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**PROGRAM FOR DEVELOPMENT OF  
FLOOD RISK MANAGEMENT PLAN  
IN THE SAVA RIVER BASIN**

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February 2017

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## **Disclaimer**

The borders between the countries cooperating in preparation of the Program for development of Flood Risk Management Plan in the Sava River Basin have not been finally determined. The content and maps of this report do not prejudice the determination or marking the borders in any way.

## **Acknowledgements**

Many institutions and individuals contributed to the preparation of the Program for development of Flood Risk Management Plan in the Sava River Basin, and therefore this Program represents a true collective effort that reflects cooperation in flood management in the Sava River Basin and beyond.

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- the Permanent Expert Group for Flood Prevention of the International Sava River Basin Commission for the overall guidance, facilitating data collection at both the basin-wide and national level, valuable comments to the structure and text of the report and its editing;
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## **ABBREVIATIONS**

APSFR	Area of Potentially Significant Flood Risk
BA	Bosnia and Herzegovina
EC	European Commission
CA	Competent Authorities of the Parties
EFD	Directive 2007/60/EC on the assessment and management of flood risks (EU Floods Directive)
EIA	Environmental Impact Assessment
FASRB	Framework Agreement on the Sava River Basin
FB&H	Federation of Bosnia and Herzegovina
FFWS	Flood Forecasting and Warning
FRM	Flood Risk Management
FRMP	Flood Risk Management Plan
HMWB	Heavily Modified Water Body
HR	Republic of Croatia
ICPDR	International Commission for the Protection of the Danube River
ISRBC	International Sava River Basin Commission
LiDAR	Light Detection and Ranging
ME	Montenegro
PEG FP	Permanent Expert Group for Flood Prevention
PFRA	Preliminary Flood Risk Assessment
RBD	River Basin District
RBM	River Basin Management
RS	Republic of Serbia
SI	Republic of Slovenia
SEA	Strategic Environmental Assessment
SRB	Sava River Basin
SWMI	Significant Water Management Issues
UNECE	United Nations Economic Commission for Europe
USACE	United States Army Corps of Engineers
UoM	Unit of Management
WFD	Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy (Water Framework Directive)

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## 1 INTRODUCTION

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Parties<sup>1</sup> to the *Framework Agreement on the Sava River Basin (FASRB)*<sup>2</sup>, having noted the need to deepen the cooperation and to implement jointly agreed activities aimed at ensuring preconditions for sustainable flood protection in the basin, have agreed to prepare the *Protocol on Flood Protection to the FASRB*<sup>3</sup> (*Protocol*). The *Protocol* emphasizes the importance of coordination measures, works and activities aimed at decreasing the flood risk throughout the basin, and the implementation of these activities in accordance with the "no harm rule" principle. Therefore, in order to contribute to the decrease of harmful consequences of floods, in particular for human life and health, environment, cultural heritage, economic activities and infrastructure, the Parties have agreed to cooperate in the implementation of above activities. The *Protocol* represents a firm legal foundation for the implementation of all activities agreed by the Sava countries, via their joint platform – the International Sava River Basin Commission (Sava Commission).

With the aim of fulfilling the goals of the *Protocol*, the Parties have undertaken the obligation to cooperate in the implementation of the following activities:

- Undertaking of Preliminary Flood Risk Assessment (PFRA);
- Preparation of Flood Maps;
- Development of *Flood Risk Management Plan for the Sava River Basin (Sava FRMP)*, starting with preparation of the Program for its development;
- Establishment of the Flood Forecasting, Warning and Alarm System (FFWS) for the Sava River Basin;
- Exchange of information significant for sustainable flood protection;
- Implementation of all measures and activities of mutual interest, originating from planning documents or the above activities.

The *Protocol* was signed by all the Parties in 2010 and entered into force on November 27, 2015.

It is important to emphasize that significant steps have already been made in terms of implementation of this *Protocol*, even before its formal entry into force. This has been achieved through the corresponding conclusions of the Sava Commission. The will of the Parties to implement joint activities agreed on the basis of the *Protocol* has been expressed in Declarations of the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> Meeting of the Parties to the *FASRB* (in Ljubljana on June 1, 2011, Sarajevo on May 31, 2013, and Zagreb on December 2, 2014, respectively).

Draft *Program for Development of Flood Risk Management Plan in the Sava River Basin (Program)* was one of the main outcomes of the project "Building the link between flood risk management planning and climate change assessment in the Sava River Basin". The project was funded by the United Nations Economic Commission for Europe (UNECE) and implemented by the Sava Commission in the period 2010-2013. The draft *Program* was based on the conclusions drawn from the analysis of legislation, strategies and plans, as well as completed and ongoing activities in flood risk management planning in the Sava River Basin, and related Danube River Basin initiatives.

Given the time that has elapsed since the beginning of the project and the fact that the activities, both at the national and international level, run concurrently with the implementation of the project, some elements of the draft *Program* became obsolete at the time of its finalization. Therefore, the Permanent Expert Group for Flood Prevention (PEG FP) of the Sava Commission, as the expert body in charge for its preparation, concluded that the *Program* should be considered as a "living" document which may be amended to the date of its adoption by the Sava Commission, the latest six months as of the entry into force of the *Protocol*.

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<sup>1</sup> Slovenia, Croatia, Bosnia and Herzegovina, and Serbia

<sup>2</sup> [http://www.savacommission.org/dms/docs/dokumenti/documents\\_publications/basic\\_documents/fasrb.pdf](http://www.savacommission.org/dms/docs/dokumenti/documents_publications/basic_documents/fasrb.pdf)

<sup>3</sup>

[http://www.savacommission.org/dms/docs/dokumenti/documents\\_publications/basic\\_documents/protocols/protocol\\_on\\_flood\\_protection\\_to\\_the\\_fasrbpdf](http://www.savacommission.org/dms/docs/dokumenti/documents_publications/basic_documents/protocols/protocol_on_flood_protection_to_the_fasrbpdf)

In the following chapters, this *Program* provides for activities and actions required for the development of the *Sava FRM Plan* in line with the *Protocol*, taking into account the activities already finished or ongoing in the Parties and at the basin-wide level.

This *Program* applies for the first cycle of preparation of the *Flood Risk Management Plan for the Sava River Basin* and may be amended for the subsequent reviews.

The threshold value for planning at the level of the Sava River Basin in terms of the size of the river catchments is 1000 km<sup>2</sup>, as agreed upon during the development of the first *Sava River Basin Management Plan (Sava RBMP)*, with exemption of the rivers with smaller catchment areas but designated as being of basin-wide importance. This principle is generally respected in this program, subject to certain exceptions which are agreed through the work of PEG FP. In further text, the solutions which represent exemptions from the above general principle are clearly indicated. The full list of rivers of basin-wide importance is provided in [Annex 1](#).

## 2 LEGAL BACKGROUND

### 2.1 FRAMEWORK AGREEMENT ON THE SAVA RIVER BASIN

The Sava River Basin countries have had a long history of different activities in managing water resources, developing and building hydraulic structures, and protecting the Sava River from land base sources of pollution.

Legal framework for continuation of such activities after dissolution of Yugoslavia was set by the *FASRB*. The Sava Commission was established as the international body in charge of implementation of the *FASRB*. The overall objective of the agreement is to support transboundary cooperation for sustainable development of the region and one of the particular goals is regulating the issues of sustainable flood protection in the Sava River Basin, by undertaking the measures with the aim to prevent or limit hazard, to reduce flood risk and to reduce or mitigate adverse consequences of floods.

#### ***FASRB, Article 2: Objective of the Agreement***

1. The Parties shall cooperate in order to achieve the following goals:
  - a) Establishment of an international regime of navigation on the Sava River and its navigable tributaries;
  - b) Establishment of sustainable water management; and
  - c) Undertaking of measures to prevent or limit hazards, and reduce and eliminate adverse consequences, including those from floods, ice hazards, droughts and incidents involving substances hazardous to water.
2. For the purpose of carrying out the goals stated in Paragraph 1 of this Article, the Parties shall cooperate in the process of the creation and realization of joint plans and development programs of the Sava River Basin and harmonization of their legislation with EU legislation.

The Parties to the *FASRB* closely cooperate in all aspects of flood management since the establishment of the Sava Commission and its expert bodies, with PEG FP having a leading role in this particular sector.

Montenegro, which shares the basin but is not a Party to the *FASRB*, cooperates in the fields covered by the *FASRB* on the basis of the *Memorandum of Understanding on cooperation between the International Sava River Basin Commission and Montenegro*<sup>4</sup>, signed on December 9, 2013, in Belgrade.

### 2.2 PROTOCOL ON FLOOD PROTECTION TO THE FRAMEWORK AGREEMENT ON THE SAVA RIVER BASIN


The *Protocol*, prepared as stipulated by the *FASRB*, Article 30 (1), defines framework for cooperation and implementation of the activities aimed at creating the conditions for sustainable flood protection in the Sava River Basin.

#### ***Protocol, Article 2: Scope and objectives of the Protocol***

This *Protocol* regulates the issues of sustainable flood protection in the Sava River Basin caused by:

- a) natural phenomena such as high flows of rivers, as well as ice jamming, and
- b) artificial impacts like water discharge from reservoirs and retentions induced by dam collapsing or inadequate handling, changes in river basin, riverbeds and floodplains, etc.,

with aim to prevent or limit flood hazard, to reduce flood risk and to reduce or mitigate detrimental consequences of floods.

 *The Parties have agreed to consider floods which are of importance for the entire basin and those which may have transboundary impact. Although flash flooding phenomena*


<sup>4</sup> [http://www.savacommission.org/dms/docs/dokumenti/documents\\_publications/memo\\_of\\_understanding/final\\_mou.pdf](http://www.savacommission.org/dms/docs/dokumenti/documents_publications/memo_of_understanding/final_mou.pdf)



may have significant local impacts in some areas of the Sava River Basin, they are not being considered at the basin-wide level.

**Protocol, Article 3: Grounds and principles of cooperation**

1. The Parties shall, in planning and implementation of measures, works and activities on sustainable flood protection in the Sava River Basin, cooperate on the basis of *Directive 2007/60/EC*, taking into account the *Action Program for Sustainable Flood Protection in the Danube River Basin* (hereinafter: the *Action Program for Danube River Basin*) and taking into account the good practices in cooperation in the field of flood protection in the Sava River Basin.
2. The Parties shall, in implementation of measures, works and activities on flood protection on their territories, as well as in conduction of activities in other sectors that may have negative impact on flood protection of other Parties, operate in accordance with “no harm rule” principle.

 *The Parties agreed to implement the Protocol in a coherent way and consistent with water policies of the European Union, as well as with the general provisions of policies in the Sava River Basin.*

The main cooperating activities agreed by the *Protocol* are provided in Article 4:

**Protocol, Article 4: Activities**


With aim to achieve the objectives of this *Protocol*, and on the basis of documents as referred to in Article 3 paragraph 1 of this *Protocol*, the Parties shall cooperate on:

- a) Preparation of the *Program for development of the Flood Risk Management Plan for the Sava River Basin*;
- b) Undertaking of Preliminary Flood Risk Assessment;
- c) Preparation of Flood Maps;
- d) Development of *Flood Risk Management Plan for the Sava River Basin*;
- e) Establishment of the Flood Forecasting, Warning and Alarm System in the Sava River Basin;
- f) Exchange of information significant for sustainable flood protection;
- g) Implementation of all measures and activities of mutual interest, originating from planning documents or activities from items (a) to (f) above or other mutually agreed measures and activities.

The initial joint activity is preparation of the *Program* which should include all elements needed for preparation of a joint *Sava FRMP*.

**Protocol, Article 5: Program for development of Flood Risk Management Plan for the Sava River Basin**

1. The Sava Commission shall adopt a *Program for Development of the Flood Risk Management Plan for the Sava River Basin* (hereinafter: the *Program*), within six months as of the entry into force of this *Protocol*.
2. The *Program* shall comprise all elements relevant for development of the *Flood Risk Management Plan for the Sava River Basin*, including responsibilities of the Parties, mechanisms of the plan development, holders of the particular activities and their realization deadlines.

 *This Program describes main actions and procedures foreseen for development of the Sava FRMP, providing also an overview of related completed and/or ongoing activities undertaken in line with various provisions of the Protocol.*

### 3 PRELIMINARY FLOOD RISK ASSESSMENT

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The *Protocol*, by its Article 6, recognises the Sava Commission as a body for the exchange of data relevant for the national Preliminary Flood Risk Assessments (PFRA) and for informing other Parties on the identified national Areas with Potential Significant Flood Risk (APSFR). It also gives the mandate to the Sava Commission to coordinate the activities on harmonisation of the APSFR shared by two or more Parties, identified by the Parties as the areas of mutual interest for flood protection.

**Protocol, Article 6: Preliminary Flood Risk Assessment**

1. Each Party shall undertake Preliminary Flood Risk Assessment for its part of the Sava River Basin, taking into account the *Directive 2007/60/EC*.
2. In the process of Preliminary Flood Risk Assessment, the Parties shall exchange all relevant data, in principle, through the Sava Commission or bilaterally, as appropriate.
3. In the case of bilateral exchange of the relevant data from paragraph 2 of this Article, the latter shall also be delivered to the Sava Commission, without delay.
4. Based on the Preliminary Flood Risk Assessment, each Party shall, on the part of the Sava River Basin on its territory, identify those areas for which it concludes that potential significant flood risk exists or might be considered likely to occur.
5. Each Party shall, through the Sava Commission, inform the other Parties on the identified areas from Paragraph 4 of this Article.
6. The Sava Commission shall coordinate the activities on harmonisation of the areas identified pursuant to paragraph 4 of this Article shared by two or more Parties, identified by the Parties as the areas of mutual interest for flood protection.

Exchange of information has been carried out regularly, in principle through the meetings of PEG FP. However, the PEG FP decided on its 21<sup>st</sup> meeting (held in Zagreb on 28-29 January 2013) to compile a joint report on the PFRA in the Sava River Basin based on collected information from the Parties on the results of their preliminary assessment of flood risks and designation of the APSFR. This integrated report on the PFRA in the Sava River Basin summarizes information on methodologies and criteria used by the Parties to identify and assess significant past floods and consequences of potential future floods. Further, the report provides an overview of designated APSFRs, with special attention paid to the APSFRs identified along transboundary rivers. It forms a basis for harmonisation of the APSFRs shared by two or more Parties, identified by the Parties as the areas of mutual interest for flood protection. The report also addresses the impacts of climate change and provides an overview of transboundary coordination and information exchange. Brief concluding remarks are provided for at the end of the PFRA report.

The report is accompanied with maps showing sub-basins larger than 1,000 km<sup>2</sup> and several smaller size sub-basins of importance at the basin level, topography and land cover, as well as all APSFRs identified by the Parties in the Sava River Basin.

The Sava Commission accepted the report and approved its publishing on web on July 1, 2014. The full report is available at:

[http://www.savacommission.org/dms/docs/dokumenti/documents\\_publications/publications/other\\_publications/pfra/preliminary\\_flood\\_risk\\_assessment\\_in\\_the\\_sava\\_river\\_basin\\_20140701.pdf](http://www.savacommission.org/dms/docs/dokumenti/documents_publications/publications/other_publications/pfra/preliminary_flood_risk_assessment_in_the_sava_river_basin_20140701.pdf)

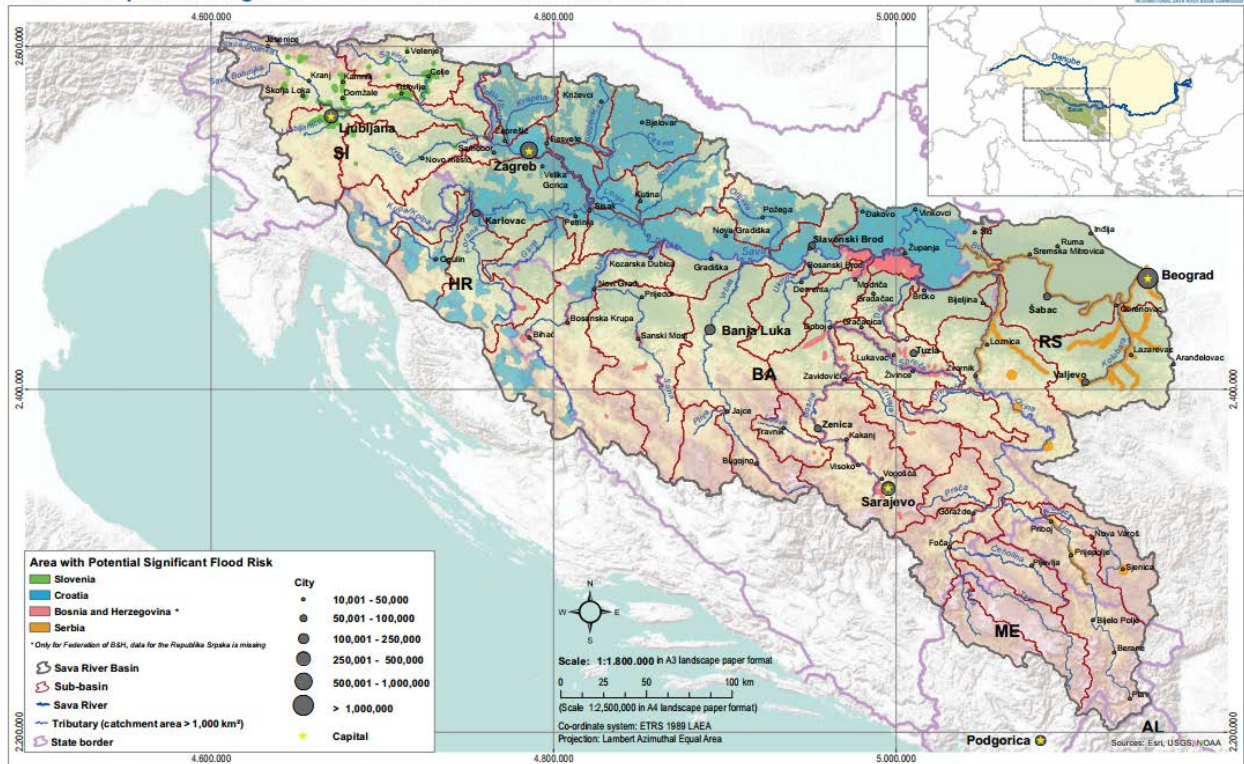
The report and the enclosed maps send an important message to the public and stakeholders on the areas which have the highest risk of flooding and present a good basis for preparation of the *Sava FRMP*.

✚ ***Through the joint report the countries have met their obligations set by paragraphs 2-5 of Article 5 as well as the obligation to inform the public in line with Article 12 of the Protocol. However, at the time of preparation of the report information for the territory of the Republika Srpska and Montenegro was not available. It is expected that these information will be collected during development of the Sava FRMP, and thus requirements set by Article 5 shall be formally completed.***

More detailed information is available on the web sites of responsible national institutions. Links to relevant documents and maps are provided in the following table.

Country	Address
SI	<p><b>Map:</b>  <a href="http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/karta_obmocij_OPVP.pdf">http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/karta_obmocij_OPVP.pdf</a>  <b>Report:</b> <a href="http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/predhodna_ocena_poplavne_ogr_ozenosti.pdf">http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/predhodna_ocena_poplavne_ogr_ozenosti.pdf</a>  <a href="http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/porocilo_OPVP.pdf">http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/podrocja/voda/porocilo_OPVP.pdf</a>  <b>Water Management Atlas:</b>  <a href="http://gis.arso.gov.si/evode/profile.aspx?id=atlas_voda@Arso">http://gis.arso.gov.si/evode/profile.aspx?id=atlas_voda@Arso</a></p>
HR	<p><b>Map:</b> <a href="http://korp.voda.hr/pdf/Prethodna%20procjena%20rizika%20od%20poplava/12.%20KARTA%20-%20PRETHODNA%20PROCJENA%20PODRU%20C4%20CJA%20ZNA%20C4%20CAJNH%20RIZIKA%20OD%20POPLAVA.pdf">http://korp.voda.hr/pdf/Prethodna%20procjena%20rizika%20od%20poplava/12.%20KARTA%20-%20PRETHODNA%20PROCJENA%20PODRU%20C4%20CJA%20ZNA%20C4%20CAJNH%20RIZIKA%20OD%20POPLAVA.pdf</a>  <b>Report:</b> <a href="http://korp.voda.hr/pdf/Prethodna%20procjena%20rizika%20od%20poplava/PRETHODNA%20PROCJENA%20RIZIKA%20OD%20POPLAVA%20-%20TEKST.pdf">http://korp.voda.hr/pdf/Prethodna%20procjena%20rizika%20od%20poplava/PRETHODNA%20PROCJENA%20RIZIKA%20OD%20POPLAVA%20-%20TEKST.pdf</a></p>
BA	<p><a href="http://www.voda.ba/preliminarna-procjena-rizika-od-poplava-za-podrucje-federacije-bih">http://www.voda.ba/preliminarna-procjena-rizika-od-poplava-za-podrucje-federacije-bih</a>  <b>Map:</b>  <a href="http://www.voda.ba/udoc/PPPR_Knjiga_2_Vodno%20podrucje%20rijeka%20Save.pdf">http://www.voda.ba/udoc/PPPR_Knjiga_2_Vodno%20podrucje%20rijeka%20Save.pdf</a>  <b>Report:</b>  <a href="http://www.voda.ba/udoc/PPPR_Knjiga_1.pdf">http://www.voda.ba/udoc/PPPR_Knjiga_1.pdf</a>  <b>Report:</b>  <a href="http://www.voders.org/index.php/edit-profile/17-vodni-akti/57-izdate-vodne-dozvole-3">http://www.voders.org/index.php/edit-profile/17-vodni-akti/57-izdate-vodne-dozvole-3</a>  <b>Map:</b>  <a href="http://www.voders.org/images/Vode_Srpske/Karta%203.1%20-%20Predlozena%20AFAs%20podrucja.jpg">http://www.voders.org/images/Vode_Srpske/Karta%203.1%20-%20Predlozena%20AFAs%20podrucja.jpg</a>  <a href="http://www.voders.org/images/Vode_Srpske/Karta%203.2%20-%20Predlozena%20AFAs%20podrucja.jpg">http://www.voders.org/images/Vode_Srpske/Karta%203.2%20-%20Predlozena%20AFAs%20podrucja.jpg</a>  <a href="http://www.voders.org/images/Vode_Srpske/Karta%203.3%20-%20Predlozena%20AFAs%20podrucja.jpg">http://www.voders.org/images/Vode_Srpske/Karta%203.3%20-%20Predlozena%20AFAs%20podrucja.jpg</a>  <a href="http://www.voders.org/images/Vode_Srpske/Tabela%20br.17%20-%20AFAs%20podrucja.pdf">http://www.voders.org/images/Vode_Srpske/Tabela%20br.17%20-%20AFAs%20podrucja.pdf</a></p>
RS	<p><b>Map and table with a list of</b>  <b>APSFR:</b> <a href="http://www.rdvode.gov.rs/doc/6.2.1%20Znacajna%20poplavna%20podrucja%20za%20teritoriju%20Republike%20Srbije.pdf">www.rdvode.gov.rs/doc/6.2.1%20Znacajna%20poplavna%20podrucja%20za%20teritoriju%20Republike%20Srbije.pdf</a></p>

Areas with potential significant flood risk in the Sava River Basin

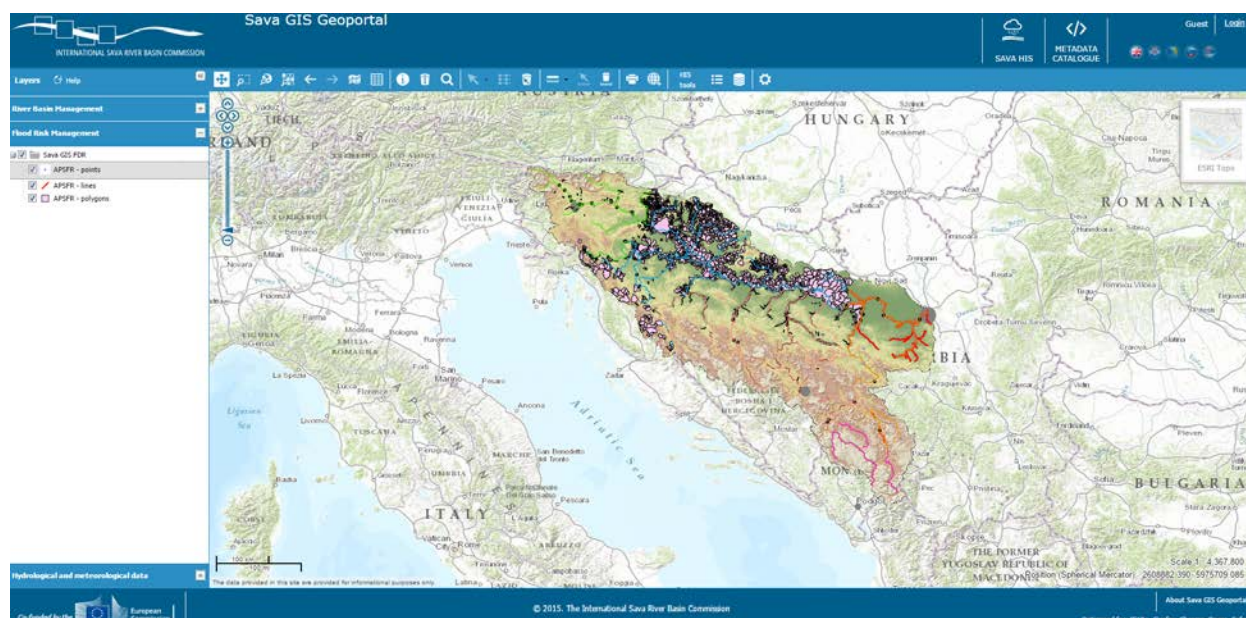


This product is based on national information provided by the Parties to the FASRB (SI, HR, BA, RS) and ME. Shuttle Radar Topography Mission (SRTM-3) from USGS Seamless Data Distribution System was used as topographic layer. The boundaries and names shown and designations used on this map do not imply official endorsement or acceptance by the ISRBC.



APSFs identified by the Parties are shown on the above map. The APSFR spatial datasets in Slovenia, Croatia, and Bosnia and Herzegovina (FB&H) were defined by using the same geometry (polygons), level of detail and resolution (at least 1:25,000), showing no inconsistency at bordering sections. Republika Srpska defined APSFR as polygons, by using map 1:250,000. Serbia presented APSFRs as lines and points, by using map 1:300,000.

Information on the APSFRs identified in the Sava River Basin is also available at the Sava GIS geoportal: <http://savagis.org/map;jsessionid=1E09C13B6832673E369F88FC458E560B>.



*SavaGIS Geoportal (<http://savagis.org>)*

The SavaGIS Geoportal has been established in order to ensure efficient and effective communication channels for the ISRBC community to share and disseminate data and information, including that related to the flood management. The SavaGIS Geoportal is associated with its database and the web application for editing, loading and retrieving data and metadata. Currently, it consists of the two models: River Basin Management (RBM) and Flood Risk Management (FRM).

The FRM database model is designed and structured in accordance with the *EU Floods Directive (EFD)*, *EFD Reporting Guidance 2013*, *INSPIRE Directive* and professional requirements. It contains spatial and alphanumeric database modules for:

- Flood Reporting Units,
- PFRA,
- APSFR,
- Flood Hazard and Risk Maps,
- Historical Floods and
- Flood Protection Structures.

**✚ Generally, the FRM database model will ensure sharing and disseminating data and information relevant for development of the Sava FRMP. However, the database module for the Plan should be designed and implemented into SavaGIS in the course of preparation of the Plan.**

## 4 FLOOD MAPS

### **Protocol, Article 7: Flood Maps**

1. Each Party shall prepare Flood Maps for the areas identified in the Preliminary Flood Risk Assessment as referred to in Article 6 of this *Protocol* for the part of the Sava River Basin under its jurisdiction, taking into account the *Directive 2007/60/EC*.
2. Each Party shall, through the Sava Commission, inform other Parties on the Flood Maps prepared for its territory.
3. The respective Parties shall agree upon the methodology for mapping of the flood areas shared by two or more Parties, identified according to the Article 6 paragraph 4 of this *Protocol*, and, thereof, inform the Sava Commission.
4. The Parties may, for purpose of joint implementation of the activities from paragraph 1 of this Article, agree to develop a joint methodology for preparation of Flood Maps for the whole Sava River Basin.
5. The Sava Commission shall coordinate the development of the Methodology from paragraph 4 of this Article.

✚ *In respect to Article 7, the Parties have started preparation of flood maps for the APSFR identified at their territories (paragraph 1) and the Parties have been informed regularly on the maps preparation through the Sava Commission (paragraph 2). Considering that the Protocol had not entered into force at the time when the national activities started, the Parties did not work neither towards the development of a methodology for flood areas shared by two or more Parties (paragraph 3), nor towards preparation of flood maps for the entire Sava Basin (paragraph 4) but they have been using national methodologies.*

✚ *PEG FP has agreed that flood maps at the Sava River Basin level **should comprise all maps prepared by the Parties, for all identified APSFR, as well as flood maps for special case scenarios along the Sava River**<sup>5</sup>.*

The method of implementing activities foreseen by Article 7 (paragraphs 2-5) has been described below.

### 4.1 FLOOD HAZARD MAPS

Flood hazard maps at the Sava River Basin level should be prepared by the Parties for all identified APSFR for the following scenarios:

- (i) floods with a medium probability (return period of 100 years), and
- (ii) floods with a low probability, or extreme event scenarios (regardless of the return period considered by the Party)

The national definitions of floods with medium and low probability are provided below.

Country	Medium probability	Low probability
SI	HQ100	HQ500
HR	HQ100	<i>HQ1000</i> – for unprotected areas
		<i>Infrastructure failure scenario</i> – for protected areas
BA	HQ100	HQ500
RS	HQ100	HQ1000
ME	HQ100	HQ500

<sup>5</sup> Agreed at the 24th meeting of the PEG FP

- ✚ *The information on national flood hazard maps shall be collected through Sava Geoportal and its database module for Flood Hazard and Risk Maps (Article 7, paragraph 2);*
- ✚ *Flood hazard maps shall be prepared for special case scenarios along the Sava River for either an extreme flood event, or levee breach/overtopping at different locations, with main aim to assess the residual risk, if the resources for such exercise are available during the preparation of the Plan (details are provided in the next text box).*

The PEG FP request, stated at the 24<sup>th</sup> meeting, regarding the need to model extreme scenarios, including levee breach/overtopping along the Sava River at various locations with the aim of evaluating the residual risk (which is an urgent topic of interest), is something that can hardly be fulfilled without high-precision terrain data, if possible homogenous, for all flood areas along the Sava River and lower courses of its main tributaries. ***For such purposes, the best option that provides the highest level of height accuracy (up to 10 cm), which is particularly important in major floodplain areas, would be LIDAR.*** Currently, such data exist only in Slovenia. Such base layers would allow not only for a precise hydraulic analysis of an extreme flood event (extent of flooding, depth and velocity); they would also be useful for all other activities connected with planning and active defence against flooding (determination of evacuation routes, second lines of defence, etc.). Currently, the second phase of support of the U.S. Government and cooperation with the USACE is ongoing, with the aim of hydrologic / hydraulic modelling and the preparation of better terrain data along the Sava River, based on LiDAR technology. The plan is to make a pilot model of a selected area flooded in 2014 and then to develop adequate risk maps during the preparation of the *FRMP*.

## 4.2 FLOOD RISK MAPS

As stated in Article 7, paragraph 1, each Party shall prepare flood maps for the part of the Sava river basin under its jurisdiction by using national methodologies.

- ✚ *The information on national flood risk maps shall be collected through Sava Geoportal and its database module for Flood Hazard and Risk Maps (Article 7, paragraph 2).*

- As stated above, paragraphs 4-5 of Article 7 leave the possibility of developing a common methodology for purpose of joint implementation of the activities from paragraph 1. Since the activities on the national level are well under way, the PEG FP agreed at its 24<sup>th</sup> meeting that it would be useful for the transboundary efforts to assess the risk on the basin-wide level based on a simplified methodology.

These flood risk maps should be prepared on the basis of a minimum set of information, showing the potential adverse consequences associated with the two mentioned flood scenarios and expressed in terms of:

- the indicative number of inhabitants potentially affected,
- type of economic activity of the area potentially affected on the basis of the Corine Land Cover,
- location of IPPC installations which might cause accidental pollution in case of flooding on the basis of the E-PRTR register and other relevant information,
- protected areas on the basis of the *WFD* protected areas, Natura2000 areas, national parks, etc.
- other relevant information, such as areas with increased sediment transport.

- ✚ *Preparation of a specific report on flood mapping in the Sava River Basin is not planned. The relevant information shall be exchanged among the Parties through Sava GIS in the course of the Sava *FRMP* preparation.*

However, the *Sava FRMP* shall include information on overall approach and methodology used, including:

- ~ national methodologies for flood hazard & risk mapping,
- ~ methodology used for flood mapping at the Sava River Basin level;

- ~ description of geographical area which could be flooded under different scenarios based on flood hazard maps;
- ~ description of the potential adverse consequences of floods based on flood risk maps for the above scenarios for the Sava River Basin;
- ~ conclusions that can be drawn from them.

An outline of the activities in the Sava River Basin regarding flood mapping is given in [Annex 2](#).

## 5 FLOOD RISK MANAGEMENT PLAN

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The *Sava FRMP* shall define common goals of flood risk management and should focus on measures for achievement of those goals that may have positive transboundary effects, as well as on measures for mitigation of potential negative transboundary effects.

**Protocol, Article 8: Flood Risk Management Plan**

1. The Parties shall prepare the *Flood Risk Management Plan for the Sava River Basin* (hereinafter: the *Flood Risk Management Plan*), in accordance with the content defined by the *Directive 2007/60/EC*, and taking into account all relevant aspects of flood risk management.
2. The *Flood Risk Management Plan* shall, in particular, define the goals of the flood risk management of common interest on the Sava River basin level, measures to achieve these goals, mechanisms of coordination on the basin-wide level and a mode of joint cooperation of the Parties in flood defence emergency situations.
3. Taking into account the principle of solidarity and the no harm rule in accordance with the Article 9 of the *FASRB*, the *Flood Risk Management Plan* for the territory of one Party shall not stipulate measures that may, by their magnitude or impact, significantly increase the flood risk on the territory of the other Party, unless those measures are coordinated and agreed between the Parties concerned.
4. The Sava Commission shall coordinate the development of the *Flood Risk Management Plan*.
5. *Flood Risk Management Plan* shall be adopted by the Parties, upon proposal of the Sava Commission.

The subject of the *Sava FRM Plan* are only those APSFRs which are identified along the Sava River and its tributaries designated as of basin-wide importance (Rivers listed in [Annex 1](#)).

The *goals of flood risk management of common interest* in the Sava River Basin shall be defined during the course of preparation of the joint *FRMP*. The starting point for their definition is the *Danube FRMP* and its related objectives of FRM, as follows:

- Avoidance of new risks,
- Reduction of existing risks,
- Strengthening resilience,
- Raising awareness,
- Implementing solidarity principle.

The cooperation of the Sava countries in FRM must focus on reducing the adverse consequences of flooding for human health, the environment, cultural heritage and economic activity. The focus may also be on reducing the likelihood of flooding and/or on using non-structural measures, including flood forecasting and raising awareness of flooding, in general on measures with positive transboundary impact, which encourage international cooperation

The overall work plan with expected outcomes, mechanisms, responsibilities and deadlines in conducting all elements relevant for development of the *Sava FRM Plan* is given in [Annex 2](#).

### 5.1 CONTENT OF THE SAVA FRMP

**The common *Sava FRMP*, including the summary of measures<sup>6</sup>, aims, *inter alia*, to:**

- set up common objectives of managing the flood risk at the Sava River Basin level based on long-term sustainable approaches;
- ensure a consistent and coordinated approach to flood risk management in the basin.

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<sup>6</sup> *Technical assistance in the preparation of the Sava FRMP shall be provided through Component 1 of the project "Improvement of Joint Actions in Flood Management in the Sava River Basin", implemented by World Bank through Western Balkans Investment Framework*



The following main components of the *Plan* are anticipated:

1. **Summary of conclusions relevant for the basin drawn from the PFRA, including all information described in Chapter 3 of this Program;**
2. **Summary of conclusions relevant for the basin drawn from flood hazard and risk maps, including all information described in the Chapter 4 of this Program;**
3. **Common objectives of managing the flood risk in the Sava River Basin**

How to reach common understanding on the FRM objectives in the basin has been described in the previous section.

4. **Summary of measures relevant for the basin as a whole**

The measures and their prioritisation aim to achieve the objectives of flood risk management of common interest on the Sava River Basin. The Parties may, among other, take into account measures proposed in the *Guidance for Reporting under the Floods Directive*, as well as those listed within the *Sub-Basin Level Flood Action Plan – Sava River Basin*, including both structural and non-structural measures.

Within the *Sub-Basin Level Flood Action Plan – Sava River Basin*, the Parties have outlined detailed targets in flood protection planning and listed several structural and non-structural flood protection measures. They range from the local measures to the regional measures and some of them are already backed up with a national legislation.

The measures were grouped as following:

- Regulation on land use and spatial planning;
- Reactivation of former, or creation of new, retention and detention capacities;
- Structural flood defences;
- Non-structural measures (preventive actions, capacity building of professionals, raising awareness and preparedness of general public).

It is expected that the *Sava FRMP* will result in sets of measures (structural and non-structural) relevant for the entire river basin, compiling the measures which shall be planned and implemented by the countries. The *Sava FRM Plan* and the joint summary of measures shall assess impact of the measures in transboundary context, their spatial distribution, prioritisation, timing and modes of implementation. For this purpose, the joint summary of measures shall ensure a coordinated planning of measures thus reducing possibility of duplication of works for reduction of flood risks. It would define priority measures having in mind costs and benefits for population, economic activities including infrastructure, cultural heritage and environment. In the procedure of the prioritisation an environmental impact analysis of the measures shall be prepared. It should ensure ecological foundations for identification of special environment protection requirements. Specifically, it shall define type and level of impact of planned measures on environment, as well as optimum mitigation measures aimed at reducing, or eliminating, harmful impacts. This analysis shall take into account the *EU SEA Directive*<sup>7</sup>.

In determining the proposed measures for achieving the objectives, the *Plan* shall have regard to:

- The costs and benefits of different methods of managing the flood risk;
- The information included in the flood hazard and risk maps;
- The river basin management plan for the basin;
- The effect of floodplains that retain flood water;
- The *WFD* environmental objectives;
- The climate change impacts;
- The transboundary impacts of the proposed measures.

Measures can be defined as individual measures or aggregated measures, and for each, the following information need to be provided<sup>8</sup>:

- Code;

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<sup>7</sup> Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, Official Journal of the European Communities, L 197, 30-37

<sup>8</sup> *Guidance for Reporting under the Floods Directive*

- Name of the measure;
  - Description of the measure, including type of measure (expressed as “Aspect of FRM” and “Type”), location, geographic coverage of expected effect, other description;
  - Responsibility (authorities responsible – level of responsibility (e.g. national authority, RBD/UoM authority, regional authorities, municipality/ies, other) or name of authority);
  - Explanation of how the measure contributes to the objectives (optional);
  - Prioritisation (timetable for implementation, or a category of priority (critical, high, very high, moderate, etc.), or a summary text);
  - Status (not started, ongoing, completed), short explanatory texts can be added;
  - Cost and benefits of the measure(s) (expressed in monetary terms (in €national currency), quantitative and/or qualitative terms) (optional), short explanatory text what is included in the cost calculation and/or further details can be added;
  - Other Community Act under which the measure has been implemented (where relevant);
  - Comments: any additional useful information of clarification (optional);
  - Hyperlink to further useful information (optional).
- ✚ *In line with Article 11 of the Protocol, the Sava FRMP should provide a proposal of modes of cooperation of the Sava countries in the flood defence emergency situations. Through the Sava FRM Plan the Parties shall establish and maintain arrangements for preparedness, as well as measures related to flood defence emergency situations, specifically including the measures for mitigation of transboundary impacts.*

## **5. Financing the measures**

There is an increasing gap between flood risk management and existing public funds and what the public wants to do. The effects of climate change are expected to increase funding needs. Likewise both the increase of value in flood-risk-area and land use changes may also increase flood risk and consequently the demand for flood risk reduction. Preventing a further increase in flood risk will be an important task for governments of the Parties. Construction in floodplain areas could be avoided, natural retention areas could be safeguarded, etc.

Realising such objectives requires a proper legal framework and incentives to promote decisions by beneficiaries and economic actors that are in line with the principles of preventive flood risk management.

*Sava FRM Plan* has to consider ways of financing flood risk management (EU funds, national and local funds, the authority for risk reduction measures, the authority for insurance fees, user-pay principle, etc.)

## **6. Coordination with the Water Framework Directive**

Coordination with the *Water Framework Directive* has been described in [Annex 4](#) of this *Program*.

## **7. Impact of climate change**

Climate plays a central role in water resources management as it influences the hydrological variables at all scales. Water resources will be one of the most affected sectors by changes in climate. Thus, the future implementation of EU water related directives should be done in the face of climate impacts projections and associated uncertainties.

The adaptation to climate change in the water resources is a challenging task that will require a paradigm shift in how we precede in future design and water resources management. Producing future climate scenarios and future impacts of climate change requires identification of adaptation measures within the *Sava FRM Plan*.

The key objective, in the face of uncertainty, is to define and implement adaptation measures which both provide a benefit to current climate conditions as well as resilience to potential future climate changes. Some of them could be summarised in following:

- Adaptation options which reduce vulnerability to climate variability,
- Modification to existing plans and designs,
- Adaptive and flexible management,
- Robust adaptation:

- ~ adaptation measures that results in benefits, which exceed the costs,
- ~ strategy as new climate change information evolve,
- ~ robustness to uncertainty,
- ~ strategies that can reduce climate change vulnerability by adding extra safety margins at low costs.

#### **8. International coordination & competent authorities**

The Sava Commission is tasked for coordination of the activities related to the information and data exchange and harmonisation in undertaking the PFRA, preparation of flood maps and of the *Sava FRMP*, as well as the activities on the establishment of the FFWS. The Sava Commission also follows up the related activities at the national and bilateral level that might have an influence on the common action at the basin-wide level.

The Parties shall designate competent authorities, which shall be responsible for implementation of the activities elaborated in the *Program*. The Parties shall nominate one authority and corresponding contact person for official communication.

##### **Protocol, Article 13: Competent authorities and Contact Persons**

1. Each Party shall designate competent authority/authorities, which shall be responsible for implementation of this Protocol.
2. Each Party shall, among designated authorities from paragraph 1 of this Article, nominate one authority for official communication in implementation of this Protocol, on its behalf. Each authority responsible for official communication shall designate a contact person.
3. Each Party shall, no later than the entry into force of this *Protocol*, notify the Sava Commission of the designated authority/authorities from paragraphs 1 and 2 of this Article, as well as of the name and address of its contact person. Each Party shall, without delay, notify the Sava Commission of any changes of the designated authority, as well as of the name and address of its contact person.
4. For reasons of efficiency, the Parties may designate other authorities to be responsible for preparation or implementation of any activity stipulated under this *Protocol* and, thereof, notifies the Sava Commission.
5. The Sava Commission shall, without delay, inform the Parties of the notifications received under this Article.

#### **9. Public information and consultation**

According to the *Protocol*, *EFD* and national legislation, the Parties should ensure efficient public information concerning the PFRA, Flood maps and *FRMP*.

The Parties shall foster active participation of the interested public in the process of development, review and update of these plans.

##### **Protocol, Article 12: Public information and consultation**

1. The public shall be informed about the implementation of this Protocol in a same manner as stipulated under permanent monitoring of the *FASRB* implementation.
2. The Parties shall ensure efficient public information concerning the Preliminary Flood Risk Assessment, Flood Maps and *Flood Risk Management Plan* and foster active participation of the interested public in process of development, review and up-date of these plans.

In accordance with the *Methodology for Permanent Monitoring of Implementation of the FASRB*, the public should be informed about the implementation of the activities defined in the *Protocol* through national reports on implementation and through a report on implementation prepared by the Secretariat, published at the Sava Commission website.

The *Preliminary Flood Risk Assessment in the Sava River Basin* is already available to the public through the Sava Commission website.

The *information on flood mapping in the Sava River Basin* shall be made available to the public through the Sava GIS Geoportal.

The Parties shall ensure active participation of the interested public in process of the development and subsequent reviews of the *Sava FRM Plan*. The *Sava FRMP* shall be made available to the public through the Sava Commission website.

#### **10. Conclusions**

The *Sava FRMP* shall also contain the maps which number and content shall be defined by PEG FP during the development of the *Plan*.

## **REFERENCES**

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- Action plan for the period 2011-2015 concerning the Strategy on Implementation of the Framework Agreement on the Sava River Basin, International Sava River Basin Commission, Zagreb, 2011
- Common Implementation Strategy for the Water Framework Directive(2000/60/EC), Technical Report - 2009 - 028, Guidance Document No. 22, Updated Guidance on Implementing the Geographical Information System(GIS) Elements of the EU Water policy, ISBN 978-92-79-11373-4, ISSN 1725-1087, N° Catalogue KH-AN-09-022-EN-N, European Communities, 2009
- Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks, Official Journal of the European Union L288, 6.11.2007, 27-34
- Framework Agreement on the Sava River Basin, Bosnia and Herzegovina, Republic of Croatia, Republic of Slovenia and Federal Republic of Yugoslavia, signed in Kranjska Gora (Slovenia) on 3 December 2002
- Guidance for Reporting under the Floods Directive (2007/60/EC), Guidance Document No. 29, A compilation of reporting sheets adopted by Water Directors, Common Implementation Strategy for the Water Framework Directive (2000/60/EC), ISSN 1725-1087, ISBN 978-92-79-33168-8, doi: 10.2779/50095, European Union, 2013
- Links between the Floods Directive (FD 2007/60/EC) and Water Framework Directive (WFD 2000/60/EC), Resource Document, European Union, 2014
- Memorandum of Understanding on cooperation between the International Sava River Basin Commission and Montenegro, International Sava River Basin Commission and Montenegro, signed in Belgrade (Serbia) on 9 December 2013
- Protocol on Flood Protection to the Framework Agreement on the Sava River Basin, International Sava River Basin Commission, signed in 2010 and entered into force on 27 November 2015
- Sava River Basin Analysis Report, International Sava River Basin Commission, Zagreb, 2009
- Strategy on Implementation of the Framework Agreement on the Sava River Basin, International Sava River Basin Commission, Zagreb, 2011

## ANNEX 1: Rivers of basin-wide importance

River	Tributary order	Basin area [km <sup>2</sup> ]	Countries
<b>Sava</b>		<b>97,713</b>	<b>SI, HR, BA, RS, ME, AL</b>
Ljubljanica	1	1,860	SI
Savinja	1	1,849	SI
Krka	1	2,247	SI
Sotla/Sutla	1	584	SI, HR
Krapina	1	1,237	HR
Kupa/Kolpa	1	10,226	HR, SI, BA
Dobra	2	1,428	HR
Korana	2	2,302	HR, BA
Glina	2	1,427	HR, BA
Lonja	1	4,259	HR
Česma	2	3,253	HR
Glogovnica	3	1,302	HR
Ilova (Trebež)	1	1,796	HR
Una	1	9,829	BA, HR
Sana	2	4,253	BA
Vrbas	1	6,274	BA
Pliva	2	1,326	BA
Orljava	1	1,618	HR
Ukrina	1	1,504	BA
Bosna	1	10,810	BA
Lašva	2	958	BA
Krivaja	2	1,494	BA
Spreča	2	1,948	BA
Tinja	1	904	BA
Drina	1	20,320	ME, AL, BA, RS
Piva	2	1,784	ME
Tara	2	2,006	ME, BA
Čehotina	2	1,237	ME, BA
Prača	2	1,018	BA
Lim	2	5,968	AL, ME, RS, BA
Uvac	3	1,596	RS, BA
Drinjača	1	1,091	BA
Bosut	1	2,943	HR, RS
Kolubara	1	3,638	RS

## ANNEX 2: Work plan for preparation of the Sava FRMP

### NATIONAL ACTIVITIES

Protocol article	EFD article	Task	Country / Entity	Deadline	Status	Responsibility
6	4, 5	Preliminary Flood Risk Assessment and APSFR identification	SI	22 Dec 2011	✓	CAs <sup>9</sup>
			HR	22 Dec 2011	✓	
			BA / FB&H	2013	✓	
			BA / RoS		✓	
			RS	-	✓	
			ME	-	underway	Ministry of Agriculture and Rural Development Montenegro
7	6	Flood maps	SI	22 Dec 2013	✓	CAs
			HR	22 Dec 2013	✓	
			BA / FB&H	2015	underway	
			BA / RoS	2013	underway	
			RS	-	underway	
			ME	-	underway	Ministry of Agriculture and Rural Development Montenegro
8	7	Flood Risk Management Plans	SI	22 Dec 2015	✓	CAs
			HR	22 Dec 2015	✓	
			BA / FB&H	2017		
			BA / RoS	2015		
			RS	2017		
			ME	underway	Ministry of Agriculture and Rural Development	

<sup>9</sup> Competent Authorities of the Parties

Protocol article	EFD article	Task	Country / Entity	Deadline	Status	Responsibility
						Montenegro

### WORK PLAN BY SUBJECT (PROTOCOL ARTICLES)

Protocol article	EFD article	Subject	Outcome	Mechanism	Responsibility	Deadline
6	4, 5	Preliminary Flood Risk Assessment in the Sava River Basin	Report (including maps of the SRB showing borders of sub-basins, topography, land use, and APSFR)	Collection of national PFRA and APSFR through SavaGIS	ISRBC Secretariat PEG FP	Completed
7	6	Flood maps	Flood hazard maps	Collection of national hazard maps (flood extents) through the SavaGIS for 2 scenarios: (i) floods with a medium probability (100 years return period) (ii) floods with a low probability, or extreme event scenarios Note: Common flood hazard maps shall be prepared based on an agreed specification for a special case scenarios along the Sava River (e.g. extreme flood event and/or levee breach at different locations).	ISRBC Secretariat PEG GIS	
			Flood risk maps	Collection of national risk maps and preparation of a common maps based on the agreed specification at the Sava River Basin level for the above scenarios, showing the indicative number of inhabitants potentially affected, type of economic activity of the area potentially affected on the basis of the Corine Land Cover, location of IPPC installations which might cause accidental pollution in case of flooding. Note: Flood risk maps shall include the assessment of the flood risk along the Sava River, based on a simplified methodology and special scenarios (e.g. extreme flood event and/or levee breach at different locations).	ISRBC Secretariat PEG GIS	



<p>8</p>	<p>7</p> <p>Flood Risk Management Plan for the Sava River Basin</p>	<p>Sava FRMP, with the following content:</p> <ol style="list-style-type: none"> <li>1. Summary of the conclusions relevant for the basin drawn from the Preliminary Flood Risk Assessment;</li> <li>2. Summary of the conclusions relevant for the basin drawn from flood hazard and risk maps;</li> <li>3. Common objectives of managing the flood risk in the Sava River Basin;</li> <li>4. Summary of Measures relevant for the basin as a whole;</li> <li>5. Financing the measures;</li> <li>6. Coordination with the Water Framework Directive;</li> <li>7. Impact of climate change</li> <li>8. International coordination &amp; competent authorities;</li> <li>9. Public information and consultation;</li> <li>10. Conclusions;</li> </ol>	<p>The project Improvement of Joint Flood Management Actions in the Sava River Basin (“WBIF” project) – Component 1, shall provide a technical assistance for development of the common Sava FRMP.</p>	<p>ISRBC Secretariat PEG FP</p>
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## WORK PLAN BY TASK (PROTOCOL ARTICLES PER PARAGRAPHS)

Protocol paragraph	EFD article	Task	Country / Entity	Deadline	Status	Responsibility
6 (1)	4	Undertaking national PFRA	SI	22 Dec 2011	✓	CAs <sup>10</sup>  Ministry of Agriculture and Rural Development Montenegro
			HR	22 Dec 2011	✓	
			BA / FB&H	2013	✓	
			BA / RoS		✓	
			RS	-	✓	
6 (2)	4	PFRA data exchange	BA / RoS	-	BA / RoS data missing	PEG FP ISRBC Secretariat
			ME	-	ME data missing	Ministry of Agriculture and Rural Development Montenegro
6 (3)		PFRA data delivering to ISRBC		-	BA / RoS data missing	PEG FP
6 (4)	5	National APSFR identification	SI	-	✓	CAs  Ministry of Agriculture and Rural Development Montenegro
			HR	-	✓	
			BA / FB&H	-	✓	
			BA / RoS	-	✓	
			RS	-	✓	
			ME	-	not yet available	

<sup>10</sup> Competent Authorities of the Parties responsible for implementation of the Protocol

Protocol paragraph	EFD article	Task	Country / Entity	Deadline	Status	Responsibility
6 (5)		Informing other Parties on national APSFR		-	BA / RoS data missing	PEG FP ISRBC Secretariat
6 (6)	5	Shared APSFR harmonisation		31 Mar 2015	not started	ISRBC Secretariat PEG FP
7 (1)	6	Preparation of national flood maps	SI	22 Dec 2013	finished	CAs
			HR	22 Dec 2013	finished	
			BA / FB&H	2015	underway	
			BA / RoS	2013	underway	
			RS	-		
		ME	-	underway	Ministry of Agriculture and Rural Development Montenegro	
7 (2)	6	Informing other Parties on national flood maps		-	underway	PEG FP ISRBC Secretariat
7 (3)		Agreement on methodology for mapping of shared APSFR		-	no information	CAs Ministry of Agriculture and Rural Development Montenegro
7 (4)		Agreement on joint methodology		-	not required	PEG FP ISRBC Secretariat
7 (5)		Development of joint methodology		-	not required	ISRBC Secretariat PEG FP
8 (1)	7	Preparation of the Sava FRM Plan		2017		PEG FP ISRBC Secretariat
8 (2)	7	Definition of common goals of FRM		2016		PEG FP ISRBC Secretariat

Protocol paragraph	EFD article	Task	Country / Entity	Deadline	Status	Responsibility
		Definition of measures to achieve goals		2017		CAs Ministry of Agriculture and Rural Development Montenegro
		Mechanisms of coordination on the basin-wide level				PEG FP ISRBC Secretariat
		Mode of joint cooperation in flood defence emergency situations				
8 (3)		Assessment of measures with transboundary impact				CAs Ministry of Agriculture and Rural Development Montenegro
8 (4)		Coordination of the development of the Sava FRM Plan				ISRBC Secretariat
8 (5)		Adoption of the Sava FRM Plan by the Parties upon proposal of the ISRBC		2018		ISRBC Parties
11 (4)		Agreement on actions and activities related to the assistance of other Parties in case of flood defence emergency situations				CAs Ministry of Agriculture and Rural Development Montenegro PEG FP ISRBC Secretariat

## **ANNEX 3: Legislation and relevant planning documents of the cooperating countries**

### **Slovenia**

- Zakon o vodah (Uradni list RS, št. 67/02, 2/04 – ZZdrI-A, 41/04 – ZVO-1, 57/08, 57/12, 100/13, 40/14 in 56/15)
- Uredba o vsebini in načinu priprave podrobnejšega načrta zmanjševanja ogroženosti pred poplavami, (Uradni list RS, št. 7/10)
- Pravilnik o metodologiji za določanje območij, ogroženih zaradi poplav in z njimi povezane erozije celinskih voda in morja, ter o načinu razvrščanja zemljišč v razrede ogroženosti, Ministarstvo za okolje in prostor Republike Slovenije (Uradni list RS, št. 60/07)

### **Croatia**

- Zakon o vodama, Narodne novine, 153/09, 130/11, 56/13, 14/14
- Zakon o zaštiti i spašavanju, Narodne novine, 174/04, 79/07, 38/09, 127/10
- Okvirni plan izrade plana 2016. - 2021., Okvirni plan izrade Plana upravljanja vodnim područjima i Plana upravljanja poplavnim rizicima za razdoblje 2016.-2021., Hrvatske vode, 2013

### **Bosnia and Herzegovina**

#### *Federation of Bosnia and Herzegovina*

- Zakon o vodama, Službene novine FBiH, 70/06
- Zakon o zaštiti i spašavanju ljudi i materijalnih dobara od prirodnih i drugih nesreća, Službene novine Federacije BiH, 39/03, 22/06, 43/10)
- Uredba o vrstama i sadržaju planova zaštite od štetnog djelovanja voda ("Sl. novine Federacije BiH", broj 26/09)

#### *Republika Srpska*

- Zakon o vodama, Službeni glasnik Republike Srpske, 50/06, 92/09
- Zakon o zaštiti i spasavanju u vanrednim situacija Republike Srpske, Službeni glasnik Republike Srpske, 121/12
- Akcioni plan za realizaciju okvirnog plana razvoja vodoprivrede Republike Srpske, planski period 2007-2016, Ministarstvo poljoprivrede, šumarstva i vodoprivrede, Bijeljina, 2007.

### **Serbia**

- Zakon o vodama, Službeni glasnik Republike Srbije, 30/10
- Zakon o vanrednim situacijama, Službeni glasnik Republike Srbije, 111/09 , 92/11 , 93/12
- Pravilnik o utvrđivanju metodologije za izradu preliminarne procene rizika od poplava, Službeni glasnik Republike Srbije, 1/12

### **Montenegro**

- Zakon o vodama, Službeni list Crne Gore, 27/07, 32/11, 48/15
- Pravilnik o bližem sadržaju preliminarne procjene rizika od poplava i plana upravljanja rizicima od poplava, Službeni list Crne Gore, 69/15
- Zakon o zaštiti i spašavanju, Službeni list Crne Gore, br. 13/07 i 32/11

## ANNEX 4: Coordination with the WFD

Coordination with the WFD can be achieved through the following<sup>11</sup>:

- Governance:
  - ~ Units of Management (UoM) – national UoM for the implementation of the two Directives may differ;
  - ~ Competent Authorities (CAs) – national CAs for the implementation of the two Directives may differ, they are required to coordinate on the implementation of the Directives;
  - ~ Transboundary governance and coordination – the Sava Commission has both river basin and flood risk management in its mandate. Permanent expert groups for river basin management (PEG RBM) and flood prevention (PEG FP) with members from the CAs of the Parties each have been meeting regularly to exchange information and to coordinate issues important for the development of the *Sava RBM Plan* and of the *Sava FRM Plan*, respectively. Transboundary governance and coordination in the Sava River Basin is complemented by bilateral agreements only between SI and HR, and between HR and BA.
- Timetable – common synergies and benefits may be achieved through coordination of the activities in:
  - ~ preparation of flood maps and the reviews of the characterisation analysis required under WFD;
  - ~ the development and review of the *Sava FRM Plan* and *Sava RBM Plan*;
  - ~ the active involvement of all stakeholders under both Directives.
- Stages of implementation:
  - ~ Preliminary Flood Risk Assessment in the Sava River Basin – spatial datasets produced for the implementation of the WFD were used for the PFRA, including river network, Sava River Basin outline, river catchments, topographic data, administrative borders, land use classification data, etc.;
  - ~ Flood Risk Maps – must be developed in such a way that the information they contain is consistent with the relevant information presented under the WFD;
  - ~ Sava FRM Plan and Sava RBM Plan – measures for flood risk reduction should be planned in such a way that they may contribute to achieving the objectives of the WFD and, possibilities for making use of the programme for monitoring of water bodies' status (including the volume and level or rate of flow) should be assessed.

Measures for flood risk reduction which may also positively interact with the environmental objectives of the WFD among others include:

    - (a) measures that are aimed at “making room for water” and increasing natural retention and storage capacity e.g. via reconnection of the floodplain to the river, increasing the retention capacity of floodplains,
    - (b) adaptation of the design of new and existing structural measures such as flood defences and storage dams, to take into account WFD objectives and obligations.

In some cases, e.g. typically in highly urbanised areas, flood protection objectives require new infrastructure that may deteriorate the status or prevent the achievement of good status in one or more water bodies, because there is no other feasible alternative. Article 4(7) of the WFD allows such projects only if the conditions set in that article are fulfilled, namely:

    - (a) all practicable steps are taken to mitigate the adverse impact on the status of the body of water,
    - (b) the reasons for those modifications or alterations are specifically set out and explained in the river basin management plan required under Article 13 and the objectives are reviewed every six years;

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<sup>11</sup> After the EU Resource Document – Links between the Floods Directive and Water Framework Directive

- (c) the reasons for those modifications or alterations are of overriding public interest and/or the benefits to the environment and to society of achieving the objectives are outweighed by the benefits of the new modifications or alterations to human health, to the maintenance of human safety or to sustainable development, and
- (d) the beneficial objectives served by those modifications or alterations of the water body cannot for reasons of technical feasibility or disproportionate cost be achieved by other means, which are a significantly better environmental option.

It should be noted that exemptions are integral part of the WFD and therefore, if applied correctly, they should not be regarded as a conflict with the WFD objectives, but a lawful application of its provisions.

In case of existing infrastructure for flood protection which physically modifies the water bodies and prevents the achievement of good status, the WFD foresees, as a default, the restoration of the water body in order to enable the achievement of the good status. However, in case the conditions in Article 4(3) of the WFD are fulfilled, the water body could be designated as Heavily Modified Water Body (HMWB). These conditions include that:

- (a) the changes to the hydromorphological characteristics of that body which would be necessary for achieving good ecological status would have significant adverse effects on legitimate uses such as flood protection
- (b) the beneficial objectives served by the artificial or modified characteristics of the water body cannot, for reasons of technical feasibility or disproportionate costs, reasonably be achieved by other means, which are a significantly better environmental option.

The reasons for the designation have to be specifically mentioned in the river basin management plan.

From the above it is clear that the designation process has a built in obligation to consider alternatives which maintain the benefits for flood protection but are better environmental options. Maintenance or rebuilding of existing infrastructure is only possible if there are no better environmental options which maintain the flood protection levels.

- Public participation – potential for coordination with WFD depends on the timetable and may be achieved in case that following activities take place concurrently:
  - ~ preparation of flood maps and the reviews of the characterisation analysis required under WFD – information could be shared,
  - ~ flood maps could be combined with the WFD consultation on Significant Water Management Issues (SWMI), if flood risk is classified by the Party as a SWMI,
  - ~ FRMP consultation can be aligned with RBMP consultation period.