

# The Source To Outcome Pathway – an integrative modeling framework for Next Generation (environmental) Risk Assessment (NGRA)

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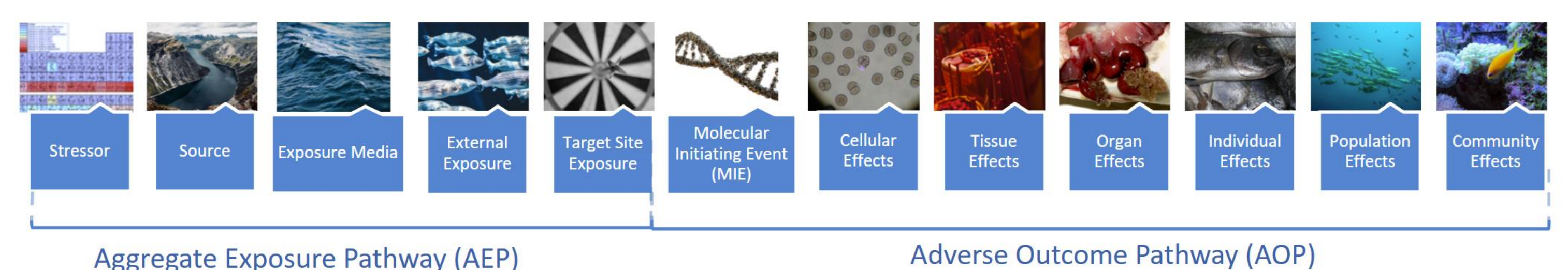
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## Introduction and objective

Advancing environmental risk assessment requires a paradigm shift from traditional single-chemical evaluations to more holistic approaches capable of addressing complex, real-world chemical exposures. Next Generation Risk Assessment (NGRA) promotes this transition by integrating diverse data sources and mechanistic understanding to inform both single and cumulative chemical risk assessments.

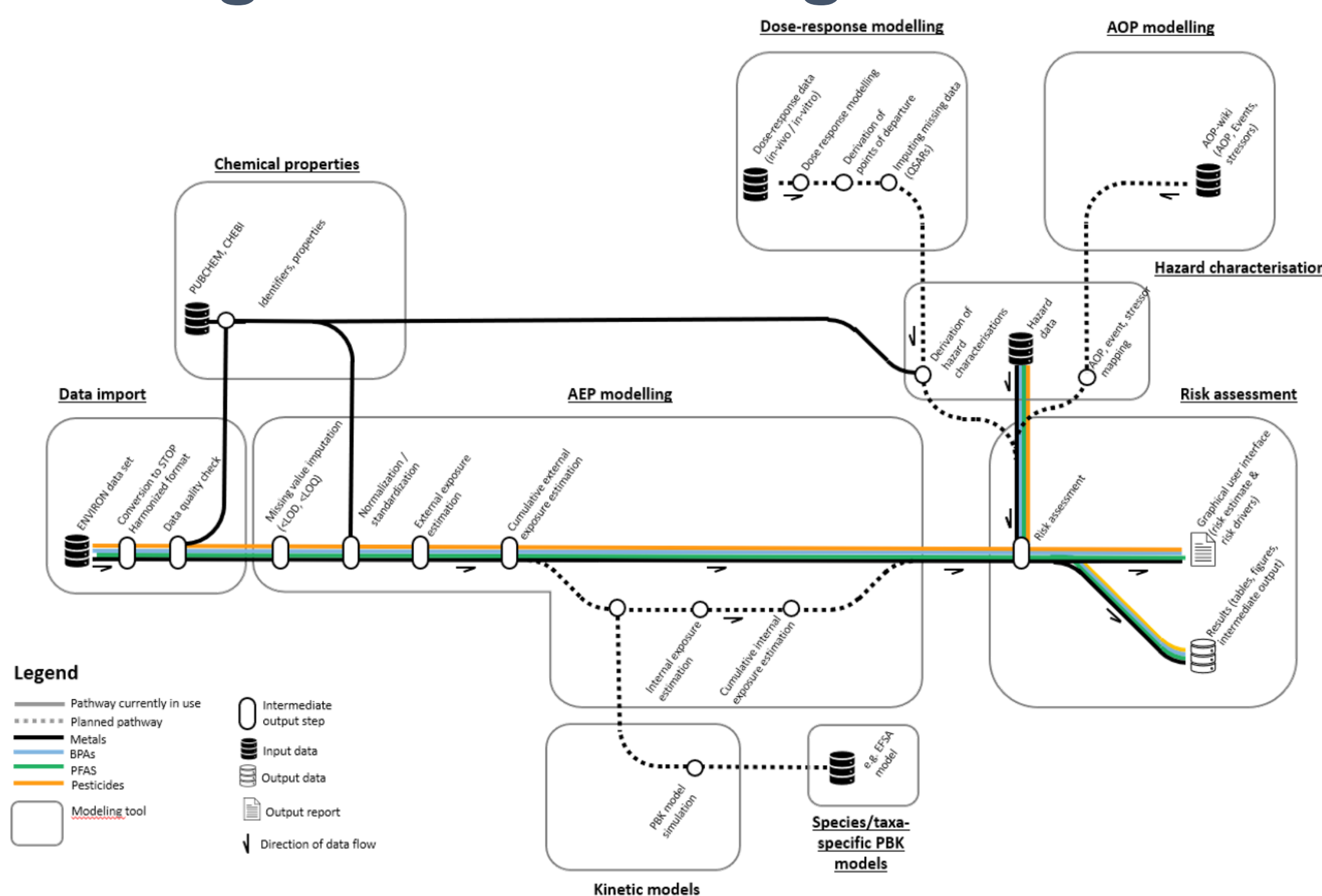
The objective of the work was to develop an integrative modeling framework that combines the Aggregated Exposure Pathway (AEP) and Adverse Outcome Pathway (AOP) for risk prediction (assessment) of single chemicals and chemical mixtures (fig. 1).

### Source To Outcome Pathway (STOP)



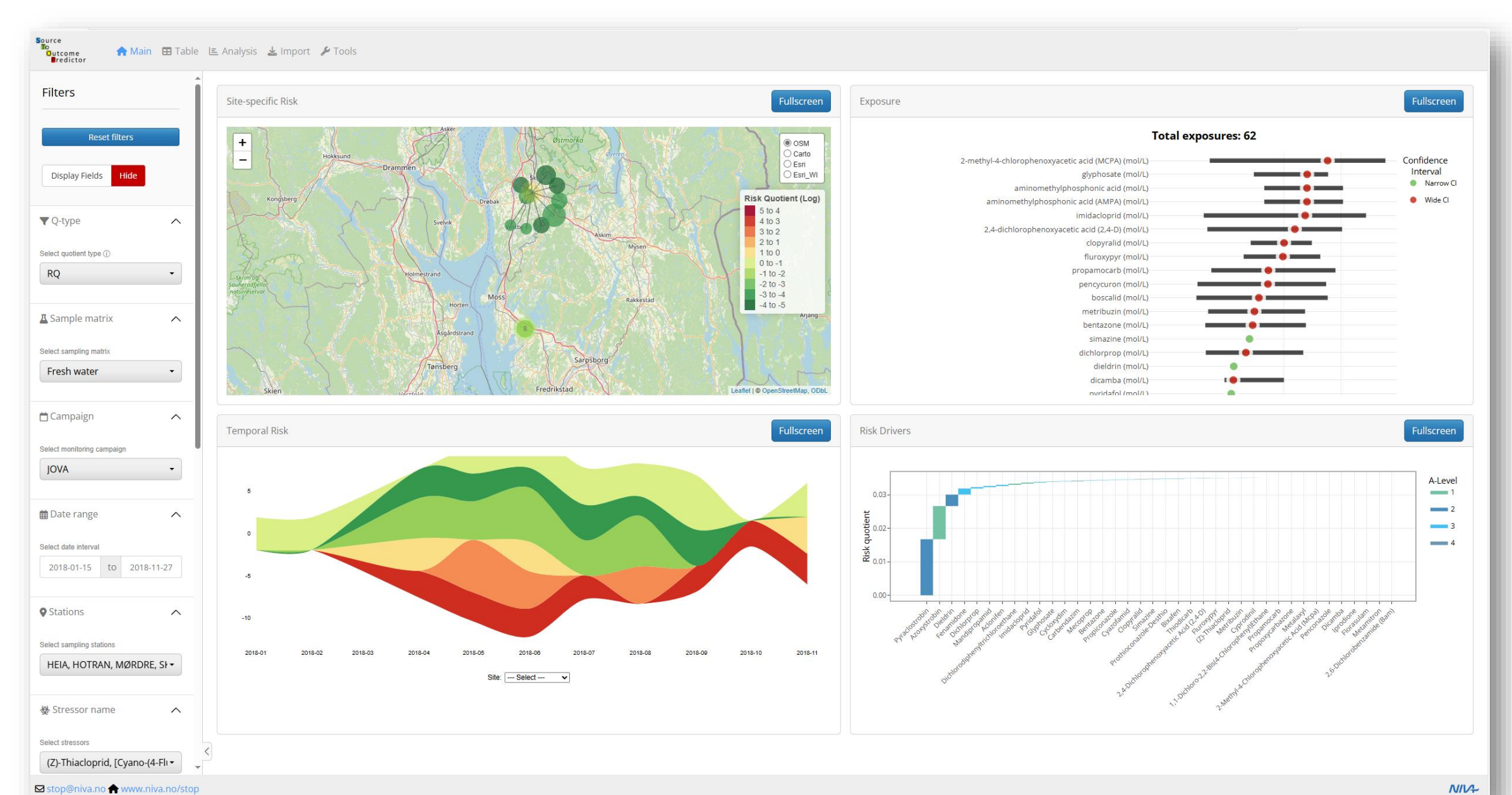
**Figure 1. Integration of the Aggregated Exposure Pathway (AEP) and Adverse Outcome Pathway (AOP) into a Source To Outcome Pathway (STOP).**

## Integrative modeling framework



**Figure 2. Conceptual model for the integration of different data and data workflows into a Source To Outcome Pathway (STOP).**

## STOPredictor



**Figure 3. The Source-To-Outcome-Predictor (STOPredictor), a graphical user interface (GUI) to visualize environmental exposure, (eco)toxicological effects thresholds and risk predictions (demo: <https://stop-jova.t.niva.no/>)**

## Summary and way forward

### Summary

An integrative modeling framework for Source To Outcome Pathway (STOP) assessment proposed and under development:

- 1) Builds upon well-established principles such as the Aggregated Exposure Pathway (AEP) and Adverse Outcome Pathway (AOP) (fig. 1)
- 2) Integrative modeling framework proposed using available data (e.g. databases), data workflows and modeling approaches (fig. 2)
- 3) The GUI “STOPredictor” prototyped for visualization of exposure data, (eco)toxicological effect thresholds and risk predictions (fig. 3)

### Way forward

- 1) Integrate solutions for FAIR-compliant exposure and dose-response data reporting and data import (see posters on eData and qData).
- 2) Harmonise controlled vocabularies used with PARC-relevant persistent identifiers and ontologies
- 3) Incorporate AEP- and AOP-informed modeling into the workflow
- 4) Test STOP workflow and demonstrate utility of the STOPredictor using selected case studies