

# FLOOD HAZARD OF SURFACE AND UNDERGROUND WATER INTAKES - THE MAP AS A TOOL TO SUPPORT DECISION MAKING



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The IT System of Country Protection against Extreme Hazards (ISOK) was implemented in Poland between 2010-2019 and co-financed by the European Regional Development Fund as a part of the Innovative Economy Operational Programme - Priority Axis 7- Information Society.

## Introduction

One of the elements of the system is a tool in the form of an operational, dynamic map supporting the management of surface and groundwater intakes in the event of a flood hazard. During the recent floods in Poland many water intakes were flooded and excluded from exploitation for many days.

## Objectives

During the occurrences of flood, the water intakes which are within the range of flood waters cannot operate and there is a risk of their contamination with pollutants carried with waters and washed away from ground. It is important to provide adequate alternative solutions connected with water supply or its reserve as well as community awareness and quick access to information on the current hazard.

## Study Area

The map covers all water intakes located in Poland in the areas of flood hazard.

## Methodology

Water intakes map is displayed by the Water Intakes Monitor, an application developed during the ISOK project. Hydrological data and forecasts are obtained from the IMGW-PIB Monitor. The IMGW-PIB Monitor incorporates a hydrodynamic model built on mass and energy balance equations, which forecast streamflow or water stage with hourly resolution, for the nearest 3 days. Water intakes presented in the map include all technical installations and facilities related to water collection and treatment. Data on water intakes and the current hydrological situation are presented on cross-sections of rivers.

## Bibliography

- [1] Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks.
- [2] Communication from the Commission of 12 December 2006 on a European Programme for Critical Infrastructure Protection.

## Results

The Water Intakes Monitor presents the user a map with overlaid water intakes, gauge stations and weather stations. By selecting an icon representing water intakes, basic specification of an object is shown. On the basis of layers containing location of water intakes and cross-section of streams incorporated into flood hazard maps [1], cross-section for representing each of the water intakes were chosen.

[Icon of the status of water intake] [code of water intake]	
Water intake name	Zator-Skawa
Type of water intake	Surface water intake
Purpose of water abstraction	1 – municipal water intake
Name of the operator	Zakład Gospodarki Komunalnej Sp. z o.o.
Forecast of water level state [m a.s.l.]	221,467 (2020-09-15 12:00 UTC)
Forecast trend of water level	No trend
The ordinate of the warning state above which the water intake is at risk [m a.s.l.]	224,479
The ordinate of the alarm state, above which the water intake cannot work properly [m a.s.l.]	225,593

Fig.1: Tooltip of water intake

## Discussion

The observation of water level on a stream gauge gives an additional opportunity to monitor threats and inform the exploiter of the intake and emergency services about a forecasted trend. The trend forecast is depicted both in a graphical form, with the use of arrows, and as a description: rising-, falling- and no trend (Fig.1).

## Conclusion

The main idea of the map is to present the policymakers and owners of the water supply infrastructure the possible consequences of flood which require taking actions, including alternative solutions to the water supply duty. Of great importance for the future development of the Decision Support System is the possibility of expanding its functionality with the analyses of water contamination with substances that can affect the quality of yielded water due to a significant industrial disaster [2].