REHABILITATION OF DISTURBED AREAS FOR THE DEVELOPMENT OF ECOLOGICAL FRAME MINING AND INDUSTRIAL AREAS OF KMA

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Abstract

The problem of sustainable development of technologically - transformed landscapes in the organization of ecological frame . It is noted that the regulatory framework and practice of land in Russia do not reflect the task of forming ecological framework. It is given scheme of eco- functional zoning industrial regions KMA in the Belgorod region . Created schema analysis showed that forests are not common everywhere, and foci are very small and riparian zones along rivers, on a background of limited areas of traditional ecological frame elements in the region, such landscapes can be anthropogenic modified under self-organized vegetation (dumps) . Field studies of ecologically significant sites showed a nigh level of recreational load in the parks and water protection zon . At the same time ecosystems under self-organized vegetation dumps are not faulted recreationally, they formed a pseudo- natural communities, which meet a wide range of plants and animals.

Keywords

ecological framework, rehabilitation areas, upland faulted territory, Kursk Magnetic Anomaly (KMA), the transformation of landscapes.

Kursk Magnetic Anomaly (KMA) is one of the largest iron ore regions of the world, occupying an area of about 125,000 sq km. Tnis region is elongated in the north-west to south-east configuration, extending to 625 kilometers per lengh, and 250 km in width. KMA is found in four areas: Belgorod, Kursk, Orel and Voronezh. Major iron ore deposits, representing commercial interest, focused on the area of 70 thousand sq. km. [1].

Belgorod region has more than 50 % of proven iron ore reserves of the Russian Federation that causes a nigh degree of development of mining activities within the region. The result of long-term operation of large mining companies in the region of KMA are 13 hectares of upland faulted converted territories which 30 % are dumps. Starooskolsky and Gubkinsky mining industrial area occupy more than 11 hectares. Earlier the development of industrial activities in the region on these lands were located on fertile farmland , ecologically valuable upland oak woodlands , currently derived from economic use for a long time [2].

Besides the fact of exclusion of significant areas of economic activity and composition of natural ecosystems, which are a major environmental problem, there are attendant environmental problems created by mining these objects: the disruption of the hydrological regime of the territory, dusting soil dumps, innibition of aesthetic perception of the environment, local population . These environmental problems actualize problem of reclamation of disturbed areas and, in particular, piles of rocks.

Earlier extensive research of the processes self-organized vegetation dumps enterprises MRA showed a nigh potential of these badlands of self-regeneration (witnin 3 years after the dumping dumps appears on grass cover, in 10-15 years, there is a natural bush encroachment and afforestation) [3]. All tnis creates prospects for the inclusion of damaged landscapes in

the overall structure of the region's ecological framework for the conservation, development and maintenance of its environmental sustainability.

Approbation of methodological approaches to the design and implementation of a regional system of ecological frame in a modern land management practices [4-6] carried out in the Belgorod region.

For the formation of a regional environmental framework is proposed to use three main categories of land:

- Protected areas: parks, wildlife sanctuaries, national parks or areas in need of protection, but has not yet received such status;

- Degraded, marginal for economic use, contaminated land, ravine type land, saline, etc.;

- Semi and close to natural areas (riparian zones, urban parks, shelterbelts , etc.).

For comparison functionality lands as ecological frame elements and functions performed by these same lands according to the official classification of the Land Code of the Russian Federation [7] formulated the corresponding scheme (Table 1).

Remote sensing analysis shows that in the total land area of the share of mining and industrial land accounts for about 0.5% of the area (Table 2, Fig.).

According to the decoding site Oskol and Gubkin districts revealed more than 70% of the area occupied by agricultural landscapes, 10% are settlements, small share and woodland - 7% area anthropogenic modified landscapes more than 6%.

Field studies of environmentally significant and promising areas show that the most intense off-the anthropogenic load characteristic for parks, water protection zones of rivers and forests located near settlements , while anthropogenic modified landscapes (mostly blades) and subject to a natural self-organized vegetation not covered off-the anthropogenic load which justifies the inclusion of data in landscape ecological framework in order to restore balance and maintain the ecological stability of the region with the extensive development of industrial activities.

Table 1: Functions of land, depending on the classification and recommendations for optimizing land use

Element of ecological frame	Formal assignment to the category of land according to the official classification of land use	Functions of lands – as lands of ecological frame	Functions of lands – as lands of appropriate classification	Analysis of environmental compliance and formal purposes	Recommendations for optimization of land use
Forestry	Forest lands; land of protected areas		Safety, hygiene, health and natural protected	As close as possible	Rationing of nature use
Riparian zones of reservoirs	Water fund land	Ecological corridors	Protection of water bodies	Functions are broadly similar	Landscape planning of recreational areas and rationing loads
Ravine complexes	Land of settlements, stock, agricultural land, forest	Nucleus of ecological stability	Grazing, mowing, often non-use	Functions are different	Green building and landscape planning recreational areas
Hayfields and pastures	Agricultural land	Buffer zones	Intended for agricultural purposes (grazing, mowing)	Functions are close	Rationing loads
City parks	Land of settlements	Dots	Recreation	Functions are close	
Forest shelterbelt	Agricultural lands	Ecological corridors	Protect land from the negative (natural, man-made) phenomena	Functions are similar	Rationing loads
Areas disturbed mining activities	Industrial lands	Buffer zones	Intended for industrial purposes, or abandoned territory	Functions are different	Green construction and reclamation

Thus, in the Belgorod region, as earlier developed, densely populated, industrialized region of a high proportion of " anthropogenically created " landscapes - agricultural, residential areas, industrial sites, whereas, the share of natural landscapes - protected areas, forests, floodplains account for a small proportion of the land . To maintain sustainable development and to minimize the impact of industrial production, undoubtedly requires the use of special events for the rehabilitation of industrial converted territories and the establishment of ecological frame – Starooskolsky and Gubkinsky districts. Conducted field studies confirmed the nigh potential to heal itself after dumping dumps. This allows us to consider this type of technological badlands, under certain landscape- planning activities in mining and industrial areas, as elements of the environmental framework, which in turn can increase the area of

land ecological frame in Stary Oskol and Gubkin - mining area of more than 5 hectares and bring its stake to 20%.

Table 2: Ratio of the main types of land Belgorod region (according to decrypt satellite imagery)

Type of land	Area in hectares	Territory in %
Localities	202417,67	7,8
Highways	5141,45	0,2
Mining and industrial areas	12320,03	0,5
Forestry	209510,34	8,0
Agroecosystems:		
Arable lands	1653499,78	63,7
Ravine forms	284933,07	10,9
Hayfields and pastures	160492,69	6,2
Marshes and wetlands	29884,83	1,2
Ravine forests	21276,39	0,8
Water bodies	17026,36	0,7

Legend:
- Mining and industrial areas
- Localities
- Arable lands
- Floodplains and meadows
- Forestry
- Ravine forms
- Водные объекты
- Border of the Belgorod region
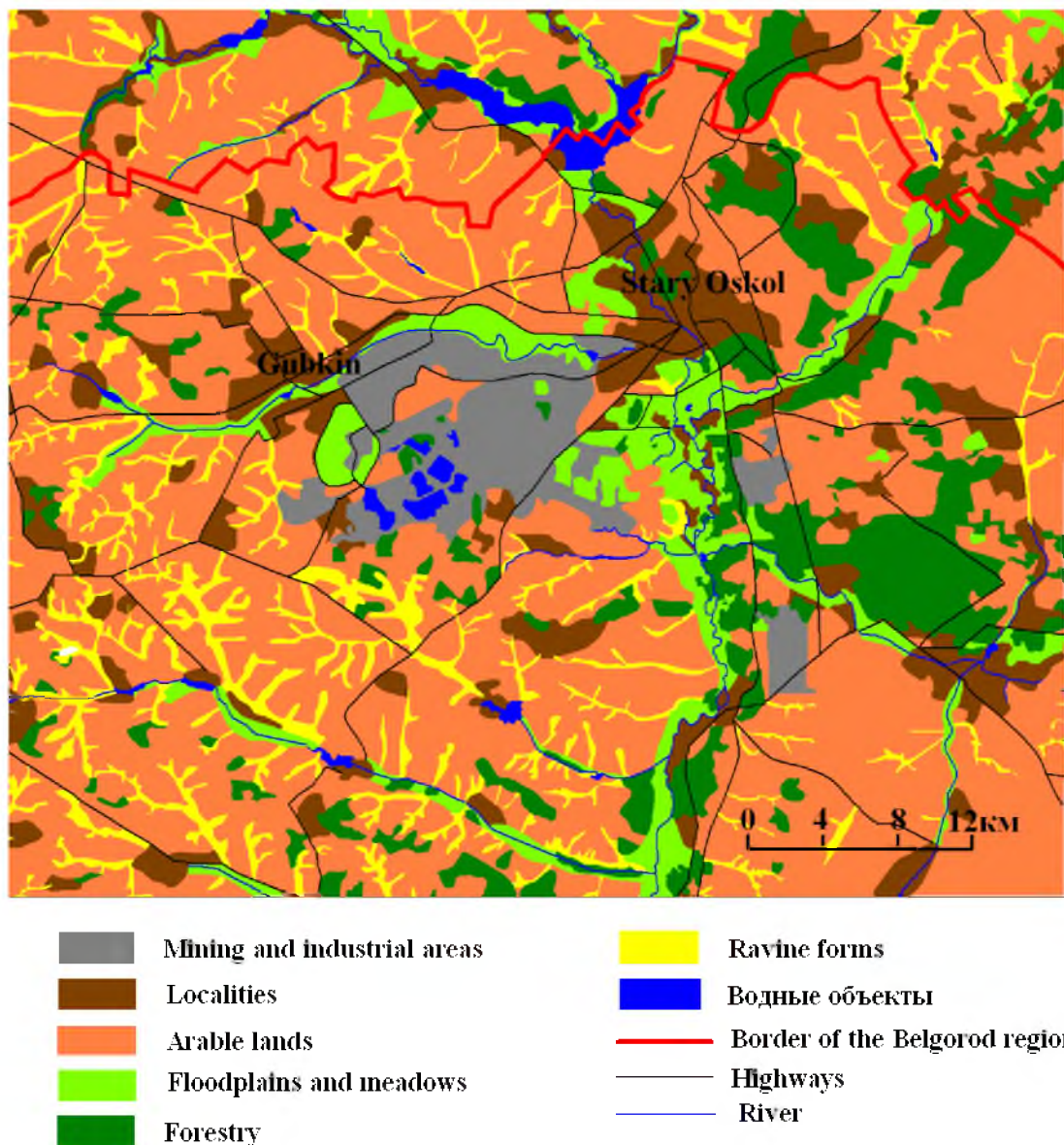- Highways
- River

Fig. 1: Functional zoning of Starooskolsky and Gubkinsky mining and industrial regions (fragment)

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353

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