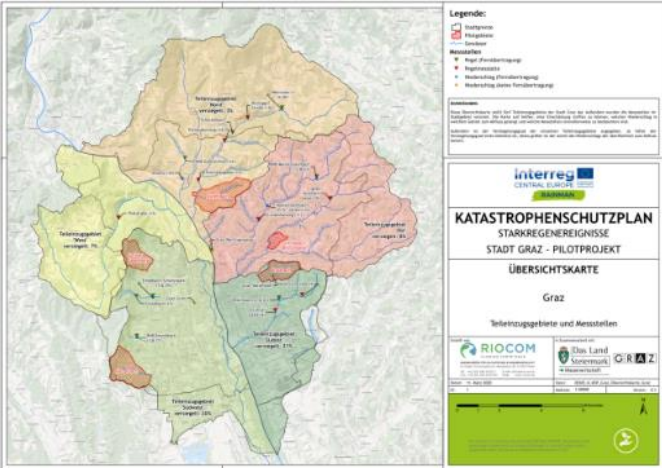


FACTSHEET RISK REDUCTION MEASURES

Experience in setting-up an emergency response plan for selected study areas in the City of Graz

Where was it implemented?	
City of Graz, Styria, Austria	
Fields of action	
<ul style="list-style-type: none"> Emergency response 	
Related to measure from the catalogue of measures	
<ul style="list-style-type: none"> Development and implementation of effective emergency response plans, keeping them up-to-date 	
Area characterisation	
<ul style="list-style-type: none"> Area type: urban Landscape type: hilly / flat 	<p>Source: RIOCOM Ingenieurbüro für Kulturtechnik und Wasserwirtschaft</p>

Problem

In 2005, 2009 and 2013 severe fluvial flood events have hit the City of Graz. That’s why the City of Graz has started the so called “Programme of Measures 2005 - 2015” to protect the citizens from flooding. It follows the concept of an integrated risk approach, which covers issues ranging from spatial planning and structural measures to emergency response. Before 2005, the preparation status of the emergency response units regarding floods was low. Over the years, however, the responsible authorities have built up a lot of knowledge, data, and experience in dealing with fluvial floods. Therefore, available flood hazard maps for all streams of Graz are essential. In the last years the topic of pluvial floods became more and more evident. On 16th April 2018 a major heavy rain event hit the southwestern part of the city centre causing flooding of underpasses, cellars, underground garages and a shopping centre. Future events of a comparable intensity in other parts of the city are possible. This type of flooding differs from known fluvial events. Hence, new strategies are needed to tackle the challenge to protect the City of Graz from pluvial flooding.

Description and aim

The basis for the heavy rain emergency response plan Graz was laid within the RAINMAN project:

- Hazard and risk maps, combining fluvial, pluvial floods and the sewer system, are available for five study areas (Annabach, Schloss Eggenberg, Katzlbach, Stufenbach, Stiftingbach) for four different scenarios.
- An emergency response toolkit sets the framework for the necessary tasks.

The plan serves as an organizational tool for dealing with disasters caused by heavy rain events. It supports those responsible to conduct operations and to set measures to minimize risk, in a structured, coordinated and targeted manner. The plan serves as the basis for decision-making.

To create the plan at first, a review of the existing hazard analysis was done, followed by a review of the existing vulnerability analysis. A workshop with all affected and responsible institutions was held in order to discuss the results. In close cooperation with the professional fire brigade, applicable measures were defined for all five study areas. With the support of the Central Institute for Meteorology and Geodynamics and their system RAPID INCA, special focus was set on the improvement of precipitations forecasts for small catchments, as initial point for the start of operations, respectively for the warning and alarming system. The legal framework, existing documents and systems were considered in the emergency response plan.

Effect of measure	
<ul style="list-style-type: none"> Improving and strengthening the skills and the knowledge of the City of Graz's civil protection in dealing with heavy rain events Enhancing the City of Graz's preparedness for heavy rain events for five study areas Intention to create emergency response plans for other endangered areas in the city 	
Description of implementation	
Effect horizon: medium	Implementation: July 2019 / April 2020
Involved stakeholders: <ul style="list-style-type: none"> City of Graz: Building Department, Department Green Space and Waters, Department Civil Protection, Professional Fire Brigade, Land Registry Office, Department City Planning, Department Building and Facility Authority, Holding Graz Office of the Styrian Government, Department Civil Protection and National Defense Central Institute for Meteorology and Geodynamics 	Initiator / responsible <ul style="list-style-type: none"> Office of the Styrian Government, Department 14 Water Management, Ressources and Sustainability External Contractor: RIOCOM Engineering Office for Environmental Engineering and Water Management
Lessons-learned	
Main success factor: <ul style="list-style-type: none"> To achieve relevant lead times, operations must start based on a forecast! For developing operational measures, individual appointments with those responsible are more effective. 	Main challenge: <ul style="list-style-type: none"> Very short lead times Forecasts involve uncertainties (affected area, rainfall intensity) In addition to the precipitation, other parameters influence the runoff, such as preceding soil moisture, vegetation cover, snow melting, snowfall, degree of sealing in the affected area Meteorological services often only provide precipitation forecasts, no forecasts of the expected runoff in a small area Due to small-scale differences in the actual rainfall event, numerous different scenarios are possible. Hazard modeling usually depicts just one of them.
Synergies / beneficial aspects: <ul style="list-style-type: none"> A lot of available basic data in the software Graz Defense Maps (Grazer Abwehrkarten) Available operational planning documents for fluvial floods in the City of Graz 	Conflicts / Constraints: <ul style="list-style-type: none"> Improvements for forecasting heavy rain events for defined areas have been achieved within the project. However, an operational test is pending to evaluate the developed emergency response plan and adapt it, if necessary.

Key message to others starting with a similar task

“Preventive measures are of great importance.”

“Coordination and information are priorities for the intervention measures”

“Think of how to explain to the inhabitants, that emergency response units have to protect critical infrastructure in the first place.”

“If the affected people know about the possible dangers in advance and are informed in good time, they can take measures on their objects independently.”

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