

**Sub-Basin Level Flood Action Plan
- Pannonian Southern Danube -**



//// Deutschland //// Österreich //// Česká republika //// Slovensko //// Magyarország //// Slovenija //// Hrvatska //// Bosna i Hercegovina //// Srbija //// Crna Gora //// România //// България //// Moldova ////

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1. INTRODUCTION

In response to the danger of flooding and in line with its Joint Action Programme, the ICPDR decided in 2000 to establish the long-term Action Programme for Sustainable Flood Prevention in the Danube River Basin. The whole process was accelerated after disastrous floods in 2002 and resulted in adoption of the Action Programme at the ICPDR Ministerial Meeting on 13 December 2004.

The overall goal of the ICPDR Action Programme is to achieve a long term and sustainable approach for managing the risks of floods to protect human life and property, while encouraging conservation and improvement of water related ecosystems. Given the area, the complexity and the internal differences in the Danube River Basin, the Action Programme represents an overall framework, which needs to be specified in further detail for sub-basins. Therefore, the targets of the ICPDR Action Programme include preparation of flood action plans for all sub-basin in the Danube catchment area.

In September 2007 a Directive of the European parliament and of the Council on the assessment and management of flood risks (EFD) was adopted by the European Council. The aim of the Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to first carry out a preliminary flood risk assessment by 2011 to identify areas at risk of flooding. For such areas they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015.

As the ICPDR Action Programme was designed in full coherence with EFD the flood action plans for sub-basins are an important part of implementation of the EFD and they summarize the key actions towards preparation of the flood risk management plans. Therefore, the preparation of the flood action plans for sub-basins can be considered as an interim step in implementation of EFD.

This action plan for the Pannonian Southern Danube sub-basin reviews the current situation in flood protection in Serbia, Croatia and Romania and sets the targets and the respective measures aiming among others to reduction of damage risks and flood levels, increasing the awareness of flooding and to improvement of flood forecasting. The targets and measures are based on the regulation of land use and spatial planning, increase of retention and detention capacities, technical flood defences, preventive actions, capacity building, awareness & preparedness raising and prevention and mitigation of water pollution due to floods.

This Action plan is derived from Action plans prepared for Croatian, Serbian and Romanian territories. It is foreseen that this planning document will be further refined as appropriate and necessary by the bilateral river commissions.

2. CHARACTERISATION OF CURRENT SITUATION

2.1. Review and assessment of current situation

2.1.1. Natural conditions

2.1.1.1. Topography

Pannonian Southern Danube sub-basin is the Danube corridor from the Drava mouth at km 1,382.5 to the mouth of the Timok River at km 845.5. The Danube defines Serbia's border with Croatia over a length of 138 km (between km 1,433 and km 1,295) and Serbia's border with Romania over a length of 229.5 km (from the mouth of the Nera River at km 1,075 to the mouth of the Timok at km 845.5). Croatian territory is on the right bank of the Danube, while Romanian is on the left bank downstream of km 1,075.

Based on geomorphological characteristics, the Pannonian Southern Danube can be divided into three different river reaches:

- **Pannonian Plain Danube**, upstream of the Nera River confluence (km 1,075). At this section, the Danube has all characteristics of alluvial rivers, with low gradients, a sandy riverbed and, consequently, highly variable morphological characteristics of the river channel (meandering, distortable and bifurcating course; numerous branches, islands and sandbars; and varying width and depth of the riverbed). The stretch downstream of the Novi Sad town (km 1,255) is under the influence of the Iron Gate 1 backwater during low and average water flows.
- **Iron Gate Danube** (km 1,075 – km 943), where the river is confined in gorge, with steep, occasionally vertical sides, which rise to 200-300 m (and even 500 m at several locations) above the water level of the river. Now it is a deep part of the Iron Gate 1 reservoir, with completely altered characteristics.
- **Western Pontic Danube**, downstream of the Iron Gate 1 dam (km 943) to the state border with Bulgaria (km 845.5), where the river again has typical alluvial and lowland character. An 80 km long section belongs to the Iron Gate 2 reservoir (km 943 to km 862.8), while the short downstream stretch is free-flowing.

2.1.1.2. Hydrology

The Danube receives many tributaries along its Pannonian Southern sector. Right bank tributaries in Croatia are the Drava (at km 1,382.5 of the Danube), and Vuka (at km 1333), and Sava (km 1,170), Velika Morava (km 1,103), Mlava (km 1,092), Pek (km 1,058.3), Timok (km 845.5) and a few torrents in Serbia. On the left side, Danube receives the Tisa (km 1,215), Tamiš (km 1,154), DTD channel (km 1,076), and Nera (at RS-RO border, km 1,075). On the Iron Gate section, the Danube receives many torrents from the right (RS) and left (RO) side. The RO side of the Pannonian Southern Danube is formed by the area (1,513 km²) of direct Danube's tributaries and the Danube from Baziaş (entrance in Romania) until Porțile de Fier I (Iron Gate I) dam. They are of Southern versants of Locvei-Almaj Mountains and have similar characteristics: reduced lengths, high slopes, and accentuated linear erosion. The most important tributaries are: Radimna (L=24 km, S=81 km²), Boşneag (L=12 km, S=60 km²), Orevița (L=25 km, F=102 km²), Berzasca (L=46 km, S=229 km²), Mraconia (L=19 km, S=113 km²) and Eşelnița (L=26 km, S=77 km²). The total length of these rivers is 465 km, the density of the hydrographic basin is 0.30 km/km².

The flow regime on the Pannonian Southern Danube is influenced by large tributaries – especially the Tisa (the largest tributary of the Danube, 157,186 km²) and the Sava River (the second largest, 95,419 km²). The Tisa and the Sava significantly increase the Danube discharge, while the Drava and other tributaries have considerably smaller influence on the Danube flow regime, as shown in Table 1.

The flow regime of the Danube is characterized by two distinct seasons: wet season (April to June, with large flood waves generated by snowmelt) and dry season (September to January).

Table 1: Main hydrologic characteristics of the Danube in RS

Profile	Chainage km	Area km ²	Average discharge		Maximum discharge and year of occurrence m ³ /s
			annual m ³ /s	monthly m ³ /s	
Bezdan	1,425.5	210,250	2,355	749 - 7,043	8,360 (1965)
Bogojevo	1,367.4	251,593	2,890	959 - 8,153	9,250 (1965)
Slankamen	1,215.5	254,961	3,690	1,093 - 9,885	11,420 (2006)
Smederevo	1,116.0	525,820	5,310	1,454 - 13,080	14,800 (2006)
Veliko Gradište	1,059.8	570,375	5,550	1,461 - 14,152	16,865 (2006)

2.1.1.3. Ice conditions

During the winter period, the thermal regime of the Danube is governed by the continental climate of the catchment area, or by sub-zero air temperatures which cause the formation of ice on the river. Critical situations involving the movement of ice along the river used to be quite frequent. During very cold winters, there were many cases of ice jams and blockages, and resultant ice flood threats. For this reason, many years ago ice defence became an integral part of flood defence on the Danube.

The occurrence of ice on the Danube has considerably diminished during the past few decades. In the period from 1901 to 1970, the frequency of ice occurrence on the Danube had been 70-90%, while between 1971 and 2006 it was 30–60%. The frequency of steady ice cover decreased from 30–60% to 3–18%, respectively. The reasons might be climate change, or anthropogenic influence as chemical and thermal pollution of the river. This should be further investigated.

All ice that comes from upstream Danube sections or is formed at the Pannonian Southern Danube, remain here until it melts. Therefore, ice defence measures and activities are important issues in the international cooperation.

2.1.2. Floodplains and flood defences

2.1.2.1. Levees

The **Pannonian Southern Danube upstream of the Iron Gate gorge** is characterized by wide alluvial valley and low riverbanks. In the past, large floodplain areas (Baranja in Croatia, Bačka and Banat in Serbia) were flooded several times each year. For that reason, organized flood protection works began at the end of the 18th/beginning of the 19th century. The river was confined by levees along both banks. Flood protection and drainage in the wide lowland areas made urban, rural and traffic development as well as agricultural production possible. However, there are still two reaches along the Pannonian Southern Danube which have nearly intact floodplains: broad flood prone areas along the Drava mouth (~40,000 ha in HR and RS), and upstream of the Tisa confluence (~20,000 ha).

- **Present situation in Croatia:** 21 km long levees downstream the Drava mouth enable protection from a 100-year flood.
- **Present situation in Serbia:** Flood protection structures are almost continuous along the left bank of the Danube. Along the right bank levees are built on some localities in the Srem region, in Belgrade area, and continuously from Smederevo (km 1,116) to Golubac (km 1,040, upstream of the Iron Gate gorge). These are “first-order” infrastructure systems, extensively reconstructed after a disastrous flood in 1965 (upstream of km 1,255) and also in the zone of the Iron Gate reservoirs (downstream of km 1255) where flood defence conditions were considerably altered after the impoundment. Presently, levees are more than 5 m high, with crest width 5-10 m, and enable protection from a 100-year flood, with additional freeboard of 1.2 – 1.7 m. Presently, flood protection level is satisfactory except in several towns along the Danube (Novi Sad, Belgrade, Smederevo, Veliko Gradište and Golubac) where flood protection structures have insufficient freeboard above the design flood level, due to urban planning criteria.

Within the Iron Gate gorge, several settlements on the Serbian territory were relocated to higher altitudes, while others were protected by revetments and flood protection walls.

The Iron Gate dams are operated jointly by RS and RO. The sluices on these dams are fully opened during floods, because the Iron Gate 1 reservoir cannot retain flood wave, due to its small volume if compared to the volume of the flood water.

2.1.2.2. Ice control

Ice control on the Pannonian Southern Danube upstream of Novi Sad was based on RS-HU and CR-HU cooperation. Presently, Serbia rents 3 icebreakers, operating on the Danube between Novi Sad and Belgrade, while the participation of Hungary and Croatia is still open for discussion.

According to a protocol between RS and RO governing the use of the Iron Gate 1 HPNS, a fleet of 4 icebreakers is planned for ice defence within the reservoir (2 icebreakers for each party). Currently, the RS Iron Gate authority rents 2 makeshift icebreakers (mainly operating upstream of the Djerdap Gorge), while RO icebreakers are not in use.

2.1.3. Institutional and legal framework

Serbia

Protection against harmful water effects is regulated by the “Water Law” (Official Gazette of the Republic of Serbia, 46/91). The Law arranges proceedings and measures for flood and ice protection, as well as protection from torrents and erosion.

The participants involved in flood defence are:

- Ministry of Agriculture, Forestry and Water Management of the Republic of Serbia – Republic Directorate for Water;
- Public Water Management Company “Vode Vojvodine” – Novi Sad, in charge of the territory of Autonomous Province of Vojvodina (left Danube bank and the right bank between Croatian border and the Municipality of Belgrade);
- Public Water Management Company “Srbijavode” – Belgrade, in charge of the right Danube bank between the Municipality of Belgrade and the border with Bulgaria;
- Public Water Management Company “Beogradvode” – Belgrade, in charge of the territory of Belgrade;
- Local water management companies;
- Republic Hydrometeorological Service of Serbia;

- Public Enterprise “Electric power industry of Serbia” – Iron Gate HPNS.

Responsibilities of participants are determined in the General Flood Defence Plan and the Annual Plan for Flood Defence. The flood and ice control actions are organized and carried on in three phases, depending on the hazard degree: preparation, regular and emergency defence. These plans are prepared only for watercourses with the existing flood protection structures. For other areas endangered by floods, local community appoints flood protection measures and proceedings. Also companies whose properties are endangered prepare special flood protection plans.

Bilateral commissions RS-HU and RS-RO have pronounced role in flood and ice management, as well as the RS-RO Iron Gate Commission. However, in the future, ice defence needs to be defined within trilateral cooperation between Hungary, Croatia and Serbia. The bilateral agreement with Croatia is expected to be signed soon.

Croatia

Flood protection in the Republic of Croatia has been regulated under the Water Act and the Water Management Financing Act. The competent bodies for flood protection issues are: the Ministry of Regional Development, Forestry and Water Management as a state administration body and Hrvatske vode as a state agency.

Operative flood defence on state waters is conducted according to the State Flood Defence Plan adopted by the Government of the Republic of Croatia, whereas the carrying out of operative flood defence on local waters is based on flood defence plans for catchment areas, which are adopted by county assemblies on the basis of proposals put forward by Hrvatske vode.

Based on these plans, operative flood defence on state waters is established in river basin districts, and within those in counties, various sectors and on different sections of watercourses. Operative flood defence on local waters is established in catchment areas, and within those in counties, various sectors and on different sections of watercourses.

In the Danube River Basin operative flood defence is carried out by Hrvatske vode: the Department of Protection against Adverse Effects of Water (Hrvatske vode Head Office), Service for protection against adverse effects of water within the Water Management Department for the Drava and Danube River Basins (Osijek WMD), and by employees of Croatian Water branch offices in the catchment areas - 2 water management branch offices (WMBO). The Danube River Basin district flood defence centre is located in the seat of river basin district in Osijek. County flood defence centres are located in county seats. Field flood defence centres for river sections and water watchmen areas have also been established. Interventions during operative flood defence are carried out by the Ministry-approved, court-registered legal entities using their own machinery, equipment and skilled workers. Materials and basic tools for operative flood defence are provided by Hrvatske vode.

Romania

Issued or updated important regulations are as follows:

- The National Strategy for Flood Risk Management on short term (Governmental Decision 1854 from 2005), which establish prevention and protection measures for flood effects mitigation for each of involved structures from central to local level;
- National Plan for Prevention and Flood Protection at Hydrographic Basin level (Governmental Decision 1309 from 2005);
- The Water Law 107 from 1996 modified and completed according tot the National Strategy;

- Emergency Order regarding safety operation of the reservoirs for pisciculture, recreation or local importance, establishing operating conditions;
- Regulations for management of emergency situations generated by flooding, dangerous meteorological phenomena and accidents at hydraulic structures adopted in May 2005.

Based on these regulations, taking into account the 2005 and 2006 floods, new flood protection plans at basin, county and local level have been approved in 2006. These plans comprise maps with level curves that bordered flooded zones by watercourses overflow and versant run-off corresponding to the maximum known discharges. In 2009 all flood protection plans will be updated.

The main actors involved in flood protection actions are: Ministry of Environment, Apele Române (Romanian Waters) National Administration, National Institute for Hydrology and Water Management, General Inspectorate for Emergency Situations and National Administration for Meteorology.

3. TARGET SETTINGS

3.1. Croatia

The roof state-level Water Management document, the implementation of which is provided for under the Water Act, is the Water Management Strategy, which is prepared by Hrvatske vode and adopted by the Croatian Parliament. It is a long-term planning document which is systematically harmonized with changes occurring in the water system and socio-economic development, and is also mutually harmonized with the National Physical Planning Strategy, Environmental Protection Strategy, the state-level forest management planning documents and the planning documents of inland navigation system development.

The Water Management Strategy defines the legislative, organizational, financial, technical, scientific-research and IT aspects of water management activities in the present socio-economic circumstances of the accession process of the Republic of Croatia to the European Union, as well as in the future circumstances of full membership.

The UN/ECE Guidelines on Sustainable Flood Prevention, the principles of EFD and Action Programme for Sustainable Flood Protection in the Danube River Basin are included in the Water Management Strategy.

Effective Flood Protection actions are to be planned thoroughly, according to the five fundamental principles:

- **Water is part of the whole** - Water is part of the natural ecological cycle and its influences have to be taken into consideration in all strategic and planned documents regarding the area utilization;
- **To keep the water in the catchment area** - Water should be kept in the catchment area in such a way to avoid jeopardizing the residents of the area and their properties, and to avoid stalling the economic development;
- **Let the river expand** - Watercourses are to be spread as to slow down the water discharge in such a way to avoid jeopardizing the residents of the area and their properties, and to avoid stalling the economic development;
- **Be aware of the danger** - People should become aware of the fact that in spite of all the flood precautions there are still flood risks in the areas that are protected;
- **Integrated and coordinated action** - The necessary precondition for successful and sustainable flood Protection is the integrated and coordinated action of all the factors;

Instead of the defensive actions taken to fight these natural phenomena, which have been the most frequent events in the past, there has to be an established risk control principle. Flood Protection can never be absolute, only a certain level of protection can be guaranteed. The past events have shown that the local area flood protection restrictions have had bad influence both downstream and upstream. Therefore it is necessary to have a thorough approach upon planning the protection system, and to take into account the whole river basin. Such a holistic approach to planning the protection systems has to be multidisciplinary and interdisciplinary, and for the watercourses across the border it is necessary to engage into an international cooperation.

For an efficient and a feasible implementation the cooperation of all the authorities is required and thereby the coordination of particular sector policies: Nature Protection, Regional Planning, Agriculture, Traffic and Urban Development. As far as the watercourses across the border are concerned, the cooperation of all the countries in the river basin is required in order to coordinate the national policies and strategies and to elaborate coordinated operational plans.

Various structural, i.e. constructional actions are taken (regulation systems and weirs) and furthermore appear to be an important flood protection element. They are to be, primarily, focused on the health care and safety, and property protection; in their planning the nature protection, and landscape utilization requests are to be taken into consideration.

Everyone who may suffer from the consequences of flood events has to take their own precautionary actions. To be able to take the personal precautionary actions on time, the authorities must establish the appropriate forecasting systems and the flood alert systems;

Human uses of flood plains should be adopted to existing hazards. To reduce the risk of flooding, it is necessary to establish appropriate utilization regulations for that area;

In flood-prone areas, preventive measures should be taken to reduce possible adverse effects of floods on ecosystems, such as water and soil pollution.

The conducted analyses of the current condition and developmental needs have shown that Croatia possesses sufficient quantities of water for its own needs, and that water resources, in terms of their quality and quantity, are not a limiting factor of economic development. However, due to marked temporal and spatial unevenness of the water regime, efficient and environmentally friendly water management requires systematic investment in the development and regular maintenance of the functionality of water management systems. Analyses have also shown that due to partly non-repaired war damage, as well as due to a longer period of insufficient investments in the development and regular maintenance of protective systems, the safety of the population and assets in many potentially flood-exposed areas has been reduced.

Establishment, maintenance and systematic improvements in appropriate preventive protection of the population and resources against floods are just one of the basic tasks of water management and are an essential precondition for further economic development of the country. This assumes achieving economic justifiable levels of protection for the population, material goods and other endangered assets (business premises, thoroughfares, infrastructural systems, agricultural areas, cultural-historical heritage, and so on) along with incentives for preserving and advancing the ecological state of waters and flood areas, in order to create the conditions for further sustainable economic development.

Improvements in flood protection require the application of integrated, systematic, effective and cost-efficient measures together with preventive structural and non- structural activities. The prerequisite for their application is active and coordinated participation of all actors, the water management sector, and of: protection and rescue services, meteorological and

hydrological service, health service, physical planning experts, local and regional self-government units, users and managers of multi-purpose water-storage reservoirs, farmers, foresters, environmentalists, scientists and researchers, the media, higher education institutions, interested non-governmental organizations, and citizens and entrepreneurs on the areas potentially at risk.

Preventive flood protection at international river basins is planned through cooperation with competent bodies from other countries in accordance with the provisions of adopted multilateral and bilateral agreements on water management cooperation.

3.1.1. Regulation on land use and spatial planning

It is necessary to bring into balance the demands for further urbanization and economic exploitation of space and land use needs to slow down the run-off and retain water in the basins.

The problems related to water estate will be regulated through the adoption of a regulation harmonized with other regulations related to land use, which will define precise criteria for addressing all controversial issues. The water estate on unregulated inundation areas and on large lowland retarding basins of protective flood defence systems will be resolved by the zoning of the terrain and graded restrictions in land use. The priority of the water management sector is the demarcation of the water estate, its registration into land registers, and entry into physical plans, and systematic monitoring of the status of the water estate.

Target 1. Solving problems related to the water estate in order to prevent inappropriate exploitation of land required for proper functioning of the current water management systems, for their regular economic and technical maintenance, and for their development.

Target 2. Providing information of areas at risk to give input to spatial planning.

3.1.2. Reactivation of former, or creation of new, retention and detention capacities

Maximum flood wave flows, particularly in small- and medium-sized basins, can be partly reduced by preserving and improving the natural retaining capacities of land, watercourses, and floodplains. By implementing such measures, the retained water infiltrates into the ground and is available for future use, favourable water regimes are ensured for water-related ecosystems, at the same time partly reducing extreme flood risks. Natural wetlands and floodplains in the basins therefore need to be preserved, and, where possible and economically justified, reconstructed or extended.

Protection of the banks of watercourses from erosion will, wherever possible, be solved with protective vegetation. The measures based on land development must be neither underestimated nor overestimated, because they usually do not enable sufficient reduction of maximum flows of extreme flood waves, which can be ensured only through the application of various engineering measures. The implementation of renaturalization measures is usually related to high land acquisition costs and the need to provide for back-up employment options because such measures affect mostly agricultural producers. All national programs aimed at improving the status of the environment and its components will be systematically supported. On the areas of large towns urban planners must provide for improved infiltration of storm water into the ground by developing parks and open spaces in new urban settlements. The current sources of pollution on the areas under potential flood risk will be gradually remediated.

Target 1. Preserving and improving natural retention capacities.

3.1.3. Structural flood defences

Safety from floods cannot be achieved without the implementation of structural measures which include regular economic and technical maintenance of watercourses, water estate, and water structures, as well system development works.

From the point of view of health, safety and environment, the priorities of first order in preventive flood protection are the areas of large and larger towns with more than 30,000 inhabitants, potentially at risk from the Danube River. The priorities of second order are other towns and settlements along the Danube. The current dikes at critical sections along major rivers will be gradually reconstructed and extended. Other activities will be implemented in the order defined on the basis of various criteria, including: the number of defended population, prevented material and other damage, general water management significance, estimated investment costs, etc.

Water management systems have to be planned as multi-purpose systems in order to rationalize water and land use, and account has to be taken of their economic justification and their impacts on the environment and nature. If due to uncoordinated priorities of various water and land users the development of the planned multi-purpose systems is not implemented according to the expected dynamics, preventive flood protection should, as a matter of public interest, be addressed by simpler solutions which would not in the future limit the development of multi-purpose systems. Water rights acts will continue to respect multi-purpose solutions envisaged under physical plans, and the water management sector will systematically encourage their development.

Small watercourses running through towns and settlements should be regulated in accordance with local needs and urban planning documents, taking into consideration the landscape and architectural demands, and the needs of municipal infrastructural systems. For the purpose of preventive protection against ice floods, regulation works at critical locations will continue to be carried out systematically.

Target 1. Achieving the 100% functionality of flood protection systems by the end of 2038.

3.1.4. Non-structural measures (preventive actions, capacity building of professionals, raising awareness and preparedness of general public)

The efficiency of operative flood defence will be improved through the modernization of current systems for the monitoring and forecasting of weather phenomena (on-line monitoring stations, radars, satellite images, forecasting models, etc.), and current communications systems. Flood forecasting models will be developed, officially adopted and regularly updated, and on international rivers they will be developed and coordinated in the framework of competent international bodies. Systematic monitoring and forecasting of weather phenomena and timely provision of relevant information to the competent services for operative flood defence are the responsibility of hydrological and meteorological services.

A flood defence plan will be drawn up for an integrated water system. Operative flood defence on boundary watercourses is carried out together with competent services from the neighbouring countries.

The protection and rescue services will ensure proper functioning of regional and local public alert systems; organize the work of the civil protection; prepare strategic, tactical and operative disaster management plans, and, if needed, organize appropriate exercises; organize the evacuation of inhabitants in case of need; organize emergency medical aid to affected population; and organize post-flood terrain recovery. Other agents in flood protection are:

science-and-research institutions, the media and interested NGOs with active and constructive participation in the processes of development of planning documents.

- Target 1. Reduce flood damage risk.
- Target 2. Increase the efficiency of operative flood defence measures.
- Target 3. Increase the capacity building and raise the level of preparedness of organizations responsible for operative flood defence.
- Target 4. Build capacity of professionals and institutions responsible for flood management.
- Target 5. Introduce principles of EU Floods directive.
- Target 6. Raise awareness and preparedness of the general public on sub-basin-wide and local scale.
- Target 7. Prevent and mitigate pollution of water caused by floods.

3.2. Serbia

Implementing criteria from the Water Management Master Plan of the Republic of Serbia, and taking into account the actual flood protection conditions and problems (especially the size of flood prone areas and possible damages) the long term flood protection strategy for the Danube in Serbia will comprise:

- The existing layout of flood protection structures remains the same, while the following is planned:
 - Regular maintenance of the flood protection structures, according to criteria, standards and norms;
 - Reconstruction or/and construction of the flood protection structures to decrease flood hazard.
- Gradual and broad implementation of non-structural flood protection measures (as upgrade of the flood forecasting and warning procedures; introduction of flood maps into spatial plans, etc.).
- International cooperation in flood management with Hungary, Croatia, Romania and Bulgaria.

3.2.1. Regulation on land use and spatial planning

- Target 1. Spatial plans of municipalities contain flood hazard maps (both for potentially and actually flooded areas) and flood risk maps.
- Target 2. Limitations related to land use in flood prone areas are defined.

3.2.2. Reactivation of former, or creation of new, retention and detention capacities

- Target 1. Present retention capacities of the Pannonian Danube in Serbia are preserved.
- Target 2. New retention capacities upstream of Novi Sad are re-considered.

3.2.3. Structural flood defences

- Target 1. Provide protection for the adopted design 100-year flood along the Danube River. This is an adequate criterion for the protection of the Danube riparian land, considering the size of the potentially endangered areas, number of inhabitants and infrastructure value.

- Target 2. Upgrade flood protection level for the most important urban areas (as Novi Sad and Belgrade) up to a 1,000-year flood.
- Target 3. Provide adequate measures for sediment management on the Danube. Apply controlled sand excavation to preserve channel conveying capacity and flow regime.
- Target 4. Provide adequate sediment and torrent control measures on small tributaries. Apply anti-erosion watershed management and torrent control measures with optimal combination of biological measures (forestation, forest melioration, pasture melioration, etc.), bio-technical measures (contour trenches, terraces etc.), and technical measures (check dams and river-bed training).
- Target 5. Provide adequate ice control measures on the Danube River.
- Target 6. Provide permanent preparedness of the flood defence system.

3.2.4. Non-structural measures (preventive actions, capacity building of professionals, raising awareness and preparedness of general public)

The non-structural measures (encompassing institutional, preventive, corrective and other measures) should be given an appropriate role in flood control and mitigation. Main activities should be tied to:

- Preventive and operative tasks (setting up or improving the data base on natural events and protection system characteristics, modification of the existing plans for flood coping practices, adoption of reservoir operational rules, development/improvement of flood forecast and warning system);
- Regulative and institutional measures (zoning of floodplains, floodplain management policy, construction standards etc.);
- Managerial and technical education, as well as public awareness building.

All these tasks will be tied together within the Flood risk management plan for the Danube River basin.

- Target 1. Reduce flood risk.
- Target 2. Introduce principles of EU Floods directive.
- Target 3. Build capacity of professionals and institutions responsible for flood management.
- Target 4. Upgrade flood monitoring, forecast and warning.
- Target 5. Introduce regulations for emergency situations response (natural disasters).
- Target 6. Prepare Flood risk management plan.
- Target 7. Improve awareness of stakeholders on floods.
- Target 8. Update/build scientific base for flood management.
- Target 9. Improve international cooperation in flood management.

3.3. Romania

The Action Plan for flood protection on medium-term (2009-2012) launched and comprises new hydraulic structures in frequently affected zones, higher safety degree of existing works and finalization of ongoing ones.

The National Action Plan foresees 1850 km river regulation 976 km of dikes, 810 km riverbank consolidation, identification of new zones as wetlands and DESWAT and WATMAN Projects finalisation.

The prioritisation criteria for promoting investments for flood protection have been made following:

- Inclusion of the proposed works in the Strategy of Ministry of Environment;
- Actual safety degree of the flood protection structures;
- Amplitude of avoided damages as result of the projects;
- The elaboration status of technical and economic documents;
- Financing possibility
- Occupied field status.

Flood Action Plan for the short term strategy implementation started in 2005 by integrated actions for 5years (2010):

- development of the hydrological information system and modernization of the early warning system – DESWAT Project
- rehabilitation of the old flood defence hydraulic infrastructure and building new ones in areas of high risk,
- Flood hazard mapping and flood management plans. The first pilot basin was Siret. Nowadays, interdisciplinary studies in eight river basins are under implementation (Siret, Mureş, Crişuri, Banat, Jiu, Olt, Someş-Tisa, Ialomiţa-Buzău) and will be finalized during 2009, beginning of 2010.

The National Plan will be finished in the frame of the River Basin Management Plans – Flood management Section first draft, till December 2009 and is planned to be adopted till mid 2010.

In the mean time, during 2009 will be finalized mid and long term National Strategy for Flood Risk management, which will take into account the need for Flood Directive implementation.

3.3.1. Regulation on land use and spatial planning

The existing local urban plans for development should contain maps with actually flooded areas, based on historic and studies data. These maps are from the Local Flood Protection Plans and are updated every 4 years.

3.3.2. Structural flood defences

The structural flood defences are realized in order to make an effective protection for populated areas, to avoid human and material losses. In total, the National Action Plan (2009-2012) foresees 1850 km river regulation 976 km of dikes, 810 km riverbank consolidation. For all investments works are realized feasibility studies.

3.3.3. Non-structural measures (preventive actions, capacity building of professionals, raising awareness and preparedness of general public)

3.3.3.1. Preventive actions

These actions are concentrated towards prevention/mitigation of potential damages generated by floods through:

- a) avoiding houses, social and cultural or/and economic objectives constructions in potentially flooded area;
- b) realisation of structural and non-structural measures for protection;
- c) geographical delimitation of natural flood risk zones and noting these in the general urban planning studies;

- d) modern forecast, warning and alarming systems implementation in case of floods;
- e) existing infrastructure for flood protection and riverbed maintenance;
- f) effective communication and people education regarding flood risk and the action ways in emergency situations.

A good system for people warning and preparation could save many lives. For this reason, in the last years was and are in development three projects: SIMIN (National Meteorological Integrated System), DESWAT (Destructive Water) and WATMAN (Water Management).

SIMIN integrates the provided data from existent systems in Romania with a high technology in meteorological radars field, stations with surface hydrologic sensors, data processing systems and forecast decision based on satellite transmission. System was released in September 2003.

The DESWAT project has in its first stage as objective, the modernisation of informational hydrological system, beginning with data acquisition through 600 automatic stations placed on rivers, 250 automatic gauging stations and 64 automatic quality stations, continuing with transmission support which will comprise the actual classic radio system, the GSM and satellite systems.

The programme package for hydrological forecast will be modernised, enlarged and will include semi-automatic procedures for elaboration of warnings, forecasts and information products for various decision makers, media and population.

WATMAN is a project through that the National Strategy for water management in case of disaster will be applied. It will integrate the output data from SIMIN and DESWAT, finally being carrying-out the Information-Decisional Integrated System. Those two projects, through modernised hydrologic and meteorological information systems will provide data and forecast in real-time, which represents input data for WATMAN infrastructure, optimising the integrated water management system.

3.3.3.2. Financial insurance for flood risk

In 1 July 2009, a law referring to the obligatory insurance for houses against natural disasters such earthquakes, landslides and flooding will come into force.

3.3.3.3. Raising awareness and preparedness of general public

- Improvement reaction capacity, response and intervention;
- Information and awareness of the population regarding floods and its effects;
- Eco-centres setting-up in frequently affected zones;
- Public meeting presenting the local flood protection plans and the warning procedures based on colours code;
- Exercises for flood simulation at basin and county level with the participation of population.

3.3.3.4. Capacity building of professionals

It was planned an intensive programme for raising personnel capacity from the water management units of Romanian Waters responsible with flood defences maintenance and with means and equipments for interventions in case of flooding.

It is developing the training action of new elected mayors and public local administration.

3.3.3.5. Prevention and mitigation of water pollution due to floods

A characteristic is represented by the pollution with heavy metals, where there are important mining perimeters with rocks which reach the surface and which are washed by the precipitation. Another significant pressure is represented by the suspended solid loads caused by coal mining activities.

The Law 466 (regarding dam safety) covers the safety problems of dams and dikes of the mining waste deposits.

Now, according to the EU Directive 1999/31/CE and Governmental Decision 349 from 2005 the major part of the mining ponds with high risk stopped the activity.

The actual legislation foresees the continuity monitoring of the closed ponds.

4. MEASURES TO ACHIEVE TARGETS

Targets	Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment	
4.1. Regulation on land use and spatial planning							
HR	Target 1: Solving problems related to the water estate	Drafting and adoption of regulations (criteria for identification, zoning of the terrain, and gradation of limitations restrictions in the use of the water estate)	Administrative	MRDFWM, HV, MEPPPC			
		Delineation of the water estate, entry into land registers and physical plans	Administrative	MRDFWM, HV, MEPPPC			
		Solving property-right relations to legalise flood protection structures (repurchase of real estate, getting location and construction permit)	Administrative	MRDFWM, HV, MEPPPC			
		Systematic monitoring of the status of ownership on the water estate.	Administrative	MRDFWM, HV, MEPPPC			
	Target 2 Provide information of areas at risk to give input to spatial planning	Introduction of flood risk maps and flood damage maps for the entire country, and their presentation to the interested public	Administrative	MRDFWM, HV, MC		Uncertain	
		Introduction of appropriate indicators and systematic monitoring of the efficiency of flood and erosion control measures	Administrative	MRDFWM, HV, MC		Uncertain	
		Preparation and systematic maintenance of: the Inventory of water bodies, water estate and water structures, the Inventory of extreme hydrologic phenomena (floods, storms and droughts), and the Inventory of the status of erosion and anti-erosion measures taken	Administrative	MRDFWM, HV, DHMZ, HS		Continuous	
RS	Target 1: Spatial plans of municipalities contain flood	Defining water estate	Administrative	MAFWM-RDW, PWMCies		Continuous	

Targets		Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
	hazard maps and flood risk maps	Introduction of flood maps into spatial plans of municipalities	Administrative	MESP			
	Target 2: Limitations related to land use in flood prone areas are defined	Preparation of instructions for limitations on land use	Administrative	MAFWM-RDW, MESP			
		Land use limitations applied	Administrative	LRSG			
RO	Target 1: Local and regional developing plans contain flood hazard maps	Including the results of the study "Identification and delimitation of the natural hazards (earthquakes, landslides and floods). Hazards maps at county level" into local and regional developing plans	Administrative	Public Administration	120	2009	
	Target 2: Urban Development Plans contain flood maps	Including the maps from Local Flood Protection Plan (Contingency Plans) into the Urban Development Plans	Administrative	Public Administration	20/year	Continuous	This actions include flood risk evaluation (flooded areas maps and estimation of damages)
4.2. Reactivation of former, or creation of new, retention and detention capacities							
HR	Target 1: Preserving and improving natural retention capacities	Existing multipurpose reservoirs are used for flood attenuation	Administrative	MRDFWM, HV		Continuous	Coordinated operation of existing multipurpose reservoirs
		Design and construction of new mountain retention storages	Technical	MRDFWM, HV		Started	
		Introduction of renaturalization measures of preventive flood protection: - reduction of flood wave peak flows by reactivating former floodplains and restoring watercourses; - Implementation of the Best Practices of Flood Prevention Protection and Mitigation in land use management	Administrative	MRDFWM, HV, MC, MEPPPC, LRSG, OTHER		Continuous	
RS	Target 1: Present retention capacities of the Pannonian Danube in Serbia are preserved		Administrative/ Technical	PWMCies		Continuous	
	Target 2: New retention capacities upstream of Novi Sad are re-considered		Scientific	MAFWM-RDW, PWMC VV		Started	

Targets		Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
RO	Target 1:	Implementation of the study “Ecologic and economic resizing of the Lower Danube floodplain”	Administrative/technical	ME	2.5	2010	Including contributions for Romania in the Danube Floodrisk Project
4.3. Structural flood defences							
HR	Target 1: Achieving the 100% functionality of flood protection systems	Gradual implementation of repair and reconstruction works on about 20 km of protective systems	Technical	MRDFWM, HV, HEP, OTHER		2038	From the point of view of health, safety and environment, the priorities of first order in preventive flood protection are the areas of large and larger towns with more than 30,000 inhabitants, potentially at risk from the Danube River. The priorities of second order are other towns and settlements along the Danube.
		Regular maintenance of watercourses, water estate, and water structures; systematic technical monitoring of key water structures	Technical	MRDFWM, HV		Continuous	
		Support to solving flood protection problems within multi-purpose systems for the regulation and use of water and land	Technical	MRDFWM, HV, HEP, OTHER		Continuous	
RS	Target 1: Provide protection for the adopted design 100-year flood along the Danube River	Reconstruction of levees or key walls in Novi Sad, Zemun, Belgrade, Smederevo, Veliko Gradište and Golubac	Technical	MAFWM-RDW, PWMCies		Started	
		Reconstruction of right bank levee downstream of Veliko Gradište	Technical	PWMC SV, EPS			
		Rehabilitation of left bank levee upstream of Novi Sad	Technical	PWMC VV			
	Target 2: Upgrade flood protection level for the most important urban areas up to a 1,000-year flood	Acquisition of mobile flood barriers for protection of Novi Sad and Belgrade	Technical	MAFWM-RDW, PWMCies		Started	

Targets		Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
	Target 3: Provide adequate measures for sediment management	Apply controlled sand excavation	Technical	PWMCies, EPS, OTHER		Continuous	
	Target 4: Provide adequate sediment and torrent control measures on small tributaries		Technical	PWMC SV, PCSŠ, LRSG		Continuous	Optimal combination of biological, bio-technical and technical measures (check dams and river-bed training).
	Target 5: Provide adequate ice control measures on the Danube River	Icebreakers, ice blasting etc.	Technical	MAFWM-RDW, PWMCies, EPS, Army		Continuous	Bilateral commissions with HU, HR and RO plan actions for current year.
	Target 6: Provide permanent preparedness of the flood defence system	Maintenance of flood protection structures	Technical	MAFWM-RDW, PWMCies, EPS, LRSG, OTHER		Continuous	According to specific standards and norms.
		Maintenance of erosion and torrent control structures	Technical	MAFWM-RDW, PWMCies, PCSŠ, PCVŠ, LRSG, OTHER		Continuous	According to specific standards and norms.
		Maintenance of the Iron Gate 1 and 2 dams	Technical	EPS		Continuous	According to specific standards and norms.
		Purchase and repair of machinery, tools, materials, equipment and communications	Technical	MAFWM-RDW, PWMCies, LRSG		Continuous	According to specific standards and norms.
		Rehabilitation of weak points at levees	Technical	PWMCies		Continuous	
4.4. Non-structural measures (preventive actions, capacity building of professionals, raising awareness and preparedness of general public)							
HR	Target 1: Reduce flood damage risk	Implementation of operative flood defence measures	Technical / Organizational	MRDFWM, HV		Continuous	
		Managing and coordinating the operation of water distribution structures during high water periods	Technical / Organizational	MRDFWM, HV, HEP, OTHER		Continuous	
	Target 2: Increase the efficiency of operative flood defence measures	Improving the system of automated weather stations and gauging stations, and making the measured data available to relevant services in real time	Technical / Organizational	MRDFWM, HV, DHMZ		Continuous	

Targets	Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
	Improving the system of hydrological and weather forecasting, and making the created forecasts available to relevant services; establishment of local forecasting centres and application of the latest technologies in forecasting - monitoring and water information system	Technical / Organizational	MRDFWM, HV, DHMZ		Continuous	
	Improvement of alarm systems and systems for issuing timely warning to population at risk; organizing improved operations of the police and fire fighting forces during floods; organizing evacuation of population, if needed; organizing life on damaged areas by providing humanitarian aid, organizing medical services, and emergency recovery of essential infrastructure	Technical / Organizational	NPRD		Continuous	
	Improvement and formalizing of international basin wide on line flood related meteorological and hydrological data exchange	Administrative	HV, DHMZ		Continuous	
	Improvement and formalizing of international basin wide on line operative flood defence information exchange	Administrative	HV, NPRD		Continuous	
Target 3: Increase the capacity building and raise the level of preparedness	Preparation, adoption, and regular updating of the National Flood Defence Plan	Administrative	MRDFWM, HV		Continuous	
Target 4: Build capacity of professionals and institutions	Support of scientific and educational projects related to all aspects of floods.	Administrative	HV, MSES, MRDFWM		Continuous	
	Professional education of scientific personnel to perform the tasks of integrated water resources management. It is necessary to create new interdisciplinary plans and programs of education.	Scientific	HV, MSES, MRDFWM		Continuous	

Targets		Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
		Continue action in the framework of international multilateral and bilateral agreements.	Administrative	MRDFWM, HV MFAEI, MEPPPC, MC		Continuous	
	Target 5: Introduce principles of EU Floods directive	Continue action in the framework of international multilateral and bilateral agreements.	Administrative	MRDFWM, HV MFAEI, MEPPPC, MC		Continuous	
		Bring into force the laws, regulations and administrative provisions complied with Flood Directive	Legal/ Administrative	MRDFWM, HV		26 November 2009	
		Decision on units of management	Legal/ Administrative	MRDFWM, HV		26 May 2010	
		The Preliminary flood risk assessment	Scientific/ Technical	MRDFWM, HV		22 December 2011	
		Preparation of flood hazard and flood risk maps	Scientific/ Technical	MRDFWM, HV		22 December 2013	
		Preparation of Flood risk management plan	Scientific/ Technical	MRDFWM, HV		22 December 2015	
		Target 6: Raise awareness and preparedness of the general public	Presentation of flood risk and flood damage maps to the interested public	Administrative	MRDFWM, HV, MC		Continuous
	Introducing the principle of covering uncovered flood damage risks through insurance policies		Administrative	MRDFWM, HV, MF		Continuous	
	Target 7: Prevent and mitigate pollution of water caused by floods	Recovery of the current sources of pollution on the areas potentially at risk	Administrative	MRDFWM, HV, MEPPPC, MHSW, LRSG		Continuous	
RS	Target 1: Reduce flood risk	Implementation of operative flood defence measures	Technical/ Organizational	PWMCies, LRSG		Continuous	
	Target 2: Introduce principles of EU flood directive	Preparation and adoption of new Water Law	Legal/ Administrative	Republic of Serbia, MAFWM-RDW		2010	

Targets	Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
Target 3: Build capacity of professionals and institutions responsible for flood management	Preparation of bylaws according to new Water Law	Legal/ Administrative	MAFWM-RDW		2011	
	Regular upgrade of General and Annual Flood Defence Plans for the Republic of Serbia	Administrative	MAFWM-RDW		Continuous	State level – increased efficiency of operative flood defence.
	Preparation and regular upgrade of General and Annual Flood Defence Plans for municipalities	Administrative	LRSG		Continuous	Municipality level – increased efficiency of operative flood defence.
	Characterisation of current situation	Technical	MAFWM-RDW, PWCies			Finished partially.
	Update/preparation of technical documentation for all existing flood protection structures (incl. data on water estate)	Technical	PWCies			Finished partially.
	Update/preparation of flood defence manual	Technical	MAFWM-RDW		2010	
	Preparation of bylaw for establishment and management of cadastre of water structures	Administrative	MAFWM-RDW		2010	
	Preparation of cadastre of flood protection structures	Technical	PWCies, LRSG		Continuous	
Target 4: Upgrade flood monitoring, forecast and warning	Improvement of the system of automated weather and gauging stations	Technical/ Organizational	RHMSS, MAFWM-RDW		Continuous	Measured data available to relevant services in real time.
	Improvement of the system of hydrological and weather forecasting	Technical/ Organizational	RHMSS, MAFWM-RDW		Continuous	Introduction of the latest technologies in forecasting. Forecasts available to relevant services through WMISS and by other IT.
	Improvement of alarm systems and systems for issuing timely warning to population at risk	Technical/ Organizational	RHMSS, MAFWM-RDW		Continuous	

Targets	Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
Target 5: Introduce regulations for emergency situations response (natural disasters)	Preparation of strategic, tactical and operative disaster management plans for catastrophic flood	Technical/ Organizational	MAFWM-RDW, PWMCies, MI, LRSG			- Criteria for declaration of an emergency; - Information routes; - Methods of public warning; - Evacuation routes; - Preparedness of public services.
	Training exercises	Public participation	PWMCies, LRSG, MI		Continuous	- Organizing operations of the police and fire fighting forces as during floods; - Organizing evacuation of population; - Organizing life (medical services, and emergency recovery).
Target 6: Prepare Flood risk management plan	Preliminary flood risk assessment	Scientific	MAFWM-RDW		2011	Activities started. Required harmonization with neighbouring countries.
	Preparation of methodology for flood risk mapping	Scientific/ Technical	MAFWM-RDW		2011	The following results/conclusions will be used: - Common position on flood risk mapping (ICPDR); - Flood risk project; - Tamnava project (Swedish Rescue Service and MAFWM-RDW).
	Adoption of bylaw on methodology for flood risk mapping	Administrative	MAFWM-RDW		2011	
	Preparation of flood hazard maps	Scientific/ Technical	MAFWM-RDW, PWMCies		2013	
	Preparation of flood risk maps	Scientific/ Technical	MAFWM-RDW, PWMCies		2013	
	Preparation of draft Flood risk management plan	Technical/ Organizational	MAFWM-RDW, PWMCies		2014	
	Public information and consultation on draft Flood risk management plan for the Danube River basin in Serbia	Public participation	MAFWM-RDW, PWMCies		2014-2015	

Targets		Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
		Bring into force Flood risk management plan for the Danube River basin in Serbia	Administrative	MAFWM-RDW		2015	
	Target 7: Improve awareness of stakeholders on floods	Introduction of flood insurance	Administrative				
		Introduction of water management issues into schools	Public participation			Continuous	From elementary school to university.
		Preparation of flood leaflet, film, TV broadcasts etc.	Public participation				
	Target 8: Update/build scientific base for flood and ice management	Preparation of studies and design	Scientific	All		Continuous	
	Target 9: Improve international cooperation in flood management	Bring into force bilateral agreement with Croatia and establish bilateral commission	Legal	Republic of Serbia		2010	
		The Danube River basin wide on-line flood related meteorological and hydrological data exchange	Administrative	Republic of Serbia + RHMSS bilateral commissions		2010	Improvement and formal agreement.
		The Danube River basin wide online operative flood defence information exchange	Administrative	Republic of Serbia + bilateral commissions		2010	Improvement and formal agreement.
RO	Target 1: Implementation of preventive measures	DESWAT – Carrying of a hydrologic information-decisional system for the management of emergency situations (61 automatic stations in Banat hydrographic space which includes Pannonian Southern Danube part in Romania)	Technical	RW	45	2010	
		DANUBE FLOODRISK flood risk reduction: risk assessment, risk mapping, involvement of stakeholders, risk reduction by adequate spatial planning.	Administrative Public	RW	6.38	2012	
		Information System for Integrated Water Management (WATMAN)	Technical	RW	138.4	2013	
		Contributions to the development of the flood risk management strategy	Technical	Romanian Waters	1.7	2009	

Targets		Measures	Type of intervention	Institution in charge	Costs (k€)	Deadline	Comment
		WIMS – Investment supporting the information system and database for water management (PHARE project) at national level	Technical	Romanian Waters	2.4	2009	
		High-flood forecasting and flood management in Romania – feasibility study - the analysis for implementing of the decision support system	Administrative Technical	Romanian Waters	0.1	2009	
		Update the Water Law	Administrative	ME			
		Update the Flood Protection Plans at basin, county and local level	Administrative	RW		Every 4 years	
		Update the Plan for warning-alarming for downstream localities in case of accidents at dams	Administrative	RW		Every 10 years	
	Target 2: Raise awareness and preparedness of general public	Exercises for general public preparedness for flood simulation	Public participation	RW, GIEO	0.50	Continuous	
		Flood Protection leaflets	Public participation	ME	0.01	Continuous	
		Setting-up New Eco-centres	Administrative	ME	0.02	Continuous	
	Target 3: Prevention and mitigation of water pollution due to floods	Monitoring the closed ponds and waste deposits	Administrative/ Technical	MIN	5.00	2012	USTDA estimation of the minimum needed equipment for monitoring and communication

Annex 1

List of competent authorities responsible for preparation and implementation of the Action Plans

Country	Name of institution	Abbreviation	Address
HR	Meteorological and Hydrological Service	DHMZ	Grič 3 10000 Zagreb
	Hrvatska elektroprivreda (Croatian power company)	HEP	Ulica grada Vukovara 37 10000 Zagreb
	Hrvatske šume	HS	Ljudevita Farkaša Vukotinića 2 10000 Zagreb
	Hrvatske vode	HV	Ulica grada Vukovara 220 10000 Zagreb
	Ministry of Culture	MC	Runjaninova 2, 10000 Zagreb
	Ministry of Environmental Protection, Physical Planning and Construction	MEPPPC	Ulica Republike Austrije 20 10000 Zagreb
	Ministry of Finance	MF	Katančičeva 5 10000 Zagreb
	Ministry of Health and Social Welfare	MHSW	Ksaver 200a 10000 Zagreb
	Ministry of Regional Development, Forestry and Water Management	MRDFWM	Babonićeva 121 10000 Zagreb
	Ministry of Science, Education and Sport,	MSES	Donje Svetice 38 10000 Zagreb
	National Protection and Rescue Directorate, Ministry of the Interior	NPRD	Ulica grada Vukovara 33 10000 Zagreb
	Ministry of Foreign Affairs and European Integration	MFAEI	Trg N. Š. Zrinskog 7 -8 10000 Zagreb
	RS	Ministry of Agriculture, Forestry and Water Management – Republic Directorate for Water	MAFWM-RDW
Ministry of Environment and Spatial Planning		MESP	Nemanjina 11 11000 Beograd
Public Water Management Company “Vode Vojvodine”		PWMC VV	Bulevar Mihajla Pupina 25 21000 Novi Sad
Public Water Management Company “Srbijavode”		PWMC SV	Bulevar umetnosti 2a 11070 Novi Beograd
Public Water Management Company “Beogradvode”		PWMC BV	Svetozara Ćorovića 15 11000 Beograd
Republic Hydrometeorological Service of Serbia		RHMSS	Kneza Višeslava bb 11000 Beograd
Electric Power Industry of Serbia – the Iron Gate Company		EPS	Pop Stojanova 2a 11000 Beograd
Public Company “Vojvodinašume”		PCVŠ	Preradovićeva 2 21131 Petrovaradin
Public Company “Srbijašume”		PCSŠ	Bulevar Mihajla Pupina 113 11070 Novi Beograd
Ministry of the Interior		MI	Bulevar Mihajla Pupina 2 11070 Novi Beograd
Local and regional self-government units		LRSG	
Other water and land users		OTHER	

Country	Name of institution	Abbreviation	Address
RO	Ministry of Environment	ME	12 Libertatii Blv, Sector 5 Bucuresti
	Ministry of Transportation and Infrastructure	MT	38 Dinicu Golescu Blv. Sector 1 010873 Bucuresti
	Romanian Waters National Administration	RW	6. Edgar Quinet St. Sector 1 010018 Bucuresti
	National Institute of Hydrology and Water Management	NIHWM	97 Bucuresti-Ploiesti Av. Sector 1 Bucuresti
	General Inspectorate for Emergency Situations	GIES	46 Banu Dumitrache St. Sector 2 Bucuresti
	Ministry of Economy	MIN	152 Calea Victoriei St. Sector 1 010096 Bucuresti