

**REHABILITATION OF THE SMALL RIVERS IN THE  
URBAN ECOSYSTEMS (MOSCOW)**

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**The background of comprehensive  
environmental measures in Moscow**

- In 1999 the Concept of the environmental safety of the Moscow city was adopted.
- In 2003 the draft law on the integrated nature management was approved by the Moscow Government
- The Moscow Environmental program for the 2003-2005 has been implemented.

### **The distribution of functions between Federal and Metropolitan authorities**

- The new Federal Law on the Environmental Protection the municipal authorities were responsible for the provision of the favorable environment and environmental health
- In 2004 the Agreement between the Ministry of Natural Resources of Russian Federation was signed for sharing of competence.

- The **ecology restoration** is referred as the special activities aimed to restore the degraded ecosystems and their initial natural characteristics in respect of the relief, microclimate, hydrology, soil, vegetation and fauna.
- The **ecology restoration** is a vital activity to contribute to the natural territories network and the ecosystem frame.

## The restoration activity

The long-term program on the size population increase of plants and animals included into Red Data Book of Moscow is being implemented.

There is a special program on the water birds, herons and cranes disappeared in Moscow since the beginning of the 19 th century. In 2002-2003 there have been issued 12 captive bred chicks of herons into the natural conditions. We hope that in future 10 years these graceful birds will come back to the city.







In 2003 the Concept on rehabilitation of the small rivers and the Program on Rehabilitation of the small rivers in Moscow have been completed.

The expected results of the program –

- the significant improvement of the water objects,
- the improvement of the banks amenities and the diversified ecosystem services recreational, etc.

### **Objectives of river rehabilitation:**

- the integrity of the natural ecosystem with the urban environment, its discontinuity,
- reduction of the geological risk,
- the enhanced esthetical value of the territory,
- better use of the degraded lands.

### **The concept of the integration**

- the reconstruction of the valley portions basing the maximum use of the ecosystem and landscape potential, preservation of the existing bio-passages and biodiversity of plants and animals
- restoration of the valley within their natural spacial and geomorphology boundaries providing the self-regulation of the natural systems, restoration of the original river network, restoration of the water sources within natural ecosystems.
- clearance of the valley preserved sites (in case of closed water bed) basing on the options of restoration following (reconstructing) the original valleys configuration
- preservation of the hydrological conditions at the sites with risk of degradation of the vegetation cover in case of the underground water level decrease.

## **The option of the small rivers valleys and adjacent territories restoration**

### **-Landscape design**

- 1) greenery-open space territories, man-made landscape
- 2) creation of the water facilities(channels, fountains, cascades, vertical water walls; imitation of the natural water ways and objects
- 3) Direct restoration of the sites of open water way.

### **-Engineering works**

- 1) reclamation projects stabilizing the geologic processes
- 2) vertical planning reconstruction of the lost landscape
- 3) erosion control

## **The activities on the river rehabilitation**

- Conservation
- Reconstruction
- Reorganization

## **Conservation**

### **Downtown**

- Preservation of the traditional sight of the valley and visual links, of the traditional greenery, maintenance of the engineering facilities
- Efforts to stress visually the preserved elements of the valley

### **Nuclear area**

- Comprehensive reconstruction.
- Restoration of the lost visual links and integrity of the natural base

### **Peripheral area**

- Maintenance of the pure springs and natural territories generating the natural water flow, restoration of links with the suburbs

## **Reconstruction**

### **Downtown**

- Preservation of the historical and cultural heritage  
– careful reconstruction

### **Nuclear area**

- Radical reconstruction, restoration of the lost visual landscape

### **Peripheral area**

- Restoration of the lost water sources and natural territories



# Reorganization

## **Downtown**

- Careful restoration using the imitating technic

## **Nuclear area**

- Radical schemes of the restoration of the natural base providing the integrity

## **Peripheral area**

- Transformation of the planning structure, construction of new water ways







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**Ministry of Natural Resources of the Russian Federation**

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In Russia the ecology restoration is highly developed in connection with the restoration of the stepp ecosystems that have been practically destroyed in the natural conditions.

The going on decrease of the greenery area around Moscow makes important the restoration of natural ecosystems that have been destroyed in the course of the urbanization.

At present the natural ecosystem of Moscow comprises the one third (35,1 th.ha) of the territory, and it is to be extended to 45 th. hectares including the area of nature protected territories. The per capita greenery in Moscow is equal to 16 m<sup>2</sup> (Tokyo – 5m<sup>2</sup>).

The extension of the nature protected area is planned to perform through the designation to the small river valleys the status of the nature protected areas restoration of the wastelands.

The biodiversity of the Moscow ecosystem is relatively high and is represented by 2 thousands plant species and 280 species of backboneed animals.

### **The restoration activity**

For the last two years the program on the restoration on the vegetation associations and size of rare species on the nature protected territories (the primary pine, fir and broad leaf trees plantings) has been implemented.

Only in the park “Izmailovo” there have been planted 1300 of fir trees, 700 pine trees, 300 larc trees, 300 oak trees.

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There is a special program on the water birds, herons and cranes dissapeared in Moscow since the beginning of the 19 th century. In 2002-2003 there have been issued 12 captive bred chicks of herons into the natural conditions. We hope that in future 10 years these graceful birds will come back to the city.

There has been issued the Red Data Book of Moscow where 80 bird species are represented out of total 130.

The important ecosystem component is also the soil cover. The natural soil cover has been entirely destroyed exept small portions in city forests. The quality of the grounds brought from other natural sites is not of proper quality.

In 2003 the Concept on rehabilitation of the small rivers and the Program on Rehabilitation of the small rivers in Moscow have been completed.

The expected results of the program –

- the significant improvement of the water objects,
- the improvement of the banks amenities
- and the diversified ecosystem services – recreational, etc.

The boundaries of the major water protection zones (Kotlovka, Gorodnya, Yauza) have been defined. The other small rivers projects (Samorodinka, Ramenka, Ochakovka, Klyazma) are under way.

The rehabilitation of 10 municipal ponds (27,4 ha area) and the adjacent territories has been performed in 2003. There have been restored the 14 water springs.

There has been given a special attention to the rehabilitation of the small rivers captured in collectors. The length of the captured rivers is 313 kilometers The total length of small rivers is 492 km.

In the course of intensive urban development the small rivers have been used mostly for drainage of the surface water.

But still a huge portion of small rivers has retained its esthetic and recreational value as unique natural objects.

**Objectives of river rehabilitation:**

- the integrity of the natural ecosystem with the urban environment, its discontinuity,
- reduction of the geological risk,
- the enhanced esthetical value of the territory,
- better use of the degraded lands.

**The concept of the integration includes:**

- the reconstruction of the valley portions basing the maximum use of the ecosystem and landscape potential, preservation of the existing bio- passages and biodiversity of plants and animals
- restoration of the valley within their natural spacial and geomorphology boundaries providing the self-regulation of the natural systems, restoration of the original river network, restoration of the water sources within natural ecosystems.
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The environmental function of the small rivers valleys has been appreciated greater than that of the wild nature site.

The assessment of the natural factors at the sites of the lost water ways with the preserved, transformed and destroyed valleys is under way

**The factors studied:**

- configuration of the river network presented in the old topographic plans,
- the preserved historical landscape,
- the availance of the altered valley forms.

The options of the small rivers valleys and adjacent territories restoration:

- landscape design: 1) greenery - open space territories, man-made landscape; creation of the water facilities (channels, fountains, cascades, vertical water walls; imitation of the natural water ways and objects, 3) direct restoration of the sites of open water way.
- engineering works: 1) reclamation projects stabilizing the geologic processes and natural drainage characteristics. 2) vertical planning –

reconstruction of the lost landscape, 3) erosion and landslide control measures.

The activities on the river rehabilitation can be classified under integrated approach into three types:

- Conservation
- Reconstruction
- Reorganization

Three major zones of the rehabilitation of the urban territory

- 1 - downtown, monuments and nature protected territories
- 2 - nuclear area
- 3 – peripheral area

The 3 types of activities within special zones are the following:

### **Conservation**

downtown	Preservation of the traditional sight of the valley and visual links, of the traditional greenery, maintenance of the engineering facilities Efforts to stress visually the preserved elements of the valley
Nuclear area	Comprehensive reconstruction. Restoration of the lost visual links and integrity of the natural base
Peripheral area	Maintenance of the pure springs and natural territories generating the natural water flow, restoration of links with the suburbs

### **Reconstruction**

- Restoration of the traditional sight of the valley and the urban landscape, elimination of the unimportant dwellings and facilities, the panoramic sight of the valley,
- Clearance of the territory, reconstruction of the water objects, valuable species of flora and fauna.
- Rehabilitation of the existing ecosystems and complimentary greening of the buildings, roofs and balconies.
- Reconstruction of the existing and new engineering facilities,

downtown	Preservation of the historical and cultural heritage – careful reconstruction
Nuclear area	Radical reconstruction, restoration of the lost visual landscape
Peripheral area	Restoration of the lost water sources and natural territories

### **Reorganization**

Establishment of the new open space, direct restoration of the surface waterway, creation of new water surface. Creation of new visual links, restoration of valuable landscape imitating the traditional sight of the valley

downtown	Careful restoration using the imitating technic
Nuclear area	Radical schemes of the restoration of the natural base providing the integrity
Peripheral area	Transformation of the planning structure, construction of new water ways