and Sivash region were considered as integral areals (classification objects of the first order). Other areas were considered from the point of patchy reclamation – exactly how they relate to recreational capacity sites (water bodies, forestlands in the steppe area, treebelts, picnic sites)

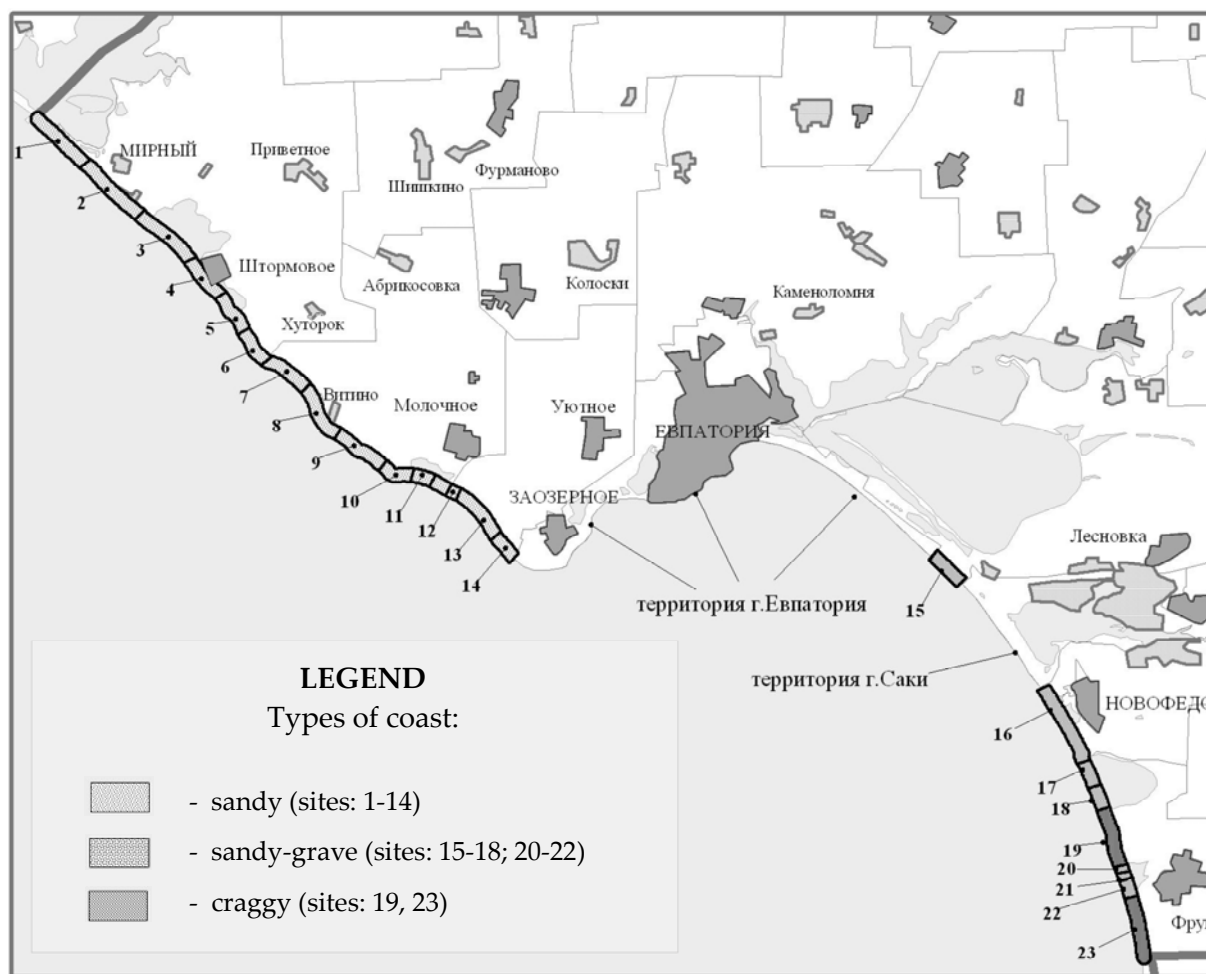


Fig. 2. Elementary recreational sectors of natural complexes at sea shore on the coast of west Crimea (Stefanovitch, Karpenko, 2010).

Based on the above-mentioned data, we described the hierarchy of approaches to recreational zoning of Crimea by the character of manifestation and development of active (in terms of their effect on natural complexes) tourism kinds:

- 1) specification of zones for widespread recreational use (Mountain and Foothill Crimea, Sivash region, coastal zones outside of urbanized sites);
- 2) division of widespread recreational zones by their administrative affiliation (administrative regions, municipal councils, for mountains and forest areas – forestry division);
- 3) obtained areals are divided into few recreational meso-zones, depending on local conditions, orography, etc.
- 4) division of meso-zones into elementary recreational micro-zones (which are subjects for certification \ passportisation);
- 5) specification of elementary recreational sites (both spot and areal), some of them (depending on value of their natural complexes) can receive status of landscape parks.

An example of visualization of the informational layer “Recreational micro-zoning” at the level of administrative district is shown on the fig. 3.

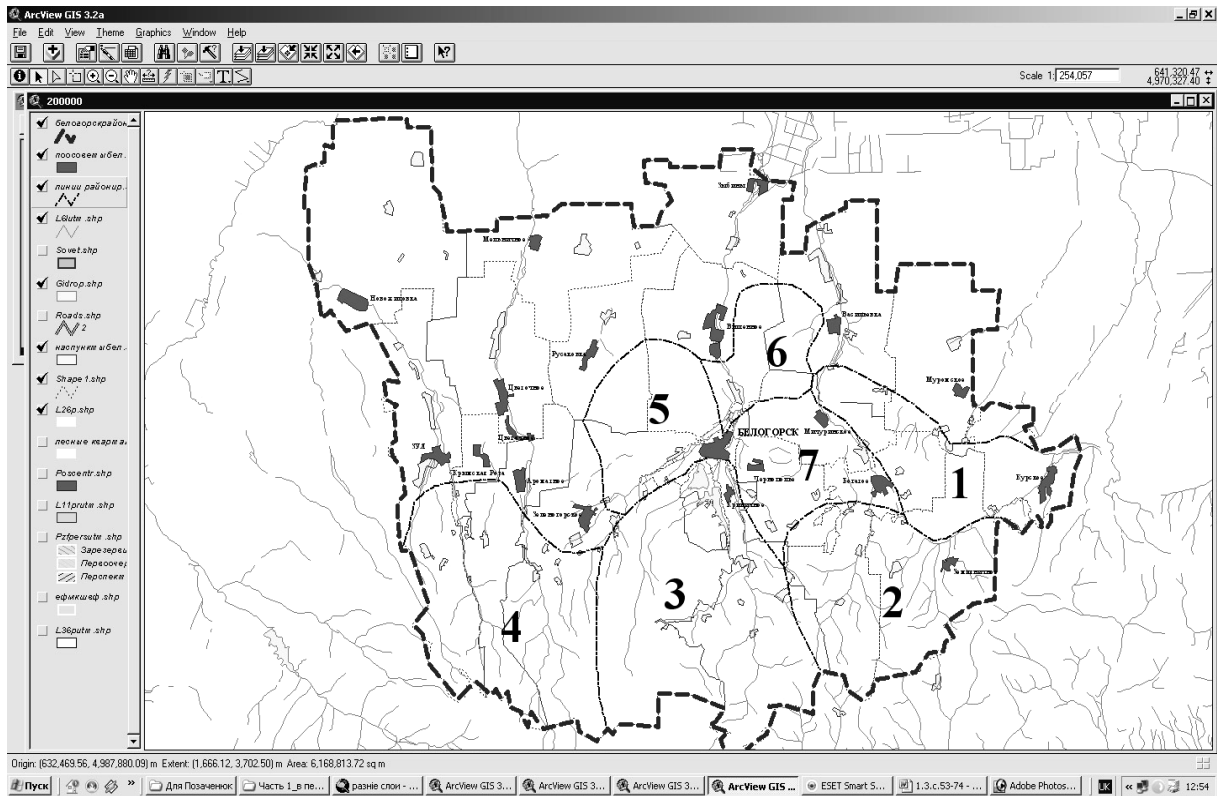


Fig. 3. Visualization of recreational zoning database – layer “Natural complexes used for recreation” (evidence from Belogorsky district of Crimea).

Map of landscape-recreational micro-zones can be used as a basis for planning of recreational activity. In order to do this, one must complete at least two steps: first – specify sites and territories that are already used in tourism and recreation, but have not lost their value and require protection; second – specify territories and sites that can eventually be used for recreation.

SPECIFICATION OF SITES AND TERRITORIES ALREADY USED FOR RECREATION THAT HAVE NOT LOST THEIR VALUE AND REQUIRE PROTECTION

In order to complete step one, we created a database of sites and territories used for recreation and requiring protection (as geoinformational data based created with ArcGIS 10.1).

We used the following principles while creating the database of natural complexes used for recreation:

- object-oriented approach to construction of informational model for the area;
- problem-oriented approach to formulation of functional structure of data-bank;
- complexity that defines the scope, including all kinds of sites with natural resource capacity;
- hierarchy organization;

- informational compatibility of all elements and sub-systems, flexibility that allows to expand the number of elements, use new technologies for collection, transfer and processing of data without major change of structure and functioning of the system;

- unambiguous and authentic data.

Main informational source of data as to location and structure of preserved natural landscapes in Crimea is the Plan for regional environmental network, created with ArcGIS 10.1.

De facto, geoinformational database of Crimea's regional environmental network creates a logical basis for defining the preserved natural complexes to be used for recreation. One must consider the fact that some sites among natural and conservation areas are already used for recreation and special licensing limits are obtained from environmental authorities.

SPECIFICATION OF TERRITORIES AND SITES THAT CAN EVENTUALLY BE USED FOR RECREATION

Based on landscape and recreation zoning and recreational zoning (layer "Natural complexes used for recreation") we defined background recreational load (based on landscape potential and its resilience). This information is used for designing the mode of environmental protection and environmental certificates\passports of conservation sites, including landscape parks.

For example, in micro-zone № 392 background recreational load is high, that should lead to regulation of existing environmental management and limiting the recreational use, while in micro-zone #273 that has low recreational use, it is possible to develop tourism further. For each micro-zone it is reasonable to eventually develop its own environmental certificate\passport.

On territories that currently are under chaotic use can be used for recreation it is very essential to introduce protection mode through assignment of conservation status.

Landscape parks can be used as a form of conservation for such territories. This is a new category of nature conservation adopted by the Decree of the AR Crimea Verkhovna Rada (November 18th 2009, № 1456-5\09). *Landscape park is a nature conservation site of local significance, created on small area in order to protect and conserve typical or unique natural complexes and sites, and to provide conditions for regulated recreation.*

Landscape park is usually organized without withdrawal of land, water or other resources from their owners or users, in order to do the following:

- preservation of valuable natural and historic-cultural complexes and objects;
- creation of conditions for efficient development of tourism, recreation and recreational infrastructure in natural condition within conservation condition of conservation territories and sites;
- mainstreaming of environmental awareness among population.

Typical structure of territory of a landscape park with functional zones defined:
conservation zone – meant for protection and restoration of most valuable natural complexes, highest level of protection \ conservation;
regulated recreation zone – meant for short-term rest and recovery of population;
stationary recreation zone – meant for hotels, camping sites and other infrastructure facilities of a landscape park;
business zone – meant for economic activities that support park's goals and objectives.

Having completed the analysis of landscape-recreational micro-zoning and recreational zoning (natural complexes used for recreation) we specified territories for formation of 51 landscape parks.

As the analysis' result show, many natural territories have not only landscape and recreational value, but also cultural and historic. Therefore, it is reasonable to design a special category of nature protection modes, i.e. **culture-landscape** park based on historic (including religious) sites. For landscape and culture-landscape park it is of vital importance to design an environmental certificate \ passport.

CONCLUSIONS

1. Authors developed a plan for landscape-recreational micro-zoning of Crimea, including allocation of 398 micro-zones that should be used as substantiation for new recreational and tourist site and calculation of background recreational load on environment.

2. Authors created a geoinformational database with ArcGIS 10.1. This database includes the following informational layers: current use of territory, the Plan of territorial management of Crimea until 2026, the Plan of environmental network of Crimea (bio-, ecocenters, environmental corridors, existing and planned protection and conservation sites), sites of recreational infrastructure of a territory;

3. Authors created an integrated informational layer "Natural complexes used for recreation" (including recreational zoning of preserved natural landscapes of Crimea). Also, elementary tourist sectors were defined.

LITERATURE

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