A study for the European Commission

FLOOD PREVENTION AND MANAGEMENT

Gap analysis and needs assessment in the context of implementing EU Floods Directive

September 2015

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Western Balkans Investment Framework (WBIF), Infrastructure Projects Facility Technical Assistance 4 (IPF 4)

The technical assistance operation is financed under the Western Balkans Investment Framework (WBIF) which is a joint initiative of the EU, International Financial institutions, bilateral donors and the governments of the Western Balkans which supports socio-economic development and EU accession across the Western Balkans through the provision of finance and technical assistance for strategic investments, particularly in infrastructure, energy efficiency and private sector development.

A project of the European Union

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List of Abbreviations

ALB	Albania
ALERT	Strengthening Serbian multi-hazard early warning and alert system
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
BD	Brčko District
BGR	Bulgaria
BiH	Bosnia and Herzegovina
CBA	Cost benefit analysis
CEI	Central European Initiative
CII	Complex impact indicator
CIMA	International Centre for Environmental Monitoring
CLC	Corine land cover
CoM	Council of Ministers
CORINE	Coordinated information on the environment
CRIS	Catastrophe Risk Insurance Facility
DANICE	Danube River basin ice conveyance investigation and icy flood management
DEM	Digital elevation model
DG NEAR	Directorate General for Neighbourhood Policy and Enlargement Negotiations
DoAFWM	Department of Agriculture, Forestry and Water Management
DRR	Disaster risk reduction
DSIP	Directive specific implementation plan
DTM	Digital terrain model
EBRD	European Bank of Reconstruction and Development
EC	European Commission
ECRAN	Environment and Climate Regional Accession Network
EDEN	Environmental Centre for Development, Education and Networking
EEC	European Economic Community (earlier acronym for European Union)
EI	Efficiency indicator
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EMA	Emergency Management Agency
EMS	European Meteorological Society
EPA	Environmental Protection Agency
EPSG	European Petroleum Survey Group
ETRS89	The European Terrestrial Reference System 1989
EU	European Union
EUDEM	The Digital Elevation Model over Europe
EUMETNET	Network of European Meteorological Services
EWBJF	European Western Balkans Joint Fund
EWS	Early warning systems
FAAARO	Flood Affected Areas Assistance and Rehabilitation Office
FBiH	Federation of Bosnia and Herzegovina
FD	Floods Directive
FHM	Flood hazard map
FHMI	Federal Hydro-meteorological Institute
FMoAWMF	Federal Ministry for Agriculture, Water Management and Forestry
FRA	Flood risk assessment
FRM	Flood risk map
FRMP	Flood Risk Management Plan
GADM	Global Administrative Areas
GDEM	Global Data Elevation Models
GEF	Global Environmental Facility
GEWE	Institute of Geoscience Energy, Water and Environment

GIS	Geographic information system
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRC	Greece
GTOPO30	The global digital elevation model developed by the U.S. Geological Survey's Centre for Earth Resources Observation and Science
HIS	Hydrological Information System
HMI	Hydro-meteorological Institute
HMS	Hydro-meteorological Service
HPP	Hydro Power Plant
HRV	Croatia
HUN	Hungary
ICPDR	International Commission for the Protection of the Danube River
IFI	International Financial Institution
IHMS	Institute of Hydrometeorology and Seismology
II	Combined impact indicator
IMWC	Inter-ministerial Water Council
IPA	Instrument for Pre-Accession Assistance
IPA FLOODS	Prevention, preparedness and response to floods in the Western Balkans and Turkey
IPF	Infrastructure Projects Facility
ISRBC	International Sava River Basin Commission
KESH	Albanian Power Corporation
IGEWE	Institute of Geoscience, Energy, Water and Environment
LAEA	Lambert Azimuthal Equal Area
LAREDAR	Hazard and risk mapping, risk management planning of the lakes and reservoirs in the Danube River Basin
M€	Million Euro
MARD	Ministry of Agriculture and Rural Development
MCDA	Multi criteria decision analysis
MERGBORD	Merging hazard maps at national border areas in the Danube basin
MEUR	Million Euro
MKD	the former Yugoslav Republic of Macedonia
MNE	Montenegro
MoAEP	Ministry of Agriculture and Environmental Protection
MoAFWE	Ministry of Agriculture, Forestry and Water Economy
MoAFWM	Ministry of Agriculture, Forestry and Water Management
MoARDWA	Ministry of Agriculture, Rural Development and Water Administration
MoE	Ministry of Environment
MoED	Ministry of Economic Development
MoEF	Ministry of Economy and Finance
MoEPP	Ministry of Environment and Physical Planning
MoFA	Ministry of Foreign Affairs
MoFTER	Ministry of Foreign Trade and Economic Relations
MoH	Ministry of Health
MoI	Ministry of Interior
MoIA	Ministry of Interior Affairs
MoLGA	Ministry of Local Government Administrations
MoM	Minutes of meeting
MoU	Memorandum of understanding
NCFMNR	Albanian National Centre for Forecast and Monitoring of Natural Risks
NEAS	National Environmental Approximation Strategy
NPAA	National Programme for Adoption of EU Acquis
OLI	Operational Land Imager
OSM	Open street map
DCG	Drin Core Group
PEG FP	Permanent Expert Group for Flood Prevention
PEG RBM	Permanent Expert Group for River Basin Management

PFRA	Preliminary Flood Risk Analysis
PoPfAEoW	Programme of Protection from Adverse Effects of Waters
PRD	Protection and Rescue Directorate
PU	Public Utility
QA	Quality assurance
RBD	River basin district
RBMP	River basin management plan
RHMS	Republic Hydro-meteorological Service
RIS	River information system
RNA	Recovery needs assessment
ROM	Romania
RS	Republika Srpska
RUCZ	Civil Protection Headquarters
SCCF	Special Climate Change Fund
SEA	Strategic Environmental Assessment
SECO	State Secretariat for Economic Affairs of Switzerland
SEEC	South East Europe and Caucasus
SEM	Sector for Emergency Management
SEPA	Serbian Environmental Protection Agency
SQE	Strategy Analyst and Quality Assurance Lead
SRB	Republic of Serbia
SRTM	The Shuttle RADAR Topographic Mission
SVAT	Soil-Vegetation-Atmosphere Transfer
TA	Technical Assistance
ToR	Terms of References
TUR	Turkey
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNMIK	UN Interim Administration Mission in Kosovo
WB	Western Balkans
WB FLOODS	Gap analysis and needs assessment in the context of implementing EU Floods Directive in the Western Balkans
WBIF	Western Balkans Investment Framework
WFD	Water Framework Directive
WIS	Water information system
WMO	World Meteorological Organization

1 Introduction

1.1 Background of the study

The preparation of this study begun following the floods in Bosnia and Herzegovina (BiH) and Serbia in May 2014. Based on a common understanding of the needs for investments in the sector and the implementation of the Floods Directive (FD) at conferences held in July and November 2014, the European Commission (EC) ordered the present analysis on the status of flood management in general and specifically on the implementation of the FD in the Western Balkans (WB) countries. It was suggested that the gap analysis should be presented at a follow-up meeting in 2015, which is planned for the end of September.

May 2014 floods

The mostly extreme flood disaster, in the Sava catchment, occurred in the WB in May 2014. This resulted in severe human casualties, considerable damage to property, land businesses and, consequently, economic loss in Bosnia and Herzegovina, Serbia and to a lesser extent in Croatia. A meteorological event, in the form of an extreme low-pressure air mass, cyclone “Tamara”, which hit the region on the 15th of May, precipitated extreme heavy rainfall. Approximately 25% of the areas average annual rainfall fell within a few days. The subsequent floods affected several river basins in the region and resulted in unprecedented damage to assets and human life[1].

Flash floods from tributaries, and landslides due to saturated soil, destroyed houses and infrastructure, while gradual and persistent flooding along the River Sava affected large portions of urban area and agricultural land. Thirty-eight municipalities (with a population of 1.6 million) were affected in Serbia. 32 thousand inhabitants were evacuated – 24 thousand from the City of Obrenovac alone – and 51 casualties were recorded. At the same time, in Bosnia-Herzegovina, flooding and more than 3000 landslides affected over one million people, 25 casualties were reported and 75 thousand homes, in 46 municipalities, were affected.

The impact was disastrous: in Serbia alone, the total value of loss in production and assets was estimated to reach EUR 1.7 billion, about 3% of the gross domestic product. Furthermore, the disaster triggered an economic recession, partly due to the loss of jobs (some 50 thousand) and partly due to suspended production and, in consequence, macroeconomic indicators greatly worsened. Losses were concentrated in the productive sector (70%), agriculture, industry, mining and energy - the operation of two coalmines, essential to Serbia's electrical supply, had to be suspended - while social sectors, although badly affected, suffered relatively less damage (12%) to infrastructure. The human development index declined; the income of some 125,000 people fell below the poverty line. Estimates put the damage from the flood in Bosnia and Herzegovina at EUR 1.3

[1] In western, south-western, central and eastern Serbia: Sava, Tamnava, Kolubara, Jadar, Zapadna Morava, Velika Morava, Mlava and Pek. In Bosnia and Herzegovina the northern part of the Country, Republika Srpska was hit the most, while the Tuzla and Sarajevo region suffered too along rivers Sava Bosna, Vrbas, Drina and Sana.

billion, mostly due to extensive inundation of arable land, which ruined crops and destroyed livestock. Mines, the legacy of war, were displaced further aggravating the situation.

The extent of the disaster revealed just how vulnerable Serbia and Bosnia and Herzegovina (BiH) were and emphasised the need to strengthen flood control/management systems, forecasting and prevention, especially in relation to climate change. Although meteorologists issued warnings on the expected weather conditions, the municipalities were not able to foresee what height water levels would reach, or the speed with which this would occur, and the order to evacuate was issued too late. It could be argued that conditions were aggravated because defence system had not been upgraded in 25 years, flood ways were not adequately maintained, proper afforestation of drainage canals had been ignored, and therefore canals could not drain excess water.

Subsequent donor conference in July 2014

After the severe floods in the spring 2014, the EC hosted a Donors' Conference in Brussels on 16 July 2014 in order to mobilise support for BiH and Serbia. One of the follow-up actions was the organisation of a Regional Conference to strengthen policy on flood prevention and flood risk management in the WB. During the conference, on 24 November 2014, an inventory of flood management initiatives in the region was presented.

Based on a common understanding of investment needs required to prevent and/or deal with floods in the region, and the implementation of the EU's FD, the EC ordered an analysis on the status of flood management in general, and specifically on the status of implementation of the FD in the WB countries. It was decided that a gap analysis should be presented at a follow-up meeting in 2015, planned for the end of September.

Developing further the work initiated in the inventory, this comprehensive analysis was to:

- provide a list of flood risk management tools (flood hazard and risk maps, hydraulic models, early warning systems, etc.) and flood prevention structures within the region;
- assess the requirements for sound flood risk management including, but not limited to, the implementation of the Water Framework Directive (WFD) and FD;
- implement a gap analysis to determine what investment is required at municipal, national and regional level;
- identify "no-regret" investments and high priority measures, which address hot spot areas, communities and infrastructure that are particularly vulnerable, yet do not have impacts downstream or upstream. Investments and measures which may have greater impact would require a more comprehensive analysis;

- convert these investments and measures into a feasible, multi-annual investment, with a prioritisation schedule tailored to suit each Country and associated with likely means of financing (including national and international resources, as well as private sector resources); and

- prepare an investment and capacity/governance building plan, which take in account available financing and includes a "prioritisation" ranking, specific to the EU's WFD and FD.

This analysis was also intended to facilitate IPA programming and financial support from International Financial Institutions and International Organisations involved in flood-related assistance.

Context revision

As recognised by the Country stakeholders and by the EC, some limitations were introduced to the study. The reasons behind these were the limited availability of data for specific investments, the ongoing processes of the development of national strategies and the definition specific projects. It has been agreed by all parties that investment strategies and plans, especially long term ones, can be developed only after the assessment of flood hazards and risks on the national level and the proposed plans are approved by all central and local governmental bodies. Due to its time frame and resources, this study could not assist the countries in such processes.

Therefore, the scope of the study is limited as follows:

- requirements for sound flood risk management were broadly defined and the study focused on the institutional framework for implementation of the FD,
- information for identification of the investments on various spatial levels have been analysed in relation to the measures and projects identified by the stakeholders, and
- non-structural measures proposed by the Consultant concerning the implementation of the FD were scheduled and structural measures were prioritised.

General objective

The general objective of this assignment is to enhance the capacity of the WB in flood risk management and flood prevention and to ensure compliance with relevant European Union legislation, in particular, the FD. The legal framework, including the FD, the WFD, directives related to nature conservation issues and the European climate policy, is presented in detail in Annex 1.

Specific objective

The specific objectives of this project are to:

- assess the gaps between the FD and its current status of implementation in the WB,
- identify the needs of the WB countries in the process of approximation to the FD,
- define measures and specific projects that need to be implemented in order for the WB countries to fulfil the FD's requirements in a reasonable timeframe, and

- identify so-called “no-regret” measures that are reasonably mature and thus can start to be implemented within a few years.

Aim of this report

This report aims to present the findings of the assessment of the implementation of the FD and the proposed non-structural and structural measures. It covers the assessment of the status of the implementation of the FD. The report gives a comprehensive picture on the steps of the implementation and analyses the countries’ status in regards to the institutional framework and the collected information on the proposed non-structural measures. After the analysis of the situation, the necessary steps to comply with the FD are identified. The report focuses on non-structural measures, which are proposed by either the project team or the Country stakeholders, and aim at developing the institutional framework of flood management.

The report deals with structural measures that have been defined by the Country stakeholders and that are of the highest relevance. It has to be noted that these structural measures cannot be considered as an outcome of the implementation of the FD, as they were defined before preparing the flood risk maps and they do not necessarily represent the official standpoint of the WB countries. These measures are those that have been identified in the Country stakeholders to deal with the most urgent problems related to floods and the flood protection infrastructure. The analysis of the measures focuses on project maturity, funding issues, regional connectivity and the nature of the projects concerning their potentials in easing flood related problems at this moment. These are the projects that are considered “no-regret” prior to the implementation of the FD.

This report gives a regional overview of the results. Detailed country specific information is found in the appendices and in the reports for Albania, BiH, Kosovo*, the former Yugoslav Republic of Macedonia, Montenegro and Serbia.

1.2 Regional background

River basins and topography

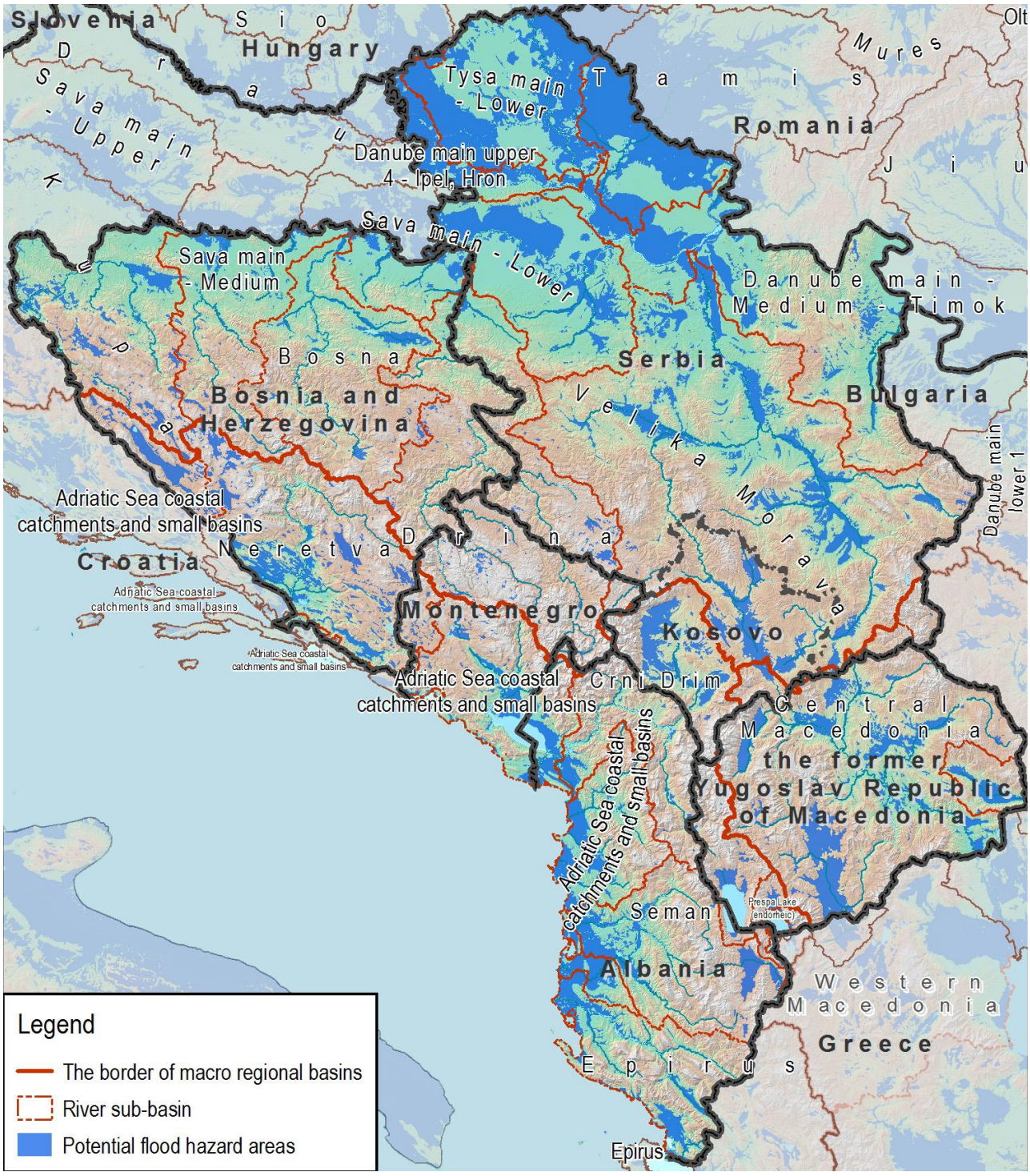
The topography of the WB Region is fundamentally determined by the Basin of the Danube River and its tributaries. Whereas the area of the WB mainly belongs to the catchment of the Danube, the southern and the south-western rivers discharge to the Adriatic Sea.

The Adriatic catchments concern Albania, Kosovo, the former Yugoslav Republic of Macedonia, Montenegro and Bosnia and Herzegovina. The characteristics of the topography range from the fairly large plains of the Danube, the Sava and the Tisa in the North to hilly and mountainous regions of the Dinaric Alps, often characterised by steep slopes with low vegetation, occasionally with narrow riverbeds and relatively large basins. The southern strip of shore of the Adriatic (typically in Albania) consists of fluvial lowlands. The large flatlands, and the extreme variations in the terrain and the river network, mean that large areas in the region are prone to flooding, to a varying degree.

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244 and the ICJ Opinion on the Kosovo declaration of independence.

The Sava River, as the largest tributary of the Danube, with a catchment area of over 97,000 km^2, flows through Croatia and Bosnia and Herzegovina and then discharges into the Danube, in Serbia. (Figure 1).

Figure 1 *The terrain, the main rivers and their river basins in the WB*



Source: European catchments and Rivers network system (ECRINS), EU-DEM, Consultant's contribution

Land cover

The characteristics of land cover are of primarily importance in investigating flood related issues. For this study, a GIS model has been set up for presentation and evaluation. Figure 2, below, shows the land use according to the CORINE 2006

database and the specific hydrological models developed for this study respectively.

The detailed methodology of the preparation of the maps and the assessment of projects is presented in Annex 2.

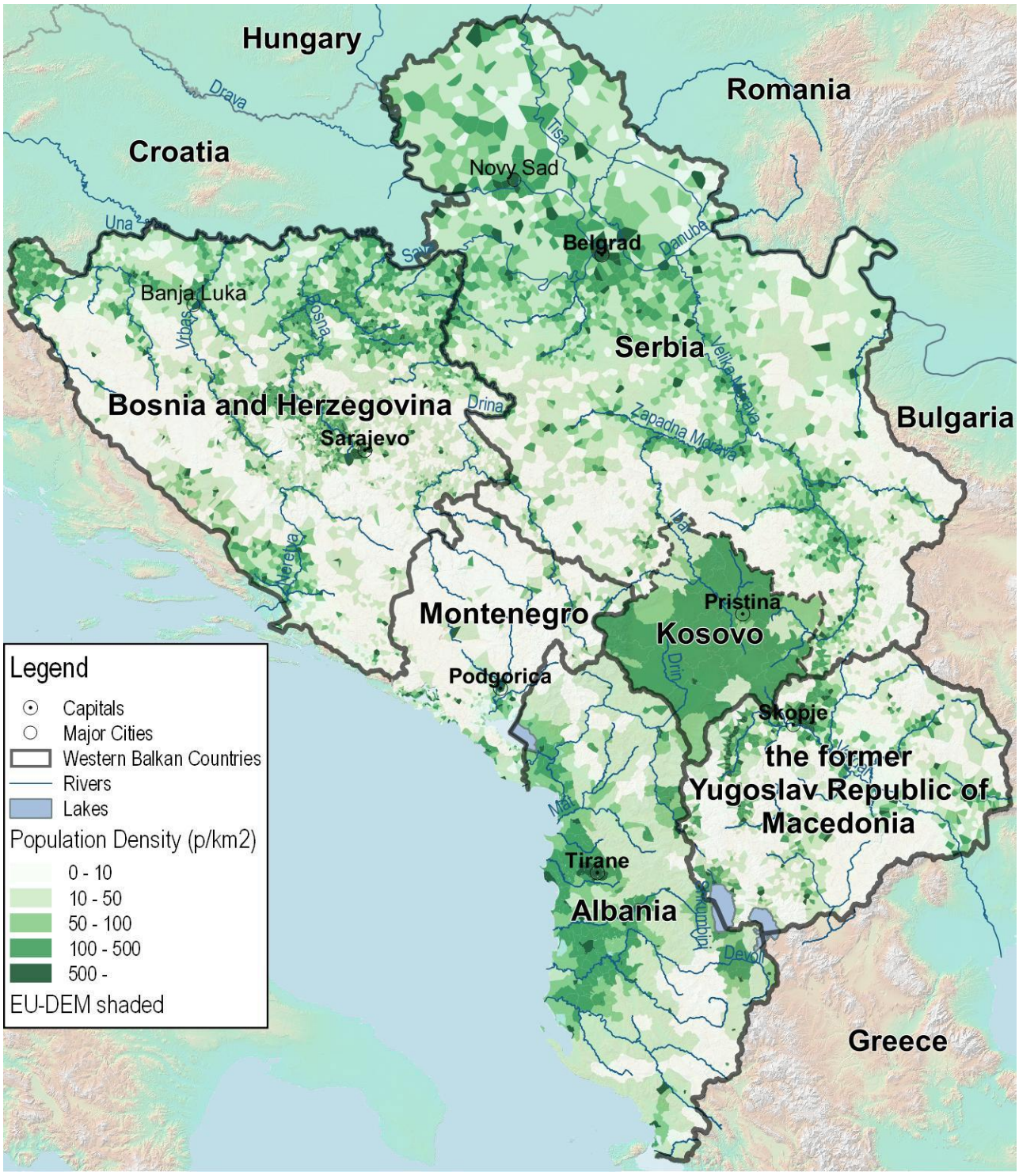
Figure 2 *Land use in WB*

Source: Consultant's drawing, based on CORINE

Population data

Most of the population data used in the study is based on the administrative units of municipalities, as no detailed population data for the settlements were available. The map of population density can be seen in Figure 3.

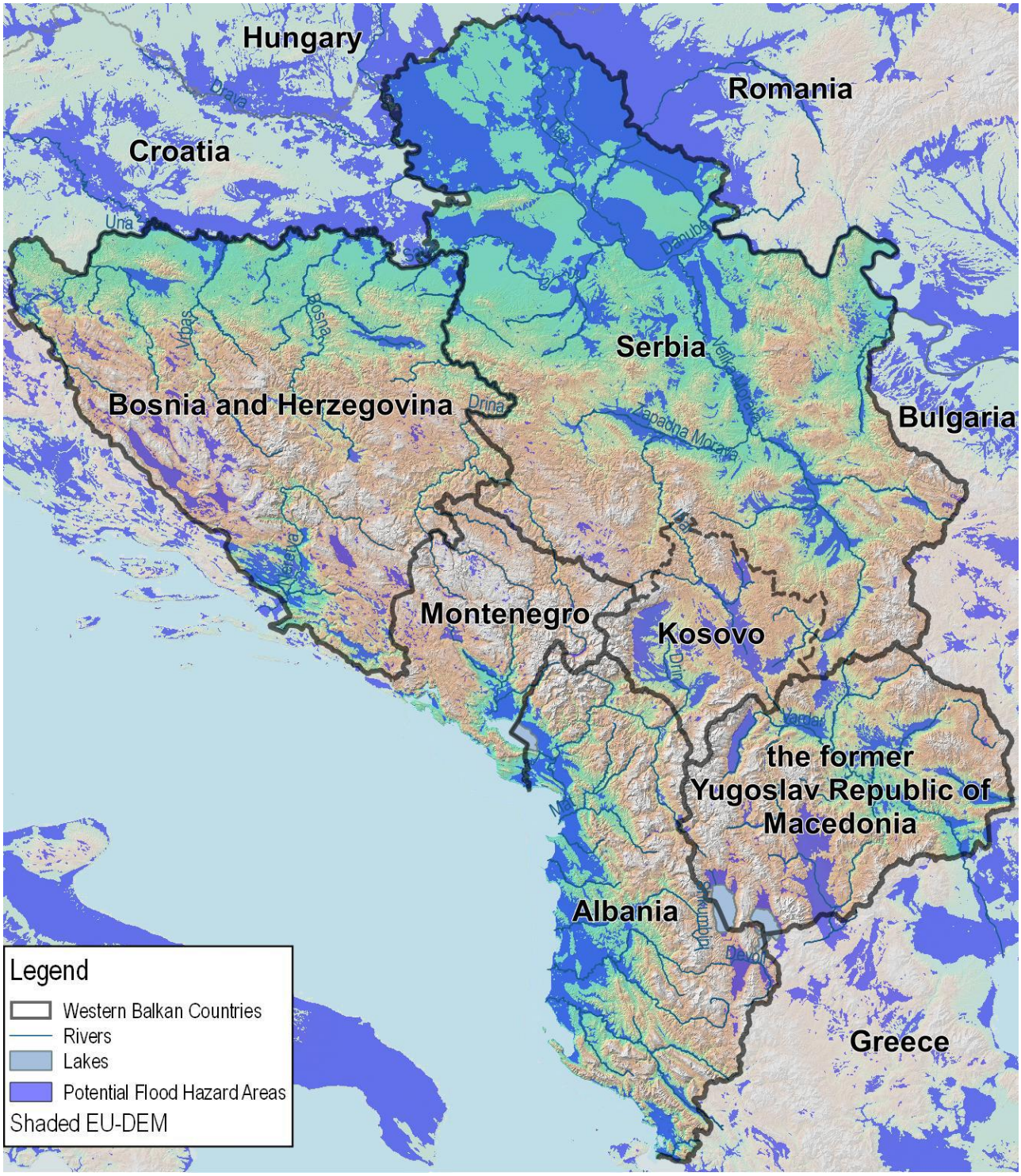
Figure 3 Population density



Source: Consultants drawing based on data from Statistical Bureaus

Figure 4 below shows the potential flood hazard areas as defined through the application of a set of hydraulic modelling tool specifically for this study (for details on modelling, see Appendix 2).

Figure 4 *Potential flood hazard areas in WB*



Source: Consultants drawing, based on EUDEM

Flood events

The occurrence of floods and flooding over the past five years has shown the importance of regional flood control and sustainable water management. The frequency and extent of severe floods along Danube and Sava Rivers and their main tributaries (for example the Drina in Bosnia and Herzegovina and the Kolubara in Serbia) justify the growing concern for human life, homes, heritage and the environment.

The geomorphological characteristics, hydrological features of the watercourses and geotechnical formation, (for example saturated soil conditions during heavy rains, steep and bare hillsides, ravines, gullies, etc.), in some areas of the WB, such as in Albania, the former Yugoslav Republic of Macedonia and Montenegro, can precipitate devastating flash floods following torrential rainfall. There is potentially, significant flood risk throughout the region, especially in highly populated areas. Kosovo, on the other hand, due to its topography and the characteristics its terrain, could experience a different form of flooding, such as flash floods in hilly areas, major lowland flooding and even “dam-failure” situations (breakage or leakage due to the operational structure and locks failing to support increased water pressure, earthquakes, landslides or rock falls), which could result in major flood damage

Albania, BiH and Serbia appear to be the most vulnerable countries in the WB Region. They have been most affected and suffered most damage over the past five years. If floods can occur at any time of the year, the region is nevertheless most severely affected during the spring due to increased rainfall and melting snow.

Table 1 below shows the major flood events of the past five years. Floods have been characterized by the following categories: extreme, severe and moderate impact. The impact of floods and torrents has been classified, according to colour, as extreme, severe and moderate, based on the area and population affected. The affected rivers and severely hit municipalities are presented in the table below, which includes data on the damage.

Table 1 Major flood events in the WB, 2010-1015

Date	Affected areas, municipalities	Extent of damage	Flood impact rating
Albania			
Jan. 2010	Shkodra, Lezhë and Durrës.	10,000 hectares flooded, over 5,000 people evacuated, 2,200 houses damaged	severe
Nov-Dec. 2010	Drin and Mati River Deltas Ulza and Shkopeti reservoirs	15,000 people evacuated, 6,000 km^2 land flooded, 4,800 houses flooded	severe
Nov. 2014	Tirana, Lezhë, Shkodër and Fier	11,000 people evacuated, 3 people died, 7500 houses damaged	severe
Feb. 2015	Vlora and Fier, Berat, Elbasan and Gjirokaster Rivers Vjosa, Devoll, Osu, Seman	42,000 people affected	severe
Bosnia and Herzegovina			
Dec. 2010	Drina River catchment, Municipalities of Bosanska Krupa, Domaljevac-Šamac, Orašje, Tuzla, Maglaj , Goražde, Foča-Ustikolina, Pale-Prača, Ravno, Čitluk, Čapljina, Stolac, Mostar, Trnovo, Ilidža, Novi Grad, Tomislavgrad, Drvar, Trebinje, Bileća, Nevesinje, Foča, Novo Goražde, Bratunac, Zvornik, Bijeljina	20,000 people affected, 5,000 houses flooded, 6,000 people evacuated	severe
May 2014	Sava tributaries: Una, Sana, Vrbas, Vrbanja, Bosna and Drina and Sava River at Raca	Nearly 15% of GDP lost, 13,200 km^2 flooded, over 1 million people in 46 municipalities affected, 25 lives lost	extreme

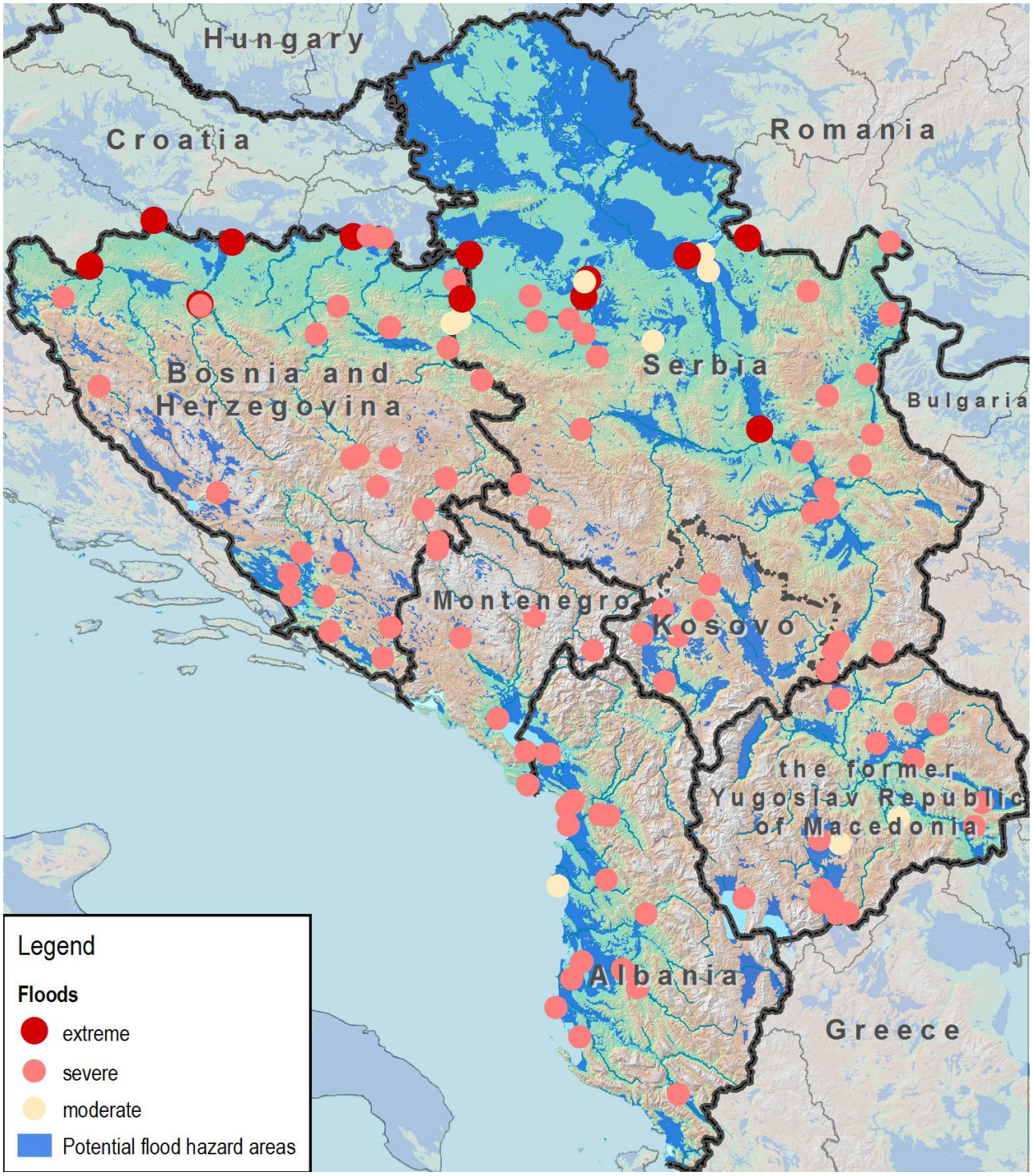
Date	Affected areas, municipalities	Extent of damage	Flood impact rating
Aug. 2014	Northern and Western Bosnia and Herzegovina. All areas along the Sava, Sava tributaries: Una, Vrbas, Stira, Banja Luka, Gracanica, Tuzla, Foka, Visegrad, Banja Koviljaca, Loznica, Kragujevac, Cacak, Zvornik, Zepce, Lukavac, Zenica	Some 200 homes evacuated	severe
Kosovo			
March 2013	Municipalities of Klina/ Klina, Skenderaj/Srbica, Peja/Pec, Istog/ Istok, Kamenice/Kamenica, Gjakova/Djakovica, and Mitrovice/Mitrovica. Rivers Drini I Bardhe, Klina, Bistrica and Lushta	Flash floods several towns flooded. Water supply shortages	moderate
the former Yugoslav Republic of Macedonia			
Feb. 2013	River Kojnarka Kumanovo, Shtip, Sveti Nikole, Strumica, Valandovo, Ohrid, Probishtip and Kochani	Approximately 6,000 people affected	severe
Jan-Feb. 2015	Eastern region: River Crna - Region of Bitola Municipalities of Mogila, Novaci and Bitola	Over 100,000 people affected	severe
Feb. 2015	Southern and central parts of the country	100,000 people affected	severe
March 2015	Municipalities of Kavadarci, Prilep and Kumanovo Northern and central parts of the Country	Agricultural lands affected	moderate
Montenegro			
Dec. 2010	Whole of Montenegro to various extents Rivers Lim, Tara, Moraca, Drina tributaries and Bojana Lakes Skadar, Piva and in Niksic area	21 municipalities affected, 1.49% of GDP equalling to MEUR 43 lost	severe
July 2014	Central and South-Montenegro	Landslides, roads blocked	moderate
Serbia			
Feb. 2010	Eastern and central parts of Serbia: Zajecar, Aleksinac, Pozega and Knjazevac, Negotin, Svrljig Boljevac; Merosina, Doljevac, Koceljeva, Ub, Lajkovac, Ljig, Vladimirci, Zitoradja, Priboj and Prijepolje	1,306 households damaged, more than 3,150 people affected	severe
June 2010	Kolubara	135 households affected, over 2000 ha flooded	moderate
Sep. 2014	Eastern Serbia municipalities of Kladovo, Majdanpek and Negotin	Approximately 7,000 people affected	severe
Feb. 2013	Pčinja District of southern Serbia Bujanovac, Preševo, Trgovište, Istog, Kliné, Dakovica, Pec, Skénderaj, Kosovska Mitrovica	Approximately 3,500 people affected, 181 families evacuated	severe
May 2014	Western, South-western, central and Eastern Serbia: Sava, Tamnava, Kolubara, Jadar, Zapadna Morava, Velika Morava, Mlava and Pek at Beli Brod on the tributary river Kolubara - Obrenovac	EUR 1,525 million lost equal to about 3% of the GDP, 9,100 km^2 and 38 municipalities/cities affected, 1.6 million people affected, 51 lives lost	extreme
July 2014	Central Serbia, municipalities of Kostolac and Pozarevac, Topola	Power plant shot down	moderate
Aug. 2014	Western Serbia River Stira Cities of Loznica, Banja Koviljaca	100 homes flooded	moderate

Source: Various: Danube River Basin District: flood events in 2010 (ICPDR flood report 2010), FloodList, ReliefWeb, International Federation of Red Cross and Red Crescent Societies

Figure 5 shows the most devastating flood events of the past five years. The severity of the floods is indicated by different colour dots in the map. It can be concluded that plains and relatively narrow valleys in the hilly and mountainous regions are those areas most exposed to flooding. The impact of the floods through

damage caused to human health and the economy is greater on the floodplains and at lower river sections, where towns, industrial areas and farmlands are concentrated. Concerning the flood periods, it can be seen that floods can occur at any time of the year, but the most severe ones hit in the spring.

Figure 5 *The flood history of 2010-2015 in the WB*



Source: *Various: Danube River Basin District: flood events in 2010 (ICPDR flood report 2010), FloodList, ReliefWeb, International Federation of Red Cross and Red Crescent Societies*

Flood risk and climate change

The WB countries are more and more exposed to the impact of climate change. They are experiencing increased periods of extreme heat in the summer months and increased rainfall during the cooler seasons. According to long-term projections, the average annual temperature will increase by 2° C to 3° C by 2050 and precipitation will decrease in the summer, resulting in longer dry periods followed by more sudden heavy rainfalls[2]. This combination increases the likelihood of floods as well as their destructive nature whilst decreasing the region's capacity to react to these floods. In short, floods, which already constitute the most common natural disaster in the region, are increasing their risk.

Historical flood data from the WB[3] indeed suggests a more frequent occurrence of flood events, characterised by more extreme and more rapid increase in water levels, attributed to an uneven distribution of precipitation and torrential rain, and this particularly over the last decade. More and larger areas and, therefore, a greater population are being affected by flooding with a strong impact on national economies. This calls for increased international collaboration in river basin and flood management and sound adaptation measures as a focus area of sustainable water management.

In addition to climate change trends, flood events are also aggravated by environmental degradation factors, such as continued pollution, inappropriate waste management and sewage treatment, badly managed urbanisation or careless land use. Thus, initiatives to deal with extreme water levels and more effective safety measures in these areas of the WB should be initiated and increased. In addition to controlling the flow of major rivers and torrents, lands, which tend to become inundated, should be considered and managed as water retention areas, thereby creating a means to save scarce water resources in those areas where annual precipitation is expected to decrease. Land use planning intending to prevent deforestation or overgrazing should, for example, focus on vegetation and crops with enhanced resilience and the ability to survive low flow periods in order to reduce flood damage.

1.3 Secondary outputs

Compiled databases

Besides the regional gap analysis and needs assessment, its executive summary and six Country Reports, which are the main outputs of this study, two databases containing all the collected projects were created: one for structural and another for non-structural measures. Both databases, made available to the EC, consist of the data collection sheets, the compiled database, analytical sections for various assessments and output tables.

Maps

Maps were created to facilitate project assessment and for presenting the results. The following digital maps were prepared:

- 3D Terrain, using the EUDEM raster database on elevation

[2] http://www.climateadaptation.eu/

[3] Sources of the historical data are the same as indicated for Figure 1.

- Potential flood hazard areas; derived from the 3D elevation model using hydraulic calculations
- Land use; using the CORINE 2006 database for Europe
- Population density; data was used as published by the national statistical bureaus

The maps were prepared in two formats:

- A4 size maps to be inserted in the text to support the presentation of the results
- A2 size maps for detailed overview of the planned structural projects and their socio-economic environment (in the scale of 1:500,000 in the case of the Albania, Kosovo, the former Yugoslav Republic of Macedonia and Montenegro; and in the scale of 1:1,000,000 in the case of BiH and Serbia; maps are made available in digital format with the final submission)

Maps were created separately for all countries and on regional level. In the case of BiH and Serbia, due to the size of the countries, the maps were presented in numerous sections to make the results more visible (see the Country reports in Annexes 3-8).

2 Analysis of Policy Measures

2.1 Requirements of the Floods Directive [4] and the Water Framework Directive

Administrative arrangements

The administrative requirements in the FD implementation are built on the arrangements in the WFD. Besides setting up competent authorities, their responsibilities, tasks and their institutional frameworks should be developed to ensure efficient functioning.

The base unit of flood management is the flood basin. Flood basin definitions must be harmonized with the river basins. Competent authorities for FD implementation can coincide with those of the WFD but it can be a different set of organisations. These institutional choices must be made early in the implementation process.

Monitoring and early warning systems

Establishing, operating and managing the early warning and monitoring systems, and setting up rules of data exchange are major pillars of the administrative framework of flood management. The international dimensions are important to be emphasised for a more effective system with focus on the sharing of data with the international meteorological organisations (such as the European Meteorological Society, EMS, or the Network of European Meteorological Services, EUMETNET), as well as the neighbouring countries.

Early warning systems (EWS) serve the primarily goal of flood prevention, they give information on the expected hydro-meteorological conditions and the expected flood situation of a certain area. The early warning systems operate with historical and real time hydro-meteorological data, meteorological and hydraulic models requiring advanced data management and computing capacities from both the infrastructural and the human aspects.

Preparation of Preliminary Flood Risk Assessment (FD Art. 4.)

Based on available or readily derivable information, such as records and studies on long-term developments, in particular impacts of climate change on the occurrence of floods, a preliminary flood risk assessment (PFRA) shall be undertaken to provide an assessment of potential risks.

Based on a preliminary flood risk assessment, the countries shall, for each river basin district or unit of management or portion of an international river basin district lying within their territory identify those areas for which they conclude that potential significant flood risks exist or might be considered likely to occur. (FD Art. 5(1)) Coordination with other states is necessary in the case of international river basins (FD Art. 5(2).)

Preparation of Flood Hazard and Risk Maps (FD Art. 6)

The countries applying the FD prepare flood hazard maps (FHM) and flood risk maps (FRM) at the level of the river basin district. In the maps, the flood extent, and water depths or water level, as appropriate, and water velocity shall be presented for different flood scenarios and probabilities.

[4] The text defining the task here is identical to that in the Directive 2007/60/EC (Floods Directive)

FRM show the potential adverse consequences associated with flood scenarios. The starting point for the FRM is the probability of flooding shown in the FHM. The FRM presents the expected monetary value of the flood damage under the flood scenarios defined for FHM.

Preparation of Flood Risk Management Plans (FD Art. 7)

Based on the maps referred to in the Directive, the countries applying the Directive establish flood risk management plans (FRMP) coordinated at the level of the river basin district, or unit of management.

Countries define appropriate objectives for the management of flood risk, focusing on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity, and, if considered appropriate, on non-structural initiatives and/or on the reduction of the likelihood of flooding (FD Art. 7(2)).

FRMPs shall take into account relevant aspects such as costs and benefits, flood extent, flood conveyance routes and areas having the potential to retain floodwater. The environmental objectives of Article 4 of Directive 2000/60/EC, soil and water management, spatial planning, land use, nature conservation, navigation aspects and port infrastructure (FD Art. 7(3) and Annex) should be considered.

The preparation of flood hazard and risk maps as well as flood management plans for areas, which are shared with other countries, shall be subjected to prior exchange of information between the countries concerned. This can be done either by direct bilateral consultations or through the existing regional flood and water management platforms.

The legal framework is presented in detail in Annex 1. Tools for the development of flood hazard and risk maps are presented in Annex 2.

2.2 Organisational background in WB countries

The specific arrangements for the institutional setting of flood management lie within the powers of the countries implementing the water related directives.

Albania

The organisational background of flood management in Albania is established and the structure reflects the requirements of the WFD and the FD. The functioning of the organisation is, however, problematic due to some overlaps in responsibilities. For example, land use planning is the concern of three ministries: the Ministry of Agriculture, Rural Development and Water Administration (MoARDWA), the Ministry of Environment (MoE) and the Ministry of Interior (MoI) as well as the prefectures and municipalities (under the MoI). The Hydro-meteorological Institute is affiliated to the Ministry of Education and the operation of the dams is under the responsibility of the Ministry of Economy, Trade and Energy. The fragmentation of the responsibilities leads to inefficient use of resources and the decrease of the overall efficiency of the flood management system.

Bosnia and Herzegovina

The institutional background of flood management in BiH is not fully aligned with the EU Directives. There are established authorities for flood management in all

entities. However, the fragmentation of the system is a major bottleneck in efficient operation. Water management as well as flood management in BiH, in accordance with the Constitution, is managed by entities and regulated in detail by the laws and bylaws of the entities. Consequently, the institutional setting is fragmented at the country level stemming from the constitutional setting of the Country. Changing this requires a common understanding and approval of all legal entities.

The Law on Protection and Rescue in Emergency Situations of the Republika Srpska and Framework law on protection and rescue of people and material goods from natural and other disasters in BiH clearly define the role of all stakeholders in the system of protection and rescue on the state and entity level, and regulates this area with high quality.

The Consultant considers that in BiH the state level institutional structure for water management and flood management is complicated. This situation results in a longer and more complicated preparation and approval process for any national strategic document to be adopted. Moreover, the differences between the institutional frameworks of two entities are setting back the possibilities of common funding of flood development.

There is vertical delegation of tasks to regional or branch offices with several levels of organisation in Federation of BiH (FBiH) and Republika Srpska (RS), while such a regional delegation of responsibilities is not required in Brčko District given its size and position. Theoretically this approach ensures efficient management based on local competence, but only when provided funds e.g. from water charges are allocated according to the actual needs. However, there is an unclear share of responsibilities, which needs to be eliminated by improved legislation.

The new Water Law is being finalised in the Brčko District, so these ongoing developments of the legal framework will require changes in the existing legislation at many points, such as bylaws on flood and water management.

the former Yugoslav Republic of Macedonia

The organisational background of flood management in the former Yugoslav Republic of Macedonia is established in general, and the structure reflects the requirements of the WFD and the FD. The functioning of the organisation is, however, problematic due to some overlaps in responsibilities, e.g., the competences of the Ministry of Agriculture, Forestry and Water Economy and that of the Ministry of Environment and Physical Planning are not clearly differentiated. The efficiency of the involvement of water management organisations at sub-basin and local levels has to be ensured by close coordination and enhancement of their capacities. The fragmentation of the responsibilities is a problem that decreases the efficiency of the flood and water management.

Kosovo

The organisational background of flood management in Kosovo is established. The structure reflects the requirements of the WFD and the FD. The organisational structure of policy formulation is co-ordinated at the central government level by the Inter-ministerial Water Council (IMWC), whereas the management of emergencies lies with the Ministry of Internal Affairs. However, some fragmentation of the responsibilities exists, for example concerning the Ministry of Internal Affairs and the Ministry of Local Government Administration. The management

responsibility of hydropower stations are under the Ministry of Economic Development. The fragmentation of the responsibilities can result in an inefficient use of resources and decrease the overall efficiency of the flood management system even though, as experience during the floods shows, there is good co-operation among the stakeholders.

The structure needs to be further developed with particular emphasis on the territorial water and flood management bodies under the Ministry of Environment and Spatial Planning. The River Basin Management Authorities are being set up. However, most of them lack sufficient staff and technical capacity.

Montenegro

The organisational background of flood management in Montenegro is established, the structure reflects the requirements of the WFD and the FD. Some elements of the organisational background need improvements due to the overlap in responsibilities. The monitoring system is managed by the Institute of Hydro-meteorology and Seismology under the Ministry of Sustainable Development and Tourism, whereas water management issues are handled at the Water Management Department in the Ministry of Agriculture and Rural Development. The involvement of the two ministries in the matter of water management creates fragmentation of the responsibilities the use of resources and the functioning of the flood management system may turn inefficient.

Serbia

The organisational background of flood management in the Republic of Serbia is established and the structure complies with the requirements of the WFD and the FD. Although there are overlaps in responsibilities concerning the Directorate for Water and the Sector for Emergency Management, the two organisations co-operate adequately and they share data and information. The operation of the dams is under the responsibility of the several subsidiaries of the state-owned power utility, Elektroprivreda Srbije (EPS). In spite of a few problems, the organisational structure, as of today, is solid, has established its own culture and is capable to perform the everyday tasks of flood management. Full adaptation of the flood risk management approach within flood management is constrained by the insufficient number of experienced experts in that area.

2.3 Level of implementation of Floods Directive

Table 2 and Table 3 summarise the WB Countries' status in terms of the strategic background and the transposition of the legislation on flood management.

Table 2 Strategic and organisational background of the flood management

Country	Strategy and institutions related to flood management	
	Overall assessment	Comment
Albania	Basic requirements are met, further detailing of tasks is needed	Institutional background set up, with a strong central co-ordination under the Prime Minister's Office National strategy on water management exists with chapters on flood management
BiH	Basic requirements are met, substantial variations among entities	Organisational and strategic framework exists at all levels (state, entities and Brčko District), Brčko District being the relatively less developed. The institutional setting is defined in the Constitution of BiH. Fragmentation of the institutions is a major problem influencing the efficiency of flood management. (Consultant's assessment) A Directive Specific Investment Plan for FD has been drafted, but needs to be finalised by competent institutions and then adopted by all levels of authority. PFRA for two entities are completed, preparation of FHM and FRM and management plans at state level are planned and finance secured. Federal Water Management Strategy exists. Strategy of integral water management of RS is prepared but not adopted yet. Action Plan for flood management exist
Kosovo	Basic requirements are met, further detailing of tasks is needed	Strong central water and flood management organisation in place. Water basin authorities are being established, but with a severe lack of resources. Strategy on water management containing chapters on flood issues.
the former Yugoslav Republic of Macedonia	Basic requirements are met, further detailing of tasks is needed	Clear, though fragmented, organisational setup with water basin management authorities. Flood management issues are incorporated into the water strategy, the national security strategy and in the National Development Programme for Agriculture, concerning farming on the flood ways.
Montenegro	Basic requirements are met, further detailing of tasks is needed	Clear, though fragmented, organisational setup with water basin management authorities. Strategy on water management exists but is outdated. New strategy is to be developed after new legislation on waters adopted.
Serbia	Basic requirements are met, further detailing of tasks is ongoing	Traditionally strong organisational framework, strong central co-ordinating body in operation. Strategies exist. New strategies and FD Implementation Plan are under preparation. Action Plan for Flood Management is being adopted.

Source: Consultant's assessment, ECRAN report, 2014, autumn

Table 3 Legal background of the implementation process

Country	Legal framework in line with the FD		
	Overall assessment	*ECRAN*	*Comment*
Albania	Legal framework is in place or under preparation	73%	Law on waters includes chapters on flood management. New law on irrigation and drainage including flood management tools, and law civil protection are under preparation. No sufficient legislation on land use. **Full transposition of the FD was planned by 2014.**
BiH	Legal framework in place	71%	Legislation is organised on entity basis creating countrywide variations. Legislation on water management and the harmful effects of waters covers flood management. **No legislative plans available for achieving full transposition.**
Kosovo	Limited legislation in place	12%	New Law on Waters covers flood management themes. **The date of full transposition of the FD is not determined yet.**
the former Yugoslav Republic of Macedonia	Limited legislation in place	14%	Law on Waters and Law on Emergency Situations include chapters on flood management. **Planned date for achieving full transposition is end of 2018.**
Montenegro	Basic legal framework is in place	52%	New law on water fully complying with the Floods Directive is being adopted. **The date of full transposition was planned as 2015, but postponed to 2016.**
Serbia	Legal framework is in place, new pieces under preparation	71%	Legislation exists, the new law on waters fully complying with the Floods Directive is under preparation/adoption. **The date of full transposition of the FD is being defined.**

Source: Consultant's assessment, ECRAN report, 2014, autumn

It can be concluded from Table 2 and Table 3, that implementation status in the WB countries is not homogeneous. In general, flood issues are, in a broader context, incorporated into water and emergency management plans. BiH is the only country that has an implementation plan that is coherent with the FD, although the document has not yet been adopted[5]. This means that flood management receives varying and, in some cases, limited attention. It is not specifically addressed in the strategic framework plans and legislation is often not in place. Furthermore, only two countries (BiH and Serbia) have incorporated the FD approach into their flood management plan. The others have just begun defining the actions necessary to implement the FD. The situation seems even less favourable when one looks at interrelated legislation, local regulations and emergency plans. Legislation on land use and waste management is either under revision or under preparation or the level of enforcement is insufficient. This merely increases the difficulty in addressing flood hazards and hinders the implementation of the FD and the management of floods.

The country most advanced in the process, as reported by ECRAN and as shown by the assessment, is BiH. Its 2017 target for completing the implementation process does, nonetheless, seem rather ambitious. The targets, in general, are challenging and will require considerable resources and hard work, if they are to be achieved.

Human resources

Lack of human capacity and skills are common problems in all countries to various levels, BiH and Serbia being in a relatively better position. At the various organisations involved in flood management, the number of employees with sufficient qualifications is less than necessary. Strengthening human capacity and the knowledge base for institutions is critical in flood management and risk mapping. Improving human capacity in the public sector responsible for flood management and dissemination of information for local people / farmers are at high priority for eliminating these problems.

2.4 Implementation gaps

This section presents the gaps in the WB countries on the implementation of the requirements of the FD; the backgrounds of these analyses are presented in Sections 2.1, 2.2 and 2.3 and in the relevant Country Reports (Annexes 3 to 8).

2.4.1 Gap analysis on the legislative and organisational requirements of Floods Directive

The implementation statuses of FD in the WB countries are classified in three main and two sub-categories as follows:

- **Existing**: The activities in the implementation process are aligned with the FD, and mainly or partly are finished. Activities that are not in line with the FD are excluded from this category. It has to be noted though, that there have been

[5] EnvIS Bosnia and Herzegovina; http://www.envis.ba

several initiatives and completed projects to cover some elements of the implementation of the FD (for example preparation of FRM, hydraulic studies, pilot projects for flood management plans, etc.) but they cannot be considered being in line with the Directive, as they did not follow the defined methodology.

- **In progress**: Activities in line with the FD are in progress.
- **To be developed**: No or not substantial activity has been carried out yet concerning the specific element of the implementation.

Albania

Based on the above the following implementation status of institutional background related to FD can be observed in Albania (Table 4):

Table 4 Implementation status of institutional background related to FD in Albania

Major steps in the implementation process	Exist	In progress	To be developed
Legal framework	√	√	√
Institutional framework			
• ***Efficient organisational framework***		√	√
• ***Sufficient early warning system***	√		√
• ***Sufficient monitoring system***	√		√
Preliminary Flood Risk Assessment			√
Flood Hazard Maps			√
Flood Risk Maps			√
Flood Management Plans			√

Legend: √: mainly completed; √ partly completed
Source: Consultants' assessment based on the country interviews

If the ongoing and/or completed activities, pilot projects, and initiatives are considered, although these are not fully in line with the requirements of the FD implementation, it can be concluded that considerable work has been done and experience gathered related to the Directive.

These initiatives are usually financed by international donor organisations, such as the Deutsche Gesellschaft für Internationale Zusammenarbeit (German Institute for International Cooperation – GIZ) or the World Bank. These studies include important elements, such as preparation of flood hazard and risk maps and management plans based on historical data, or hydraulic studies for the most threatened river basins, such as the Drin.

The legal framework of flood management in Albania is aligned with the FD. However, in some related legislation considerable work has still to be done. The new Law on Civil Protection and new Law on Irrigation and Drainage are under preparation. These ongoing developments on the legal framework will require changes in the existing legislation such as the clarification of the responsibilities of the local municipalities and bylaws on flood and water management.

The fragmented allocation of responsibilities increases the approval period for designs and plans. Reorganising these responsibilities to establish a strong background unit of the MoARDW to support data collection and sharing, flood and water management research and planning activities professionally might be a solution for eliminating this problem.

As the Ministry of Environment and the River Basin Agencies do not have their monitoring systems and access to data through contracts with other institutions (GEWE), the monitoring system is not sufficiently effective. Strengthening hydro-meteorological data collection procedures, related IT capacity and access to collected data by setting up a national organisation -hydro-meteorological service- might be a solution to this problem.

The early warning system is not working well, as the state of the available equipment, measuring stations and data management capacities is poor and the measuring stations are not regularly calibrated. Based on the territorial aspects of the country, improving the data exchange between the neighbouring countries should be in the focus of the development in the future.

Weak enforcement of legislation especially on use of flood ways and flood areas, farming, mining, waste management and property issues constitutes a major problem.

Bosnia and Herzegovina

The implementation status of institutional requirements of the FD in the country is described by the Consultant, as classified in the three main and two sub-categories as described above. The following implementation status can be observed in BiH (Table 5):

Table 5 Implementation status of institutional background related to FD in BiH[6]

Major steps in the implementation process	Exist	In progress	To be developed
Legal framework	√	√	√
Institutional framework			
• ***Efficient organisational framework***	√	√	√
• ***Sufficient early warning system***		√	√
• ***Sufficient monitoring system***		√	√
Preliminary Flood Risk Assessment	√		√
Flood Hazard Maps		√	
Flood Risk Maps		√	
Flood Management Plans			√

Source: Consultant's assessment based on the country interviews

Based on the above-described assessment on legal and institutional framework, identified problems and bottlenecks can be summarised as:

- Not all necessary legislation is in place yet to continue with implementation WFD and FD although it is developed and transposed to a significant level particularly in the FBiH and BD. In the BD, a new Water Law is being drafted in compliance with the EU directives and coherent with the legislation of entities. It is not yet adopted. The adoption must be followed by required changes in the existing legislation at many points, such as bylaws on flood and water management.

[6] *Legend: √ mainly completed; √ partly completed*

- The organisational set-up is fragmented between two entities and BD. There are several major gaps among authorities for flood management on different administrative units. As BD is a small administrative unit with a low budget, setting up a coherent and efficient organisational framework with a strong support of tools and powers to ensure the implementation of FD is a key issue. The close co-operation between all entities (and with neighbouring countries) is crucial.
- Monitoring systems and EWS exist or are under development in FBiH and RS, but further improvement is needed; no operational EWS or monitoring system are available in BD (existing stations are not functioning). Since the level of EWS and monitoring systems of entities and BD is different, establishing the system of data exchange between entities and BD will be difficult and not efficient before these systems are developed to a compatible level.
- Weak enforcement of legislation especially on use of flood ways and flood areas, construction, mining, waste management and property issues is a major problem. Having many illegally built houses and other structures even on main watercourses hampers the development of flood management assets. Identifying and adopting flood management, development and implementation of rules, tools and enforcement for environmental protection and land usage should be carefully undertaken.
- Finally, an efficient system for dissemination of information to local people / farmers needs to be established.

Kosovo

The following implementation status of the institutional background related to FD can be observed in Kosovo Table 6.

Table 6 Implementation status of institutional background related to FD in Kosovo

Major steps in the implementation process	Exist	In progress	To be developed
Legal framework	√		√
Institutional framework			
• ***Efficient organisational framework***		√	√
• ***Sufficient early warning system***			√
• ***Sufficient monitoring system***	√	√	√
Preliminary Flood Risk Assessment			√
Flood Hazard Maps			√
Flood Risk Maps			√
Flood Management Plans			√

Source: Consultants' assessment based on the country interviews

Through ongoing and/or completed activities, pilot projects and initiatives, which are not fully in line with the status of the FD implementation, considerable experience has been gathered related to the Directive. These initiatives are usually financed by international donor organisations and include preparation of FHM, FRM and FRMP based on available historical data, or hydraulic studies for the most threatened river basins, such as the Morava e Binces.

The legal framework of flood management in Kosovo is aligned with the FD. However, in some related legislation considerable work has still to be done. The relatively new Water Law adopted by the Parliament imposes changes related to

the flood management system through developing bylaws and rules. In spite of the financial problems and limited human capacity, the institutional framework can be considered solid and the necessary organisational structures exist. Setting up of the River Basin Management Authorities is in progress. However, they lack sufficient staff and technical capacity. Although the “Strategy on Water Management” exists in Kosovo, a specific strategic document on flood management is needed. The plan or strategic framework specific to flood management has to be considered to lay down the current situation and the principles to be applied in detail, including a scheduled plan for the implementation of the FD. This document can assist for the development of the institutional framework as well.

Although development of the monitoring systems to collect hydrologic and hydro-meteorological data is in progress, further assistance is needed for the full development of the systems. The early warning system in operation is critically underdeveloped with the exception of the Drin River Basin. The development of the system is planned.

Operation and maintenance of flood assets owned by the state does not work properly. Clear legal framework defining tasks, responsibilities and financial aspects of operation and maintenance of flood assets should be set up in order to avoid these problems.

the former Yugoslav Republic of Macedonia

In the former Yugoslav Republic of Macedonia, implementation status of institutional background related to FD is summarised in Table 7.

Table 7 *Implementation status of institutional background related to FD, the former Yugoslav Republic of Macedonia*

Major steps in the implementation process	Exist	In progress	To be developed
Legal framework	√		√
Institutional framework			
• ***Efficient organisational framework***	√		√
• ***Sufficient early warning system***	√		√
• ***Sufficient monitoring system***	√	√	√
Preliminary Flood Risk Assessment			√
Flood Hazard Maps			√
Flood Risk Maps			√
Flood Management Plans			√

Source: Consultants’ assessment based on the country interviews

Several pilot projects and initiatives have been initiated in the country, which are, however, not fully in line with FD. Considerable work has been done and financed by the international donor organisations, including preparation of pilot flood hazard and risk maps and management plans based on historical data and hydraulic studies for the most threatened river basins, such as the Strumica or Lake Prespa.

Although the institutional background of flood management in the former Yugoslav Republic of Macedonia is aligned with the EU Directives, still some legislative work

is required for detailing the rules and procedures to guide the activities related to the implementation of the FD.

Water quality monitoring exists in the country and is delegated to the HMS under the Ministry of Agriculture, Forestry and Water Economy (MoAFWE), but it is not in coherence with the requirements of the WFD although it complies with national legislation. The development of the monitoring systems to collect hydrologic and hydro-meteorological data is in progress. However further assistance is needed for the full development of the systems. Sedimentation issues are a priority and actions are needed to monitor this specific phenomenon. A relatively well-developed sub-system is in operation in the Drin River Basin

The early warning system in operation is critically underdeveloped with the recent exception of the Drin River Basin. There is an urgent need to establish a well operating system and to develop the necessary infrastructural background. Considering the territorial aspects of the country, the improvement of data exchange between the neighbouring countries should be the focus of the development in the future.

At various organisations involved in flood management, the number of employees with sufficient qualifications is less than necessary. Strengthening the human capacity and knowledge base for institutions is critical in flood management and risk mapping. Improving human capacity in the public sector responsible for flood management and dissemination of information for local people / farmers are at high priority to eliminate these problems.

Montenegro

The status of implementation related to FD in Montenegro is presented in Table 8.

Table 8 Implementation status of institutional background related to FD in Montenegro

Major steps in the implementation process	Exist	In progress	To be developed
Legal framework		√	√
Institutional framework			
• ***Efficient organisational framework***		√	√
• ***Sufficient early warning system***			√
• ***Sufficient monitoring system***	√		√
Preliminary Flood Risk Assessment			√
Flood Hazard Maps			√
Flood Risk Maps			√
Flood Management Plans			√

Source: Consultants' assessment based on the country interviews

If the ongoing and/or completed activities, pilot projects and initiatives are considered (even though they are not fully in line with the status of the FD implementation), it can be concluded that considerable work has been done and experience gathered related to the Directive. Most of these initiatives are financed by international donor organisations. They include preparation of pilot flood hazard and risk maps and management plans based on historical data or hydraulic studies for the most threatened river basins, such as that of the Skadar Lake / Drin / Bojana sub-basin.

Based on the information presented above, the institutional background of flood management in Montenegro is aligned with the EU Directives. Still, however, after the adoption of the new Water Law considerable legislative work is required for detailing the rules and procedures to guide the activities related to the implementation of the FD.

The monitoring systems to collect hydrologic and hydro-meteorological data can be considered satisfactory. However, the number of the measuring stations is low and further assistance is needed for full development of the systems. Sedimentation issues are a priority and actions are needed to monitor this specific phenomenon. In all cases, the work overload of the employees and the background infrastructure for the operation of the system are critical.

The early warning system in operation is critically underdeveloped. There is an urgent need to establish a well operating system and to develop the necessary infrastructural background and based on the territorial aspects of the country, the improvement of data exchange between the neighbouring countries should be in the focus of the development in the future.

Serbia

In Serbia, the status of implementation is as summarised in Table 9.

Table 9 Implementation status of institutional background related to FD in Serbia

Major steps in the implementation process	Exist	In progress	To be developed
Legal framework	√	√	
Institutional framework		√	
• ***Efficient organisational framework***	√		√
• ***Sufficient early warning system***	√		√
• ***Sufficient monitoring system***	√		√
Preliminary Flood Risk Assessment	√		√
Flood Hazard Maps	√		√
Flood Risk Maps			√
Flood Management Plans			√

Source: Consultants' assessment based on the country interviews

Based on the information presented above, it can be concluded that the institutional background of flood management in Serbia is aligned with the EU Directives, although transposition of the EU legislation is still in progress. The new Water Law has been drafted but has not been adopted yet; new regulations will be applicable according to the new legislation.

The organisational set up is relatively well functioning even if there is considerable fragmentation of responsibilities, which sometimes is not sufficiently clear. The organisational set up is expected to be improved according to the new legislation.

There are early warning and monitoring systems operating in Serbia. The communication between the two institutions responsible for data collection - Republic Hydro-meteorological Service and Agency for Environmental Protection- is good, as they exchange data of interest on a daily basis. By strengthening the system of data exchange and development of communication between institutions,

data management could be made more effective, as well as the infrastructural background of monitoring should be developed.

2.4.2 Filling the gap

To fully implement the Directive, a complex approach is required that allows for the long-term sustainability of the results. The actions proposed should cover the legal and institutional framework and include specific steps towards the tasks of the FD implementation.

Table 10, Table 11, Table 12, Table 13, Table 14 and Table 15 below summarise those activities and relevant costs that are directly related to the implementation of the FD. It has to be noted that some elements of these activities may overlap with activities already initiated by the countries (presented later in this section).

It is highlighted that the information in the tables below is based on the assessment of the Consultant and may not be in line with the official statements made by the responsible national institutions. The budgets and the dates below are estimated as based on the international data and experiences of the Consultant and the experiences gained during the first sets of the implementation of the FD in the region, notably in BiH. The total budget estimates covers only the cost of preparing documents, studies, text of legislation, flood hazard and risks maps and strategies. It does not include costs for monitoring stations or equipment for establishing early warning system.

Table 10 Planned schedule of the FD implementation process, Albania

Activity	Total budget (M €)	Start of activity	End of activity
Detailed methodologies, capacity building	1.5	2016	2017
Regulations, standards and FD implementation strategy	1.2	2016	2018
Data collection and management	2.0	2017	2019
Preliminary Flood Risk Assessment	1.5	2018	2019
FHM and FRM	3.0	2019	2021
FMP; national and local strategies and plans	4.0	2020	2023
Total	**13.2**	**2016**	**2023**

Source: Consultant's assessments

Table 11 Planned schedule of the FD implementation process, BiH

Activity	Total budget (M €)	Start of activity	End of activity
Detailed methodologies, capacity building	0.6	2016	2017
Regulations, standards and FD implementation strategy	1.2	2016	2016
Data collection and management	1.2	2015	2016
Preliminary Flood Risk Assessment	completed		
FHM and FRM	3.4	2015	2018
FMP; national and local strategies and plans	6.0	2016	2018
Total	12.4	**2015**	**2018**

Source: Consultant's assessments

Table 12 Planned schedule of the FD implementation process, Kosovo

Activity	Total budget (M €)	Start of activity	End of activity
Detailed methodologies, capacity building	0.3	2016	2017
Regulations, standards and FD implementation strategy	0.5	2016	2018
Data collection and management	0.8	2017	2019
Preliminary Flood Risk Assessment	1.0	2018	2019
FHM and FRM	2.5	2019	2021
FMP; national and local strategies and plans	2.0	2020	2023
Total	**7.1**	**2016**	**2023**

Source: Consultant's assessments

Table 13 Planned schedule of the FD implementation process, the former Yugoslav Republic of Macedonia

Activity	Total budget (M €)	Start of activity	End of activity
Detailed methodologies, capacity building	1.0	2016	2017
Regulations, standards and FD implementation strategy	1,2	2016	2018
Data collection and management	1,8	2017	2019
Preliminary Flood Risk Assessment	1,5	2018	2019
FHM and FRM	2,8	2019	2021
FMP; national and local strategies and plans	3,5	2020	2023
Total	**11.8**	**2016**	**2023**

Source: Consultant's assessments

Table 14 Planned schedule of the FD implementation process, Montenegro

Activity	Total budget (M €)	Start of activity	End of activity
Detailed methodologies, capacity building	**1.0**	**2016**	**2017**
Regulations, standards and FD implementation strategy	**1.2**	**2016**	**2018**
Data collection and management	**1.8**	**2017**	**2019**
Preliminary Flood Risk Assessment	**1.5**	**2018**	**2019**
FHM and FRM	**2.8**	**2019**	**2021**
FMP; national and local strategies and plans	**3.5**	**2020**	**2023**
Total	**11.8**	**2016**	**2023**

Source: Consultant's assessments

Table 15 Planned schedule of the FD implementation process, Serbia

Activity	Total budget (M €)	Start of activity	End of activity
Detailed methodologies, capacity building	0.8	2016	2017
Regulations, standards and FD implementation strategy	0.5	2016	2017
Data collection and management	1.2	2016	2017
Preliminary Flood Risk Assessment	Completed		
FHM and FRM	3.5	2016	2019[7]
FMP; national and local strategies and plans	6.0	2018	2021
Total	**12.0**	**2016**	**2021**

[7] According to the Law on Water, Serbia should finish its flood hazard and risk maps by 2017, which is too ambitious.

Proposals

Besides measures and actions that are required for the implementation of the FD, there are specific non-structural measures that can address the existing problems and offer long-term solutions for the development of the institutional system as well as contribute to the success of structural measures. These measures have been identified by the Consultant based on the stakeholders' meeting and the analysis of the present state of the institutional framework. It is the Consultant's assessment that the following measures are particularly important to achieve sound flood risk management:

- **Development of the regulations on land use**
  Land cover plays a significant role in the characteristics of the runoff both in the upstream and in the downstream areas. Improper land use, the loss of vegetation, notably forests, in the upstream areas result in flash floods, whereas the dense and uncontrolled vegetation of the downstream areas causes water retention resulting in more severe floods upstream. New or improved land use regulations, defined from the state level and introduced at the local level, should focus on the fullest land coverage in the upstream areas and the regulation of the downstream flatlands and flood ways allowing for sustainable water flow.

- **Development of the regulation of the gravel-mining sector and proper enforcement**
  Today, the activities of the mining sector create considerable burdens for successful flood management especially in the flatlands and the coastal areas: gravel deposits block flood ways. Existing dikes are often damaged and cut for cheaper gravel transportation. These practices have to be eliminated and mining permits shall be limited for locations and size to minimize the negative impact of the activities.

- **Development of the regulation on waste management**
  The improper waste management practices of many of the WB countries results in the blocking of drainage channels and flood ways. Besides being an environmental hazard, it increases the probability of floods with potential impact on public health. This issue is closely linked to the general awareness level of the public. Large amounts of waste are disposed at illegal sites. The waste management system should focus on sustainable waste management, raising public awareness, mapping, and rehabilitating the existing illegal and closed waste disposal sites in areas endangered by floods.

- **Revision of service contracts with hydropower operators**
  Several multipurpose dams in the upstream areas can serve as efficient flood management assets. Recently the management of the reservoirs of the hydropower stations consider flood control as a secondary issue, which may conflict with the financial interest of the facility. In emergencies, they are open for cooperation, even though it may be sometimes too late to avoid downstream floods. The revision of the hydropower service contracts should consider flood issues to a larger extend and should be based on data collected by the hydropower stations and the national hydro-meteorological service. A compromise must be reached for the sustainable operation of the dams while maximising their potential management support in flood risk mitigation.

- **Strengthening hydro-meteorological monitoring and early warning systems**
  Properly operating hydro-meteorological and the early warning systems are an important tool of flood management and is a requirement of the FD and, at the same time, are a pre-requisite of the assessment of flood risks and hazards within the implementation process. In general, there are limited resources for the development of these systems in the WB countries that result in major gaps concerning spatial coverage and the quality of the data and information. These issues are related to the problems of human resources as well. During the course of development of the systems, a complex approach is required that covers the areas of infrastructure, software, modelling tools and human capacity building.

- **Establishment of the centrally controlled national hydro-meteorological service – Albania**
  The operational framework of the hydro-meteorological service is currently unclear. The service is within the Polytechnic University of Tirana, which has a contractual relation to many of the potential users of their information. The service should be reorganised in a way that it would serve primarily the public interest to ease and decrease the cost of data management and access for all bodies involved with flood management, planning and design.

- **Establishing the Hydro-meteorological Organisation of BiH with country wide powers**
  Today, the operational framework of the hydro-meteorological services is jeopardised by the fact that they operate on entity level. The two entity hydro-meteorological services are the RHMS RS (Republic Hydro-Meteorological Service of the RS) and the FHMS FBiH (Federal Hydro-Meteorological Service of the FBiH). According to the Law on Ministries of BiH, article 15, the Ministry of Civil Affairs is responsible for the coordination between the two services. Although the co-operation between the services is adequate, there is a need to establish a state level service for promoting data exchange and management among the entities, to undertake state level co-ordination of tasks and to represent BiH in the international hydro-meteorological organisations and in bilateral data and information exchange activities. The service is to be organised in a way that it would serve primarily the public interest to ease and decrease the cost of data management and access for all bodies involved with flood management, planning and design. It is important to note that today the two services operate in accordance with the Constitution of BiH. A new “umbrella” hydro-meteorological organisation needs to be established covering tasks of state interest based on consensus of all entities, taking the requirements of the Constitution into account. Such organisation can be initiated under a state institution such as Ministry of Civil Affairs of BiH.

2.4.3 Regional aspects

Both the FD and the WFD define several regional aspects to be taken into account when implementing flood management projects, with cross-border effects.

Regional non-structural measures

Either by contacting country stakeholders or by reviewing the available strategic documents, the Consultant identified ten regional non-structural projects, of which

three are ongoing. Most of these projects are initiatives of professional agencies. Table 16 and Table 17 provide the summary information of these projects.

Table 16 Ongoing and proposed regional non-structural projects

ID	Title	Project area	Budget (M €)
Ongoing Projects			
REGNS39	Support to Water Resources Management in Drina River Basin	BiH, MNE, SRB, Drina River Basin	1.2
REGNS41	Programme for Prevention, Preparedness and Response to Floods in the WB and Turkey (IPA FLOODS).	ALB, BiH, HRV, MKD, KOS, MNE, SRB, TUR	2.0
REGNS60	Adapting to Climate Change in the WB	ALB, MKD, MNE, KOS, SRB, Drin River Basin	3.5
		Total	**6.7**
Planned Projects			
REGNS1	REACT2ALERT	ALB-MKD	0.8
REGNS2	Improving transnational capacity for advanced environmental monitoring and more rational use of common water resources	ALB, Prefecture of Kukes and Shkoder Region; KOS, South and West Economic Region. Portion of Drini River	0.5
REGNS54	Improvement of Joint Actions in Flood Management in the Sava River Basin	MNE, BiH, SRB / Sava River Basin	2.0
REGNS55	West Balkans Drina River Basin Management Project	MNE, BiH, SRB / Drina River Basin	8.0
REGNS58	South East Europe and Caucasus Catastrophe Risk Insurance Facility	BiH, SRB, MKD	4.0
REGNS59	Achieving Climate Resilient Infrastructure through Mainstreaming of Ecosystem Based Adaptation Approaches in the WB Region	ALB, BiH, SRB, MKD, MNE, HRV, KOS	9.6
REGNS64	FLOOD-EDU	WB countries	5.5
		Total	**30.4**

Source: Consultant's database based on collected data from stakeholders and other sources

Note: Pink shade means finance not secured

Table 17 Content of ongoing and proposed regional non-structural projects

ID	Purchasing/ preparing data, hardware and software	Methodology for FRA	Preliminary/ Detailed FRA	Flood Man. strategies	Flood Man. plans / programmes	Revision/ Reinforcing of legislation	Institutional reorganisation	Capacity building
REGNS39					√	√		√
REGNS41		√	√					
REGNS60	√		√	√	√			√
REGNS1		√	√					√
REGNS2		√	√					
REGNS54	√	√			√			
REGNS55	√	√		√				√
REGNS58								
REGNS59					√	√		√
REGNS64	√							√

Source: Consultant's database based on collected data from stakeholders and other sources

Note: Pink shaded projects are ongoing.

The details of non-structural projects of regional relevance are as presented below.

Title	Support to Water Resources Management in Drina River Basin
Beneficiary	BiH - Federation BiH: Ministry of Agriculture, Forestry and Water Management; RS: Ministry of Agriculture, Water Management and Forestry Serbia: Ministry of Agriculture, Forestry and Water Management Montenegro: Ministry of Agriculture and Rural Development
Project area	BiH, SRB, MNE / Drina River Basin
Budget	EUR 1,200,000
Finance	World Bank
Summary information	This project proposes a support to the water management authorities in BiH, Montenegro and Serbia in preparation of the Drina RBMP and the Investment Prioritization Framework in accordance with - their Water Laws (using the Drina River basin as a pilot for other basins) - EU water policy in general, EU WFD and FD in particular. The overall objective of this project is to support more effective water resources management in Drina River basin with a special focus on flood and drought mitigation, and hydropower and environmental management, based on "good practices" and within the framework of integrated water resource management. This project proposes to consider plans and strategies in the energy sector in the watershed and in the wider region, in order to determine the most important operational and investment interventions in the basin.

Source: Consultant's database based on collected data from stakeholders and other sources

Title	Programme for Prevention, Preparedness and Response to Floods in the WB and Turkey (IPA FLOODS)
Beneficiary	Disaster Management Authorities and agencies or institutions in charge of water management and flood risk prevention in the countries
Project area	ALB, BiH, HRV, MKD, KOS, MNE, SRB, TUR
Budget	EUR 1,998,386
Finance	EC DG ECHO
Summary information	The project will include: Establishing multinational Civil Protection Modules for Flood Rescue using Boats (FRB) involving all Beneficiaries in line with EU framework/practices; Establishing Standard Operating Procedures according to the EU Guidelines for Standard Operating Procedures and based on the experience of existing EU (multinational) Civil Protection Modules; Organizing a regional field-exercise for the multinational Civil Protection Modules with participation of Civil Protection Modules of the same type from the Participating States of the Union Civil Protection Mechanism; Delivering a capacity building programme on approximation to/implementation of the EU FD; Preparing guidelines on flood risk management which take stock of existing EU/national guidelines/guidance documents for the implementation of the EU FD; and Preparing a roadmap for future regional action in disaster risk management

Source: Consultant's database based on collected data from stakeholders and http://www.cimafoundation.org/wp-content/uploads/2015/03/FACTSHEET_IPA_Floods_LOT_1.pdf

Title	Adapting to Climate Change in the WB
Beneficiary	Albania: Ministry of Environment; Kosovo: Ministry of Environment and Spatial Planning; Macedonia: Ministry of Environment and Physical Planning; Montenegro: Ministry of Sustainable Development and Tourism; Serbia: Ministry of Agriculture and Environmental Protection
Project area	ALB, MKD, MNE, KOS, SRB, Drin River Basin
Budget	EUR 3,500,000
Finance	GiZ
Summary information	Objective of the Project is adaptation to climate change in the WB, especially in relation to the risks of flooding and droughts, is improved. The project acts in five key areas: - establishing a regional flood early warning system for the Drin River Basin; - support for national institutions in drafting climate change adaptation strategies; - advisory services during the formulation of local flood risk and drought management plans, and in the implementation of measures to reduce risks; - advisory services during the elaboration of trans boundary concepts for water resource management; - integrating recommendations for climate change adaptation into urban planning and development for the cities of Tirana, Podgorica and Belgrade.

Source: Consultant's database based on collected data from stakeholders and www.giz.de

Name of the Project	REACT2ALERT
Beneficiary	Albanian Power Corporation, Korporata Elektroenergjitike Shqiptare (KESH), Institute of Geoscience, Energy, Water and Environment (IGEWE), General Directorate of Civil Emergencies – Ministry of Interior Affairs
Project area	ALB - MKD
Total budget	EUR 800,000
Finance	Partly secured by EC DG ECHO
Summary information	The Project aims at filling the gaps between National and local services and authorities by improving the communication flow among institutions and authorities across different level, by setting operational procedures for risk mitigation measures- Including dam management- to be activated at local level according to the forecasted warnings. The project intents to stimulate the involving of local community in the Early Warning System. The project is articulated in 5 work-packages as follows: - Project management, financial and technical reporting and monitoring and evaluation of the project implementation. - Publicity and mainstreaming of project results - Improving forecasting system and communication flow - Training and capacity building for strengthening local community to react to alert and prepare a draft Emergency plan for two selected municipalities in Albania and Macedonia - Field exercise where to test tools, methodology, plan developed.

Source: Consultant's database based on collected data from stakeholders

Name of the Project	Improving transnational capacity for advanced environmental monitoring and more rational use of common water resources
Beneficiary	ALB, Prefecture of Kukes and Shkoder Region; KOS, South and West Economic Region. Portion of Drin River
Project area	ALB - KOS
Total budget	EUR 469,371
Finance	Not secured
Summary information	The Project aims to encourage the use of modern technologies for the monitoring of hydrology and key environmental parameters in important branches of Drin River, thus promoting the integrated management of water resources and increasing safety of populations against natural disasters.

Source: Consultant's database based on collected data from stakeholders

Title	Improvement of Joint Actions in Flood Management in the Sava River Basin
Beneficiary	Institutions responsible for flood management in countries
Project area	MNE, BiH, SRB / Sava River Basin
Budget	EUR 2,000,000
Finance	World Bank / WBIF
Summary information	Project objective is to support capacity building, studies and investments to strengthen the capacity of the governments of BiH, Serbia and Montenegro to plan and implement integrated, cooperative international management of the River basin and address climate change adaptation in the Drina River basin. The project is composed of two components: - Flood Risk Management Plan for the Sava River Basin, including the Programme of measures (PoM) and Environmental Impact Assessment Study for the PoM - Flood Forecasting and Warning System for the Sava River Basin, with the main components:

Source: Consultant's database based on collected data during the preparation of Present Situation Report, http://ec.europa.eu/enlargement/pdf/press_corner/floods/20141120_conference_paper.pdf

Title	West Balkans Drina River Basin Management Project
Beneficiary	MNE - Ministry of Agriculture and Rural Development , BiH - FBiH Ministry of Agriculture, Forestry and Water Management, RS Ministry of Agriculture, Water Management and Forestry, SRB - Ministry of Agriculture, Forestry and Water Management
Project area	MNE, BiH, SRB / Drina River Basin
Budget	
Finance	GEF/SCCF
Summary information	The project objective is to support capacity building, studies and investments to strengthen the capacity of the governments of BiH, Serbia and Montenegro to plan and implement integrated, cooperative international management of the river basin and address climate change adaptation in the Drina River basin. The following activities are planned to be implemented: - Development of an agreed Strategic Action Program (SAP) - Institutional Development and Capacity Building - Support for Flood and Drought Management and Community Participation

Source: Consultant's database based on collected data during the preparation of Present Situation Report, http://ec.europa.eu/enlargement/pdf/press_corner/floods/20141120_conference_paper.pdf

Name of the Project	South East Europe and Caucasus Catastrophe Risk Insurance Facility
Beneficiary	Homeowners, farmers, enterprise sector and government agencies in BiH, Serbia and the former Yugoslav Republic of Macedonia
Project area	BiH, SRB, MKD
Total budget	5,000,000 USD (EUR 4,000,000)
Finance	IDA Loan
Summary information	The most important result of SEEC CRIF is the increased access to affordable weather risk coverage and catastrophe insurance for millions of people and thousands of enterprises in the region. The aim is to raise catastrophe and weather risk insurance penetration among homeowners, farmers, the enterprise sector, and government entities from the current 1-5 percent to 15 percent over the next 5 years, without making the insurance compulsory. There are two components under the overall program. Component 1 supports SEEC countries' efforts to join Europa Re by financing their membership contributions to the Facility. Component 2 includes: risk mapping and modelling for participating countries; design and pricing of appropriate catastrophe and weather risk insurance products; development of a web-based underwriting platform; small weather monitoring stations to support parametric weather insurance; and technical assistance for regulatory and policy reforms, to create an enabling market environment.

Source: Consultant's database based on collected data during the preparation of Present Situation Report, http://ec.europa.eu/enlargement/pdf/press_corner/floods/20141120_conference_paper.pdf

Name of the Project	Achieving Climate Resilient Infrastructure through Mainstreaming of Ecosystem Based Adaptation Approaches in the WB Region
Beneficiary	ALB, BiH, SRB, MKD, MNE, HRV, KOS
Project area	South Eastern Europe countries
Total budget	12,000,000 USD (EUR 9,600,000)
Finance	UNEP GEF
Summary information	The objective of the Project is to support countries in the South East Europe in adaptation to climate change by integration of eco-system based adaptation technologies into planning and engineering of communal and critical economic infrastructure. The Expected Outcomes are as follows: - Eco-system based adaptation to climate change integrated into infrastructural management policies, plans and regulations - Enhanced capacity to understand and respond to emerging climate hazards and address them through strategic integration of climate resilience into construction sector in the region. - Demonstrated and developed lessons learned from climate proofing of selected infrastructural case studies.

Source: Consultant's database based on collected data during the preparation of Present Situation Report, http://ec.europa.eu/enlargement/pdf/press_corner/floods/20141120_conference_paper.pdf

Name of the Project	FLOOD-EDU
Beneficiary	Ministries of Education and agencies responsible for flood management in countries
Project area	WB countries
Total budget	EUR 5,500,000
Finance	Not secured
Summary information	MSc thesis will be connected to research projects. PTs could be organized in various topics: technical or non-technical. Experience with this type of project in other field show great improvement of knowledge and capacities in the countries as well as establishing and improvement of networking of scientists and professionals in the field within the WB countries.

Source: Consultant's database based on collected data from stakeholders except the total budget, which is an estimation of the Consultant.

In addition to the projects presented above, there are a several other projects that are initiated and managed by two most important international stakeholders of water and flood management in the region. Following the consultations with the representatives of the International Commission for the Protection of the Danube River (ICPDR) and the International Sava River Basin Commission (ISRBC) the following non-structural measures have been identified:

- Development of the Flood Risk Management Plan for the Sava River Basin (ISRBC)
- Sustainable Operational Flood Forecasting in Real-Time and Water Resource Management (ISRBC)
- Establishment and completion of the Sava GIS – 2nd and 3rd phases (ISRBC)
- Hydrological Study for the Sava River Basin (ISRBC)
- "DANICE" - DANube River basin ICE conveyance investigation and icy flood management (ICPDR)
- "APROD-CL" - Analysing flood discharge PROpagation for the whole Danube River and creation of Coherent Longitudinal profile for discreet events (ICPDR)
- "LAREDAR" - Hazard and risk mapping, risk management planning of the LAkes and REservoirs in the DAnube River basin (ICPDR)
- "FORTRED" - FORest TRaining in thE Danube floodplain (ICPDR)
- „MERGBORD" - MERGing hazard maps at national BORder areas in the Danube basin (ICPDR)

In the case of countries of Drin River basin, the platform of international co-operation is embedded in the Memorandum of Understanding for the management of Drin Basin (Albania, Greece, the former Yugoslav Republic of Macedonia, Kosovo and Montenegro). The issues are handled on the operational level by the Drin Core Group. The organisation has only limited powers and its renewal for the efficient support of flood and water management activities in the region could be an important element of identifying regional projects.

It has to be noted that the details of most of these projects were not yet available.

Another important forum for co-operation on non-structural measures at regional level is the European Union Civil Protection Mechanism. Current members from the WB are Serbia, the former Yugoslav Republic of Macedonia and Montenegro. The Emergency Response Coordination Centre, as the operational hub of the mechanism, manages a voluntary pool of resources including material assistance,

equipment and expertise, all of which was readily deployed at the time of the flood crisis in Serbia and BiH in 2014.

The countries participating to the EU Civil Protection Mechanism have been given the opportunity to enhance their preparedness, disaster resilience, competencies in flood prevention and risk management – and recent legislation has placed greater emphasis on the latter – by exchanging information on best practices, making use of new communication methods, monitoring tools, information system, etc. However, the tools designed to strengthen preparedness have not yet been widely used by the participating WB countries.

2.4.4 Funding needs

The funding needs of the FD implementation by the WB countries have been calculated as based on estimated costs of the non-structural development needs of the implementation of the FD for each country, as presented in Section 2.4.2. The cost of all ongoing projects that add to its implementation are excluded from the total estimated cost. That entails the assumption that no further funds are needed for the implementation of these projects.

In the current section, all ongoing and proposed projects are listed at country level, and their contributions are shown to the estimated development needs. It is important to note that a significant number of proposed projects are not limited to non-structural interventions for FD implementation but cover non-structural interventions for WFD implementation and structural measures for flood control.

Albania

The Consultant identified eight non-structural projects by contacting either the relevant stakeholders and by reviewing the available strategic documents for Albania (Table 18 and Table 19). Five of these projects are currently ongoing and are expected to be completed by the end of 2016.

Table 18 Ongoing and planned non-structural projects in Albania

ID	Title	Project area	Budget (M €)
Ongoing Projects			
ALBNS42	FP7-GALILEO-2011-GSA-1-a/CP. Integrating satellite navigation (GNSS/EGNOS), earth observations (EO/GMES) and telecommunications for establishing a flood alert and location based information system (FLOODIS)	ALB / Shkodra Qark	2.00
ALBNS44	Study and design for providing safe flood management of Drin Cascade	ALB / Drin River Basin, North of Albania,	1.95
ALBNS45	Risk Analyses, Emergency preparedness plan and strengthening of DSD	ALB / Drin River Basin	0.30
ALBNS4	Preparation of River Basin Management Plan for Drin-Buna & Semani	ALB / Ana e Malit, Berdice, Bushat, Dajc, Gur i Zi, Rrethina, Shkoder, Velipoje	1.37
ALBNS66	Three Hydro Power Plants in Mati-Drin Cascade and Drin River Basin	ALB / Mati-Drin Cascade and Drin River Basin	4.0
		Total	**9.62**

ID	Title	Project area	Budget (M €)
Proposed Projects			
ALBNS3	Promotion of Ecosystem Services and Biodiversity Protection Through Integrated Monitoring System Application in Mati River Basin Albania	ALB / River Mati Basin	0.18
ALBNS9	Potential of multi-purpose use of reservoir of Drin Cascade	ALB / Drin River Basin	0.08
ALBNS10	Flood Forecast System for building static/dynamic flood scenarios produced by dam management policies in the Drin/Buna River basin	ALB / Drin - Buna River Basin	0.50
		Total	**0.76**

Source: Consultant's database based on collected data from stakeholders and other sources

Table 19 Financial gap for non-structural projects in Albania

Activity	Total budget needed *(M €)*	Ongoing projects[8]	Proposed projects[8]
Detailed methodologies, capacity building	1.5	ALBNS42, ALBNS44[9], ALBNS45, ALBNS4[9]	ALBNS3, ALBNS9, ALBNS10
Regulations, standards and FD implementation strategy	1.2	ALBNS44[9], ALBNS45, ALBNS4[9]	
Data collection and management	2.0	ALBNS4[9], ALBNS66	ALBNS10
PFRA	1,5	ALBNS42	
FHM and FRM	3.0	ALBNS44[9], ALBNS45, ALBNS4[9]	ALBNS3, ALBNS9, ALBNS10
FMP; national and local strategies and plans	4.0	ALBNS44[9], ALBNS45, ALBNS4[9], ALBNS66	ALBNS3, ALBNS9
Budget	13.2	**9.62**	**0.76**
Funding needs (Total budget - Budget of ongoing projects)	3.58		

Source: Consultant's assessment

The remaining funding need for Albanian projects is 3.58 M€, which includes 0.76 M€ for the projects proposed by the Consultant. Projects footnoted 9 include some measures that are not directly related to the implementation of the FD, thus the actual funding need may be higher than the calculated value.

Bosnia and Herzegovina

The Consultant identified seventeen non-structural projects by contacting with the relevant stakeholders and by reviewing the available strategic documents for BiH (Table 20 and Table 21). Three of these projects are currently ongoing.

Table 20 Ongoing and proposed non-structural projects in BiH

ID	Title	Project area	Budget (M €)
Ongoing Projects			
BHNS33	Technology transfer for climate resilient flood management in Vrbas River Basin	BiH / Vrbas River basin	4.6
BHNS35	Improving Hydrologic Monitoring and Information Sharing in BiH	BiH	0.1
BHNS61	Capacity building in the Water Sector	BiH, Sava River Basin	2.4
		Total	**7.0**

[8] Some Projects are referring to more than one requirement of the FD.
[9] Include measures not directly related to FD implementation

ID	Title	Project area	Budget (M €)
Proposed Projects			
BHNS5	Establishment of procedures for regular exchange of meteorological and hydrological data among responsible institutions in BiH and neighbouring countries and ISRBC, WMO, ICPDR etc.	BiH	0.26
BHNS6	Capacity building of institutions responsible for water management in BiH, providing adequate level of coordination and cooperation with other institutions in BiH and ensuring participation in work of international bodies (institutions)	BiH	2.56
BHNS7	Continue with harmonization of the legal framework for water management in BiH with EU legislation, including the adoption of Plans for the implementation of key Directives in the water management sector	BiH	2.05
BHNS8	Preparation of River Basin Management Plans in BiH, including reporting to BiH Council of Ministers about their coordination (on the level of implementation) in BiH, neighbouring countries, ISRBC and ICPDR	BiH	2.56
BHNS14	Establishment of hydrological forecast models for river basins in BiH and capacity building for meteorological forecasts	BiH	3.07
BHNS29	Preparation of FHM and FRM in BiH	BiH	3.38
BHNS40	Modernisation and automation of existing and establishment of new water gauge stations including equipment for hydrometric measurements on water courses	BiH	3.25
BHNS62	Hydrological forecasting system for Sava River Basin in BiH (Phase 1. Bosna River)	BiH, Bosna River Basin	2.00
BHNS63	Prepare and adopt Plans for flood risk management including report of Council of Ministers about the coordination of their implementation with neighbouring countries, ISRBC and ICPDR; including level connectivity with the River Basin Management Plans, Climate Change Impact Assessment and active public and stakeholder participation.	BiH	2.56
BHNS27	Modernisation and automation of existing and establishment of new automated meteorological and precipitation stations	BiH	4.15
BHSNS30	Flood Prediction and EWS for RS	RS	1.40
BHSNS32	Institutional Development for RS	RS	0.50
BHBNS26	Flood Prediction and Early Warning System for BD	BD	0.07
BHBNS28	Institutional Development for BD	BD	0.50
		Total	**28.31**

Source: Consultant's database based on collected data from stakeholders and other sources

Table 21 Financial gap for non-structural projects in BiH

Activity	Total budget needed (M €)	Ongoing projects[8]	Proposed projects[8]
Detailed methodologies, capacity building	0.6	BHNS33, BHNS35, BHNS61	BHNS6, BHNS14, BHNS29, BHNS40, BHNS62, BHNS27, BHSNS30, BHSNS32, BHBNS28
Regulations, standards and FD implementation strategy	1,2	BHNS33, BHNS61	BHNS5, BHNS7, BHSNS32, BHBNS28
Data collection and management	1.2	BHNS61	BHNS14, BHNS29, BHNS40, BHNS62, BHNS27
PFRA	completed		
FHM and FRM	3.4	BHNS33	BHNS29
FMP; national and local strategies and plans	6.0	BHNS33, BHNS61	BHNS8[9], BHNS63
Budget	12.4	**7.0**	**28.31**
Funding needs (Total budget - Budget of ongoing projects)	**5.4**		

Source: Consultant's assessment

The implementation of the FD is more advanced in BiH than in several other countries of the WB. Many of the proposed projects in the above table are already advancing to non-structural interventions, which include procurement of equipment and services. Some proposed projects cover implementation of both FD and WFD. Moreover, projects footnoted 9 include some measures that are not directly related to the implementation of the FD. The separation of the proposed projects into interventions is not possible at that stage. Therefore, it is not possible to estimate the costs for non-structural measures only as the projects are presented with their total estimated costs. Consequently, the total costs of the proposed projects cannot be directly compared to the calculated funding gap.

Kosovo

The Consultant identified two non-structural projects proposals from the relevant stakeholders for Kosovo (see Table 22 and Table 23).

Table 22 Proposed non-structural projects by stakeholders in Kosovo

ID	Title	Project area	Budget (M €)
KOSNS11	Strengthening of Hydro-meteorological Institution on Forecast Prediction	KOS	1.0
KOSNS12	Preparation of Flood Risk Maps	KOS	3.5
		Total	**4.5**

Source: Consultant's database based on collected data from stakeholders

Table 23 Financial gap for non-structural projects in Kosovo

Activity	Total budget needed (M €)	Ongoing projects	Proposed projects[8]
Detailed methodologies, capacity building	0.3		KOSNS11
Regulations, standards and FD implementation strategy	0.5		
Data collection and management	0.8		KOSNS11
PFRA	1,0		
FHM and FRM	2.5		KOSNS12
FMP; national and local strategies and plans	2.0		
Budget	7.1		**4.5**
Funding needs (Total budget - Budget of ongoing projects)	7.1		

Source: Consultant's assessment

The remaining funding need for projects in Kosovo is 6.6 M€, which includes 4.5 M€ for the projects proposed by the Consultant.

the former Yugoslav Republic of Macedonia

The Consultant identified six non-structural projects by contacting either the relevant stakeholders and by reviewing the available strategic documents for the former Yugoslav Republic of Macedonia (see Table 24 and Table 25).

The remaining funding need for projects in the former Yugoslav Republic of Macedonia is 11.4 M€, which includes 6.3 M€ for the projects proposed by the Consultant.

Table 24 Ongoing and planned non-structural projects in the former Yugoslav Republic of Macedonia

ID	Title	Project area	Budget (M €)
Ongoing Projects			
MKDNS34	Support to Introducing the Flood Risk Management Requirements in Accordance with the EU FD	MKD	0.4
		Total	**0.4**
Proposed Projects			
MKDNS13	Information System for Climate Services	MKD	0.9
MKDNS15	Bregalnica River Flood Management Plan	Bregalnica River Basin (East MKD)	0.5
MKDNS16	Crna River basin flood management plan	Crna River Basin (Southwest MKD)	0.8
MKDNS17	Establishment of the Hydrological Information System (HIS)	MKD	3.1
MKDNS65	TORRENTS	MKD	1.0
		Total	**6.3**

Source: Consultant's database based on collected data from stakeholders and other sources

Table 25 Financial gap for non-structural projects in the former Yugoslav Republic of Macedonia

Activity	Total budget needed (M €)	Ongoing projects	Proposed projects[8]
Detailed methodologies, capacity building	1.0		MKDNS15, MKDNS16, MKDNS65
Regulations, standards and FD implementation strategy	1,2	MKDNS34	MKDNS65
Data collection and management	1,8		MKDNS13, MKDNS15, MKDNS16, MKDNS17, MKDNS65
PFRA	1,5		
FHM and FRM	2,8		MKDNS15, MKDNS16, MKDNS65
FMP; national and local strategies and plans	3,5		MKDNS15, MKDNS16, MKDNS65
Budget	11.8	**0.4**	**6.3**
Funding needs (Total budget - Budget of ongoing projects)	**11.4**		

Source: Consultant's assessment

Montenegro

The Consultant identified eight non-structural projects by contacting the relevant stakeholders or by reviewing the available strategic documents for Montenegro (Table 26 and Table 27).

Table 26 Proposed non-structural projects in Montenegro

ID	Title	Project area	Budget (M €)
MNENS46	Water Management Strategy*	MNE	**0.3**
MNENS47	River basin management plans*	MNE	**3.0**
MNENS48	Development of Flood Risk and Hazard Maps	MNE	**2.0**
MNENS49	Flood Management Plans	MNE	**2.5**
MNENS50	Improvement of hydro-meteorological observation and transmission network	MNE	**1.5**
MNENS51	Early Warning System	MNE	**1.5**
MNENS52	Establishment of hydrological forecast models for river basins in Montenegro	MNE	**1.5**
MNENS53	Capacity building*	MNE	**0.5**
		Total	**12.8**

Source: Consultant's database based on collected data from stakeholders and other sources

Table 27 Financial gap for non-structural projects in Montenegro

Activity	Total budget needed (M €)	Ongoing projects	Proposed projects[8]
Detailed methodologies, capacity building	1.0		MNENS46, MNENS47[9], MNENS48, MNENS53
Regulations, standards and FD implementation strategy	1.2		MNENS46, MNENS47, MNENS48
Data collection and management	1.8		MNENS47[9], MNENS48, MNENS49
PFRA	1.5		
FHM and FRM	2.8		MNENS48
FMP; national and local strategies and plans	3.5		MNENS49
Other[10]	**4.5**		MNENS50, MNENS51, MNENS52
Budget	**16.3**		**12.8**
Funding needs (Total budget - Budget of ongoing projects)	**16.3**		

Source: Consultant's assessment

The remaining funding need for Montenegrin projects is 16.3 M€, which includes 12.8 M€ for the projects proposed by the Consultant. Projects footnoted 9 include some measures that are not directly related to the implementation of the FD, thus the actual funding need may be a bit higher than the calculated value.

Serbia

The Consultant identified ten non-structural projects by contacting either the relevant stakeholders, by reviewing the available strategic documents and assessed by the Consultant based on FD requirements for Serbia (see Table 28 and Table 29). The Central European Initiative (CEI) is currently implementing one of these projects. A second phase is foreseen as can be seen below (SRBNS38).

Table 28 Ongoing and proposed non-structural projects in Serbia

ID	Title	Project area	Budget (M €)
Ongoing Projects			
SRBNS37	"ALERT": Strengthening Serbian multi-hazard early warning and alert system. Phase I: Setting-up integrated policies to reduce damages from extreme events and risks for population	SRB	0.08
		Total	**0.08**
Proposed Projects			
SRBNS18	Setting up the devices for technical surveillance of seven dams in AP Vojvodina	SRB / Vojvodina, Danube River basin.	0.12
SRBNS19	Rehabilitation and strengthening of hydro-meteorological monitoring network of central Serbia for forecasting and early warning purposes	SRB / Jadar, Kolubara, Južna Morava, and Timok Rivers	2.15
SRBNS20	Development and introduction of System 112	SRB	6.00
SRBNS21	Improvement of Water Information System (WIS)	SRB	0.75
SRBNS22	Procurement of LIDAR equipment	SRB	1.20
SRBNS23	Development of flood risk and flood hazard maps	SRB (for areas not covered)	2.05
SRBNS24	Preparation of flood management plans	SRB / Flooded Water areas	2.50
SRBNS25	Capacity building of flood management institutions	SRB	1.00
SRBNS38	"ALERT": Strengthening Serbian Multi-Hazard Early Warning and Alert System. Phase II:	SRB	0.80
		Total	**16.57**

Source: Consultant's database based on collected data from stakeholders and other sources

[10] Projects for the implementation of early warning systems, or hydro-meteorological forecast models were not included in the original estimates, thus such projects are automatically included in the funding needs on top of the original budget assumptions

Table 29 Financial gap for non-structural projects in Serbia

Activity	Total budget needed (M €)	Ongoing projects[8]	Proposed projects[8]
Detailed methodologies, capacity building	0,80	SRBNS37	SRBNS21, SRBNS22, SRBNS25
Regulations, standards and FD implementation strategy	0.50		SRBNS20
Data collection and management	1,20	SRBNS37	SRBNS18, SRBNS21, SRBNS22, SRBNS23, SRBNS38
PFRA	completed		
FHM and FRM	3,50		SRBNS23
FMP; national and local strategies and plans	6.00		SRBNS20, SRBNS24
Budget	12.00	**0.08**	**16.57**
Funding needs (Total budget - Budget of ongoing projects)	11,92		

Source: Consultant's assessment

Implementation of the FD is more advanced in Serbia than in several other WB countries. Many of the proposed projects are advancing to non-structural interventions including procurement of equipment and services related to FD implementation. A breakdown of the proposed projects into interventions is not possible at that stage. It is not possible to estimate the costs for non-structural measures only as the projects are presented with their total estimated costs. The total cost of the proposed projects is directly not comparable to the funding gap.

3 Assessment of the Infrastructural Investment Projects

3.1 List of projects

Defining projects

During stakeholders' meetings and individual consultations, a number of projects have been identified by the stakeholders that constitute a "long list" of projects that are in line with the national priorities in the wider field of flood management. The identified projects constitute a list of needs (or wishes) of various institutions and cannot be considered as exactly corresponding with the official priorities of the countries. The stakeholders consulted were the central state administrations, local water and flood management agencies.

The compiled projects were screened against the following criteria (for the screening criteria see Annex 2):

1 Relevant sector (flood related),
2 Sufficient information available, and
3 Compliance with EU and other legislation.

Projects not focusing on flood prevention interventions, not having the minimum data requirements for the assessment or not being in line with the national legislation have been screened already in this stage. Projects not satisfying the screening criteria were rejected.

For the establishment of the database of the projects, the relevant data was collected on all identified projects using a data collection sheet. This data was checked and validated in stakeholders' workshops and during direct consultation with the relevant stakeholders.

Summary of collected projects

The structural projects are usually composed of a number of interventions. To ensure a sound assessment, 13 different types of interventions were identified, prior to data collection, and the collected projects were classified according to that typology. After the first round of data collection, additional categories were included such as dam reconstruction, riverbed rehabilitation and construction of the earthen weirs.

Most of the proposed structural projects include more than one intervention. The projects, typically, concern dike construction/rehabilitation or channel construction/rehabilitation with riverbed regulation and floodway rehabilitation and regulation.

Special types of interventions like bridge rehabilitation/construction or road rehabilitation/construction have been identified. Each of these interventions was a component of a flood-related intervention, so neither of these projects were excluded based on the screening criteria. There are a number of projects including pumping station rehabilitation or construction and rehabilitation / construction of

reservoirs, which serve multiple purposes, aiming to reducing flood risk too. For the types of interventions of the proposed projects, see Table 30.

Table 30 The summary of the proposed projects

Country	No of projects	Total budget (M €)	Flood related interventions				Special interventions			
			Dike rehabilitation / construction	Channel rehabilitation / construction	Riverbed regulation / Floodway rehabilitation	Pumping station rehabilitation / construction	Reservoir construction	Road rehabilitation / construction	Bridge rehabilitation / construction	Other
Albania	8	204.36	10	6	15	11	1	5	3	4
BiH	87	231.09	54	39	75	5	0	1	1	5
Kosovo	9	50.93	12	13	16	1	1	0	13	1
the former Yugoslav Republic of Macedonia	7	21.81	9	6	8	1	1	1	0	5
Montenegro	11	116.30	11	0	15	0	0	1	0	0
Serbia	51	128.03	24	8	27	7	0	2	3	6
Total	**173**	**752.52**	**120**	**72**	**156**	**25**	**3**	**10**	**20**	**21**

Source: Consultant's assessment

The full list and the relevant data of the proposed structural projects can be found in Table 31.

Table 31 The list of the proposed projects

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
ALBS99	Flood Protection (Mati River)	Lezhë, Dibër	Mati	8 360 000 €	MoARDWA
ALBS100	Flood Protection (Lower Drin & Buna River Basin in Shkodra area)	Shkodra	Lower Drin - Buna River Basin	63 000 000 €	MoARDWA
ALBS101	Flood Protection in Vjosa River	Vlore, Selenice, Ura Vajgurore, Memaliaj, Permet	Vjosa	33 300 000 €	MoARDWA
ALBS102	Flood Protection in Semani River	Fier, Roskovec	Semani	26 700 000 €	MoARDWA
ALBS103	Flood Protection in Shkumbin River	Elbasan, Librazhd, Peqin, Rrogozhine	Shkumbin	26 700 000 €	MoARDWA
ALBS104	Flood Protection in Droje + Erzen Rivers		Droje	20 000 000 €	MoARDWA
ALBS107	Flood Protection Estimation for Ishem River	Fushë Krujë, Kurbin	Ishem	20 000 000 €	MoARDWA
ALBS166	Emergency Intervention for Flood Protection Works (Vjosa River)	Vlora, Fier, Lushnje, Gjirokaster, Berat	Vjosa River Basin	6 300 000 €	MoARDWA
BHFS8	Cross section cleaning and reconstruction of damaged embankments of Neretva River-Section Struge-Čapljina		Neretva / Trebišnica	350 000 €	
BHFS9	Reconstruction of embankment and dike parts on River Trebižat	Čapljina	Neretva / Trebišnica	50 000 €	
BHFS10	Reconstruction of embankment and dike parts on River Krupa	Čapljina	Neretva / Trebišnica	40 000 €	
BHFS11	Reconstruction of pump station Svitava on Svitava retention	Čapljina	Neretva / Trebišnica	200 000 €	
BHFS12	Reconstruction of embankment on River TMT in municipality Ljubuški	Ljubuški	Neretva / Trebišnica	120 000 €	
BHFS13	Reconstruction of embankments and riverbed of River TMT in settlements Žabar, municipality Ljubuški	Ljubuški	Neretva / Trebišnica	100 000 €	
BHFS14	Reconstruction of damaged embankments of River Neretva	Konjic	Neretva / Trebišnica	200 000 €	
BHFS15	Reconstruction of left embankment and cross sections of River Lištica	Široki brijeg	Neretva / Trebišnica	150 000 €	
BHFS16	River Željeznica regulation from the War Bridge to Entity border	Ilidža	Sava	1 840 679 €	AVP Sava /Municipality Ilidža
BHFS17	Regulation of the River Bosna in Sarajevsko polje field	Novi Grad, Ilidža	Sava	2 700 000 €	AVP Sava/Municipality
BHFS18	River Bosna regulation in the village Svrake	Vogošća	Sava	511 300 €	AVP SAVA/Municipality
BHFS19	Regulation left bank of the River Bosna in the settlement Ljubnići	Ilijaš	Sava	102 260 €	AVP Sava/municipality

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
BHFS20	Regulation of the River Bosna in Visoko	Visoko	Sava	511 300 €	AVP Sava/municipality
BHFS21	Regulation of the right bank of the River Bosna in Kakanj	Kakanj	Sava	255 650 €	AVP Sava/Municipality
BHFS22	Regulation of the left bank of the River Bosna in Kakanj	Kakanj	Sava	255 650 €	AVP Sava/Municipality
BHFS23	Regulation of the Bosna River from the bridge Bilmišće to the bridge in Lukovo polje	Zenica	Sava	766 950 €	Municipality/AVP Sava
BHFS24	Regulation of the Bosna River downstream from the mouth to the bridge	Žepče	Sava	76 695 €	Municipality/AVP Sava
BHFS25	Regulation of River Bosna between the two bridge	Zavidovići	Sava	766 950 €	Municipality/AVP Sava
BHFS26	Regulation of the Bosna River left bank	Maglaj	Sava	204 520 €	Municipality/AVP Sava
BHFS27	Regulation of the Bosna River right bank	Maglaj	Sava	357 910 €	Municipality/AVP Sava
BHFS28	River Spreca regulation	Lukavac	Sava	2 000 000 €	Municipality/AVP Sava
BHFS29	Regulation of the right bank of the Vrbas River downstream from the creek Lučna	Jajce	Sava	204 520 €	Municipality/AVP Sava
BHFS30	Regulation of the right bank of the Vrbas River downstream from the creek Sušica	Donji Vakuf	Sava	76 695 €	Municipality/AVP Sava
BHFS31	Regulation of the Vrbas River from the bridge M1 to M3	Gornji Vakuf	Sava	357 910 €	Municipality/AVP Sava
BHFS32	Regulation of the Unas River in Bihać	Bihać	Sava	409 040 €	Municipality/AVP Sava
BHFS33	Regulation of the left bank of the Drina River from Kosovo to Kolina	Foča/Ustikolina	Sava	204 520 €	Municipality/AVP Sava
BHFS34	Regulation of the Usora River	Doboj-Jug, Usora, Tešanj	Sava	5 419 777 €	Municipalities/AVP Sava
BHFS35	Reconstruction of "Modrac" dam on lake Modrac in Tuzla municipality	Tuzla	Sava	997 019 €	Cantonal Ministry of agriculture, forestry and water management of Tuzla Canton and Public company "Spreča" in Tuzla
BHFS36	Regulation of River Tinja in Srebrenik municipality (approx. 1300 m length)	Srebrenik	Sava	818 067 €	AVP Sava/Municipality
BHFS37	Regulation of River Sapna in Sapna municipality (approx 750 m length in urban part of municipality)	Sapna	Sava	753 008 €	AVP Sava/Municipality
BHFS38	Regulation of Rivers Jala and Turija in Lukavac municipality	Lukavac	Sava	3 450 844 €	AVP Sava/Municipality
BHFS39	Regulation of River Drinjača in municipality Kladanj	Kladanj	Sava	280 155 €	AVP Sava/Municipality
BHFS41	Reconstruction of dikes on Sava River	Brčko, Odžak, Orašje	Sava	7 817 727 €	AVP Sava/Municipality
BHFS43	Reconstruction of dikes on Sava River, section Svilaj - P.S. Novi Grad (km 15+057 to + km 17+670)	Odžak	Sava	1 329 360 €	AVP Sava/Municipality
BHFS44	Reconstruction of dikes on Sava River, section Prud to confluence of River Bosna to Sava (km 0+000 to km 3+000)	Odžak	Sava	992 000 €	AVP Sava/Municipality
BHFS45	Reconstruction of dikes on Bosna River (km 0+000 to km 6+900)	Odžak	Sava	3 528 000 €	AVP Sava/Municipality

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
BHFS46	Reconstruction of dikes on Sava River - downstream from Šamac (km 39+444 to km 42+600)	Domaljevac Šamac	Sava	802 000 €	AVP Sava/Municipality
BHFS168	Geotechnical investigation and stabilization of Sava Dyke in the length of 50 km	Odžak, Domaljevac, Šamac Orašje		2 000 000 €	AVP Sava/Municipality
BHFS181	Flood protection works and support for Goražde area	Goražde, Prača-Pale, Foča-Ustikolina	Sava	13 658 701 €	AVP Sava/Bosansko-Podrinjski Canton and Municipalities
BHBS50	Geotechnical investigation and stabilization of Sava Dyke in the length of 15 km	Brčko	Sava	615 000 €	Brčko District
BHBS51	Regulation of Teka River	Brčko	Sava	4 486 284 €	Brčko District
BHBS52	Regulation of Brke River and Zovičice River in urban Brčko area	Brčko	Sava	5 372 644 €	Brčko District
BHBS53	Regulation of the stream Blizna in the urban area	Brčko	Sava	1 253 907 €	Brčko District
BHBS54	The regulation of the flow stream Lukavac, Govneč and Žigića potok	Brčko	Sava	1 307 637 €	Brčko District
BHSS57	Geotechnical investigation and consolidation of Sava Dyke in the length of 175 km	Kozarska Dubica, Gradiška, Srbac, Derventa, Brod, Šamac, Bijeljina	Sava and Trebišnjica	7 000 000 €	PU Vode Srpske
BHSS58	Flood protection measures for Prijedor town	Prijedor	Una	5 116 705 €	Municipality Prijedor, PU Vode Srpske
BHSS59	Flood protection measures for Kostajnica	Kostajnica	Una	3 027 232 €	Municipality Kostajnica, PU Vode Srpske
BHSS60	Repair Minor and Mayor Failures in Sava River Dyke, Gradiska (near Liman PS)	Gradiška	Sava	1 067 469 €	PU Vode Srpske
BHSS61	Regulation of the Vrbanja River Bed, locality Česme	Banja Luka	Vrbas	1 239 143 €	PU Vode Srpske
BHSS62	Regulation of the Vrbas River Bed, Banja Luka	Banja Luka	Vrbas	1 691 143 €	PU Vode Srpske
BHSS63	Regulation of Dragočaj River, Banja Luka	Banja Luka	Vrbas	1 187 082 €	Municipality Banja Luka
BHSS64	Repair Superficial Damage to Celinac Bridge on Jošavka River	Čelinac	Vrbas	1 733 390 €	Municipality Čelinac
BHSS65	Flood protection measures on Vrbas River, Srbac	Srbac	Vrbas	1 313 962 €	PU Vode Srpske and Municipality Srbac
BHSS66	Flood protection measures on Sava River, Srbac	Srbac	Sava	517 613 €	PU Vode Srpske and Municipality Srbac
BHSS67	Major Maintenance Povalic R and Gornja Inja canal	Srbac	Vrbas	709 678 €	Municipality Srbac and PU Vode Srpske
BHSS68	Discharge Channel - Drainage Turjanica -Vrbas Rivers Confluence	Laktaši	Vrbas	1 913 241 €	PU Vode Srpske and Municipality Laktaši
BHSS69	River rehabilitation, Liješnja River	Prnjavor	Ukrina	1 583 163 €	PU Vode Srpske and Municipality Prnjavor

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
BHSS70	Flood protection measures on Sava River, Brod	Brod	Sava	3 546 415 €	PU Vode Srpske and Municipality Brod
BHSS71	Maintain Ukrina-Sava R Lower Lateral Channel	Brod	Sava	3 587 212 €	PU Vode Srpske and Municipality Brod
BHSS72	Flood protection measures in Brod - reconstruction of sewerage system	Brod	Sava	7 749 600 €	Municipality Brod
BHSS73	Phase 1 and Phase 2 - Upgrade Modrica IV Settlement Protective Dykes	Modriča	Bosna	3 355 930 €	PU Vode Srpske and Municipality Modriča
BHSS74	Construction of embankment on the left bank of the river Bosna, Modriča	Modriča	Bosna	2 029 393 €	PU Vode Srpske and Municipality Modriča
BHSS75	River bank protection, Bosna River, Settlement Poloj, Modriča	Modriča	Bosna	1 854 364 €	PU Vode Srpske and Municipality Modriča
BHSS76	River bank protection; Bosna River, curves, Modriča	Modriča	Bosna	1 123 857 €	PU Vode Srpske and Municipality Modriča
BHSS77	Flood protection measures in Vukosavlje	Vukosavlje	Bosna	1 012 546 €	PU Vode Srpske and Municipality Vukosavlje
BHSS78	Flood protection measures on Bosna River downstream from Doboj	Doboj	Bosna	7 776 749 €	PU Vode Srpske and Municipality Doboj
BHSS79	Flood protection measures in Doboj City	Doboj	Bosna	12 813 058 €	PU Vode Srpske and Municipality Doboj
BHSS80	River regulation, Usora River, Teslić	Teslić	Bosna	2 258 393 €	PU Vode Srpske and Municipality Teslić
BHSS81	Flood protection measures in Šamac	Šamac	Sava	228 324 €	PU Vode Srpske and Municipality Šamac
BHSS82	Reconstruction of the channels network in Šamac	Šamac	Sava	3 199 228 €	PU Vode Srpske and Municipality Šamac
BHSS83	River regulation, Bosna River, Šamac	Šamac	Sava	4 218 213 €	PU Vode Srpske and Municipality Šamac
BHSS84	Construction of separate storm sewer network in the urban area of Samac	Šamac	Sava	1 809 330 €	Municipality Šamac
BHSS85	Flood protection measures in Bijeljina's channel network, Bijeljina	Bijeljina	Sava	6 040 034 €	PU Vode Srpske and Municipality Bijeljina
BHSS86	Flood protection measures in Vršani, Bijeljina	Bijeljina	Sava	3 390 831 €	PU Vode Srpske and Municipality Bijeljina
BHSS87	Janja River rehabilitation, Janja-Bijeljina	Bijeljina	Drina	3 579 043 €	PU Vode Srpske and Municipality Bijeljina
BHSS88	River bank protection of Drina River, Bijeljina	Bijeljina	Drina	13 119 399 €	PU Vode Srpske and Municipality Bijeljina

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
BHSS89	Regulation of Janja River, Municipality Ugljevik	Ugljevik	Drina	3 405 185 €	PU Vode Srpske and Municipality Ugljevik
BHSS90	Rehabilitation of erosive river bank, Tabanci, Trsic, Zvornik and Flood protection of settlement Ekonomija from Drina and Sapna Rivers	Zvornik	Drina, Tabanci	2 546 946 €	PU Vode Srpske and Municipality Zvornik
BHSS92	River Bank Protection and regulation of four tributaries of the Drina River, Bratunac	Bratunac	Drina, Križevačka, Kravička, Slapnička and Glogovska	3 003 358 €	PU Vode Srpske and Municipality Bratunac
BHSS93	River regulation, Bistrica River, Miljevina	Foča	Drina	1 692 478 €	PU Vode Srpske and Municipality Foča
BHSS94	River regulation - Kasindolska River and Tilava River, Istočna Ilidža	Istočna Ilidža/ Istočno Sarajevo	Drina	2 257 589 €	PU Vode Srpske and Municipality Istočna Ilidža and Istočno Novo Sarajevo
BHSS95	River regulation, Vrelo River, Čajniče	Čajniče	Drina	393 560 €	PU Vode Srpske and Municipality Čajniče
BHSS96	Flood protection of Gatačko polje - construction of lateral channel, Gacko	Gacko	Trebišnjica	10 391 714 €	PU Vode Srpske and Municipality Gacko
BHSS97	Flood protection of Trebinje town. Increasing of capacity Trebišnjica River in urban area	Trebinje	Trebišnjica	5 541 430 €	PU Vode Srpske and Municipality Trebinje
BHSS98	Flood protection of Mokro polje, Trebinje	Trebinje	Trebišnjica	5 673 590 €	PU Vode Srpske and Municipality Trebinje
BHSS166	Rehabilitation of the Drinjaca River Bed			2 700 000 €	PU Vode Srpske and Municipality Sekovici
BHSS170	Rehabilitation of the Stormwater Pumping Stations	Kozarska Dubica, Novi Grad, Gradiška, Srbac, Brod, Bijeljina, Samac, Raca		15 000 000 €	PU Vode Srpske
KOSS158	Flood Risk Management For Morava E Binces	Viti, Klokot, Partesh, Gjilan, Ranillug	Morava Binces	11 002 200 €	Viti, Kllokot, Budriga, Ranillug
KOSS159	Cleaning, dike repairing and construction of Sitnica River	Lipjan, Graçanicë, Fushëkosovë, Obiliq, Vushtrri, Mitrovicë	Ibri	4 050 810 €	Lipjan, Fushëkosovë, Obiliq, Vushtrri, Mitrovica
KOSS160	Llap River cleaning, dike repairing and construction	Podujeva, Obiliq	Ibri	1 000 200 €	Podujevë and Obiliq
KOSS161	"Mirusha" riverbed regulation & pedestrian and bicycles tracks construction	Malisheva	Drini Bardhë	1 851 900 €	Malishevë
KOSS162	"Klina" riverbed cleaning regulation and dike construction	Klina	Drini Bardhë	1 333 600 €	Mamushë
KOSS163	"Shtimjanka" river cleaning, and bed regulation	Shtime	Ibri	1 041 875 €	Shtime
KOSS164	"Toplluha" Riverbed cleaning regulation and dike construction	Mamusha	Drini Bardhë	1 000 200 €	Mamushë

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
KOSS165	"Morava binçes" River flood control by feasibility study and construction of three reservoirs	Kamenica, Ranilug, Gjilan	Morava Binçes	28 500 000 €	Kamenic, Ranillug, Gjilan
KOSS167	"Drini Bardhë" riverbed cleaning regulation and dike construction		Drini Bardhë (White Drin) (Beli Drin)	1 150 000 €	Klina, Gjakova, Prizren
MKDS1	Cumulative project - consisting of 11 independent projects for the same flooded area - Skopsko Pole	Ilinden, Petrovec, Zelenikovo, Aracinovo, Gazi Baba	Vardar - sub-basin Mid Vardar	3 025 000 €	Municipalities of Ilinden, Petrovec, Arachinovo, Gazi Baba, Zelenikovo, Water Economy "Skopsko Pole"
MKDS2	Investment and technical documentation, for River Vardar regulation	Jegunovce	Vardar - sub-basin Upper Vardar	6 220 000 €	Municipality of Jegunovce,
MKDS3	Main designs and flood prevention works for Radoviska Reka and its tributary Sushica	Radovis	Strumica	5 241 300 €	Municipality and Water Economy Radovisko Pole
MKDS4	Main design for rock fill dam with supportive structures on River Otinjas	Stip	Vardar, sub basin Bregalnica	3 500 000 €	Municipality of Stip
MKDS5	Completion of 64 Action plans for urgent actions	NUTS III - Polog statistical region NUTS III - Skopje region, NUTS III - Notheastern region, NUTS III - Eastern region, NUTS III - Pelagonia region NUTS III - Vardar region NUTS III - Southeastern region	VARDAR sub basins: Upper Vardar, Vardar and Skopje Valey, Mid Vardar, South Vardar, Treska River, Pcinja River, Brgealnica River, Crna reka	2 518 951 €	All municipalities and Water Economies in the basin (total 64)
MKDS6	Completion of 8 Action plans for urgent activities	Radovis, Strumica, Bosilovo, Vasilevo , Novo Selo	Strumica	1 154 730 €	All municipalities and Water Economies in the basin (total 8)
MKDS7	Completion of 5 Action plans for urgent activities	Resen, Ohrid, Struga, Centar Zupa, Vevcani	Crn Drim	146 383 €	5 municipalities (out of 7) in the basin
MNES110	Regulation of Ćehotina River on the Section Ševari - Židovići	Pljevlja	Cehotina	4 700 000 €	Pljevlja
MNES111	Regulation of the riverbed and dike on the left bank of the River Grncar in Gusinje	Gusinje	Grncar	1 300 000 €	Gusinje
MNES112	Regulation of the riverbed and dike of Lim River in on the section Zaton	Bijelo Polje	Lim	9 000 000 €	Zaton
MNES113	Rehabilitation of dike on the River Buna	Ulcinj	Buna	10 000 000 €	Ulcinj
MNES114	Regulation of the riverbed and dikes of Kutska River in on the section Krkori - Kamena luka	Andrijevica	Zlorecica - Lim	4 800 000 €	Andrijevica

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
MNES115	Regulation of the riverbed and dikes of Gracanica River in on the section Halda-mouth of the River in the channel	Niksic	Zeta	11 000 000 €	Niksic
MNES116	Regulation of the riverbed and dikes of Zeta River on the section Brezovik - Slivlje	Niksic	Zeta	10 000 000 €	Niksic
MNES117	Regulation of the riverbed and dikes of Tara River on the area of Municipality of Mojkovac	Mojkovac	Tara	13 000 000 €	Mojkovac
MNES118	Regulation of the riverbed and dikes of Zwta River on the area of the Municipality Danilovgrad	Danilovgrad	Zeta	22 000 000 €	Danilovgrad
MNES119	Regulation of the riverbed and dikes of Susica River on the area Polja	Danilovgrad	Zeta	5 500 000 €	Danilovgrad
MNES120	Construction of dikes for flood protection on Skadar Lake	Podgorica, Cetinje		25 000 000 €	
SRBS121	Construction of the earthen weir on Baricka River (at the section 8+469.97)	Belgrade - Rakovica	Sava	874 000 €	Municipalities of Obrenovac and Čukarica
SRBS122	Bela riverbed regulation from upstream end of regulated part to the existing weir	Belgrade -Rakovica, Belgrade -Voždovac	Sava	642 620 €	Municipality of Voždovac
SRBS123	Regulation of Kijevski stream and Sikijevac stream riverbeds	Negotin	Sava	852 900 €	Municipality of Rakovica
SRBS124	Topčiderska riverbed regulation (section from 12+300 to 17+800)	Vladimirci	Sava	2 000 000 €	Municipalities of Rakovica and Voždovac
SRBS125	Rehabilitation of mechanical equipment in Pump stations Kosno Grlo and Kosno Grlo I	Priboj	Danube	370 000 €	JVP "Srbijavode"
SRBS126	Reconstruction of pump station "Provo"	Priboj	Sava	412 000 €	JVP "Srbijavode"
SRBS127	Regulation of the left bank of River Lim in Piboj from Milješ stream to Grabovički stream	Šabac	Drina	482 500 €	JVP "Srbijavode"
SRBS128	Regulation of the Lim riverbed in Priboj from bridge on Mostina to hospital	Vladimirci	Drina	568 000 €	JVP "Srbijavode"
SRBS129	Regulation of the Dobrava riverbed (section from 0+000 to 6+000)	Koceljevo	Sava	1 018 000 €	JVP "Srbijavode"
SRBS130	Construction of the multipurpose water basin "Vukošić"	Ada, Senta	Sava	2 300 000 €	JVP "Srbijavode"
SRBS131	Tamnava River basin development at its part upstream of Koceljevo town	Kovin	Kolubara	200 000 €	JVP "Srbijavode"
SRBS133	Rehabilitation of the lateral channel along the left Danube dike (section from 20+100 to 23+000, from 30+000 to 39+000)	Žabalj	Danube	1 275 000 €	Municipality of Kovin
SRBS134	Rehabilitation of the Danube left bank dike in sector D.7 - Bela Crkva (section from 0+000 to 0+500)	Bačka Palanka, Bač, Apatin	Danube	1 000 000 €	Municipality of Bela Crkva
SRBS135	Rehabilitation of pump station of Mošorin	Bela Crkva	Danube	81 000 €	Municipality of Žabalj
SRBS136	Rehabilitation of the left bank Danube dike at the sector of Bačka Palanka and Sombor	Aleksinac	Danube	3 200 000 €	Municipalities of Bačka Palanka, Bač and Apatin
SRBS137	Rehabilitation of Karaš riverbed on Serbian Section	Žitorađe	Danube	8 640 000 €	Municipalities of Bela Crkva

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
SRBS139	Moravica riverbed regulation in Aleksinac, (section from 2+370 to 3+950)	Žitorađa	Južna Morava	1 205 000 €	JVP "Srbijavode"
SRBS140	Toplica riverbed regulation (section from 8+500 to 12+500)	Niš	Južna Morava	1 680 000 €	JVP "Srbijavode"
SRBS141	Moravica riverbed regulation in Žitorađe (section from 0+000 to 1+350)	Vlasotince	Južna Morava	1 265 000 €	JVP "Srbijavode"
SRBS142	Nišava riverbed regulation from bridge in Medošavac to railway bridge (section from 11+360 to 13+235)	Kraljevo	Južna Morava	2 110 000 €	JVP "Srbijavode"
SRBS143	Reconstruction of the dikes along the Vlasina River in Vlasotince and construction of cascade objects on the streams "Puškina dolina" and "Smrdanski"	Aleksinac	Južna Morava	840 000 €	JVP "Srbijavode"
SRBS144	Protection of Kraljevo drinking water source from high waters of Ibar River	Aleksinac	Zapadna Morava	1 205 000 €	JVP "Srbijavode"
SRBS145	Južna Morava riverbed regulation at Donji Ljubeš (section from 0+000 to 7+050)	Sremska Mitrovica, Ruma	Velika Morava	1 515 000 €	JVP "Srbijavode"
SRBS146	Regulation of Južna Morava Riverbed, construction and rehabilitation of the dikes at the river section from Vitkovac to Trnjane (section from 0+000 to 15+595)	Vladimirci	Velika Morava	2 450 000 €	JVP "Srbijavode"
SRBS147	Stabilization of the River Sava banks at the section between settlements Hrtkovaci and Jarak	Čoka	Danube	4 460 000 €	Municipality Sremska Mitrovica
SRBS149	Provo - Orlača dike reconstruction	Ruma	Sava	7 500 000 €	JVP "Srbijavode"
SRBS150	Construction of the pump station "Katahat"	Kula	Danube	640 000 €	Municipalities of Čoka and Kikinda
SRBS151	Rehabilitation of the channel connecting PS "Hrtkovci" and PS "Hrtkovačka draga"	Apatin	Sava	72 000 €	Municipality of Ruma
SRBS152	Rehabilitation of the existing dike along the channel Vrbas-Bezdan (section from 14+035 to 14+235) and channel Delta K-I-64 (section from 7+855 to 8+055)	Sjenica	Danube	102 000 €	Municipality of Kula
SRBS153	Rehabilitation of PS "9-3A Apatin" Apatin	Sjenica	Danube	240 000 €	Municipality of Apatin
SRBS154	Grabovica Riverbed Regulation upstream of the existing regulated riverbed	Kraljevo	Drina	630 000 €	JVP "Srbijavode" and Municipality of Sjenica
SRBS155	Regulation of the riverbed Grabovice downstream of the existing regulation	Bač	Drina	1 330 000 €	JVP "Srbijavode" and municipality of Sjenica
SRBS156	Construction of revetments on the left Ibar River bank along the street Karađjorđeva in centre of Kraljevo	Ruma, Pećinci	Zapadna Morava	500 000 €	JVP "Srbijavode"
SRBS172	Strengthening of the left Danube bank in area of the pump station Labudnjača	Kovačica, Opovo, Pančevo		840 000 €	Municipality of Bač
SRBS173	"Feasibility study with General project design" and "Flood protection of area on the left Sava River bank from Progar to Hrtkovci"	Zrenjanin	Danube	1 691 000 €	Municipality of Sremska Mitrovica
SRBS174	Reconstruction of the Flood protection structures on the left River Tamiš bank from its mouth into the River Danube to Uzdine	Sremska Mitrovica		2 086 500 €	Municipalities
SRBS175	Upgrading of the River Tisa dike in area of the Taraš and in the length of 1.2 km.	Žabalj		352 500 €	Municipalities
SRBS176	Securing the left Sava River bank in area of settlement Martinci	Šid		1 672 083 €	Municipality of Sremska Mitrovica

ID	Title	Municipalities	River Basin	Budget	Beneficiary(ies)
SRBS177	Rehabilitation of the Tisa River banks on several sections in total length of 1,320 m	Bela Crkva		4 156 500 €	Municipality of Žabalj
SRBS178	Construction of the water retention "Morović"	Čoka		12 445 000 €	Municipality of Šid
SRBS179	Regulation of the Nera River at Joint River sector with Romania	Valjevo		1 285 000 €	Municipality of Bela Crkva
SRBS180	Reconstruction of Zlatici bridges at 4 locations.			348 500 €	Municipality of Čoka
SRBS182	Urgent works on protection of wider area of Valjevo against floods	Svilajnac	Sava	2 800 000 €	JVP "Srbijavode" and town Valjevo
SRBS183	Urgent works on protection of wider area of Paracin against floods	Bogatic	Morava	3 000 000 €	JVP "Srbijavode" and Municipality Paracin
SRBS184	Urgent works on protection of wider area of Svilajnac against floods	Bogatic	Morava	2 700 000 €	JVP "Srbijavode" and Municipality Svilajnac
SRBS185	Protective System Macva: Sava – Drina: East Zone: Reconstruction of the right side Sava River Dyke, Drina: West Zone: Reconstruction of the right side Drina River Dyke	Obrenovac, Surčin, Novi Beograd	Sava	10 000 000 €	JVP "Srbijavode", Municipality Bogatic and Town Sabac
SRBS187	Rehabilitation of the drainage network in the municipalities Obrenovac, Surcin and Novi Beograd.	Obrenovac	Sava	9 300 000 €	Municipalities of Obrenovac, Surcin and Novi Beograd
SRBS188	Rehabilitation of the Pump stations Kupinac, Mislodjin, Piroman, Skela Nova (Mladost), Vic Bara, Zabreške Livade	Obrenovac	Sava	344 288 €	Municipality Obrenovac
SRBS194	Rehabilitation of the flood protection facilities on the Zlatica from km 10 + 400 to the State Border (25 km)	Lazarevac		348 500 €	Municipalities
SRBS195	Multipurpose dam and reservoir "Selova"		Toplica	12 000 000 €	Municipalities
SRBS196	The implementation of the proposed measures for the regulation of the Kolubara River basin		Sliv Kolubare	11 000 000 €	Municipalities

Source: Consultant's assessment

3.2 Prioritisation

3.2.1 Framework

The assessment of the present situation and the project prioritisation of the projects are based on the assessment of the impacts that requires the definition of the base unit of analysis. The unit for analysis takes the form of maps of potential flood hazard areas that were prepared by the Consultant for this study. An assessment of present situation is needed to determine the impact of the project compared to the situation without the project.

Since detailed FRM and FMS in line with the Directive are not available, the assessment of proposed structural measures is based on database queries and some preliminary spatial analyses performed by the Consultant.

The magnitude of the impact is a function of the protected population and economic value of land use. Therefore, the present situation is characterised by:

- population data of the potential flood hazard area, and
- land use of the potential flood hazard area,

For the characterisation of the situation when a specific project is implemented, the following attributes were used:

- population data of the potential flood hazard area affected by the project, and
- land use of the potential flood hazard area affected by the project.

To support the assessment, a database was designed. It facilitates the evaluation process and project prioritisation. The database contains information on the flood related phenomena of the WB on a preliminary level. All data that has specific spatial dimensions are organised into a GIS: on the one hand, potential flood hazard areas are identified, and against this, the planned measures are evaluated.

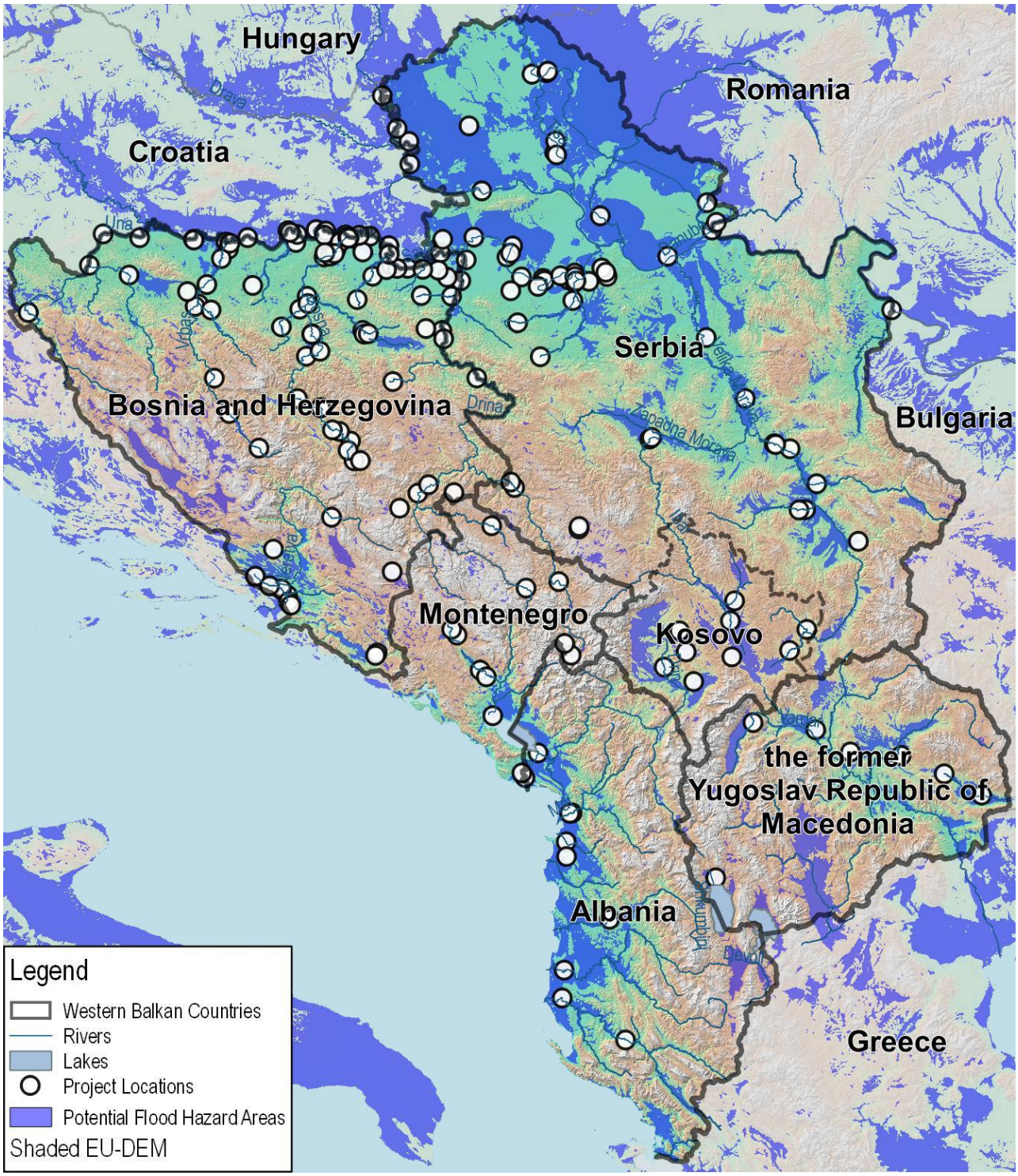
For the definition of the potential flood hazard areas, a region-wide hydrologic model was run as described in Annex 2. No detailed information is available on the present state of the flood protection infrastructure in all WB countries. However, all past studies report that (with few exceptions) protection is insufficient. The potential flood hazard area is derived from topographic information for each river basin based on the assumption that the flood protection infrastructure is inadequate (which may not be the case at all locations).

Hydrologic modelling – defining the boundaries of the base unit

Hydrologic modelling is a complex and challenging task in GIS. Within the framework of the assignment, an overview model of the six countries was created for the evaluation of the impacts of the proposed measures. The most important content of a GIS-based hydrologic model is the Digital Elevation Model (DEM), sometimes referred as Digital Terrain Model (DTM). The direction of the surface flow (flow direction) and the accumulated flow (flow accumulation) for each cell can be calculated in GIS environment. Above a certain water-amount, a surface flow

(Stream) occurs. The map in Figure 6 shows the potential flood hazard areas in the region as the result of the specific modelling exercise of this study.

Figure 6 *Potential flood hazard areas and proposed structural projects*



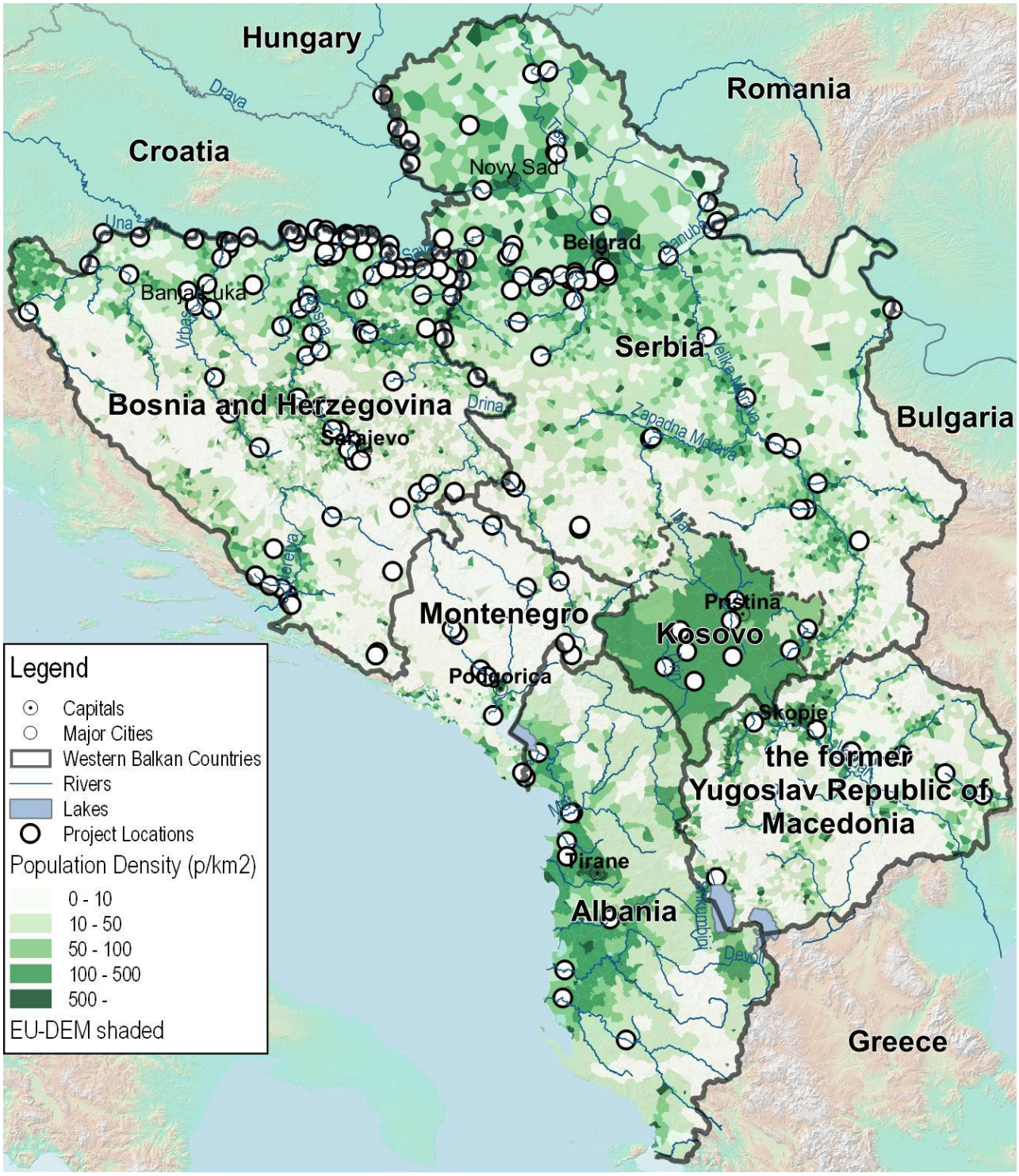
Source: Consultant's drawing, based on EUDEM

The following maps (Figure 7 and Figure 8) show the land use, population density, the potential flood hazard areas and the location of the proposed structural projects in the region.

Figure 7 Land use and the proposed structural projects

Source: Consultant's drawing, based on EUDEM

Figure 8 *Population in the potential flood hazard areas and the proposed structural projects*



Source: Consultants drawing, based on data from Statistical Bureaus

Definition of impact area

The impact area is crucial in regards to the analysis as a great number of criteria and any flood prevention infrastructure is justified by the protected lives and values. The definition of the impact area requires building an independent GIS model that could be used as a tool for evaluation. It is important to emphasise that the GIS modelling does not aim at giving any initial flood risk figures; it targets to create an overview of the available datasets, and to help the assessment of different flood management and FD implementation activities.

The coordinates and radii of the projects and the affected areas were requested during the data collection process to the stakeholders. However, the accuracy of the submitted data cannot be justified in most of the cases. In such cases, information on the potentially affected municipalities are gathered and used for further analysis assuming that the full area of the municipality is endangered.

3.2.2 Priority list

In the prioritisation procedure, projects are scored against the weighted criteria defined in the methodology presented in Annex 2. The output of the procedure is a list of ranked projects, i.e. a prioritised list as summarised in the below tables.

Projects can be ranked according to different weighting scenario. Three scenarios have been elaborated (See Annex 2 for detailed explanation):

- In Scenario 1 the ranking of the projects is based on the overall impacts of the projects in terms of population and economic activity affected, the so-called "Complex impact indicator (CII)" (Table 32). In this scenario, the cost of the project is not taken into account in the ranking.
- In Scenario 2 the prioritisation of the projects is based on the efficiency of the projects in terms of euros spent per avoided impact, thus the "Efficiency indicator (EI)" is observed (Table 33). In this scenario, the overall impact and the costs are considered.
- In Scenario 3, two indicators are weighted. In this case, "Complex impact" indicator is weighted by 70% and "efficiency" indicator is weighted by 30% (Table 34).

Table 32 Structural projects ranked using Complex Impact Indicator (CII)[11]

Country	Value 5		Value 4		Value 3		Value 2		Value 1	
	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos
ALB	69.30	2	26.70	1	41.66	2	26.70	1	40.00	2
BiH	49.43	19	67.74	24	51.88	16	25.69	12	36.36	16
KOS	30.35	2	15.05	2	1.00	1	2.19	2	2.33	2
MKD	3.17	2	1.15	1	2.52	1	3.50	1	11.46	2
MNE	13.70	2	35.00	2	14.80	2	15.50	2	37.30	3
SER	15.57	11	37.44	13	18.41	8	19.29	8	37.32	11
TOTAL	**181.52**	**38**	**183.10**	**43**	**130.26**	**30**	**92.87**	**26**	**164.77**	**36**

Source: Consultant's assessment

[11] *5 is the highest score, 1 is the lowest. Decimal figures of scoring are rounded in tables for classification.*

Table 33 Structural projects ranked using Efficiency Indicator (EI) 11

Country	Value 5		Value 4		Value 3		Value 2		Value 1	
	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos
ALB	33.00	2	8.36	1	46.70	2	20.00	1	96.30	2
BiH	14.19	20	69.16	20	58.45	18	34.22	12	55.07	17
KOS	2.15	2	5.09	2	1.85	1	2.33	2	39.50	2
MKD	2.67	2	3.03	1	1.15	1	3.50	1	11.46	2
MNE	11.30	2	36.00	2	27.50	2	14.70	2	26.80	3
SER	14.51	7	11.07	9	22.43	12	13.42	9	66.59	14
TOTAL	**77.82**	**35**	**132.72**	**35**	**158.09**	**36**	**88.18**	**27**	**295.72**	**40**

Source: Consultant's assessment

Table 34 Structural projects ranked using both CII and EI 11

Country	Value 5		Value 4		Value 3		Value 2		Value 1	
	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos	Total budget (M €)	Nos
ALB	6.30	1	89.70	2	8.36	1	80.00	3	20.00	1
BiH	12.22	9	92.51	31	58.91	22	50.98	18	16.48	7
KOS	0.00	0	35.40	4	13.19	3	0.00	0	2.33	2
MKD	3.17	2	3.67	2	0.00	0	3.50	1	11.46	2
MNE	0.00	0	35.70	3	33.00	3	47.60	5	0.00	0
SER	7.01	3	40.03	20	12.18	9	33.34	12	35.48	7
TOTAL	**28.69**	**15**	**297.02**	**62**	**125.64**	**38**	**215.41**	**39**	**85.76**	**19**

Source: Consultant's assessment

3.2.3 "No-regret" projects

A "no-regret" project is defined here as an intervention that affects an area with a high number of inhabitants, numerous assets and significant economic activities, irrespective of any other, potentially, more effective or efficient projects in another location[12]. Assessment of the level of flood problems is based on the type of land use in the area potentially affected by flooding and the affected population.

In addition, projects that have already been financed by national bodies and/or IFIs have also been defined as "no-regret" projects. Prior to the preparation of this assessment, a number of projects have been proposed by the countries to the IFIs, such as the EC/IPA, World Bank or the European Investment Bank, for financing. Many of the projects have received full funding already, meaning that an earlier assessment has been carried out on those project. Those projects that have been

[12] This is a non-traditional definition of "no-regret" projects. Traditionally "no-regret" projects would be defined as projects which have a positive economic contribution and which are likely to have a positive economic contribution even if other facts, such as climate, population or the implementation of other projects changes. However, due to the lack of flood risks maps it is not possible to make the assessments needed for such a traditional "no-regret" approach.

selected for finance already have not been evaluated using the multi-criteria decision analysis.

It has to be stated that investment decisions to be taken in the near future will lack sufficient information on flood risks, since detailed flood risk maps and assessments in line with the Directive are not available. Therefore, this study has been limited to the determination of “no-regret” projects, the implementation of which may contribute significantly to reduce flood risk according to the presently available information in the country.

Specifically, a “no-regret” project is a project where the value of both the impact and the efficiency indicators are either four or five. Extending the definition of the “no-regret” project, those projects where at least two of the three indicators (the impact, the efficiency indicators and their weighted combined indicator) score four or five can be considered. The summarised results of the assessment are shown in Table 35.

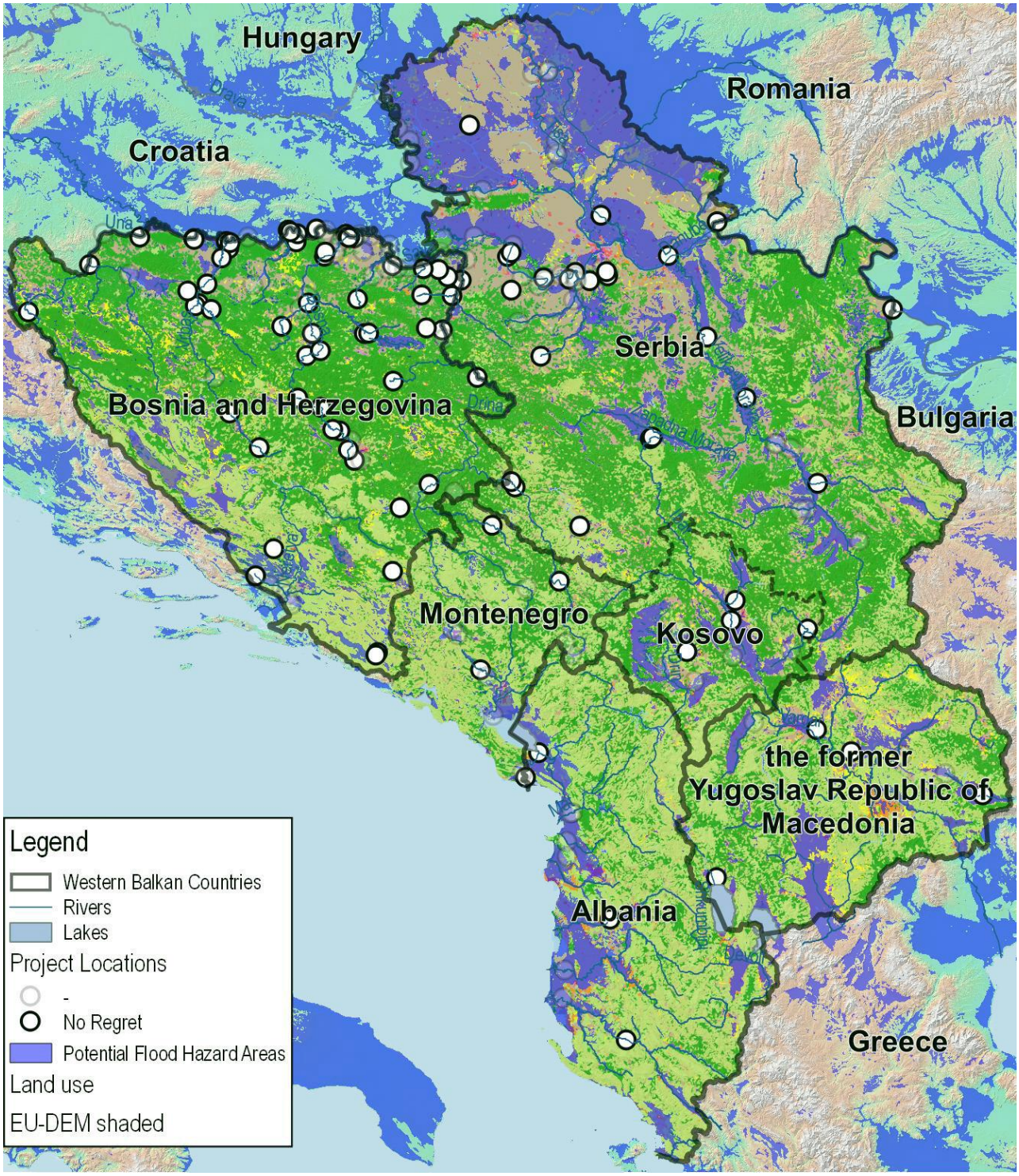
Table 35 Summary of “no-regret” projects

Country	Projects with committed funding			“No-regret” narrow definition			“No-regret” extended definition		
	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No
Albania	6.30	6.30	1	26.70	0.00	1	63.00	0.00	1
BiH	114.92	101.37	26	18.08	2.51	15	34.10	2.13	14
Kosovo	0.00	0.00	0	4.05	0.12	1	31.35	0.63	3
the former Yugoslav Republic of Macedonia	0.00	0.00	0	3.17	0.05	2	3.67	0.97	2
Montenegro	0.00	0.00	0	0.00	0.00	0	35.70	0.00	3
Serbia	28.14	28.14	6	8.46	0.00	6	10.43	0.00	11
TOTAL	**149.36**	**135.81**	**33**	**60.46**	**2.68**	**25**	**178.26**	**3.73**	**34**

Source: Consultant’s assessment

The distribution of the “no-regret” projects in the region is presented in Figure 9.

Figure 9 The location of the "no-regret" projects



Source: Consultant's drawing

The full list of "no-regret" projects is presented in Table 36 below:

Table 36 The list of "no-regret" projects

Country	Project ID	Project title	Total budget (M €)	Funds secured (M €)	Source of funding
Albania	ALBS100	Flood Protection (Lower Drin & Buna River Basin in Shkodra area)	63.00	0.00	Not secured yet
	ALBS103	Flood Protection in Shkumbin River	26.70	0.00	Not secured yet
	ALBS166	Emergency Intervention Flood Protection Works (Vjosa River)	6.30	6.30	Other
BiH	BHFS12	Reconstruction of embankment on River TMT in municipality Ljubuški	0.12	0.00	Not secured yet
	BHFS15	Reconstruction of left embankment and cross sections of River Lištica	0.15	0.00	Not secured yet
	BHFS16	River Željeznica regulation from the War Bridge to Entity border	1.84	0.00	National
	BHFS17	Regulation of the River Bosna in Sarajevsko polje field	2.70	2.70	IPA
	BHFS19	Regulation Left bank of the River Bosna in the settlement Ljubnići	0.10	0.00	National
	BHFS20	Regulation of the River Bosna in Visoko	0.51	0.00	National
	BHFS22	Regulation of the left bank of the River Bosna in Kakanj	0.26	0.00	National
	BHFS23	Regulation of the Bosna River from the bridge Bilmišće to the bridge in Lukovo polje	0.77	0.00	National
	BHFS24	Regulation of the Bosna River downstream from the mouth to the bridge	0.08	0.00	National
	BHFS25	Regulation of River Bosna between the two bridge	0.77	0.00	National
	BHFS26	Regulation of the Bosna River left bank	0.20	0.00	National
	BHFS30	Regulation of the right bank of the Vrbas River downstream from the creek Sušica	0.08	0.00	National
	BHFS31	Regulation of the Vrbas River from the bridge M1 to M3	0.36	0.11	National
	BHFS32	Regulation of the Unas River in Bihać	0.41	0.00	National
	BHFS35	Reconstruction of "Modrac" dam on lake Modrac in Tuzla municipality	1.00	0.80	IPA
	BHFS36	Regulation of River Tinja in Srebrenik municipality (approx. 1300 m length)	0.82	0.60	IPA
	BHFS37	Regulation of River Sapna in Sapna municipality (approx 750 m length in urban part of municipality)	0.75	0.60	IPA
	BHFS38	Regulation of Rivers Jala and Turija in Lukavac municipality	3.45	2.70	IPA
	BHFS39	Regulation of River Drinjača in municipality Kladanj	0.28	0.20	IPA
	BHFS41	Reconstruction of dikes on Sava River	7.82	6.90	IPA
	BHFS44	Reconstruction of dikes on Sava River, section Prud to confluence of River Bosna to Sava (km 0+000 to km 3+000)	0.99	0.99	Other
	BHFS46	Reconstruction of dikes on Sava River - downstream from Šamac (km 39+444 to km 42+600)	0.80	0.80	Other
	BHFS181	Flood protection works and support for Goražde area	13.66	13.66	Other
	BHBS52	Regulation of Brke River and Zovičice River in urban Brčko area	5.37	1.40	IPA
	BHSS60	Repair Minor and Mayor Failures in Sava River Dyke, Gradiska (near Liman PS)	1.07	1.07	Other
	BHSS61	Regulation of the Vrbanja River Bed, locality Česme	1.24	1.24	Other
	BHSS62	Regulation of the Vrbas River Bed, Banja Luka	1.69	0.00	Not secured yet
	BHSS63	Regulation of Dragočaj River, Banja Luka	1.19	0.00	Not secured yet
	BHSS64	Repair Superficial Damage to Celinac Bridge on Jošavka River	1.73	1.73	Other

Country	Project ID	Project title	Total budget (M €)	Funds secured (M €)	Source of funding
	BHSS65	Flood protection measures on Vrbas River, Srbac	1.31	1.31	Other
	BHSS66	Flood protection measures on Sava River, Srbac	0.52	0.52	Other
	BHSS67	Major Maintenance Povalic R and Gornja Inja canal	0.71	0.71	Other
	BHSS68	Discharge Channel - Drainage Turjanica -Vrbas Rivers Confluence	1.91	1.91	Other
	BHSS70	Flood protection measures on Sava River, Brod	3.55	3.55	Other
	BHSS71	Maintain Ukrina-Sava R Lower Lateral Channel	3.59	3.59	Other
	BHSS72	Flood protection measures in Brod - reconstruction of sewerage systen	7.75	7.75	Other
	BHSS73	Phase 1 and Phase 2 - Upgrade Modrica IV Settlement Protective Dykes	3.36	3.36	Other
	BHSS77	Flood protection measures in Vukosavlje	1.01	0.00	Not secured yet
	BHSS79	Flood protection measures in Doboj city	12.81	2.50	IPA
	BHSS80	River regulation, Usora River, Teslić	2.26	0.18	Other
	BHSS81	Flood protection measures in Šamac	0.23	0.23	Other
	BHSS84	Construction of separate storm sewer network in the urban area of Samac	1.81	0.00	Not secured yet
	BHSS85	Flood protection measures in Bijeljina's channel network, Bijeljina	6.04	0.43	Other
	BHSS86	Flood protection measures in Vršani, Bijeljina	3.39	0.00	Not secured yet
	BHSS87	Janja River rehabilitation, Janja-Bijeljina	3.58	3.20	IPA
	BHSS88	River bank protection of Drina River, Bijeljina	13.12	13.12	Other
	BHSS89	Regulation of Janja River, Municipality Ugljevik	3.41	3.41	National
	BHSS90	Rehabilitation of erosive river bank, Tabanci, Trsic, Zvornik and Flood protection of settlement Ekonomija from Drina and Sapna Rivers	2.55	2.00	IPA
	BHSS92	River Bank Protection and regulation of four tributaries of the Drina River, Bratunac	3.00	1.10	IPA
	BHSS93	River regulation, Bistrica River, Miljevina	1.69	0.00	Not secured yet
	BHSS96	Flood protection of Gatačko polje - construction of lateral channel, Gacko	10.39	0.00	Not secured yet
	BHSS97	Flood protection of Trebinje town. Increasing of capacity Trebišnjica River in urban area	5.54	0.00	Not secured yet
	BHSS98	Flood protection of Mokro polje, Trebinje	5.67	0.00	Not secured yet
	BHSS170	Rehabilitation of the Stormwater Pumping Stations	15.00	15.00	Other
	BHSS166	Rehabilitation of the Drinjaca River Bed	2.70	2.70	Other
Kosovo	KOSS159	Cleaning, dike repairing and construction of Sitnica River	4.05	0.12	Other
	KOSS160	Llap River cleaning, dike repairing and construction	1.00	0.02	Other
	KOSS161	"Mirusha" riverbed regulation, pedestrian and bicycles road constructio	1.85	0.04	Other
	KOSS165	"Morava binçes" River-flood control by feasibility study and construction of three reservoirs	28.50	0.57	Other
the former Yugoslav Republic of Macedonia	MKDS1	Cumulative project - consist of 11 independent projects for the same flooded area - Skopsko Pole	3.03	0.00	National
	MKDS5	Completion of 64 Action plans for urgent actions	2.52	0.83	Other
	MKDS6	Completion of 8 Action plans for urgent activities	1.15	0.14	Other
	MKDS7	Completion of 5 Action plans for urgent activities	0.15	0.05	Other

Country	Project ID	Project title	Total budget (M €)	Funds secured (M €)	Source of funding
Montenegro	MNES110	Regulation of Ćehotina River on the Section Ševari -Židovići	4.70	0.00	Not secured yet
	MNES112	Regulation of the riverbed and dike of Lim River in on the section Zaton	9.00	0.00	Not secured yet
	MNES118	Regulation of the riverbed and dikes of Zwta River on the area of the Municipality Danilovgrad	22.00	0.00	Not secured yet
Serbia	SRBS121	Construction of the earthen weir on Baricka River (at the section 8+469.97)	0.87	0.00	Not secured yet
	SRBS122	Bela riverbed regulation from upstream end of regulated part to the existing weir	0.64	0.00	Not secured yet
	SRBS124	Topčiderska riverbed regulation (section from 12+300 to 17+800)	2.00	0.00	Not secured yet
	SRBS125	Rehabilitation of mechanical equipment in Pump stations Kosno Grlo and Kosno Grlo I	0.37	0.00	Not secured yet
	SRBS127	Regulation of the left bank of River Lim in Piboj from Milješ stream to Grabovički stream	0.48	0.00	Not secured yet
	SRBS128	Regulation of the Lim riverbed in Priboj from bridge on Mostina to hospital	0.57	0.00	Not secured yet
	SRBS130	Construction of the multipurpose water basin "Vukošić"	2.30	0.00	Not secured yet
	SRBS133	Rehabilitation of the lateral channel along the left Danube dike (section from 20+100 to 23+000, from 30+000 to 39+000)	1.28	0.00	Not secured yet
	SRBS142	Nišava riverbed regulation from bridge in Medošavac to railway bridge (section from 11+360 to 13+235)	2.11	0.00	Not secured yet
	SRBS144	Protection of Kraljevo drinking water source from high waters of Ibar River	1.21	0.00	Not secured yet
	SRBS151	Rehabilitation of the channel connecting PS "Hrtkovci" and PS "Hrtkovačka draga"	0.07	0.00	Not secured yet
	SRBS152	Rehabilitation of the existing dike along the channel Vrbas-Bezdan (section from 14+035 to 14+235) and channel Delta K-I-64 (section from 7+855 to 8+055)	0.10	0.00	Not secured yet
	SRBS155	Regulation of the riverbed Grabovice downstream of the existing regulation	1.33	0.00	Not secured yet
	SRBS156	Construction of revetments on the left Ibar River bank along the street Karađjorđeva in centre of Kraljevo	0.50	0.00	Not secured yet
	SRBS173	"Feasibility study with General project design" and "Flood protection of area on the left Sava River bank from Progar to Hrtkovci"	1.69	0.00	Not secured yet
	SRBS174	Reconstruction of the Flood protection structures on the left River Tamiš bank from its mouth into the River Danube to Uzdine	2.09	0.00	Not secured yet
	SRBS179	Regulation of the Nera River at Joint river sector with Romania	1.29	0.00	Not secured yet
	SRBS182	Urgent works on protection of wider area of Valjevo against floods	2.80	2.80	IPA
	SRBS183	Urgent works on protection of wider area of Paracin against floods	3.00	3.00	IPA
	SRBS184	Urgent works on protection of wider area of Svilajnac against floods	2.70	2.70	IPA
	SRBS185	Protective System Macva: Sava – Drina: East Zone: Reconstruction of the right side Sava River Dyke	10.00	10.00	IPA
	SRBS187	Rehabilitation of the drainage network in the municipalities Obrenovac, Surcin and Novi Beograd.	9.30	9.30	IPA
	SRBS188	Rehabilitation of the Pump station Kupinac	0.34	0.34	IPA

Source: Consultant's assessment

3.3 Maturity

Following the prioritisation of projects, the maturity of the projects was assessed using the method described in Annex 2. Considering maturity, the following levels were determined:

High level of maturity

"Highly mature" projects are defined as "projects, where after some preparations, the preparation of the grant contracts can start and the project implementation can be initiated in a few months, or those projects where basically all documents are available but the administrative process of tendering is ongoing and some documents may need be to be finalised". This means that the preparation of the grant contract can start within approximately 6 months. For a more detailed analysis within the category of "Highly mature", the following two sub-categories were defined:

- Ready for finance: All ("yes" OR "partly") AND ("Status for tendering" IS EQUAL "Tendering strategy is under preparation" OR "Tendering strategy defined" OR "Tendering strategy approved" OR "Procurement plan approved"), and
- Highly mature, tendering in progress: ("Status for tendering" IS EQUAL ["Tendering strategy is under preparation" OR "Tendering strategy defined" OR "Tendering strategy approved" OR "Procurement plan approved"]) AND ("Conceptual design documents available?" OR "Consent/Permit design documents available?" OR "Construction design documents available?" OR "Construction permit available?" is "yes").

High-medium level of maturity

"High-medium level of maturity" projects are defined as "projects that are well prepared, the necessary permits are available, however some supporting studies, such as feasibility, CBA studies tendering documents are missing". After the completion of the full project documentation, and the drafting of the grant contracts, the implementation of the projects can start within 1-2 years depending on the quality of the available documents.

Low-medium level of maturity

"Low-medium level maturity" projects are defined as "the preparation of the project has started, the basic founding documents are available, however the design works are still ongoing and the permit procedures are still ahead". The implementation of these projects may commence within 1-3 years depending on the actual stage, the complexity of project and the need for permits. For a more detailed analysis within the category of low-medium level maturity, the following two sub-categories were defined:

- Partly prepared, design in progress: IF ("Conceptual design documents available?" OR "Construction design documents available?") is "YES", and
- Partly prepared, feasibility/CBA studies available: IF ("Preliminary feasibility study available?" OR "Feasibility study available?") is "yes".

Low-level of maturity

The projects in this class are project ideas, with merely more than generic descriptions of the content and cost estimates. The development of these projects to full maturity may take 2-4 years. The summarising results of the assessment are shown in Table 37 and Table 38.

Table 37 Classification of all projects according to maturity

Country	High level maturity			High-medium level of maturity			Low-medium level maturity			Low level maturity			Total		
	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No
Albania	0.00	0.00	0	0.00	0.00	0	204.36	6.30	8	0.00	0.00	0	204.36	6.30	8
BiH	56.70	36.54	39	0.00	0.00	0	26.08	15.06	5	148.31	59.42	43	231.09	111.02	87
Kosovo	11.00	0.55	1	4.05	0.12	1	0.00	0.00	0	35.88	0.69	7	50.93	1.37	9
the former Yugoslav Republic of Macedonia	6.22	0.00	1	3.03	0.00	1	12.56	3.64	5	0.00	0.00	0	21.81	3.64	7
Montenegro	4.70	0.00	1	10.30	0.00	2	0.00	0.00	0	101.30	0.00	8	116.30	0.00	11
Serbia	16.37	0.00	5	41.04	9.64	22	36.94	15.80	12	33.68	2.70	12	128.03	28.14	51
TOTAL	**94.99**	**37.09**	**47**	**58.41**	**9.77**	**26**	**279.94**	**40.80**	**30**	**319.17**	**62.82**	**70**	**752.52**	**150.47**	**173**

Source: Consultant's assessment

Table 38 Classification of "no-regret" projects according to maturity

Country	High level maturity			High-medium level of maturity			Low-medium level maturity			Low level maturity			Total		
	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No
Albania	0.00	0.00	0	0.00	0.00	0	96.00	6.30	3	0.00	0.00	0	96.00	6.30	3
BiH	41.95	36.38	24	0.00	0.00	0	19.03	15.06	2	106.12	54.57	29	167.10	106.01	55
Kosovo	0.00	0.00	0	4.05	0.12	1	0.00	0.00	0	31.35	0.63	3	35.40	0.75	4
the former Yugoslav Republic of Macedonia	0.00	0.00	0	3.03	0.00	1	3.82	1.02	3	0.00	0.00	0	6.85	1.02	4
Montenegro	4.70	0.00	1	9.00	0.00	1	0.00	0.00	0	22.00	0.00	1	35.70	0.00	3
Serbia	3.52	0.00	3	21.58	9.64	12	19.14	15.80	6	2.80	2.70	2	47.04	28.14	23
TOTAL	**50.17**	**36.38**	**28**	**37.66**	**9.77**	**15**	**137.99**	**38.18**	**14**	**162.27**	**57.90**	**35**	**388.08**	**142.22**	**92**

Source: Consultant's assessment

3.4 Funding

According to the findings, the following three types of finance are defined.

- Country: finance allocated by the local or central institutions.
- IPA (Instrument for pre-accession): financed granted by IPA (pre-2014) or IPA II (2014-2020).
- Other: finance secured by other international sources, as IFIs, bilateral agreements or for which a ratio of finance is determined, but its source is unknown

The necessary funds are determined as the sum of project specific funds and funding gap.

The project specific fund expresses the amount of the total budget the finance of which is secured. It is calculated by the following formula:

Project specific funds = Total estimated budget * ratio of finance secured

The total funding gap is the amount of the total budget of the projects without any finance secured and the unfinanced part of budget of the partly financed projects. It is calculated by the following formula:

Funding gap = Total estimated budget – Project specific finance

IPA II funds were allocated according to EC Implementation Decision of 17.11.2014 adopting on a special measure on flood recovery and flood risk management in Albania, BiH, Kosovo, the former Yugoslav Republic of Macedonia, Montenegro, Serbia and Turkey. As the EC Decision did not define projects to recover this financial source, the assessment on funding gap was made according to information collected by the country experts on the availability of the various documents. Similarly, the situation is the same concerning the submitted Post-Flood Needs Assessment of the country, in which specific measures have been identified to be funded from sources reserved for the recovery of emergencies. As there is no final decision on the allocation of the funds yet, no funding has been considered for specific interventions.

After the classification of each project, Table 39 and Table 40 below summarise the results of the analysis presenting the number of projects according to funding.

Table 39 Regional funding gap considering all proposed projects

Country	Total budget (M €)	Source of funding (M €)						Project specific funds secured (M €)	Funding gap (M €)
		National		IPA		Other			
		Funds secured (M €)	No. of Projects	Funds secured (M €)	No. of Projects	Funds secured (M €)	No. of Projects		
Albania	204.36	0.00	0	0.00	0	6.30[13]	1	6.30	198.06
BiH	231.09	6.67	18	24.70	12	79.64	25	111.02	120.08
Kosovo	50.93	0.00	0	0.00	0	1.37	8	1.37	49.56
the former Yugoslav Republic of Macedonia	21.81	1.57	2	0.00	0	2.07	4	3.64	18.17
Montenegro	116.30	0.00	0	0.00	0	0.00	0	0.00	116.30
Serbia	128.03	0.00	0	28.14	6	0.00	0	28.14	99.89
TOTAL	**752.52**	**8.24**	**20**	**52.84**	**18**	**89.38**	**38**	**150.47**	**602.05**

Source: Consultant's assessment

Table 40 Regional funding gap considering "no-regret" projects

Country	Total budget (M €)	Source of funding (M €)						Project specific funds secured (M €)	Funding gap (M €)
		National		IPA		Other			
		Funds secured (M €)	No. of Projects	Funds secured (M €)	No. of Projects	Funds secured (M €)	No. of Projects		
Albania	96.00	0.00	0	0.00	0	6.30[11]	1	6.30	89.70
BiH	167.10	6.67	12	24.70	12	74.64	20	106.01	61.09
Kosovo	35.40	0.00	0	0.00	0	0.75	4	0.75	34.65
the former Yugoslav Republic of Macedonia	6.85	0.00	1	0.00	0	1.02	3	1.02	5.83
Montenegro	35.70	0.00	0	0.00	0	0.00	0	0.00	35.70
Serbia	47.04	0.00	0	28.14	6	0.00	0	28.14	18.89
TOTAL	**388.08**	**6.67**	**13**	**52.84**	**18**	**82.71**	**28**	**142.22**	**245.86**

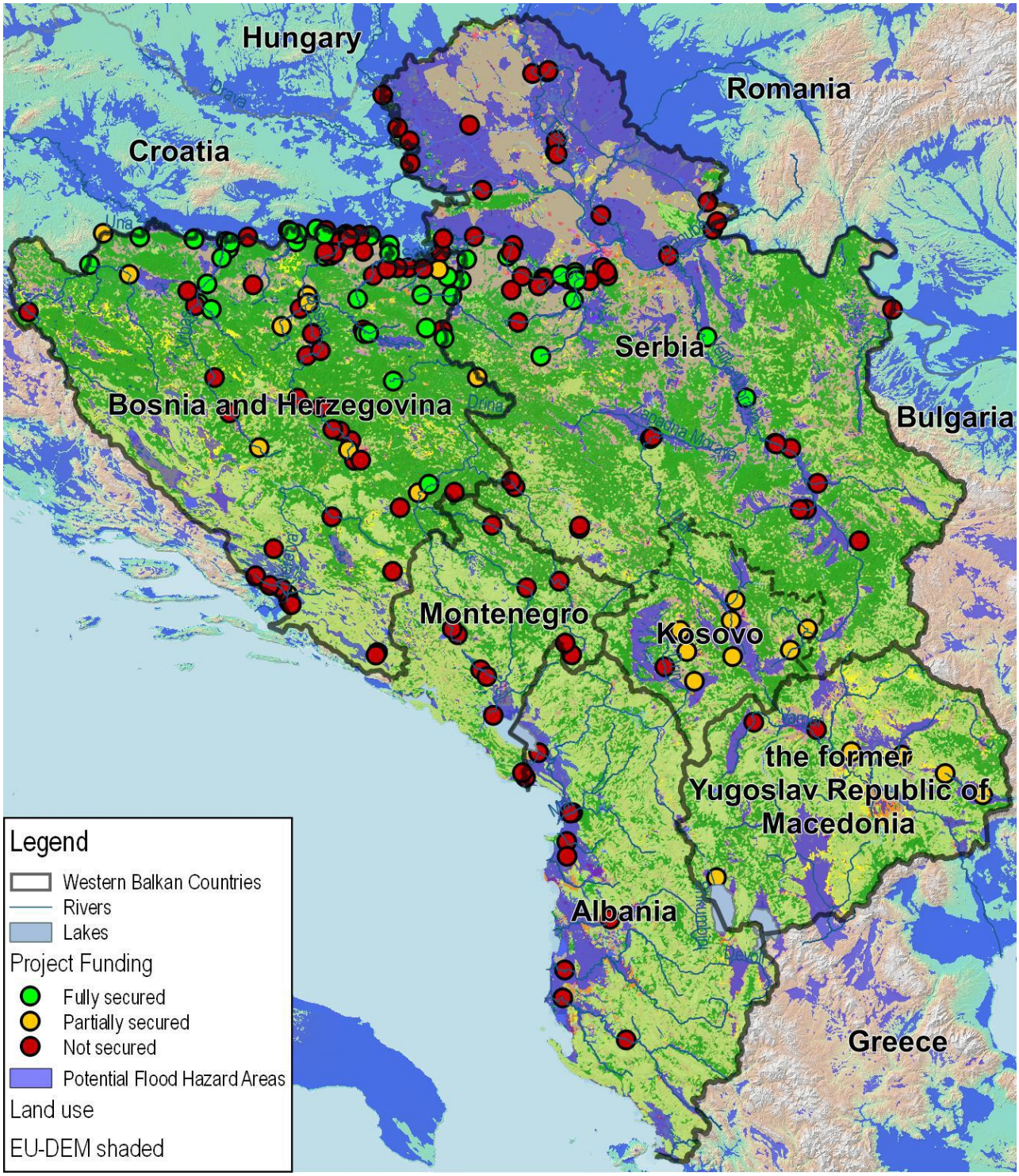
Source: Consultant's assessment

[13] Combined funding: IPA 2013 and UNDP

Table 39, above indicates the total financial gap is MEUR 602.05, if all regional projects are considered. In case of the “no-regret” projects the funding gap is equal to MEUR 245.86 as shown in Table 40.

The regional distribution of the projects concerning the type and security of finance is presented in Figure 10. It may be concluded that the largest percentage of the financially secured projects are in BiH.

Figure 10 Regional distribution of the projects concerning to the financial security



Source: Consultant’s drawing

3.5 Projects of regional relevance

The regional relevance of any structural measure can be claimed in the following cases:

- the planned intervention affects more than one country,
- the impacts of the project extend to more than one country.

Those river basins that cover more than one country are of international/regional concern as defined in the WFD. Measures and their impact in these are to be incorporated into the regional list of measures to secure that no national level investment jeopardise flood management activities elsewhere in the region.

It has to be noted that the projects under implementation by the international river basin management institutions such as ISRBC and ICPDR refer to non-structural measures and therefore are not in the scope of this chapter.

The measures of regional relevance can be defined on different levels. Firstly, measures that are implemented by more than one country are defined as the most relevant regional measures. In these cases, the common planning, design, permitting and implementation of the intervention secures the most efficient solution to a specific flood related issue for all countries concerned. Such measures have not been identified in the region.

Secondly, the projects whose impact areas cross country borders can be considered of highest regional relevance; these projects have “direct cross-boundary impact”. In the case of these projects the cross-boundary impact is clear and, as required by the FD and WFD, a common understanding is needed that shall manifest in common solutions and measures on both sides of the border. For these measures, countries are obliged to consult their neighbours about the planned interventions. The plans and design are to be prepared and the intervention should be implemented in a way that by no means increase flood risks in the neighbouring countries. The statement and the consent of the concerned water authorities and permitting bodies as well as the central water agencies of the neighbouring country have to be collected in all cases. Depending on the nature and the magnitude of the interventions, some parallel prevention works shall be considered in the neighbouring country to overcome the potential negative impacts, such as the unwanted retention of waters or the changing character of the water flows. The planned interventions shall be considered by the neighbouring countries during the preparation of their flood management strategies.

Projects that concern border rivers and cross-boundary rivers within a 15 km buffer are considered those where “impact on cross-boundary waters” are likely to occur. In these cases, a similar procedure is to be followed as described above.

The measures, defined in this study as having “direct impact on regional waters”, can be defined as those where the impact area of the project affects a delineated potential flood hazard area that crosses or touches a country border. Common action in this case is necessary according to the projects with cross-boundary impact.

The measures defined below as having “indirect impact on regional waters” are those whose impact areas concern international river sub-basins within the WB Region: the WFD, in line with the Espoo Convention, defines all necessary steps to be made in case projects that are implemented within an international river basin are of international relevance. This group of measures cover most of those identified by the stakeholders as river sub-basins usually cross the borders of the relatively small countries of diverse terrain on the catchment of the major rivers. In the case of these measures, according to the WFD, the implementing bodies shall inform and consult their neighbours to identify potential negative impacts, if any, and to find the solution of mitigation. In addition, neighbouring countries shall consider the interventions in the preparation of their strategies and plans for the development of their own flood protection systems.

Besides those projects that affect the WB Region itself, there are a number of measures where the international relevance concerns EU Member States. Here we consider only those projects whose impact areas have an effect on potential flood hazard areas of cross-boundary nature with an EU Member State. In this case, we assume that all countries observe their obligations stemming from the WFD prescribing the obligation of sharing information and consultation. These measures are those that may have impacts in Croatia, Greece, Hungary, Romania and Bulgaria.

The forums of co-operation, data and information exchange at all levels can be the ICPDR, the ISRBC, the co-operation of the Drin Core Group of the Drin Memorandum and the EU Civil Protection Mechanism.

Table 41 and Table 42 summarise the projects with regional - international connectivity.

Table 41 Summary of projects with regional relevance

Country	Direct cross-boundary impact			Impact on cross-boundary waters			Direct impact on regional waters			Indirect impact on regional waters			EU country concerned		
	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No
Albania	69.30	6.30	2	129.30	6.30	4	117.66	6.30	5	156.00	6.30	5	6.30	6.30	1
BiH	87.99	58.01	28	130.36	74.01	45	140.69	73.16	42	144.39	79.90	50	127.30	72.06	40
Kosovo	11.00	0.55	1	49.89	1.35	8	6.09	0.16	3	50.93	1.37	9	0.00	0.00	0
the former Yugoslav Republic of Macedonia	0.00	0.00	0	14.96	2.62	3	5.24	1.57	1	14.96	2.62	3	5.24	1.57	1
Montenegro	10.00	0.00	1	61.70	0.00	5	11.30	0.00	2	116.30	0.00	11	0.00	0.00	0
Serbia	16.14	0.00	8	38.37	9.30	17	76.43	22.34	28	98.98	22.44	46	76.43	22.34	28
TOTAL	**194.44**	**64.86**	**40**	**424.57**	**93.58**	**82**	**357.42**	**103.54**	**81**	**581.57**	**112.63**	**124**	**215.27**	**102.28**	**70**

Source: Consultant's assessment

Table 42 Summary of "no-regret" projects with regional relevance

Country	Direct cross-boundary impact			Impact on cross-boundary waters			Direct impact on regional waters			Indirect impact on regional waters			EU country concerned		
	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No	Total budget (M €)	Funds secured (M €)	No
Albania	69.30	6.30	2	96.00	6.30	3	69.30	6.30	2	96.00	6.30	3	6.30	6.30	1
BiH	63.32	57.26	17	82.43	69.65	24	95.20	69.24	22	102.34	78.07	28	81.81	68.14	20
Kosovo	0.00	0.00	0	35.40	0.75	4	5.05	0.14	2	35.40	0.75	4	0.00	0.00	0
the former Yugoslav Republic of Macedonia	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0	0.00	0.00	0
Montenegro	0.00	0.00	0	13.70	0.00	2	0.00	0.00	0	35.70	0.00	3	0.00	0.00	0
Serbia	2.22	0.00	3	17.54	9.30	8	29.23	22.34	11	41.34	22.44	21	29.23	22.34	11
TOTAL	**134.85**	**63.56**	**22**	**245.07**	**86.00**	**41**	**198.78**	**98.02**	**37**	**310.78**	**107.56**	**59**	**117.33**	**96.78**	**32**

Source: Consultant's assessment

4 Conclusions and Recommendations

4.1 Summary of findings

In line with the objectives of the study to map ongoing and planned activities to implement the FD and improve flood management infrastructure, the institutional framework and measures proposed by the countries have been assessed. Besides the specific structural and non-structural projects collected from the countries, after the extended assessment of the countries' institutional settings, a number of non-structural measures have been identified by the Consultant. These proposals concern the tasks for implementing the FD and strengthening the institutional framework behind implementation and flood management as referred to in the WFD. In some cases, the tasks of FD implementation defined by the countries and the Consultant overlap, meaning that the countries are well aware of their obligations and necessary actions to comply with the Directive.

Concerning the projects collected from the country stakeholders, there have been 51 non-structural and 173 structural projects identified with a total budget of EUR 86.34 million and EUR 752.5 million respectively. If we consider the measures proposed by the Consultant as well, a total budget of EUR 102.5 million shall be spent on non-structural measures, such as assessments and strategy formulation, institutional and legal developments, data collection and management, etc., in the region.

Status of implementation of the Floods Directive

The assessment of the status of implementation of the FD including the institutional set-up and capacity showed that BiH and Serbia, being the most exposed to floods, have considerably advanced in the last few years and are continue to advancing. Kosovo, the former Yugoslav Republic of Macedonia and Montenegro are at the beginning of the FD implementation process. The legislative and the organisational frameworks exist in all countries. Anyhow, a considerable amount of work and resources is still needed to implement the FD and to establish an efficient flood protection and management system.

The status of the implementation of the FD is uneven among the WB countries. In most of the cases flood issues are incorporated into the wider context of water management and the management of emergencies. Only in the case of BiH there is a FD specific implementation plan available and even this is not adopted yet. This means that floods receive varying, in some cases limited recognition in the legal and strategic framework and in many cases, there are no bylaws, regulations or standards specifically for floods. This situation results in some uncertainties concerning the enforcement of legislation and the specific responsibilities of the various organisations involved in the FD implementation process.

The FD is a directive, which requires mostly institutional changes and emphasises coordination. Implementing these changes is often a long and difficult process even in the EU Member States. The full implementation of the Directive in the entire region is not likely before 2025. The targets of all countries seem to be rather

challenging, considerable resources and hard work are required for their achievements.

It is important to note that the available flood management strategies today cannot be considered as “outcomes” of the implementation of the Directive and they should be revised and adjusted in the final phases of FD implementation. The necessary inputs for this, such as flood hazard and flood risk assessments, have not been prepared yet. BiH and Serbia are the exception as their preliminary assessments are available which can contribute to the development of detailed Directive specific strategies and plans.

Table 43 summarises those activities and relevant costs that are directly related to the implementation of the FD[14].

Table 43 The summary schedule and budget (in MEUR) of the FD implementation process in WB

Country	Albania			BiH			Kosovo			Former Yugoslav Republic of Macedonia			Montenegro			Serbia		
	Start	End	Budget	Start	End	Budget	Start	End	Budget	Start	End	Budget	Start	End	Budget	Start	End	Budget
Detailed methodologies, capacity building	2016	2017	1.5	2016	2017	0.6	2016	2017	0.3	2016	2017	1.0	2016	2017	1.0	2016	2017	0.8
Regulations, standards and strategy	2016	2018	1.2	2016	2016	1.2	2016	2018	0.5	2016	2018	1.2	2016	2018	1.2	2016	2017	0.5
Data collection and management	2017	2019	2.0	2015	2016	1.2	2017	2019	0.8	2017	2019	1.8	2017	2019	1.8	2016	2017	1.2
Preliminary Flood Risk Assessment	2018	2019	1.5	completed			2018	2019	1.0	2018	2019	1.5	2018	2019	1.5	completed		
Flood Hazard and Risk Assessment	2019	2021	3.0	2015	2018	3.4	2019	2021	2.5	2019	2021	2.8	2019	2021	2.8	2016	2018	3.5
Flood Management Plans	2020	2023	4.0	2016	2018	6.0	2020	2023	2.0	2020	2023	3.5	2020	2023	3.5	2018	2021	6.0
TOTAL	2016	2023	13.2	2015	2018	12.4	2016	2023	7.1	2016	2023	11.8	2016	2023	11.8	2016	2021	12.0

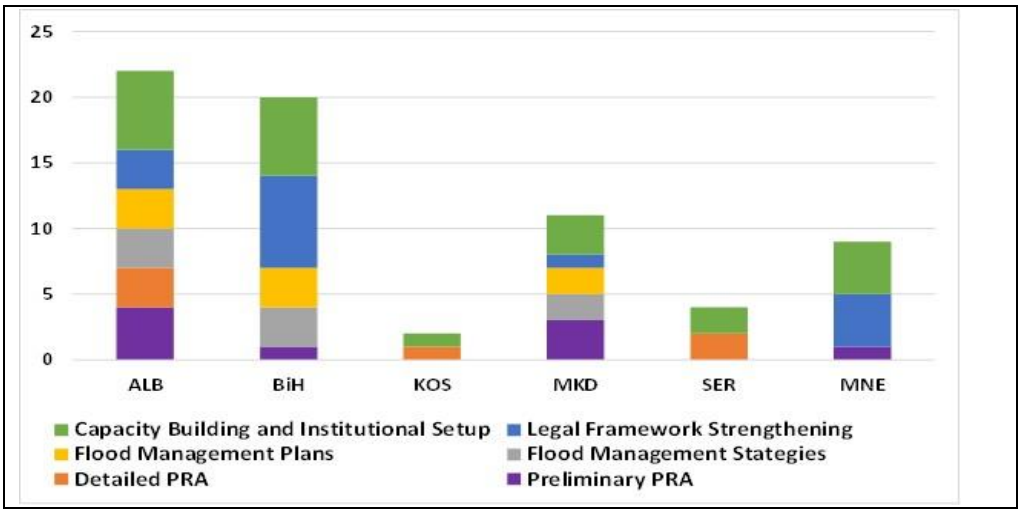
Source: Consultant’s proposal and estimates

The information in Table 43 is based on the assessment of the Consultant as it is stressed in section 2.4.2. The total budget estimates relates to the implementation costs in a narrow sense and concerns the necessary actions to arrive to the full implementation of the FD. It does not include investment costs of monitoring stations or equipment for establishing early warning system.

[14] It has to be noted that some elements of these activities may overlap with activities already initiated by the countries.

Concerning the non-structural measures proposed by the countries, Figure 11 indicates the magnitude of the cost and the types of the interventions. It has to be noted that overlaps with the proposals of the Consultant exist, as the countries already realised the importance of the development of the institutional background and have made steps to carry out the specific tasks related to the Directive.

Figure 11 Breakdown of cost estimates of non-structural measures per country



Source: Consultant's assessment based on data collected from country stakeholders

Besides the non-structural projects collected from the country stakeholders there are many non-structural projects that are initiated by international organisations. The ISRBC manages projects related to the Sava River and facilities the communication among the countries of the Sava River Basin. Serbia is a full member of a similar international cooperation in the Danube River Basin under the auspices of the ICPDR targeting transboundary water management in the Danube River Basin. Priorities of the initiatives include improving the environmental emergency warning system, flood forecasting, the monitoring network and the information system as well as sustainable flood prevention and risk management.

The Drin Core Group set up in the framework of the Memorandum of Understanding for the management of Drin Basin can serve as a potential organisation that assists joint efforts for international level planning and communication among the signing countries. The processes can be triggered through the EU Civil Protection Mechanism that may contribute to the regional processes with good practices and aid the development of flood protection institutions and strategies.

Structural measures

The flood protection projects collected constitute a "long list" of flood management, however this list cannot be considered as an officially recognised priority list or strategy of any of the countries. The long list may be a useful input for further planning and the formulation of investment strategies before the final outputs of the FD implementation processes are available in the medium term.

The assessment of the financial background of the collected projects shows that in the case of structural projects, the overall funding gap is EUR 602 million and there is a total budget of EUR 150.5 million already assigned to developing the flood

protection infrastructure. The number of structural projects with fully secured funding is 33 with a total budget of EUR 135.8 million; in the cases of Kosovo, the former Yugoslav Republic of Macedonia and Montenegro no fully financed projects could be identified; the total funding gap in these countries is MEUR 49.6, 18.2 and 116.3 respectively. In Albania, Serbia and BiH there are already MEUR 6.3, 28.1 and 106.0 funds allocated for the construction of flood prevention infrastructure, and there is still a funding gap of MEUR 198, 99.9 and 120.1 respectively.

Concerning maturity and “no-regret” projects, complex evaluation procedures, specifically developed for this study, were applied. Forty-seven structural projects out of the 173 are already categorised as high-level maturity and 92 projects were identified as “no-regret” based on their impacts, efficiency and secured funding. Twenty-eight of the “no-regret” projects have already reached high-level maturity. The estimated budget of the "no-regret" structural projects totals to EUR 388 million, which implies a funding gap of EUR 245.9 million.

4.2 Recommendations

Implementation of the Floods Directive

Based on the assessment of the institutional backgrounds behind the implementation of the FD, there are a varying number of tasks to be performed by the WB countries. These tasks cover the preparatory activities and the preparation of flood hazard and risk assessments and flood management plans as prescribed in the Directive. The total funding need of these policy (non-structural) measures in the region is EUR 56 million in total and the overall funding gap is EUR 28.5 million.

The institutional framework is a crucial issue in the implementation of the FD, as it requires complex tasks to be performed in close co-operation between the different monitoring, data management and planning institutions on local, country and regional levels. The FD itself does not define the ideal institutional framework but leaves it to the authorities to establish the most effective governance and implementation structure. However, the implementation requires a well-functioning and well-governed network of all public and private players.

To fully implement the Directive, a complex approach is required in order to allow long-term sustainability of the results. The actions proposed cover the legal and institutional framework and include specific steps to implement this Directive. Actions to be taken by the countries cover the following areas:

- Capacity building:
    - Regulatory measures to enforce legislation and establish the necessary coherence with regulations of other fields, such as land use, law on local governance and local regulations
    - Strengthening the organisational background; strengthening central governmental bodies, hydro-meteorological services, river basin management authorities; targeted training

- Develop data collection and management capacities, modelling and computing tools (hardware and software), local and territorial water and flood management bodies, hydro-meteorological services
- Planning and implementing educational programmes in tertiary education of flood management, modelling, planning and design
- Planning and implementing awareness-raising programmes for the public and economic actors potentially affected by floods

- Preparatory activities:

  - Developing detailed methodologies for data collection and management, hydraulic modelling, climate and weather modelling and forecasting
  - Detailing regulations and establishing standards to support implementation, development of a detailed FD implementation strategy and plan (establishing a solid and precisely defined legal and institutional framework)
  - Collection and management of data necessary for implementing the Directive (GIS databases on the terrain, water courses, population, the state of existing flood protection infrastructure, land use, economic activities, protected values, etc.)

- Flood assessment and planning, as defined in the FD:

  - Preliminary Flood Risk Assessment,
  - Flood Hazard and Flood Risk Maps
  - Flood Management Plans.

Structural measures – flood protection infrastructure

The development of the flood protection infrastructure in the WB is an urgent issue, as, due to the improper infrastructure, a low-level preparedness, low enforcement and climate change, severe floods hit the region on an annual basis. This study cannot take the role of a specific investment plan for the countries because of its limited framework and because the decision on specific investment plans shall lie in the countries' competences. It has to be emphasised that investment plans in line with the directive can be developed only after flood management plans have been prepared. Considering the time and resources needed for the full implementation of the FD and the limited resources of the WB countries, investment plans in line with the FD can be expected in the region only in 2018-2025. Still, the results of the assessment of the proposed structural projects can give an indication for the scheduling of the most urgent interventions.

There are a great number of projects with committed funding. Their implementation can start in the near future with the preparation or the finalisation of the necessary feasibility studies and design documents. The next step of investing in flood protection infrastructure can be the implementation of the projects that qualified among the "no-regret – narrow definition" projects. This means that with the implementation of these projects both high impact and high efficiency can be achieved. It is suggested by the Consultant that these projects shall receive priorities in the short and medium term investment strategies of the countries.

Projects within the class “no-regret, extended definition” are a selection of projects where the impact is still high and efficiency is somewhat lower than in the case of the projects of the narrow definition of “no-regret”. These projects are recommended by the Consultant to be included mostly into the medium term investment plans.

Projects with regional relevance

Projects with regional relevance are those where either the interventions or their impacts concern more than one country.

Countries have to consult their neighbours about the planned interventions. The plans and design have to be prepared in a co-ordinated manner and interventions should be implemented in a way that by no means increase flood risks in the neighbouring countries.

There are projects that serve flood protection in more than one country. These projects are suggested for financing from regional or cross-border programmes.

4.3 The way forward

The following road map is proposed when implementing sound flood protection and management in the WB countries.

1 The countries should develop and adopt their **FD implementation plan and programme**.

2 The countries should **accelerate the transposition of EU legislation**. Besides the full transposition of the FD and the WFD, detailed bylaws and decrees, annexed with renewed planning, design and construction standards are to be developed. These should be in line with the country-specific institutional settings and the overall framework of disaster risk management and should consider the foreseeable impacts of climate change.

3 The countries should take steps to **incorporate flood management issues into all other sectoral procedures**, such as urbanisation, urban and rural housing, agriculture or dam management. Special emphasis is to be given to land use in flood areas, sewage and waste management, as well as climate change. Strengthening legislative enforcement is a key issue, in general, but also in light of land use and property issues.

4 The FD is a soft directive and, therefore, it is necessary that institutional and planning activities are in place prior to its implementation. The **implementation of the Directive** has to be accelerated, organisational structures have to be rehabilitated and refined, and existing management organisations need to prepare for the Directive’s implementation. Strengthening organisational structures must be carried out as soon as possible.

5 The preparation of **flood hazard and flood risk assessments and flood management plans** are the major points of the FD. For the WB countries,

with the exception of Serbia and BiH, the preparation of the PFRA is a prerequisite and must be initiated.

6 Based on the results of the assessments, **flood management strategies and flood risk management plans**, at the country and local level, should be prepared and adopted. Based on those, a final **prioritised structural investment list** for each country has to be developed in order to ensure sound flood management.

7 While preparing long-term plans, short-term investments also need to be planned, focusing on the **most urgent interventions** based on available information. At this stage, the “no-regret” project list presented in this study needs to be replaced with the prioritised list, adopted by the countries. The short-term investment plan is to be revised later, preferably at the end of flood risk mapping process, and replaced once the flood management plans have been prepared.

8 **Early warning and hydro-meteorological monitoring** are important elements of the FD as they contribute greatly to the planning and design as well as to the successful management of flood situations. The monitoring systems need to be developed in all countries of the region, based on a common foundation, and data has to be made available to all interested parties. Historical data on waters today held by the Serbian water authorities must to be shared with the neighbouring countries to assist their efforts in analysing floods.

9 The implementation of the FD requires **knowledgeable and dedicated staff at regional, country and local levels**. At present, none of the countries has sufficient flood professionals. Using existing knowledge at the largest universities in the region, region-wide undergraduate and professional educational and training programmes need to be developed. The programmes should focus on the tools of flood modelling, planning and design according to the definitions of the FD and the existing European practices. Considering that results of any complex educational programme must be tangible and will require time, initiatives to address this must be taken as soon as possible to avoid further weakening of the professional background in the region.

10 Emphasis is to be given to **disseminating information on floods**, the **possible actions in emergencies** and the **activities related to flood control** to local inhabitants and economic players. These activities, as highlighted in the Directive, can drastically decrease damages of floods and can have significant results in short term.

11 The EC, the IFIs and other funding sources should consider **prioritising funding measures** to support the implementation of the FD, particularly the preparation of the flood hazard and risk maps and development of the national flood strategies and countrywide flood risk management plans.

12 The countries should strengthen their **regional and cross-border cooperation in flood management planning and design** and use existing

structures to foster more efficient interventions and data sharing. The ISRBC and the ICPDR, as the main organisations of such mission, must be supported politically and financially. The obligations and opportunities stemming from the membership of WB countries in the EU Civil Protection Mechanism shall also be used.

13 **Monitoring the results of the FD implementation process and the activities of the countries and sharing good practices** shall be done on a regular basis by the international professional organisations and the donor.