



# **Flood Forecasting and Early Warning System for the Sava River Basin**

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International Sava River Basin Commission

# Legal Background

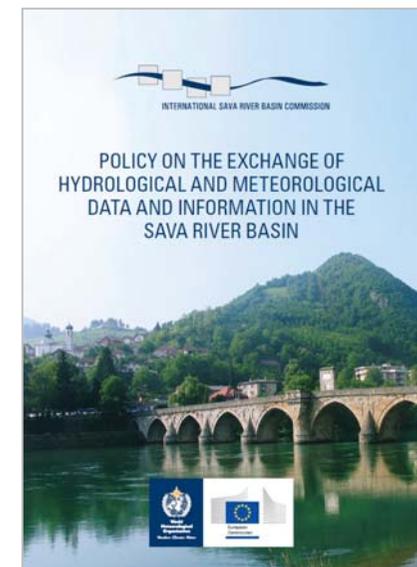
- **International Legal Background**

- Framework Agreement on the Sava River Basin → **Parties: BA, HR, RS, SI**
- Protocol on Flood Protection to the FASRB
- WMO Resolutions 25 (Cg-XIII) and 40 (Cg-XII)
- The Convention on Cooperation for the Protection and Sustainable use of the Danube River
- Policy of the exchange of Hydrological and Meteorological Data and Information in the SRB → **signed by HM data providers in the Parties**

- **National Legal Background**

Article 4 of FASRB  
EXCHANGE OF DATA AND INFORMATION

Pursuant to Article 3 of this Agreement, the Parties shall, on a regular basis, **exchange information on the water regime of the Sava River Basin**, the regime of navigation, legislation, organizational structures, and administrative and technical practices.



# Data and information exchange

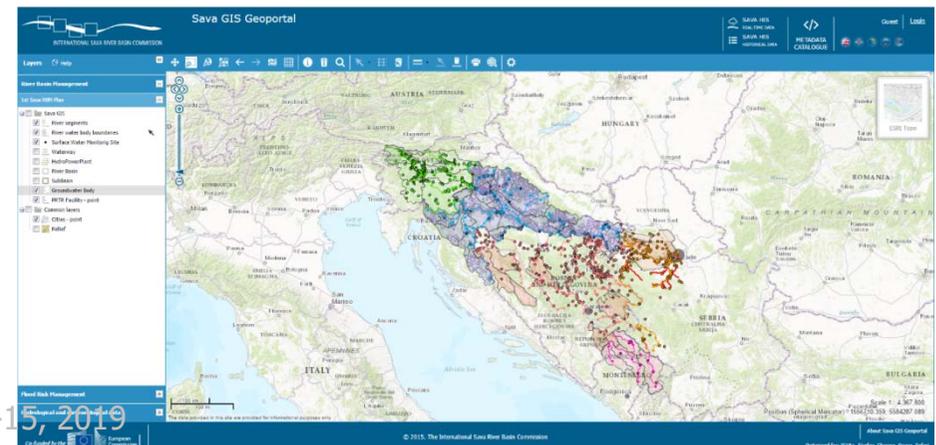
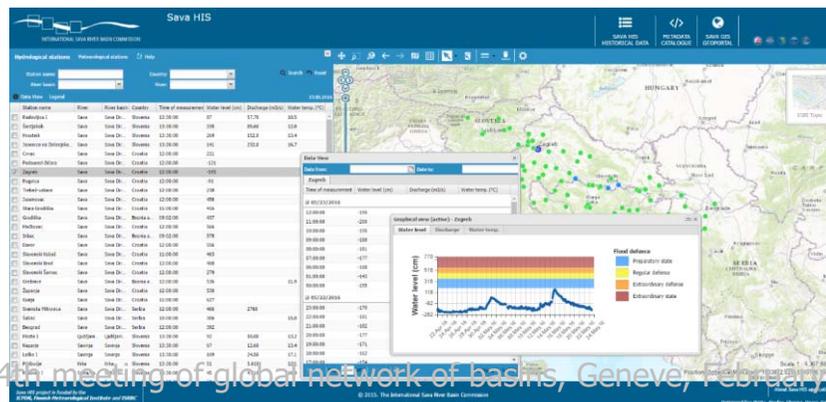
- **Sava GIS** (INSPIRE, WFD, FD, ICPDR) [www.savagis.org](http://www.savagis.org)

Common platform for sharing of information and knowledge about WRM in the basin

- **River basin management** data
- **Flood risk management** data
- **Historical H&M** data
- **Other** databases (in future)
  - Navigation
  - Sediment management
  - Accident prevention and control

- **Sava HIS** (INSPIRE, WMO resolutions, WaterML 2.0) [www.savahis.org](http://www.savahis.org)

- **'Real time' H&M** data
- **Sediment transport** data (2016)



# Flood Forecasting and Warning

The Protocol of FP states

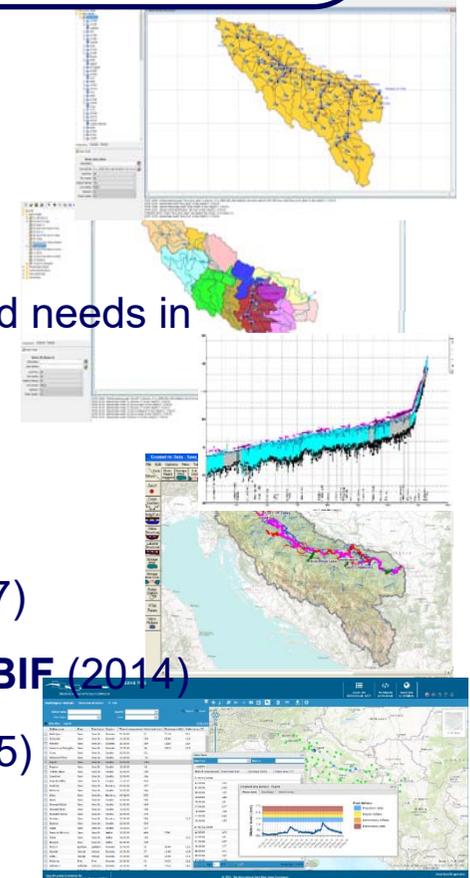
**The Parties shall establish a Flood Forecasting, Warning and Alarm System in the Sava River Basin** and to jointly undertake all necessary actions for establishment of the System, including the development of the project documentation

**The Sava Commission shall coordinate the activities** on establishment of the System

After the System is established, the **Parties shall ensure its regular maintenance and performance control**, as well as regular training of the engaged personnel, with application of joint standards

- **Initial steps**

- **Initiated by national NHMSs** of the Sava countries (2003)
- **ISRBC supported the initiative** since its establishment
- **World Bank supported** preparation of assessment of the status and needs in national institutions (2007)
- Development of the **basin-wide hydrologic model** (2010)
- Development of the **Sava mainstream hydraulic model** (2012)
- Hydrologic and hydraulic **models improvements**, (2014, 2016-2017)
- **Project proposal for Sava FFWS establishment approved by WBIF** (2014)
- Development of the **system for real-time HM data collection** (2015)



# Sava FFWS

## The project organizational structure and beneficiaries



- Steering Board**

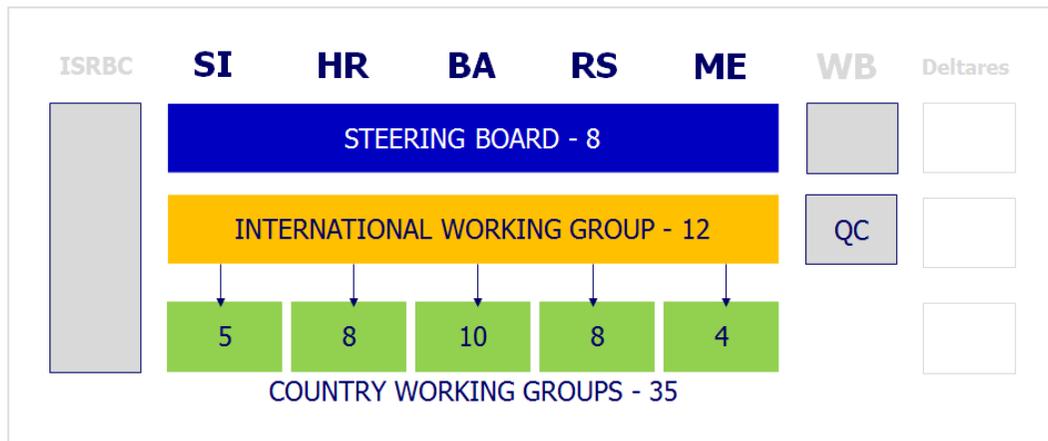
to perform the overall monitoring of the project performance

- International Working Group**

to harmonize the input of the Country Working Groups, follow the overall progress, and provide input to the Steering Board

- Country Working Groups (5)**

to provide all data and other related information required for development of the Sava FFWS, and provide input to the International Working Group



### Slovenia

Ministry of the Environment and Spatial Planning



Slovenian Environment Agency

### Croatia

Ministry of Environment and Energy



Meteorological and Hydrological Service

Croatian Waters



### Bosnia and Herzegovina

Ministry of Foreign Trade and Economic Relations of BiH



Ministry of Agriculture, Water Management and Forestry of Federation BiH



Ministry of Agriculture, Forestry and Water Management of Republika Srpska



Federal Hydrometeorological Institute Sarajevo



Republic Hydrometeorological Institute Banja Luka



Sava River Watershed Agency Sarajevo



Public institution "Vode Srpske" Bijeljina



### Serbia

Ministry of Agriculture, Forestry and Water Management



Republic Hydrometeorological Service of Serbia



Public water management company "Srbijavode"



Public water management company "Vode Vojvodine"



Public water management company "Beogradvode"



### Montenegro

Ministry of Agriculture and Rural Development

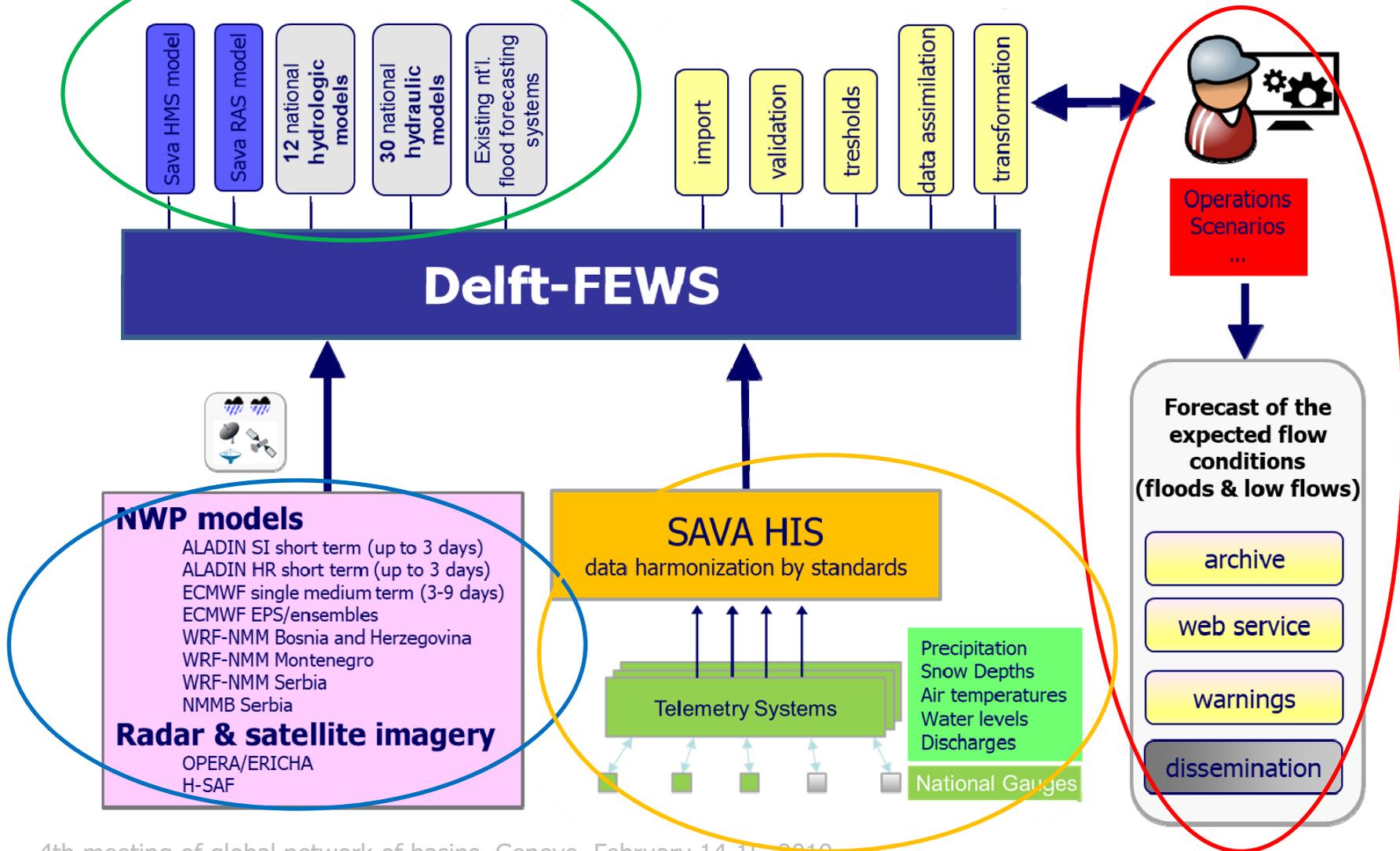


Institute of Hydrometeorology and seismology of Montenegro



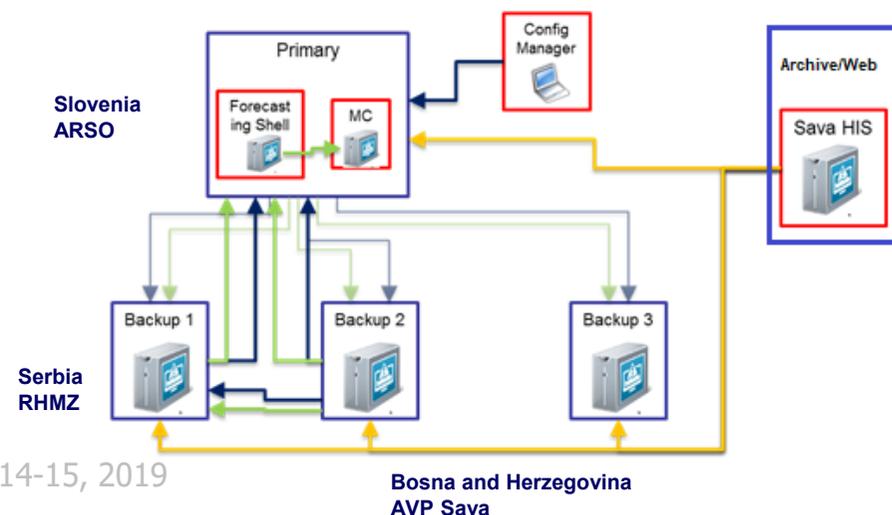
# Flood Forecasting and Warning

- Sava FFWS – schematic overview**



# Flood Forecasting and Warning

- **Sava FFWS – interface overview**
  - Versatile **forecasting system** for the SRB
  - **Unique in the region** and example for the rest of the world when it comes to transboundary cooperation on flood forecasting
  - Technically and organizationally **challenging** (5 countries, 19 organizations)
  - **Mature base** for possible future extensions- including climate change projections (droughts, floods)
  - **Joint System Hosting** by the institutions responsible for forecast



# Sava FFWS operational period

- after the WBIF project ends

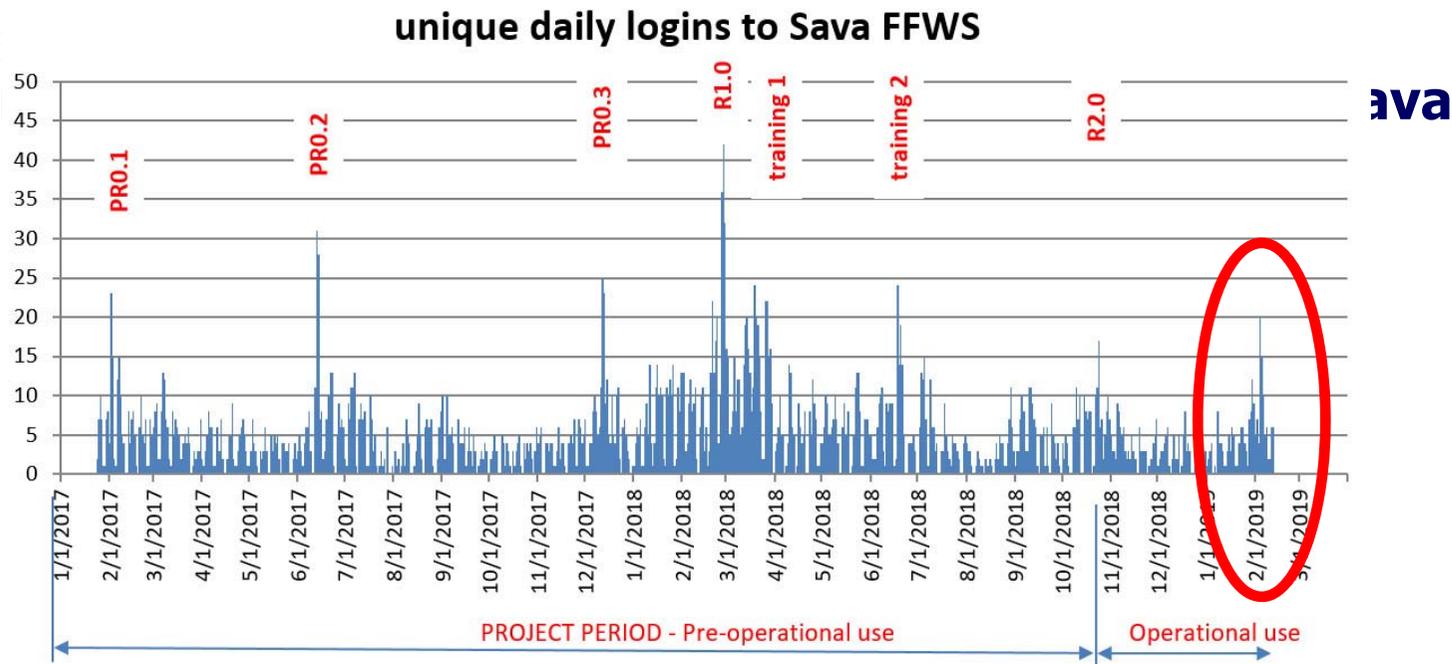


## Protocol on flood protection to the FASRB

After the System is established, **the Parties shall ensure its regular maintenance and performance control**, as well as regular training of the engaged personnel, with application of joint standards

- Sava FFWS is in **operational use** especially during flood events (e.g. Floods in BA and HR in February 2019)

- Preparation of cooperation FFWS



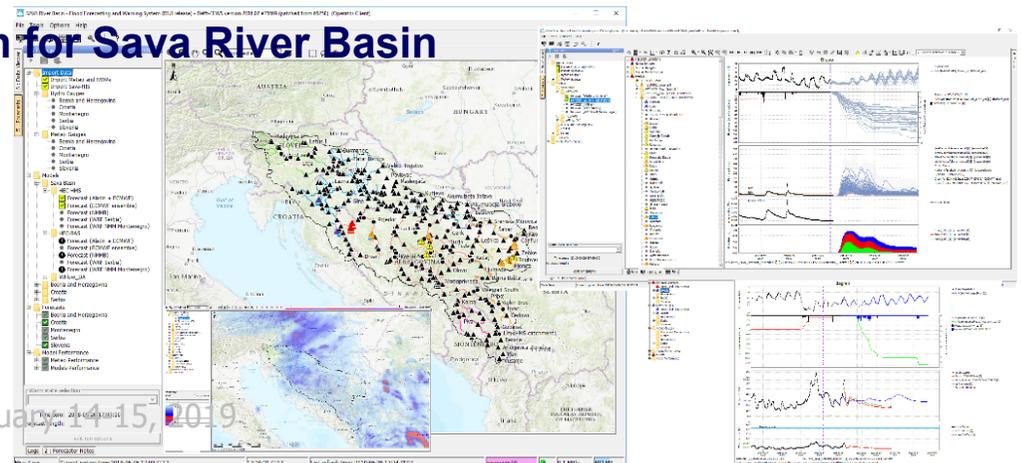
# Flood Forecasting and Warning

- **Lesson learned**

- The project has been **initiated** by the national institutions (NHMIs);
- NHMIs are willing to **cooperate and share** HM data;
- Good **legal background** established (FASRB, Protocol, Policy);
- Good **institutional cooperation** (through the basin wide inst. i.e. Sava Commission);
- Available **funding** (WB, WMO, WBIF)
- FFWS as a non-structural (*soft*) measure is included in

- **Outline of the CCA Strategy and**

- **Flood Risk Management Plan for Sava River Basin**



# Contact information

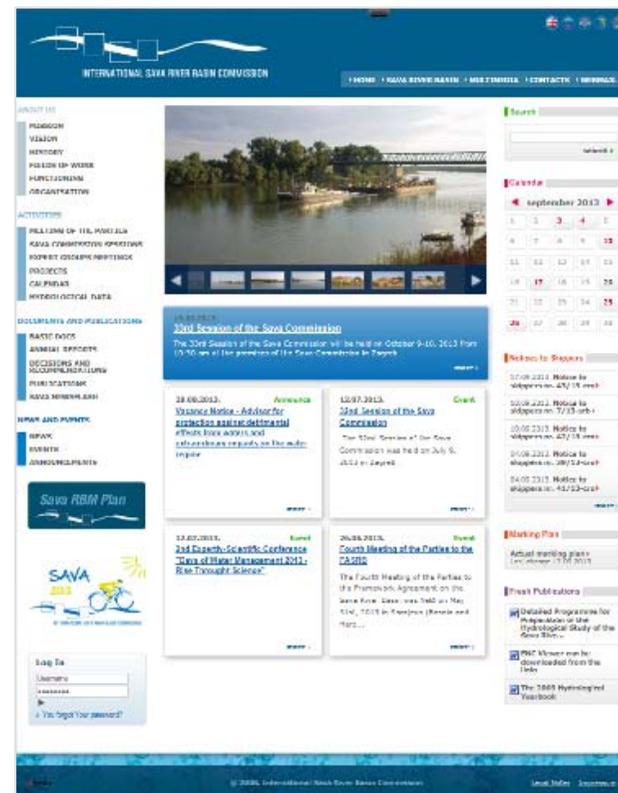
**International Sava River Basin Commission**

**Kneza Branimira 29**

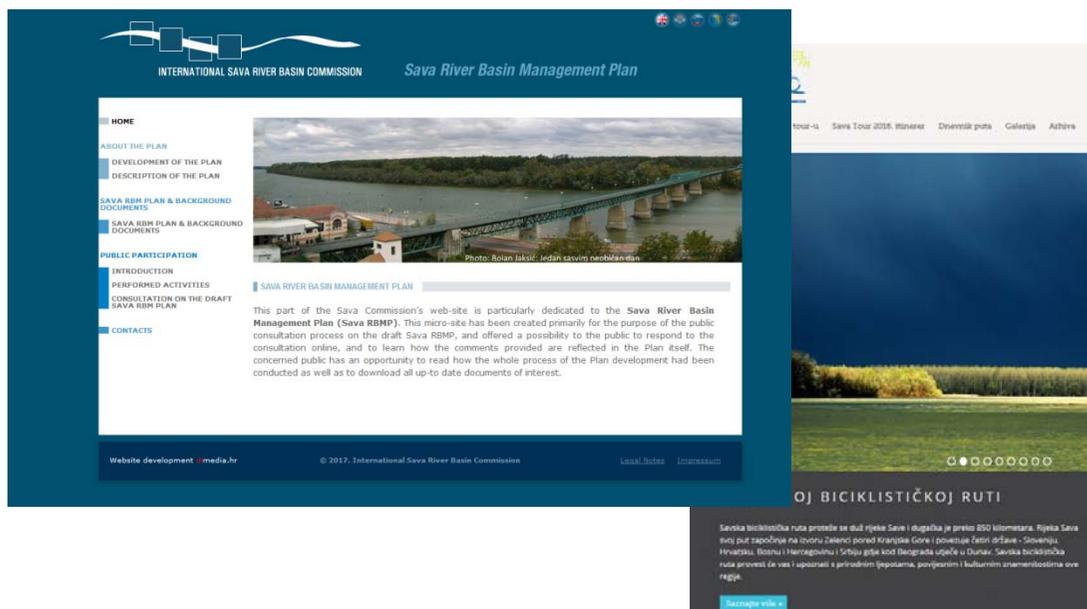
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**Croatia**

[www.savacommission.org](http://www.savacommission.org)



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4th meeting of global network of basins, Geneva, February 14-15, 2019