



## **River restoration in Russia**

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**ABSTRACT:** River restoration in Russia involves water quality restoration and is a priority in taking water protective measures, because water quality of the major rivers of Russia remains unsatisfactory. The Federal Programs stipulate the main aspects of water bodies restoration. The most wide-scale river restoration project in Russia is the “The Volga Revival” Federal Target Program. The Program covers 8 republics and 31 oblasts of Russian Federation, with 1,4 mln square km total area and 57 mln inhabitant and directed on enhancement of ecological situation on the Volga River and its tributaries, the ecosystem restoration and degradation prevention. All measures of this Program funded mostly from charges for water use. Federal budget allocated funds for measures on state significance water bodies restoration. But During the Program action period (1998 – 2001) 0.23 billion US \$ were allocated for the Program measures implementation (5 % of total cost of measures). That is why improvement of economic mechanism securing funding of water-related activities remains the essential condition of the Program realization.

**KEYWORDS:** river restoration; program of measures; sources of funding

### **Introduction**

River restoration in Europe has a wide range of objectives, which types will differ for river systems in different parts of Europe. For example open floodplain fens are more prominent in Northern and Central Europe and restoration of riparian forest is a priority in many river systems of Southern Europe. In general, it aimed to increase the habitat diversity and natural functioning and dynamics of the river and riverine landscape.

River restoration in Russia involves water quality restoration and is a priority in taking water protective measures as this problem has gone beyond the framework of local, regional and industry branch issues and refers to all the population and the whole water/economic complex of this country.

### **Current status of rivers in Russia**

Water quality of the major rivers of Russia remains unsatisfactory. The main rivers as the Volga, the Don, the Kuban, the Ob, the Yenisey, the Amur, and the Ural are now assessed as polluted while their tributaries are assessed as highly polluted.

Water bodies ecological status deterioration occurs. Multi-factor human impacts upon water bodies as well as change of their hydrological regime has led to intensification of negative processes in aquatic medium as a result of which pollution transformation and accumulation of bottom sediments containing hazardous substances occur. Secondary water pollution caused by bottom sediments is a reason of water body and watercourse ecosystems degradation. Economic development of catchment territories has led to depletion of many minor rivers potential and to their disappearance. Therefore restoration

of water quality is the most important direction in establishment of favorable ecological conditions in the river basins [1].

### **Institutional aspects of river restoration**

The system of measures aimed at water bodies restoration is stipulated by the “Water of Russia – XXI Century” Program, that is being developed as a coordinating and integrating program for all Federal target programs, and programs of industry branches social/economic development in terms of water resources rational use and protection as well as development of the water/economic complex as a whole.

To coordinate activities of all participants of the Program development the Coordinating Board has been established. It comprises representatives of the State Duma and the Council of Federation of the Federal Assembly of Russian Federation, ministries and agencies, all Federal districts of Russia, executive bodies of the RF constituent members, scientific and design institutions, as well as non-governmental organizations.

The national action Program is being developed at the three levels - territorial, basin and Federal – with appropriate ranking of measures on water resources rational use and protection, water bodies rehabilitation, and water/economic complex enhancement and development.

Territorial sub-programs constitute the basis of the Program. On the territorial level 89 sub-programs were developed for all the constituent members; these sub-programs are combined into 19 basin sub-programs for the major water body basins. Measures of the territorial sub-programs of the RF constituent members located in a water body basin are grouped into all-basin measures in accordance with Basin Agreements.

The purpose of the basin body is to cooperate with the RF constituent members, to coordinate activities of the basin agreement parties, and to distribute funds efficiently. The agreements formulate objectives of collaboration, principles of their attainment, organizational and economic schemes of realization, fix engineering and financial details: location of control ranges, list of measures, sources and amount of funding, measures realization mechanisms, assessment of social/economic efficiency and ecological consequences.

### **River restoration main provisions**

According to the Ecological Doctrine [2], natural environment preservation and restoration are the main directions of state policy in the sphere of ecology. Preservation and restoration of landscape and biological diversity, as well as qualitative status sufficient for maintaining of aquatic ecosystems self-regulation ability and compensation of human activities impact are the main tasks in water sector. To do this it is necessary:

- to preserve and restore aquatic ecosystems on economically developed and urban territories;
- to preserve and restore rare and disappearing species of animals and plants;
- to establish and develop specially protected natural territories of various levels and regimes, to preserve available natural complexes;
- to preserve and restore continuity of water systems including prevention of their fragmentation in the process of economic activities (water works, road, railroads and other lines construction).

Realization of the above listed provisions involves development of action plans on the Federal, regional and branch levels, as well as development and implementation of state support and regulation measures in the sphere of environment protection and rational water use. Detailed elaboration of these provisions is being carried out in Federal target programs.

### **“The Volga Revival” Federal Target Program**

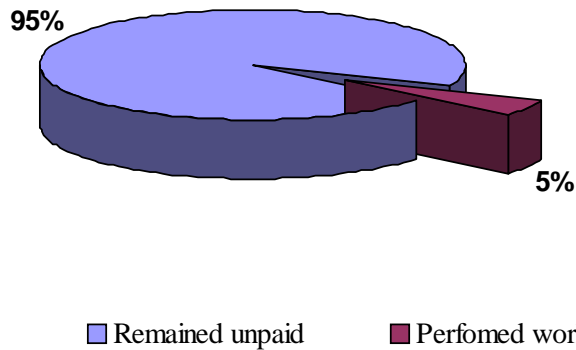
In 1998 the RF Government accepted Federal target program “Sanitation of ecological situation on the Volga River and its tributaries, the Volga basin natural complexes restoration and degradation prevention for the period up to 2010”. The Program is the most wide-scale river restoration project in Russia. It stipulates measures on the following directions:

- water resources protection and reproduction, transition from pollution control to water quality management, minor rivers restoration and rational use;
- water treatment plants construction and reconstruction, adoption of low-waste and water-saving technologies in industry;
- establishment of sanitary/protection zones;
- rehabilitation of natural complexes, expansion of specially protected territories, rising of farming lands productivity;
- sanitation of fish resources habitat and spawning sites;
- integrated ecological monitoring;
- regulatory/legal control, economic and engineering/scientific support;
- establishment of ecological education system etc.

Ministry of Natural Resources of the Russian Federation is a state sponsor of the program on the federal level; administrations of the RF constituent members coordinated by the MNR, are sponsors of the territorial sub-programs. Four associations: “Central Russia”, “North-West”, “Urals Region”, and “The Greater Volga” were established in the region to concert the RF constituent members efforts. Funds for the Program implementation were collected by “The Volga Revival” Fund established by Ministry of Natural Resources. Funds from the RF constituent members budgets, non-budget foundations, shares of enterprises/institutions revenue etc. were allocated to the Fund and accumulated there. Directorate of “The Volga Revival” Federal Target Program was established by Ministry of Natural Resources to manage the Program operatively and to solve current issues. The Ministry of Natural Resources Inter-departmental Scientific Council provided scientific/methodological support for the Program.

At the first stage mostly local bodies and legal entities funded the Program. Since 1999 the Federal budget allocated funds only for measures and projects of social value. Funds accumulated from charges for water use remained the main funding sources. Total cost of the Program measures was evaluated as equal to 4.4 billion US \$. During the Program action period (1998 – 2001) 0.23 billion US \$ were allocated for the Program measures implementation (figure 1), nevertheless the work done permitted to 17.2 % reduce of pollutants discharge in comparison with 1995. Republic of Tatarstan, Perm and Yaroslavl oblasts made the greatest contribution during the program action term.

The Program implementation will permit to regulate any economic activity in the river basin, at the first stage it will permit 30 % decrease of untreated waste water discharge and then to stop it entirely; to enhance operation of the Volga-Kama Cascade; and to



**Figure 1.** Funding of measures in accordance with “The Volga Revival”

form the system of specially protected territories (natural reserves and natural parks will occupy 3 % of the basin area).

In 2002 the Program was included into “Ecology and natural resources of Russia (2002 – 2010)” Federal Target Program.

### **“Ecology and natural resources of Russia (2002 – 2010)” Federal Target Program**

In order to solve current environmental problems and to prevent further deterioration of the country natural resources complex ecological status in 2001 the RF Government approved “Ecology and natural resources of Russia (2002 – 2010)” Federal Target Program. Within the Program framework measures on stabilization of situation in environmentally unfavorable regions, natural resources protection and reproduction are being implemented. The Program water portion involves the measures presented in table 1.

### **“Water bodies protection against pollution” Program project**

The Program project is a component of Program measures system of “Water of Russia – XXI Century” National Action Program on Russian water/economic complex prospective enhancement and development. The Program most important task is water quality and surface water and groundwater bodies ecological status improvement.

The system of measures on water quality restoration involves water protection programs development and implementation. These programs should include the whole set of measures: improvement of production technological processes (adoption of low-waste and water-saving technologies, recycling water supply systems, repeated use of waste water, creation and use of low-toxic pesticides in agriculture etc.); enhancement of waste water treatment technologies; prevention of water bodies pollution with surface runoff from the catchment territory; improvement of water intakes sanitary protection zones condition; and small rivers protection.

The Program takes into account measures on providing of ecological safety at inland water transport including measures on prevention of water bodies pollution with waste water from vessels, localization and liquidation of oil products accidental spills; meas-

**Table 1** The list of measures on water bodies restoration within the frameworks of “Ecology and natural resources of Russia (2002 – 2010)” Federal Target Program

Sub-program, measure	Total cost for 2002-2010, million \$	Including		Expected outcomes
		2002	2003	
<b>“Water resources and water bodies” sub-program</b>	5.03	0.36	0.46	Maintaining of water bodies natural ability to self-purification, prevention of river degradation;
Cleaning of watercourse runways (1500 km long) and reservoir beds	2.00	0.16	0.20	Watercourses passage ability restoration and preservation
Arrangement of water protection zones and coastal protective stripes, meadow formation on degraded plough lands	3.03	0.20	0.26	Prevention and liquidation of economic activities negative impact aftermaths on water bodies
<b>“Water biological resources and aquaculture” sub-program</b>	9.87	1.75	1.94	Development of fishery and coastal production and non-production structures; creation of conditions for biological resources and aquaculture; fishery potential efficiency increase
Construction and reconstruction of units for fish resources reproduction	1.25	0.13	0.21	The most valuable biological resources species rational use and preservation
Aquaculture development	8.62	1.62	1.73	Inland water bodies biological resources increase and development
<b>“The Volga Revival” sub-program</b>	47.24	3.05	3.95	The Volga basin natural ecosystems restoration and territories degradation prevention, establishment of economic activities regulation systems – this well positively affect natural and, especially, water environment pollution level lowering
<b>Total</b>	62.14	5.16	6.35	

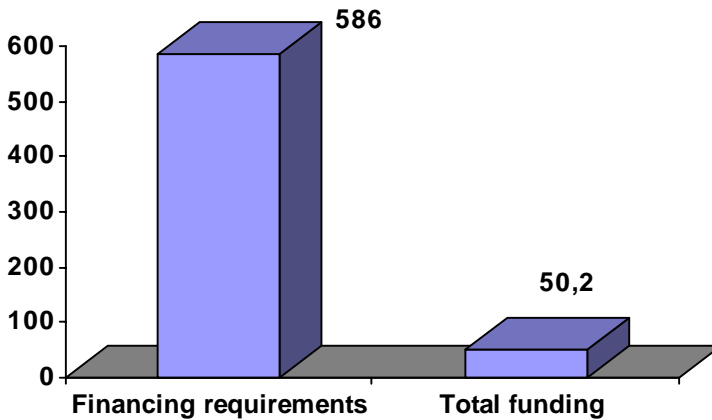
ures on water bodies cleaning from abandoned vessels and sunken timber.

Total cost of the project is 8.4 billion US \$. Main scope of measures for 2003 – 2015: construction of waste water treatment facilities and sewage systems worth of 6.7 billion US \$ will be funded at the cost of investments. Works on cleaning and deepening of riverbeds, arrangement of water protection zones and coastal protective stripes will cost 1.7 billion US \$ and will be funded at the cost of other current expenses.

### Sources of funding for measures on rivers restoration

Measures on water bodies restoration are funded mostly from the RF constituent members budgets at the cost of funds accumulated from charges for water use. Federal budget allocated funds for measures on state significance water bodies restoration, or for measures of acute social significance. Part of funds is allocated from non-budget sources, from fuel/power, fishery and other brunches (depending on enterprises specialization); foreign investments were attracted as well, especially at the regional level.

According to data provided by the RF constituent members, in 2003 their budgets allocated 20.43 million US \$ for waterworks. About 13.4 million US \$ are expected to be allocated from the Federal budget. With other sources total funding will be about 50.2



**Figure 2.** Funding of measures for water bodies restoration and protection in 2003, million US \$

million US \$, while demands for funding for water bodies restoration and protection within the framework of the “Water of Russia – XXI Century” National Program realization will be about 586 million US \$ in 2003 (figure 3).

It should be noted that out of the total volume of water/economic and water/protective measures funding on the average up to 30 % of funds from the Federal budget and from 5 % to 15 % of funds from the RF constituent members are allocated for measures on water bodies restoration. The main proportion of these funds is spent for riverbeds cleaning, while the balance is spent for measures on surface water bodies monitoring efficiency enhancement, establishment of ecological water natural reserves, researchers etc. Construction and reconstruction of waste water treatment plants for river basins with high human load in terms of pollution from stationary and diffuse sources can be also considered being part of efforts on water bodies restoration.

## Conclusion

Necessity of realization of measures on rivers restoration is obvious. More than half of the country population use surface waters for drinking water supply, therefore the problem of public drinking water supply emerged; the problem is linked with quality guarantee and rising of drinking water supply epidemiological safety. Due to waste water treatment plants low efficiency continuous deterioration of surface water bodies quality occur. In this case lowering of water bodies pollution due to waste water treatment plants construction and decrease of pollutants mass in discharges, arrangement of water protection zones and coastal protective stripes, banks consolidation, anti-erosion measures, and riverbeds cleaning will be of utmost importance. All these measures are included into the National Program, their implementation in 2003 – 2015 will permit to solve to the great extent problems of providing water resources to population and economy, to improve water resources quality, to restore water bodies ecological status, significantly decrease waters harmful impacts aftermaths, to secure favorable conditions for human vital activities, as well as fulfill provisions of the UN ECE Helsinki Convention on transboundary river.

However, establishment of economic mechanism securing funding of water-related activities, intensification of investment and innovation processes remains the essential condition of the Program realization.

### **References**

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