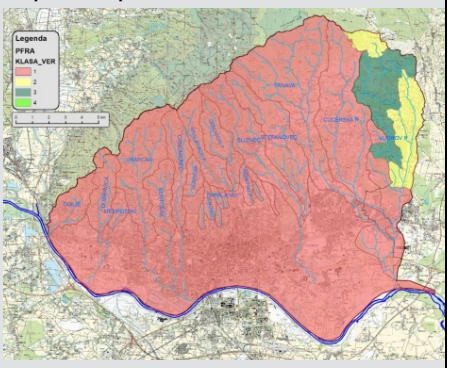
FACTSHEET RISK ASSESSMENT AND MAPPING ACTIVITIES

Heavy rain risk map for Zagreb

Where was it implemented?

Croatia, Zagreb

Map example:



Problem/background

The last ten years have experienced more frequent events with extreme rainfall causing fluvial and pluvial floods in Croatia. Heavy short-lasting rainfall poses a particular threat to urban environments, including the City of Zagreb, which in such events gets flooded. Such floods develop due to heavy intensity rainfall in a short period of time, as well as due to public sewer systems which are not designed to transport such extreme volumes of water that fall in a short period of time. The situation is in some locations additionally aggravated due to insufficiently maintained public sewer systems. The concentration of stormwater from torrential streams from the Medvednica mountain massif also contributes to the intensity of floods.

During such events, material damage was recorded in the Zagreb area, not only in its immediate centre, but also in the wider city area, so far with no casualties. The final objective is to develop hazard and risk maps for the selected parameters in the pilot area for floods caused by heavy short-lasting rainfall.

Description of methodological background and outcomes

Currently methodology is in testing. Most probably will include some sort of hydrodynamic modelling (HEC-HMS & HEC-RAS 2D).Testing HEC-RAS combined 1D/2D model.

Area and event characterisation

Area type Urban	**Topography** Hilly
Land cover/land use distribution 59 % artificial, 28 % forest & seminatural, 13 % agricultural areas	**Event** Observed event, synthetic/design event
Receptors Buildings, roads, built-up area	**Flood type** High intensity precipitation / Flash flood

Specifications of method/measure and data demands and outputs

Level of complexity	3
Addressed SPRC element	Source, pathway, receptor
Method group	Process-based approach
Spatial scale(s) of application	Local, testing raster, 10 m
Time scale/resolution	calculation timesteps: testing 5–30 min

Input datasets (type and scale/resolution)	Weather station data (point, time series, 5 min) Design storms (point, time series, testing 5–30 min) Digital elevation Model (raster) River geometry (vector: line/polygon) Hydraulic structures (vector: line/polygon/point) Land use data (vector: polygon) Buildings (vector: polygon) Traffic/technical infrastructure (vector: line/polygon)
Output datasets (type and scale/resolution)	Max. Water levels (raster) Max. Flow velocity (raster) Receptors affected Risk classes
Description of implementation	
Implementation • Start date/End date	**Users (reported/designated)** • Water management and local authorities
Initiator/responsible • Hrvatske vode	**Involved stakeholders** • GF Rijeka, DHMZ
Lessons-learned	
Main success factor: • testing	**Main challenge:** • Updating data about the degree of development and purpose; quality of inputs; selecting the representative cell size • Risk assessment

Key message to others starting with a similar task	**Contact**
The implemented activities provide insight into the required steps as assistance in the application of the activities in other towns in Croatia to address similar problems in their respective areas. First of all, prior to the implementation of activities it is necessary to identify the key problems. Special attention needs to be paid to the preparation of inputs as results largely depend on their accuracy; the development of a quality terrain model; and the establishment of a hydraulic model (including model calibration and analysis of results). It is also important to select representative rainfall (design shower) and model dynamics, with continuos model upgrades.	Hrvatske vode voda@voda.hr