

Flood Risk Management in Croatia

Implementation of Flood Directive in Croatia

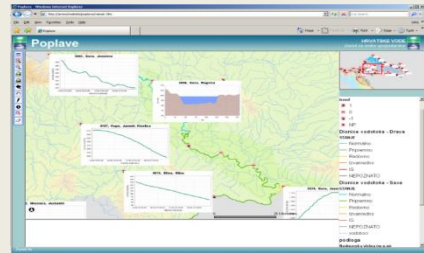
Understanding Risk Balkans Conference

September 17–19, 2018 | Belgrade, Serbia

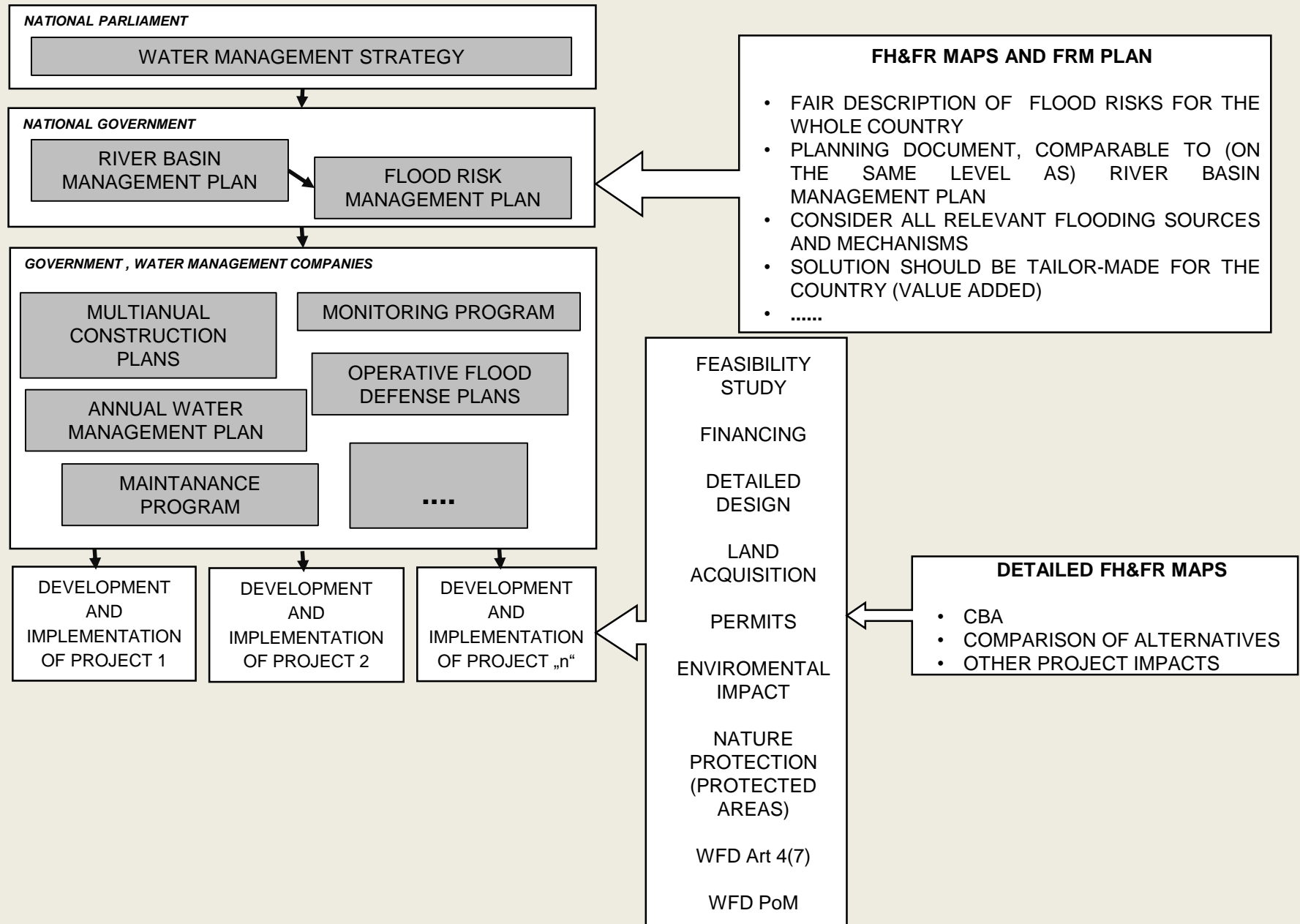


Darko Barbalić (darkob@voda.hr)
Hrvatske vode

FLOOD RISK MANAGEMENT TRADITION AND HISTORY

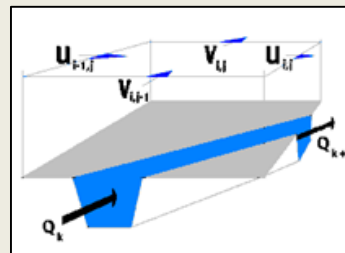
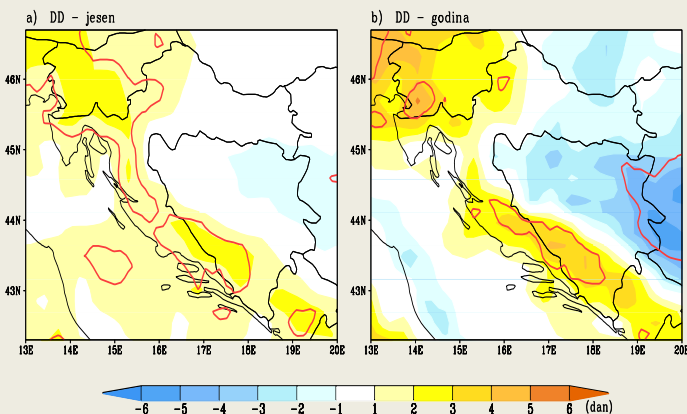
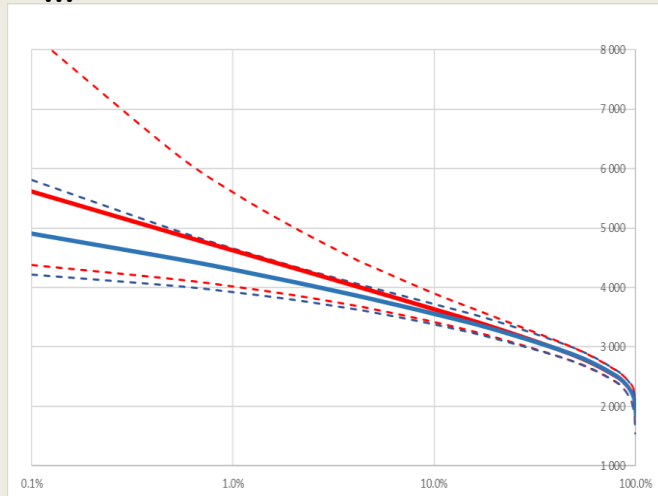


FLOOD HAZARD MAPS AND FLOOD RISK MAPS, CROATIAN CONTEXT



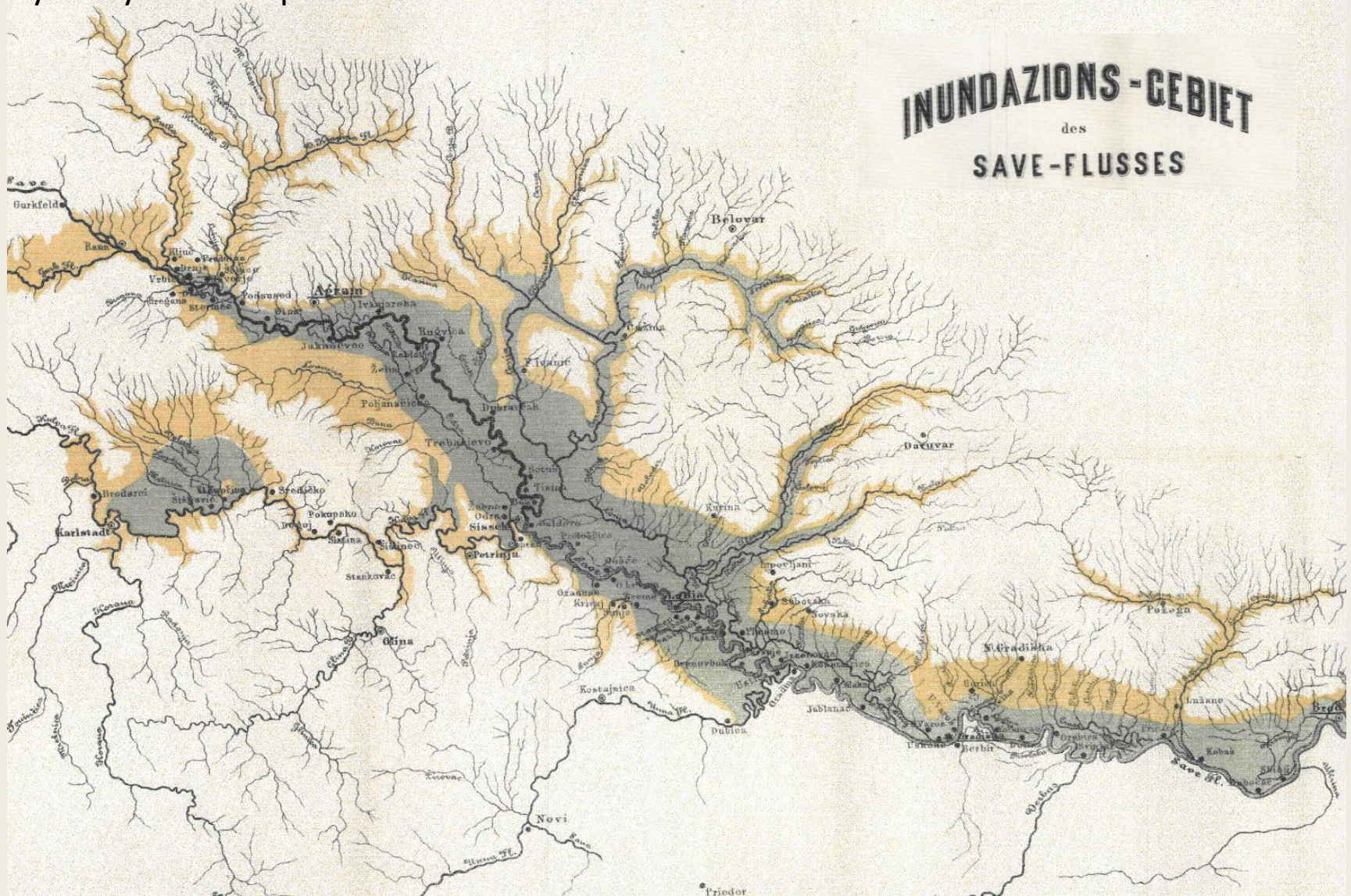
UNFORTUNATELY:

- Limited resources (time, data.....)
- We will never know it all
- It is not scientific modeling exercise (clear results and time limits)
- There is no one cook-book for all problems (at least for Croatia)
- ...



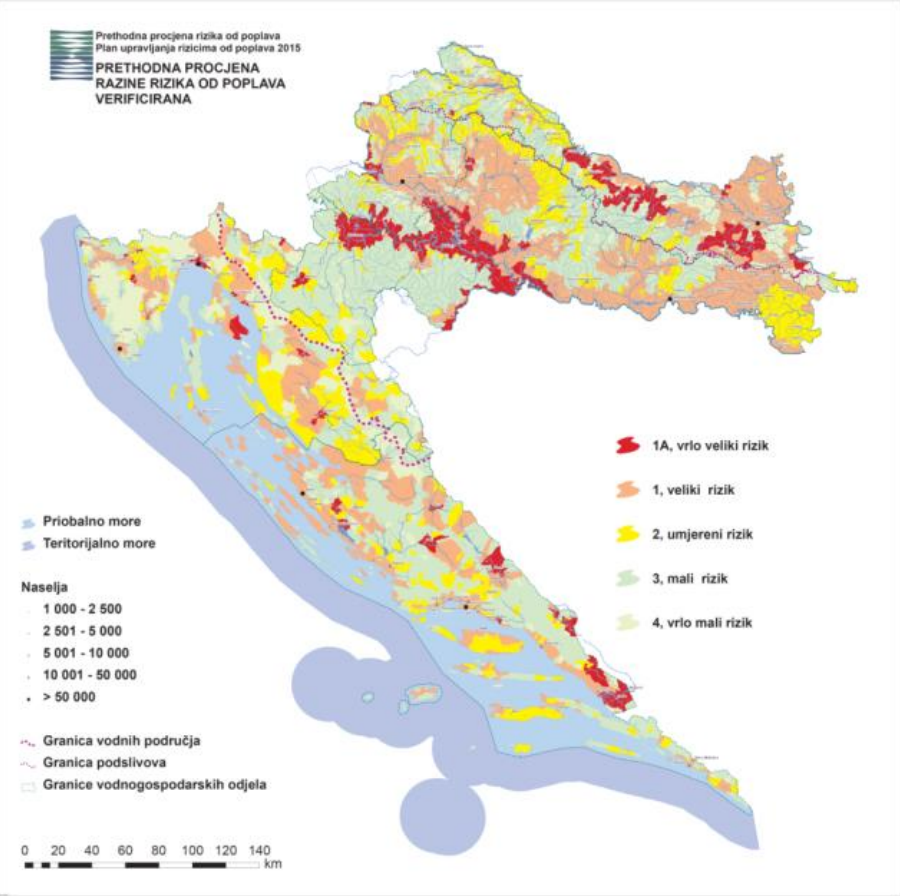
LUCKILY:

- A lot of expertise and knowledge already exists (since 1876?)
- Some data already prepared for the River Basin Management Plan
- It is neither Design of flood control structure nor Feasibility study
- Six year cycle for improvement

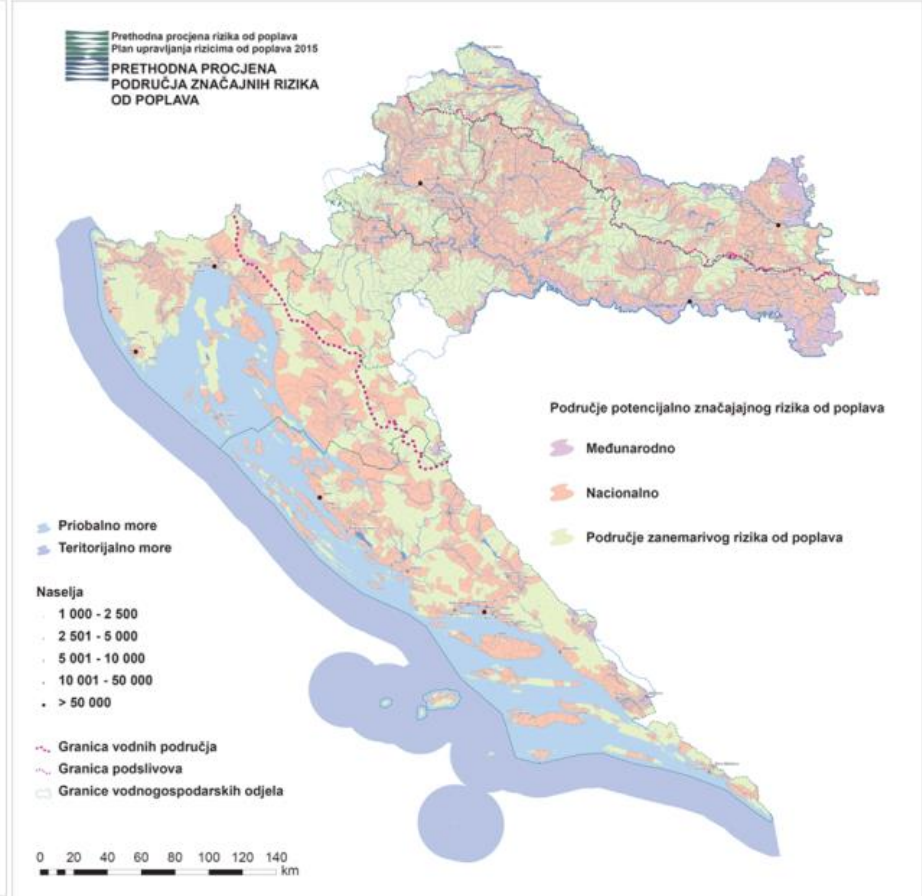


PRELIMINARY FLOOD RISK ASSESSMENT – „very red map” – 2013.

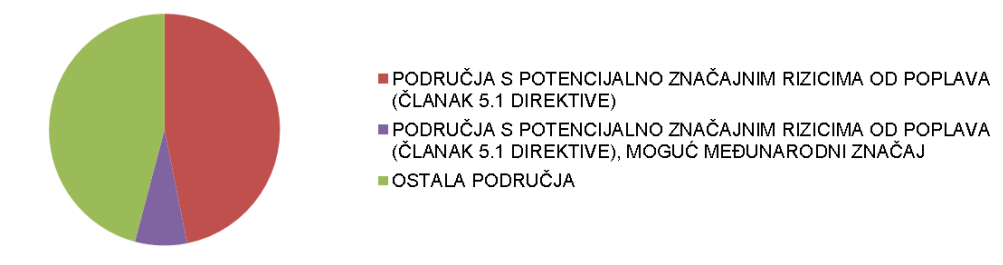
PRELIMINARY FLOOD RISK



AREAS OF POTENTIALLY SIGNIFICANT FLOOD RISK



**ANALYSIS LEVEL:
ADMINISTRATIVE AREA OF SETTLEMENT
(INCL. CORRECTIONS FOR RB DISTRICT AND ISLANDS)**



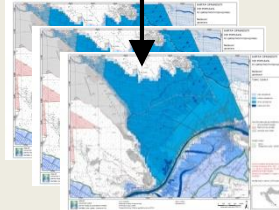
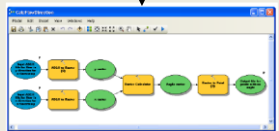
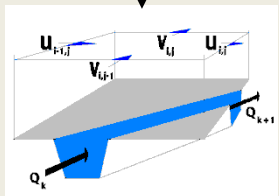
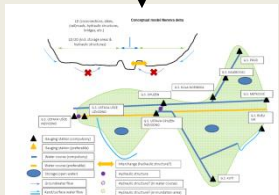
FLOOD HAZARD MAPS AND FLOOD RISK MAPS, PREFERENCES

- Scale 1 : 25 000 (already available data)
- Scenarios:
 - High probability $T \approx 25$ years (sea, rivers, rain* and groundwater*)
 - Medium probability $T=100$ years (sea, rivers, rain* and groundwater*)
 - Low probability $T \approx 1000$ years (sea, rivers, rain* and groundwater*), large dam and dike breach (simple hypothesis)
- MAPS for the general public (as simple and informative as possible), data for the Flood Risk managers:
 - Flood Hazard Maps - Mapping of flood extent and depth (water level, velocity), all flood sources on the same map
 - Flood Risk Maps – (Minimal) directive requirements + relevant available data (not actual risk map)



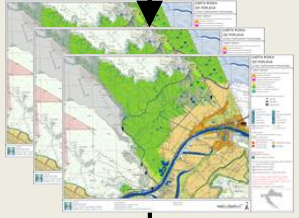
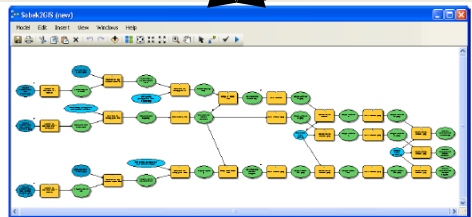
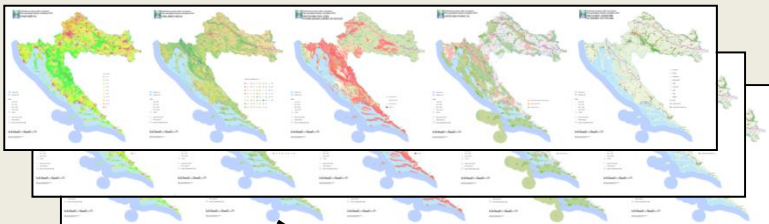
OVERALL WORKFLOW

HAZARDS



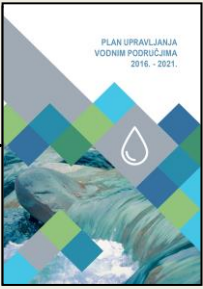
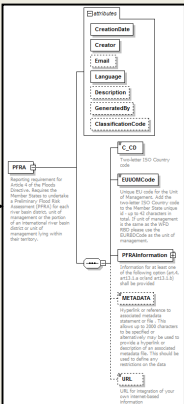
Sophisticated analysis of large quantity of data from limited number of sources

RISKS

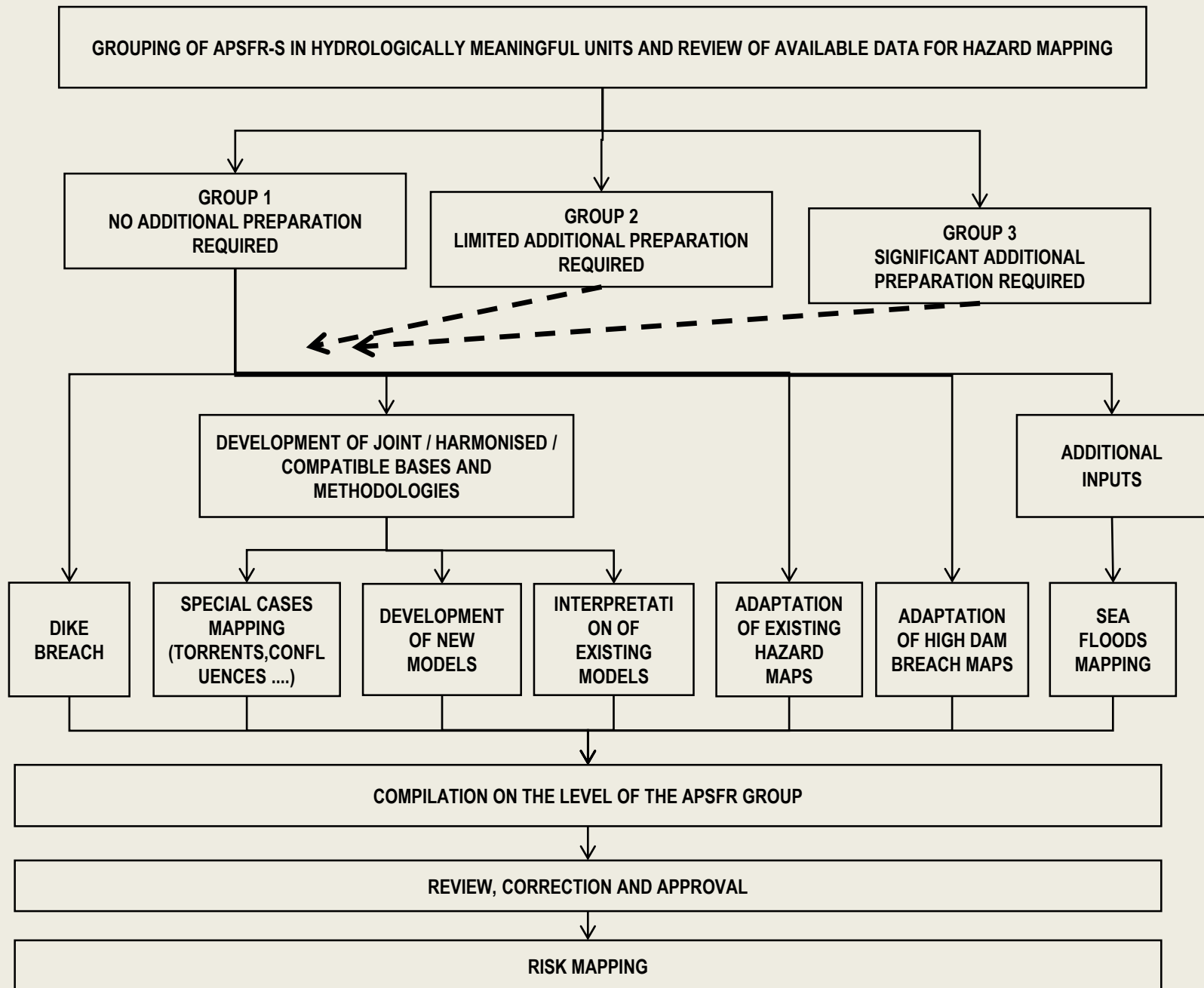


Simple GIS analysis of small quantity of data from exceptionally diverse sources

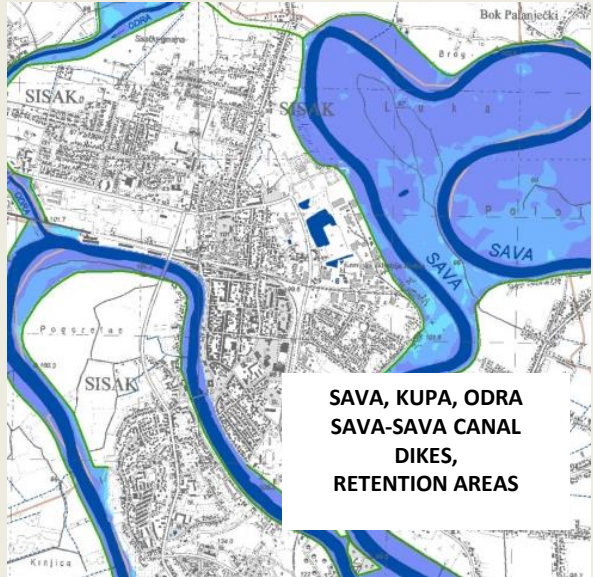
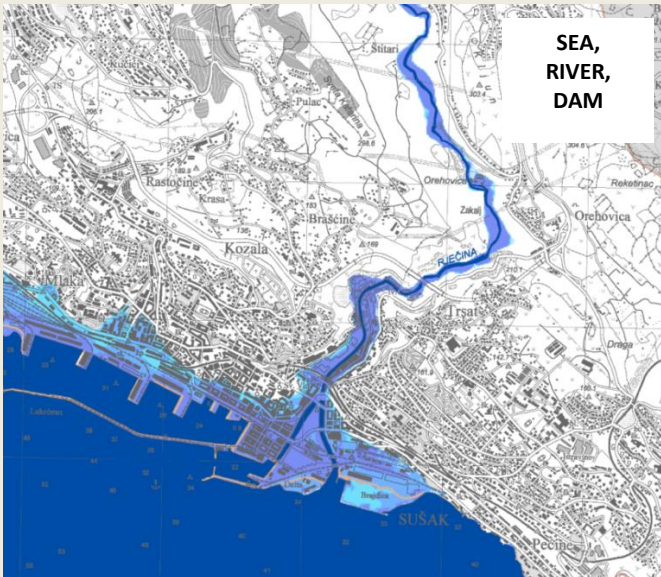
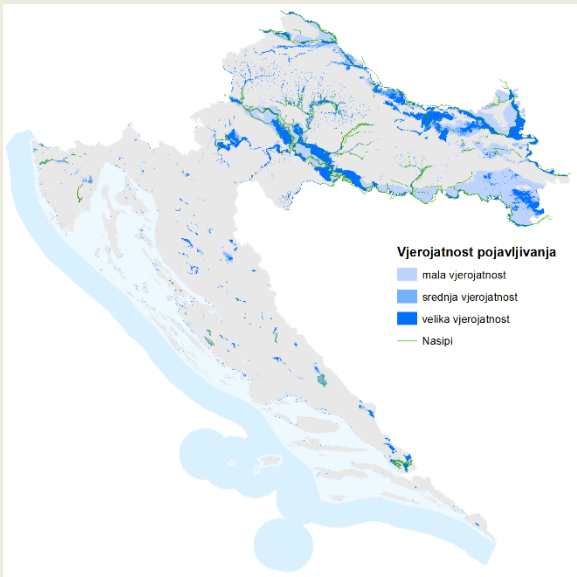
DISTRIBUTION



HAZARD WORKFLOW

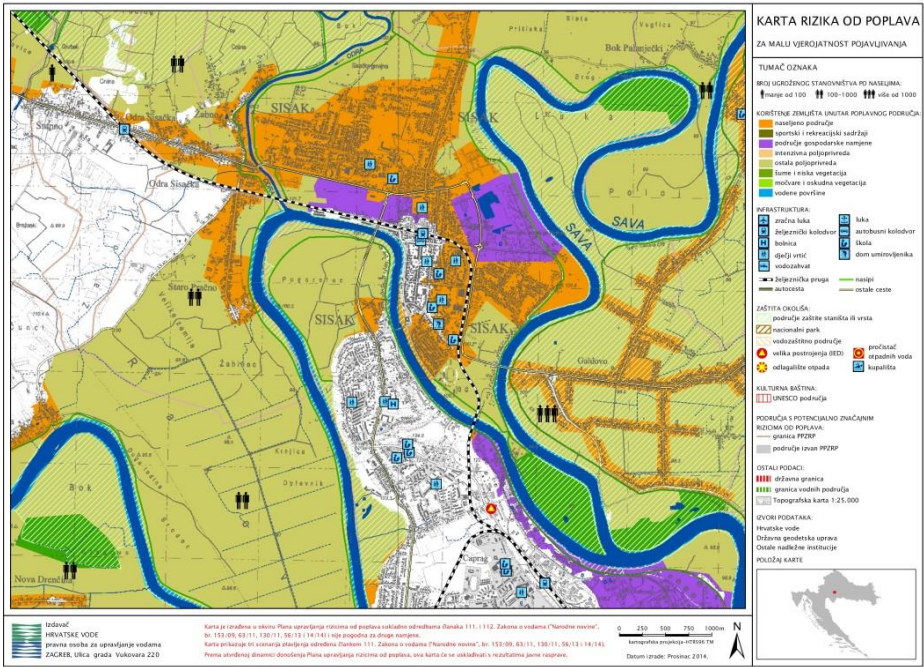
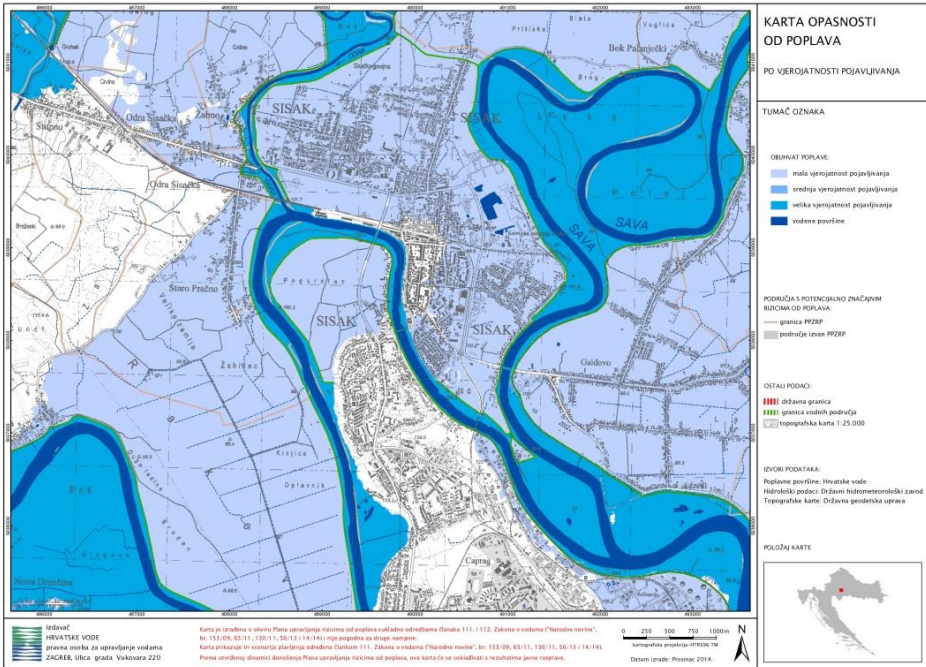


FLOOD HAZARD AND FLOOD RISK MAPS - RESULTS



FLOOD EXTENT AND DEPTH OF ALL THREE SCENARIOS (4 MAPS)

FLOOD RISK MAPS FOR ALL THREE SCENARIOS (3 MAPS)



FLOOD RISK MANAGEMENT PLAN (RIVER BASIN MANAGEMENT PLAN)

- Passed all required procedures (Public Participation, Strategic Environmental Impact Assessment, ESPO, etc)
- Adopted by Government on 06.07.2016.

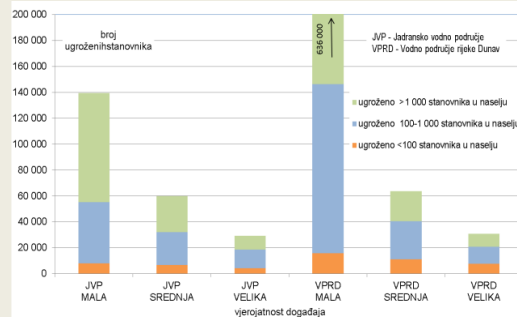
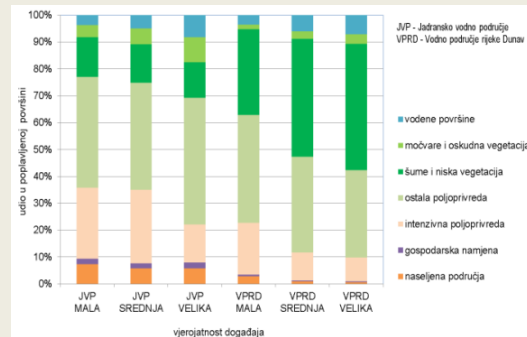
PoM:

Location non specific

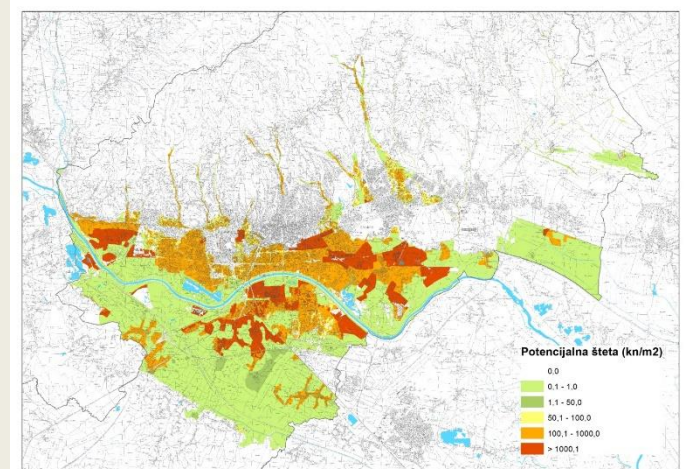
- Improvement of flood risk management (16, non structural)
- Flood risk reduction (20, structural and non structural)
- Improvement of operative flood defense (11, non structural)
- Flood risk reduction through information of public (8, non structural)

Location specific

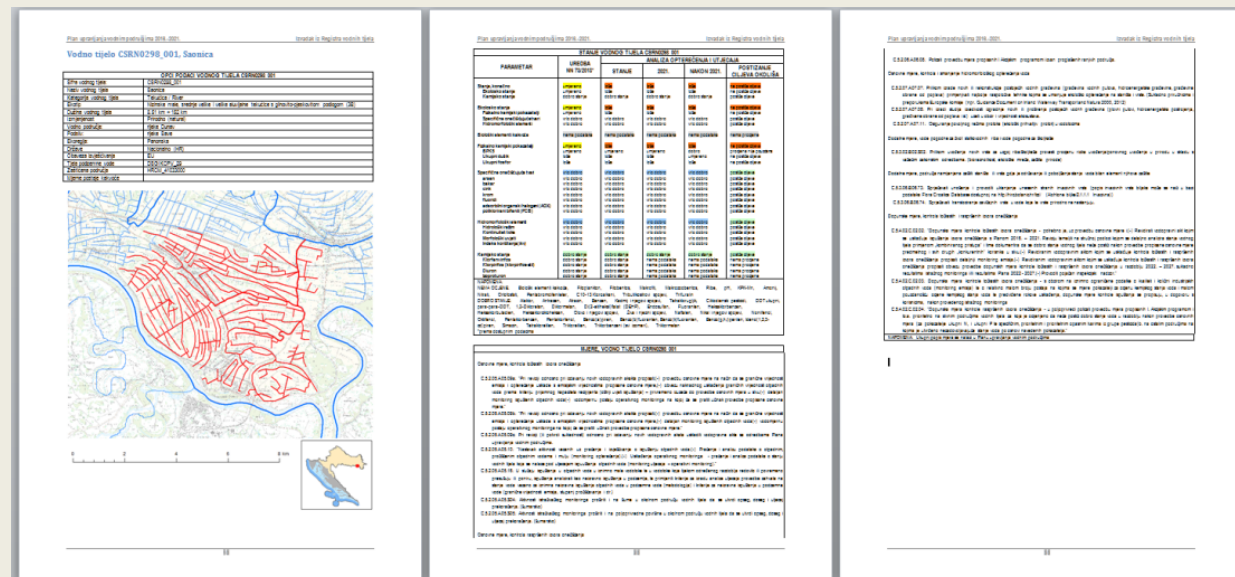
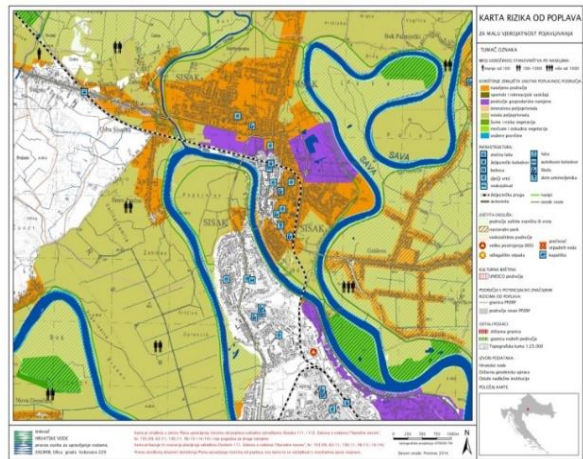
- Multiannual Program for Construction of Flood protection Structures and Amelioration Structures 2013. – 2023 (structural)



Method for assessment of potential financial damages (NACER)

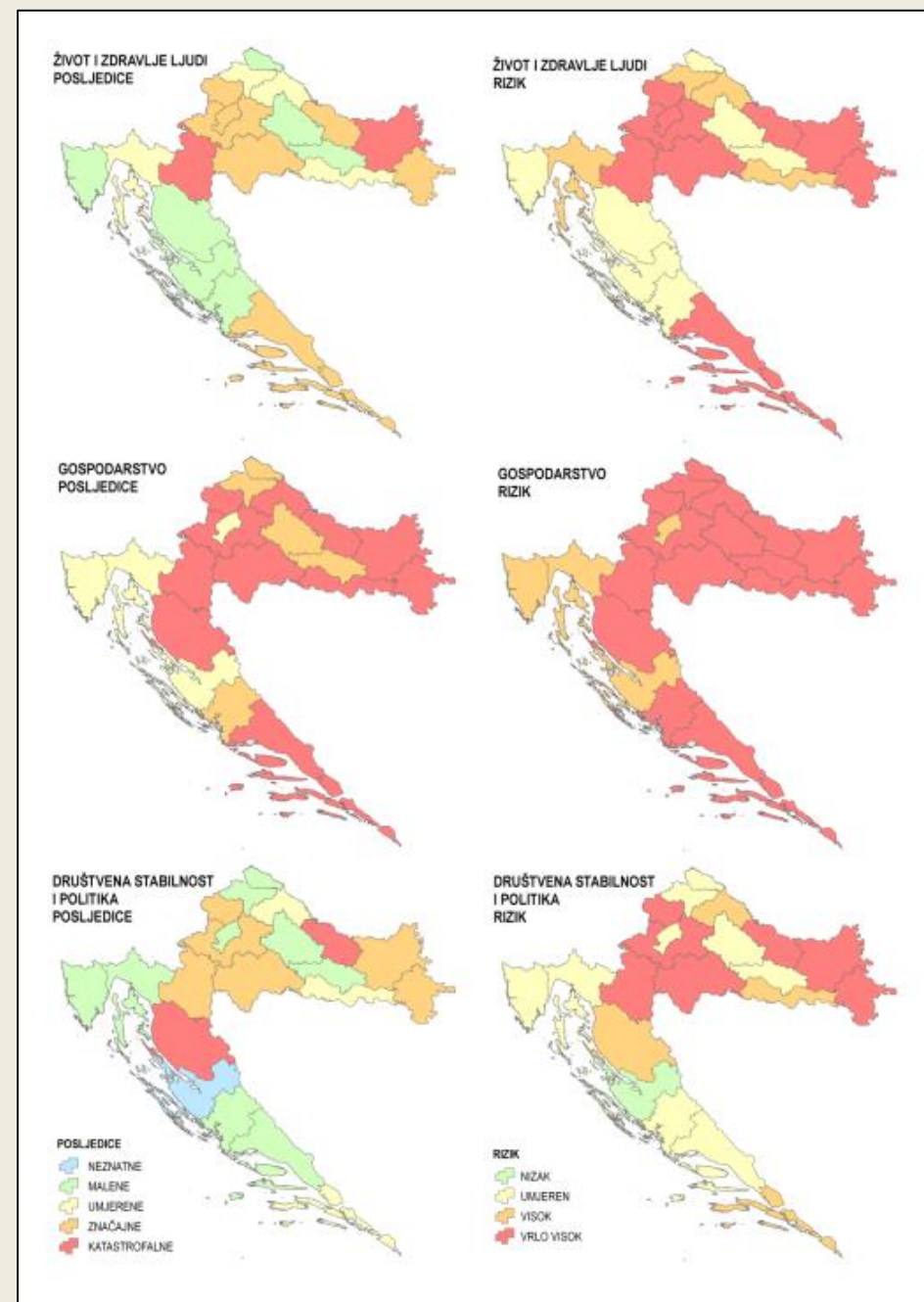
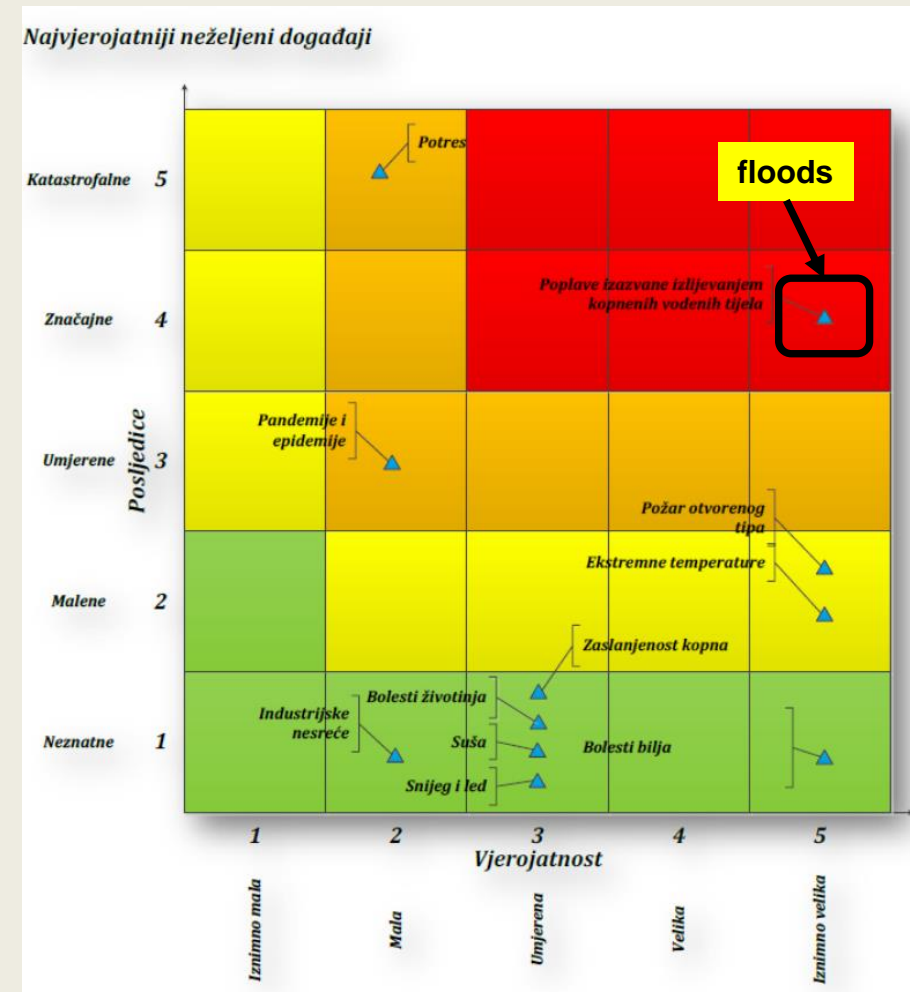


For almost all activities in the space, in the frame of environmental impact assessment, 3-4 requests per day
Article 4.7 (WFD) „new sustainable human development activities”



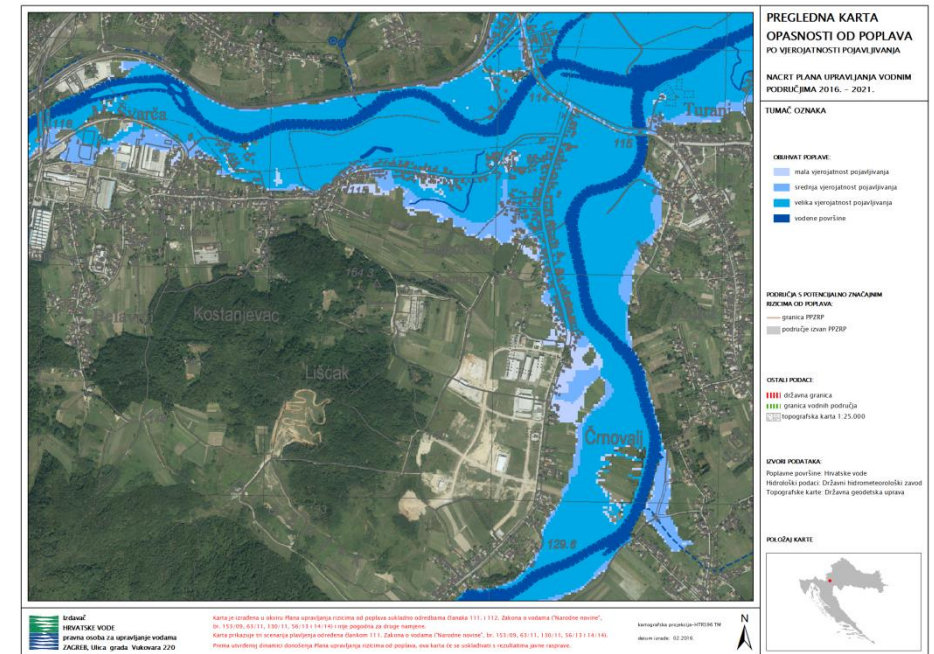
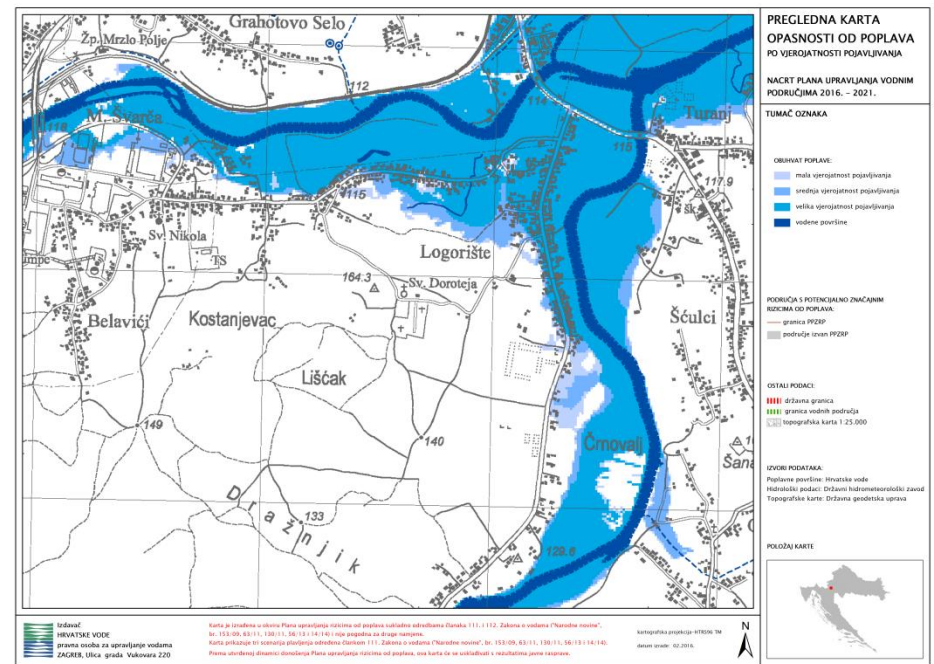
Risk Assessment and Mapping for Disaster Management

National Protection And Rescue Directorate
(Sendai)



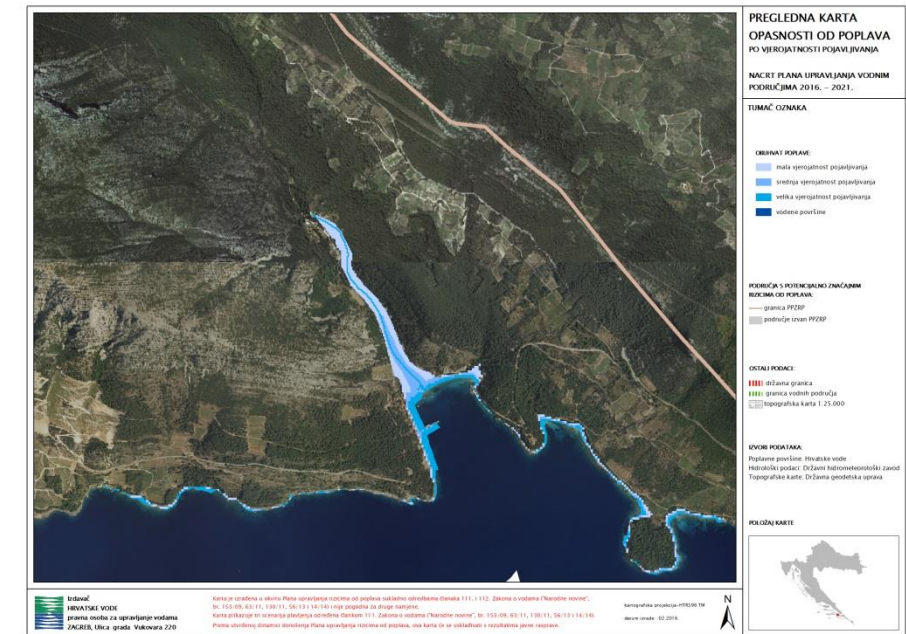
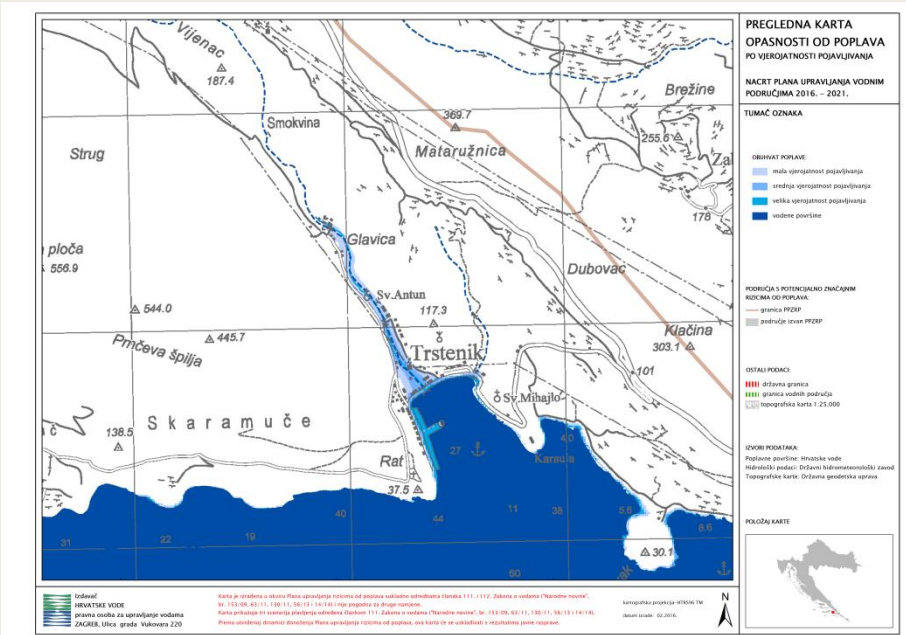
Follow up...

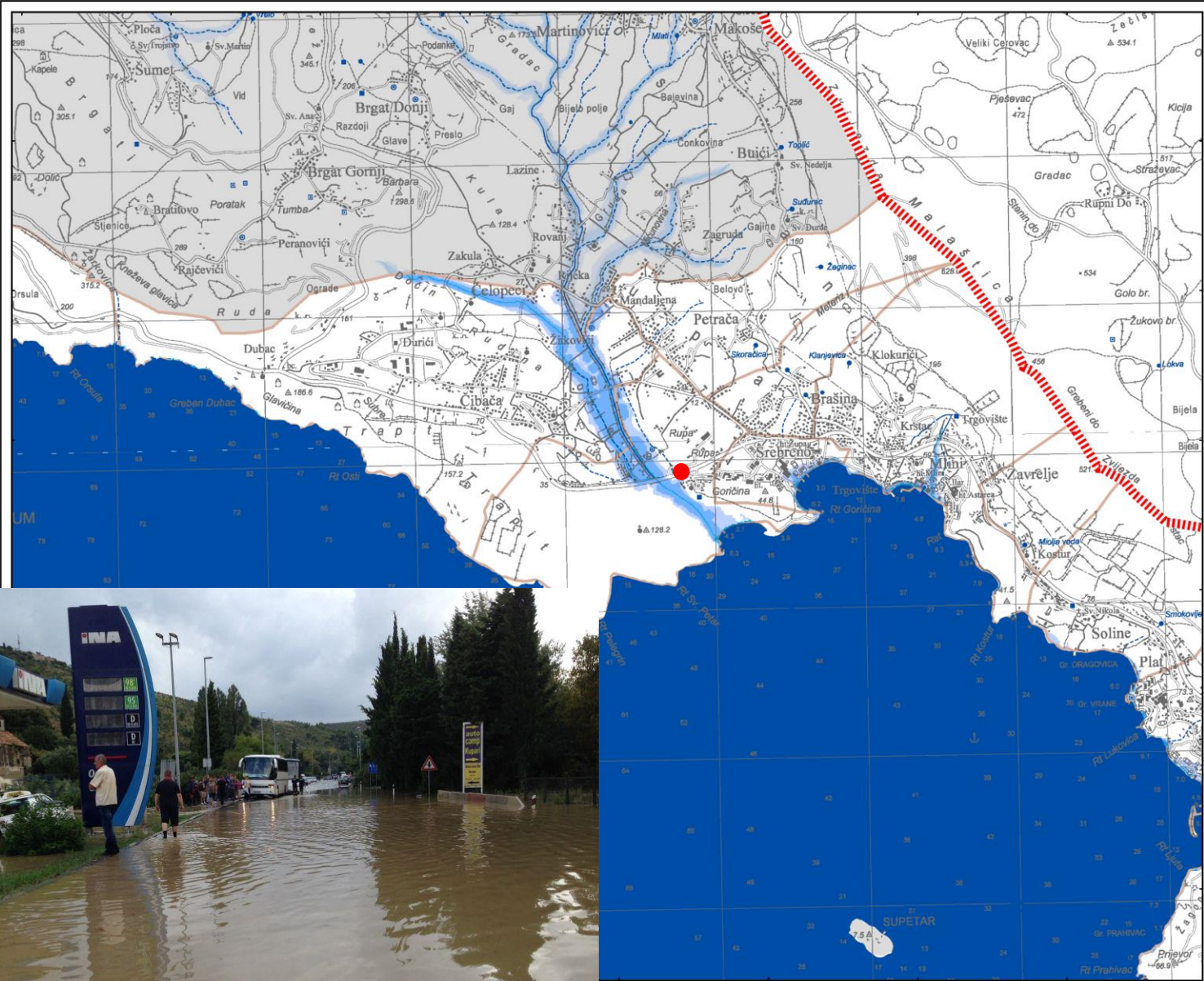
Logorište,



Follow up...

Trstenik, autumn, 2015





KARTA OPASNOSTI
OD POPLAVA

PO VJERJATNOSTI POJAVLJIVANJA

PLAN UPRAVLJANJA VODNIM
PODRUČJIMA 2016. – 2021.

TUMAČ OZNAKA

OBUHVAĆ POPLAVE:

- mala vjerojatnost pojavljivanja
- srednja vjerojatnost pojavljivanja
- velika vjerojatnost pojavljivanja
- vodene površine

PODRUČJA S POTENCIJALNO ZNAČAJNIM
RIZICIMA OD POPLAVA:

- granica PPZRP
- područje izvan PPZRP

OSTALI PODACI:

- državna granica
- granica vodnih područja
- topografska karta 1:25.000

IZVORI PODATAKA:

Poplavne površine: Hrvatske vode
Hidrološki podaci: Državni hidrometeorološki zavod
Topografske karte: Državna geodetska uprava

POLOŽAJ KARTE

sukladno odredbama članaka 111. i 112. Zakona o vodama ("Narodne novine",
druge namjene.
Zakona o vodama ("Narodne novine", br. 153/09, 63/11, 130/11, 56/13 i 14/14).

kartografska projekcija-HTRS96 TM
datum izrade: 10.2016.

CONCLUSIONS...

- The Plans are completed and adopted (nearly) on time and all basic expectations have been fulfilled
- (International) cooperation and exchange was tremendously useful (Twinning), however copy-paste is not possible.
- Mapping of the significant part of Croatia enabled balanced and fair insight in flood risks (further analysis was needed, risk maps were not enough).
- It should be noted that maps and plans are not only bases for further technical activities. They are also mean of communication to the all interested parties, including general public and consequently hazards and risks shown should be carefully explained and limitations of the maps clearly noted.
- There is remarkable need for such information!
- Finalization of Plans is just beginning
 - Improvement in new planning cycles (rain, groundwater, sea, „Mediterranean ephemeral watercourses“, reliability, gradual mapping of whole country, more scenarios?, better data, inclusion of more detailed maps)
 - Additional products needed (cooperation with National Protection And Rescue Directorate)
 - Improved database design, better documentation
- So, it was all like playing....

BAGPIPE

