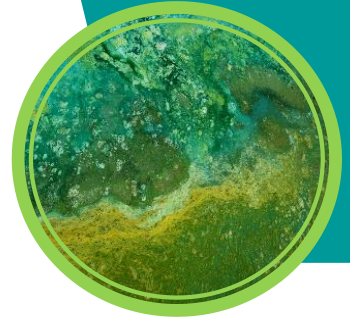




Międzynarodowa Komisja Ochrony Odry przed Zanieczyszczeniem
Internationale Kommission zum Schutz der Oder gegen Verunreinigung
Mezinárodní komise pro ochranu Odry před znečištěním



WORKSHOP OF THE ICPO G3 WORKING GROUP “EMERGENCY POLLUTION”

*“International Warning and Alarm Plans and Experiences in
Applying/Defining Threshold Values for Reporting in Warning
and Alarm Plans”*

4–5 November 2025, Wrocław

CONFERENCE ABSTRACTS

“The Odra Emergency Plan”

Tomáš Kacálek, ICPO Working Group G3 “Accidental Pollution”, Povodí Labe, s.p.

The Odra Emergency Plan is a fundamental document for managing emergency events affecting the aquatic environment in the international basin of Oder river. This plan was developed through cooperation between the Czech Republic, Poland, and Germany within the framework of the International Commission for the Protection of the Odra River against Pollution (ICPO). Its aim is to ensure effective prevention, early detection and coordinated response to accidents that may threaten water quality, ecosystems and public health. The document is divided into two parts – the first focuses on technical and organizational measures, while the second contains the International Warning and Alarm Plan for the Oder and which is described in a separate presentation. The plan is based on European legislation, particularly the SEVESO III Directive and the Water Framework Directive. It includes lists of potential sources of emergency pollution, such as industrial facilities, pipeline systems, and municipal wastewater treatment plants. Special attention is given to the protection of sensitive areas, including drinking water intake sites, bathing waters, and protected territories. The emergency plan contains data on sites for emergency response near state borders. It also defines procedures for documenting and evaluating accidents and recommends measures for prevention and mitigation of consequences. Experiences from past accidents highlight the need for harmonized approaches and information sharing among countries. Therefore, the document emphasizes the importance of cross-border cooperation. The Odra Emergency Plan is a crisis management tool that provides concise yet comprehensive information necessary for emergency preparedness, information exchange, and appropriate response in the event of a cross-border accident. The Odra Emergency Plan is a crisis management tool that provides concise but relevant information needed for emergency preparedness, information sharing and appropriate response in the case of a transboundary accident.

“International warning and alarm plan for the Oder”

Bogdan Romanowski, ICPO Working Group G3 “Accidental Pollution”, Lower Silesia Voivodeship Office

The Warning and Alarm Plan for the Odra River was developed by the International Commission for the Protection of the Odra River against Pollution (ICPO) with the aim of coordinating actions in the event of pollution threats to the Odra River and its basin, which includes the territories of Poland, Germany, and the Czech Republic. The main objectives of the plan are to ensure the efficient exchange of information between countries and institutions, as well as to undertake coordinated warning and alarm actions in order to minimize the risks and consequences of pollution. The plan includes procedures for, among others: notifying the competent authorities after an incident is detected, defining the hierarchy of responsibilities,

cooperation between services and institutions of the member states, and mechanisms for real-time data exchange. The scope of the plan covers prevention, monitoring, response, and communication in emergency situations – including warning and information activities. The plan operates across borders, which is particularly important given the character of the Odra River as a boundary river flowing through several countries. It also emphasizes the importance of training and exercises for services responsible for crisis management, as well as the need for clear communication channels – both between countries and at regional or provincial levels – to enable a swift response in the event of environmental threats.

“International warning and alarm plan for the Rhine”

Marc Daniel Heintz, ICPR Secretariat

Since 1985 (and thus for 40 years), the International Commission for the Protection of the Rhine (ICPR) has been operating the International Warning and Alarm Plan for the Rhine. The aim of this instrument is to enable states to respond quickly to pollution incidents and to take appropriate measures. Several industrial accidents in the past have highlighted the need to further improve communication. Due to its dense population and high degree of industrialisation in its basin, as well as the dependence of the delta on its drinking water supply, the Rhine is particularly vulnerable to pollution. Today, the seven main international warning centres routinely work together. This is supported by an online platform. Training courses and test alarms are conducted annually. Fallback options have been defined for system failures. Criteria and thresholds have been established for doubtful cases. The ICPR publishes an annual report on the most important events of the previous year. In the coming years, a flow time model for calculating the spread of pollutant waves, which can be applied by environmental authorities in the states, is to be updated.

“International warning and alarm plan for the Elbe”

**Jiří Petr , Chair of ICPE Working Group H “Accident-related Water Pollution”,
Povodí Labe s.p., Lenka Běhounek, ICPE Secretariat**

In the case of an accidental water pollution, it is crucial to promptly inform the affected riparian communities downstream. This is why, immediately after its foundation in 1990, the International Commission for the Protection of the Elbe River (ICPER) adopted the International Warning and Alarm Plan Elbe (IWAPE) as one of its first documents. The IWAPE is a uniform warning and alarm system that provides information on the location, timing and scale of water pollution related to accidents in the Elbe river basin. It is of particular importance in the event of transboundary accidents.

The main structure of IWAPE comprises five international main warning centres: one in the Czech Republic (Hradec Králové) and four in Germany (Dresden, Magdeburg, Potsdam and Hamburg). Messages are forwarded between the centres according to a pre-defined relay system.

The IWAPE is regularly updated to reflect new findings and experience. Since 1991, it has been revised six times: in 1995, 2004, 2006, 2012, 2018 and 2023.

Since 2007, the number and nature of messages have shown that they refer not only to significant accidental pollution, but also to events that could attract media or public attention. The primary objective of these messages is to provide the relevant authorities with accurate information promptly, to prevent potential misunderstandings and the spread of misinformation. Between 2007 and 2024, petroleum products and other floating substances were the main reasons for sending a message (64% of events).

“Monitoring of pollutant loads as part of non-target screening”

Pavel Ondruch, ICPR Secretariat

The project introduces an international system for *Non-Target Screening (NTS)* of pollutants in the Rhine basin, coordinated by the International Commission for the Protection of the Rhine (ICPR). Seven partner institutions from five countries (DE, NL, CH, LU, FR) operate a harmonised NTS network to detect, identify, and track emerging substances in river water.

The NTS Tool, now fully implemented, combines LC-HRMS analysis with harmonised data processing, enabling the detection of both known and unknown compounds across a wide range of polarities and molecular masses, focusing on substances not covered by routine GC-MS monitoring. A shared *CIS database* and visualization platform allow cross-station evaluation, emission tracking, and retrospective analysis.

The system enhances chemical risk assessment and supports the long-term Rhine monitoring programme. Future work will improve semi-quantification, expand coverage to less polar substances, and strengthen information transfer to expert groups for early-warning applications within IWAP-Rhein.

“The Elbe alarm model – ALAMO”

**Svenja Sommer, ICPE Working Group H “Accident-related Water Pollution”,
Federal Institute of Hydrology (BfG)**

The Elbe Alarm Model (ALAMO) is a predictive model used to calculate pollutant dispersion in the Elbe River and certain tributaries. Introduced in 2004 for the Elbe River alone, the model has since been extended to the Vltava, Saale, and Bílina rivers. It is primarily used in the five International Main Warning Centres of the International Warning and Alarm Plan Elbe (IWAPE).

The model aims to provide rapid results with minimal input, as data is typically scarce in the early stages of an incident. Only the time, duration, location, and the quantity of the emitted substance are required. The model’s results can be examined through various visualizations and directly integrated into an IWAPE notification. The most important outputs of the model are:

- The maximum pollutant concentration along the longitudinal profile of the Elbe,
- The pollutant concentration for various profiles over time,
- A graphical display of the pollutant wave movement.

Models that calculate pollutant dispersion in rivers are calibrated using tracer measurements, which allow the determination of advection and dispersion parameters. These parameters depend on the river discharge, making it necessary to conduct tracer measurements under different discharge conditions (low, medium, and high).

A fluorescent dye is used as the tracer, and its concentration is measured at various locations along the rivers. The tracer concentration is monitored by measuring the fluorescence of the dye. Based on the time course of tracer concentrations, advection and dispersion parameters can be derived between measurement locations, which are then used to calibrate ALAMO.

Through the continuous development of the ALAMO model, it plays a crucial role in enhancing safety and efficiency in handling pollutant incidents in the Elbe river, enabling rapid and informed decision-making in crisis situations.

“Intervention monitoring procedure for golden algae in Poland”

Lidia Czerwińska, Chief Inspectorate of Environmental Protection (GIOŚ)

Following the 2022 incident on the Odra River, the Chief Inspectorate of Environmental Protection (GIOŚ) developed and implemented the *Prymnesium parvum* "golden alga" Intervention Monitoring Procedure. The procedure defines the method for conducting intervention monitoring, including locations covered by intervention monitoring, the frequency of measurements/tests at these locations, alert levels, and the route for transmitting information to other institutions. The procedure is updated as needed. The current 4th edition of the procedure defines five different types of monitoring points (primary, secondary, tertiary, quaternary, and quintuple). The frequency of field measurements and laboratory tests varies and depends on three factors: the assigned monitoring point type; the assigned risk of a potential bloom; and the period of the year during which the measurements/tests are performed (taking into account the growing season).

“Warning system of the German State of Brandenburg for *Prymnesium parvum* mass developments in the Odra river”

Bernhard Aichner, State Office for the Environment Brandenburg (LfU)

The warning system is based on available information from three sources:

1. *Prymnesium* concentrations in the Odra river, routinely measured with molecular methods (dPCR) at nine sampling spots, by the Berlin-Brandenburg Environmental State Laboratory (LLBB).
2. Water chemical and biological data (chlorophyll concentrations, pH, nitrate), continuously measured in two automated measuring stations (Frankfurt Oder and Hohenwutzen).
3. *Prymnesium* concentrations in the middle and upper reaches of the Odra river in Poland, routinely analysed with microscopic methods at several sampling spots. Data provided in bilateral exchange (weekly reports) and via a website by Polish authorities.

Available data from these three sources are integrated, via threshold values and an overall water ecological assessment, to three alert levels. Those trigger respective information duties to local and state authorities and induce potential water management measures.

“Summary of the ODER~SO Special Investigation Program”

Martin Pusch, Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB)

The *ODER~SO* project investigates the environmental disaster in the River Oder of August 2022. It is funded by the German Federal Ministry of Environment and runs from February 2023 to June 2026. The project is led by Dr. habil. Martin Pusch with co-leads Dr. Christian Wolter and Prof. Dr. Sonja Jähnig. Main goals include monitoring algal and pollutant loads in the lower Oder section shared by Germany and Poland, documenting aquatic population recovery, and assessing toxin risks, ecosystem resilience and development scenarios. Thirteen subprojects address e.g. data coordination, genomic monitoring, toxicity tests, and assessments of river and floodplain status. A GIS-based early warning system is being developed to detect algal risks in real time that collates various data, including qPCR tests, field records and satellite data for continuous monitoring of water quality. Genomic studies revealed high genetic diversity within *Prymnesium parvum*, crucial for understanding toxin variability. Laboratory experiments identified environmental factors controlling algal growth and toxin production. Toxicity tests on fish showed species-specific sensitivity to algal toxins. Research however cannot yet explain the absence of toxin production by the *Prymnesium* bloom from summer 2024. Fish and mussel populations are recovering, though a clear risk of renewed mortality remains if salt concentrations remain high. The availability of ecosystem services is assessed using the River Ecosystem service Index (RESI) for the river, the active floodplains and the former floodplains for the status quo, and additionally for two development scenarios, as i) further

construction of large groynes to support navigation and ii) revitalization of the Oder aiming to reach the goals of the EU Water Framework Directive. The *ODER~SO* project work hence also supports the development of management actions strengthening the resilience of this impacted river-floodplain ecosystem.