



A Transdisciplinary Approach to Geopolitically Induced Environmental Risks in the Gulf of Finland

The project *Coastal waters under pressure – safeguarding a healthy Gulf of Finland in a changing geopolitical and environmental landscape* (CoWup) aims to strengthen protection of the Gulf of Finland by addressing safety and security-related environmental risks.

CoWup: CONNECTS EXPERTISE TO NAVIGATE UNCERTAINTY

- Coastal waters are subject to several human-induced pressures, such as eutrophication, pollution, and climate change. The current unpredictable geopolitical situation, particularly Russia's war against Ukraine, has heightened environmental risks in the Gulf of Finland, the Baltic Sea, and beyond. Growing uncertainty in alliances and the cessation of cross-border cooperation may undermine the ability to prevent environmental damage or mitigate its consequences.
- CoWup is an inter- and transdisciplinary project that bridges geopolitical security with marine and environmental risk. It brings together methods, perspectives, and expertise from:
- political science, environmental social sciences, ecotoxicology, ecology, oceanography, statistics, communication science, environmental psychology, museology, engineering;
- state authorities from a range of relevant sectors, municipalities, environmental non-governmental organizations, and key international partners.

CoWup: FROM SCENARIOS TO SOLUTIONS

- Builds scenarios to enhance understanding and assessment of marine environmental risks arising from the current geopolitical situation.
- Analyzes cause-and-effect relationships related to these risks and identifies measures to help reduce them.
- Develops a modeling system to assess the transport and fate of harmful substances and nutrients in the Gulf of Finland and other coastal seas. The system integrates physical, biogeochemical, and drift modeling with advanced statistical methods.
- Creates a comprehensive tool by integrating knowledge of computational ecotoxicology into the modeling system, enabling the determination of chemical mixture toxicity in a marine accident area and assessment of the impacts on the marine ecosystem.
- Develops methods and models to enable environmental impact assessment and the promotion of best practices for the sustainable use and management of coastal marine resources.

CoWup: STRENGTHENS MARINE RISK PREPAREDNESS

- Society gains a deeper understanding of the risks and impacts in the Gulf of Finland driven and amplified by the geopolitical situation and associated uncertainties.
- Up-to-date models and methods enable the assessment of environmental risks and impacts of adverse events, while also incorporating uncertainties.
- Improved understanding of the toxicity of chemical mixtures in the marine environment, along with enhanced capacity to model their transport and effects on the marine ecosystem.
- Improved societal capacity to prepare for marine environmental risks in the Gulf of Finland and other coastal seas, and to respond in a coordinated way during crisis situations.

Laura Tuomi¹, Aleksi Nummelin¹, Leena Kalliovirta², Veli-Pekka Tynkkynen², Johannes Jauhainen³, Niina Kotamäki⁴, and Päivi Haapasaari⁴

¹Finnish Meteorological Institute

²University of Helsinki

³Demos Helsinki

⁴Finnish Environment Institute