

COMPREHENSIVE RISK MANAGEMENT FOR GROUNDWATER BODIES WITH POOR CHEMICAL STATUS - A NEW APPROACH

POAKORI-PROJECT

LIISA KOIVULEHTO,
JARNO LAITINEN,
KIMMO JÄRVINEN,
ESA ROUVINEN*



POAKORI

THE PROJECT

- **Objective:** A new, cost-efficient and risk based approach for risk management of groundwater bodies with poor chemical status
- **Schedule:** 2017-2019
- Two pilot study areas

The project group

- Three regional centres for economic development, transport and the environment (ELY)
- Geological Survey of Finland (GTK), Finnish Environment Institute (SYKE)
- WaterHope
- Cities, waterworks companies*
- Ramboll - project coordination, reporting, communications

BACKGROUND

GROUNDWATER BODIES WITH POOR CHEMICAL STATUS

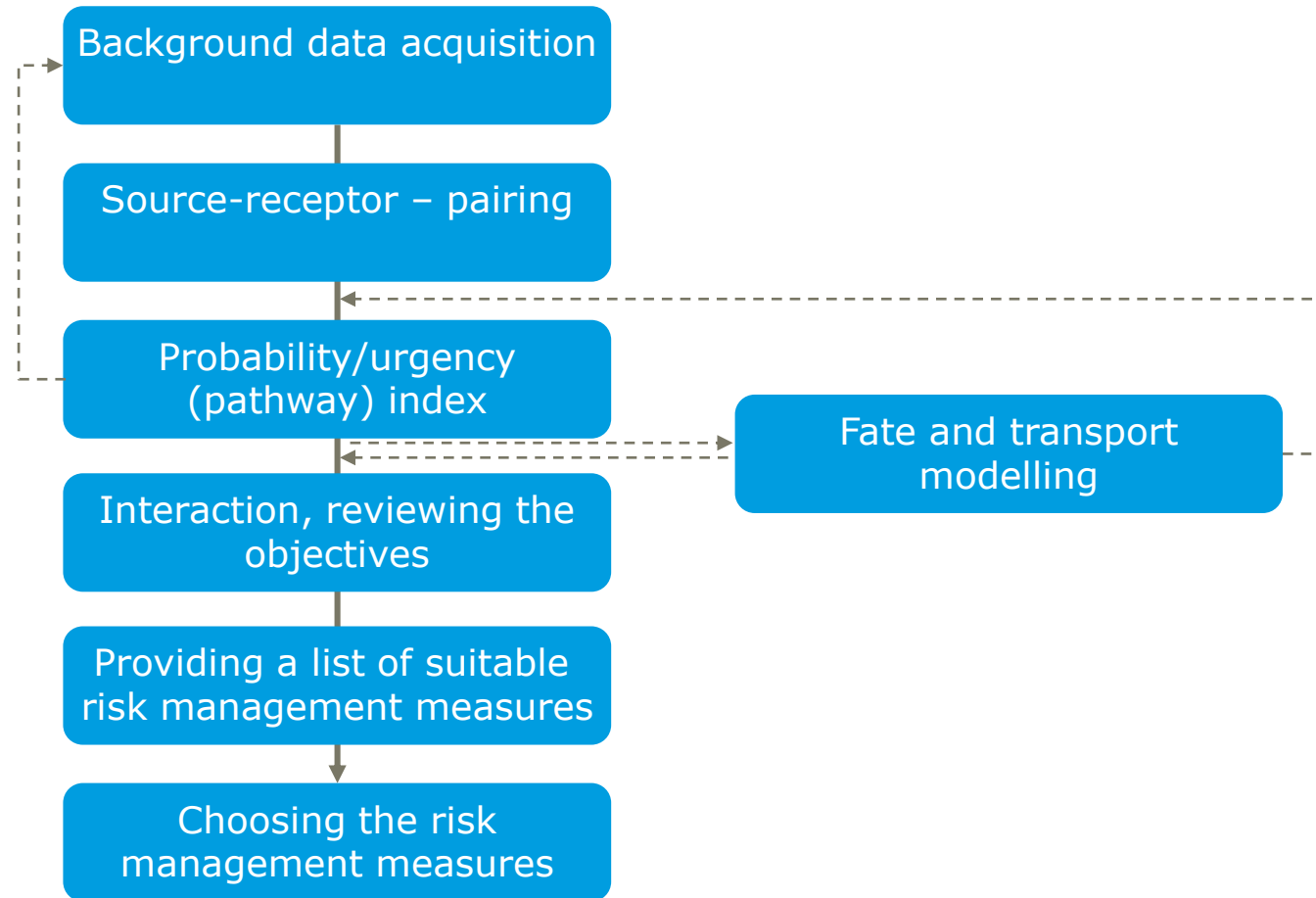
- In Finland there are 95 groundwater bodies with poor chemical status, from which 87 are important for water supply
- According to the Finnish ELY centre experts, approx. 30% of those won't achieve good chemical status until 2027 (the last possible deadline according to WFD)
- **The usual culprits:** contaminated land, salinification (roads), agriculture
- Groundwater remediation is technically challenging and time consuming - **high costs**
- Currently, emissions are observed separately and different studies at the area are handled separately - **we're not looking at the whole picture**
- **Prioritising risk management procedures is challenging**

OBJECTIVES

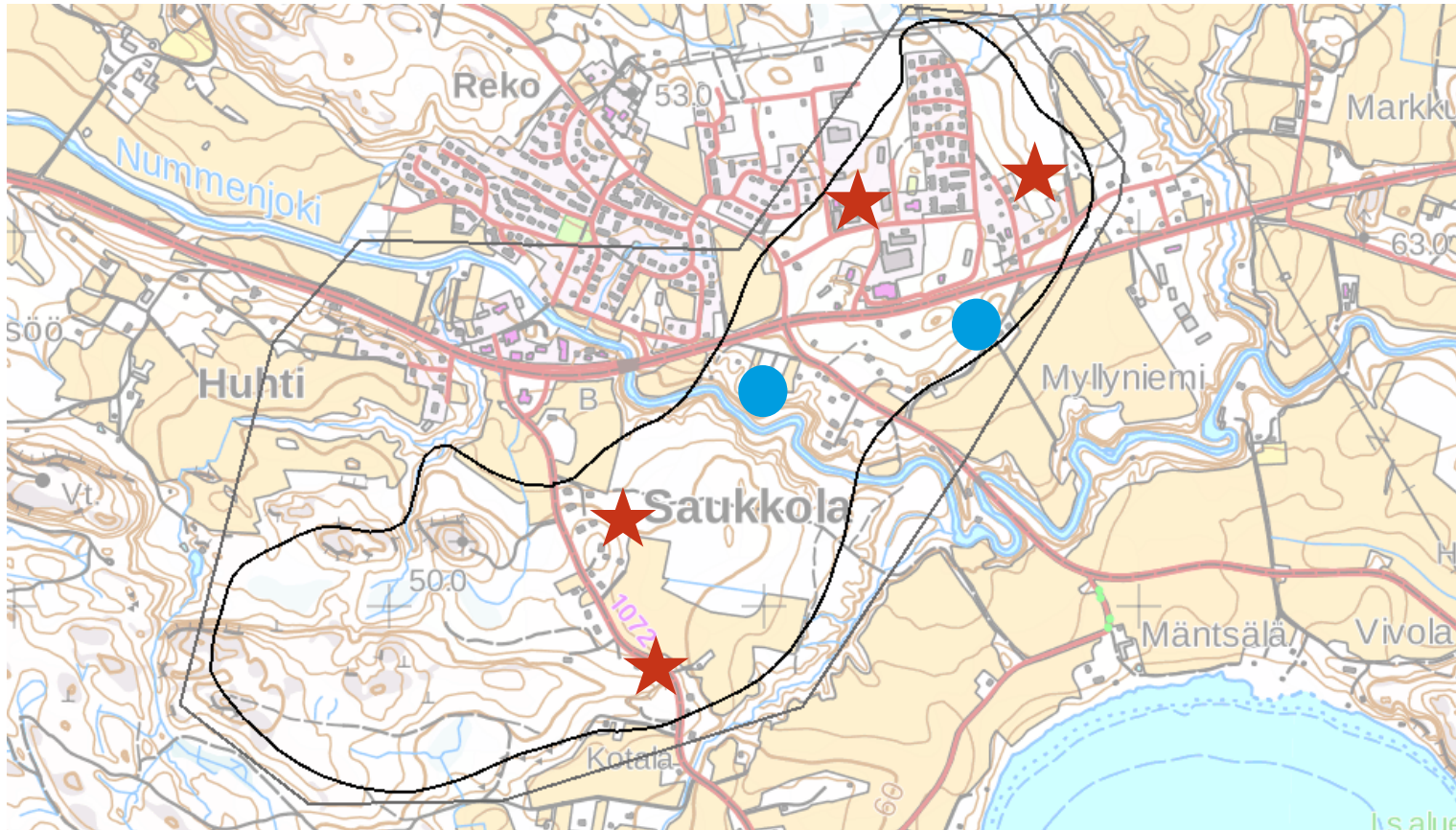
- **Water Framework Directive:** achieving a good status
- Water supply protection
- **Managing costs:** applying the measures to the right sources



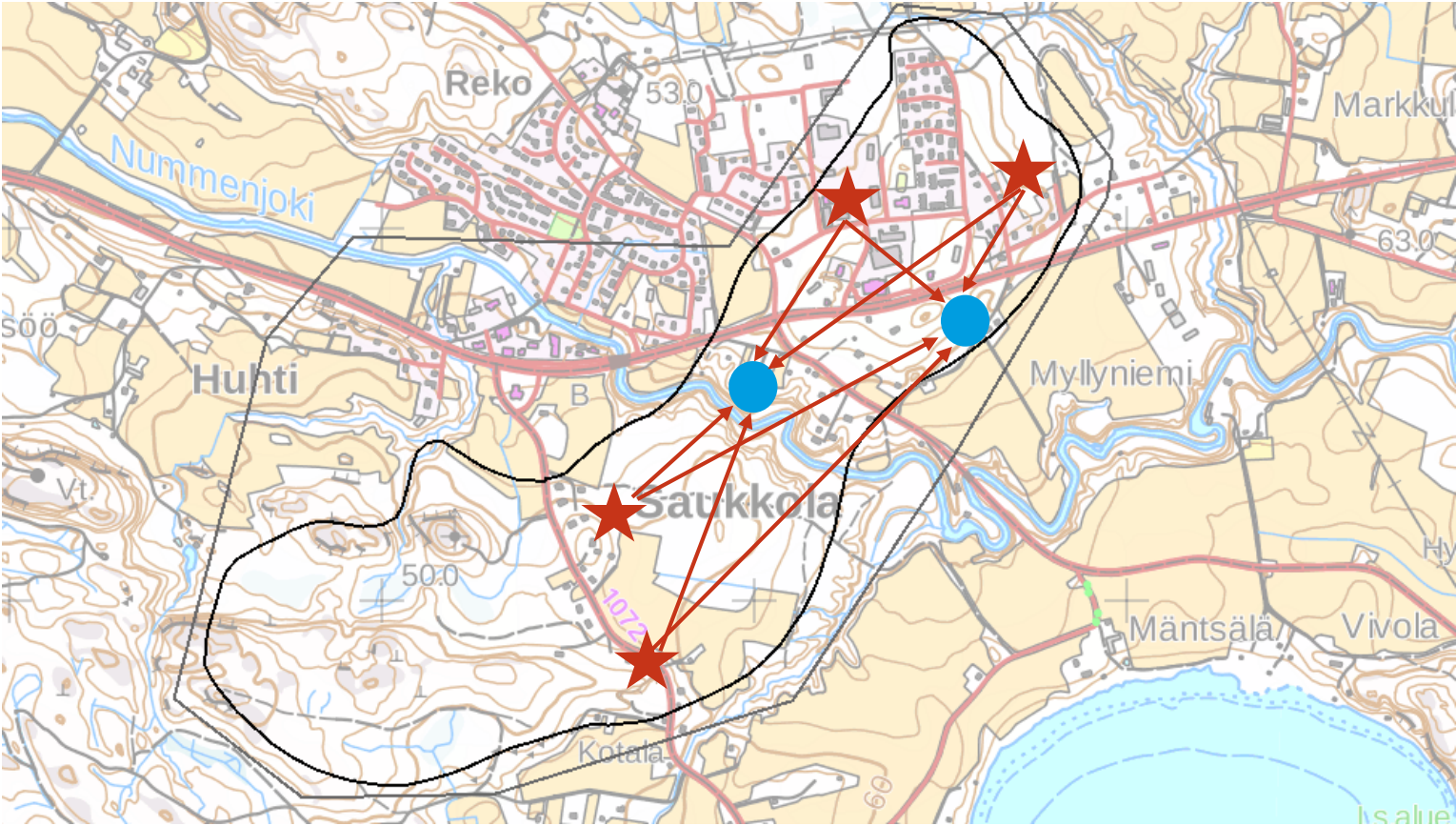
THE APPROACH



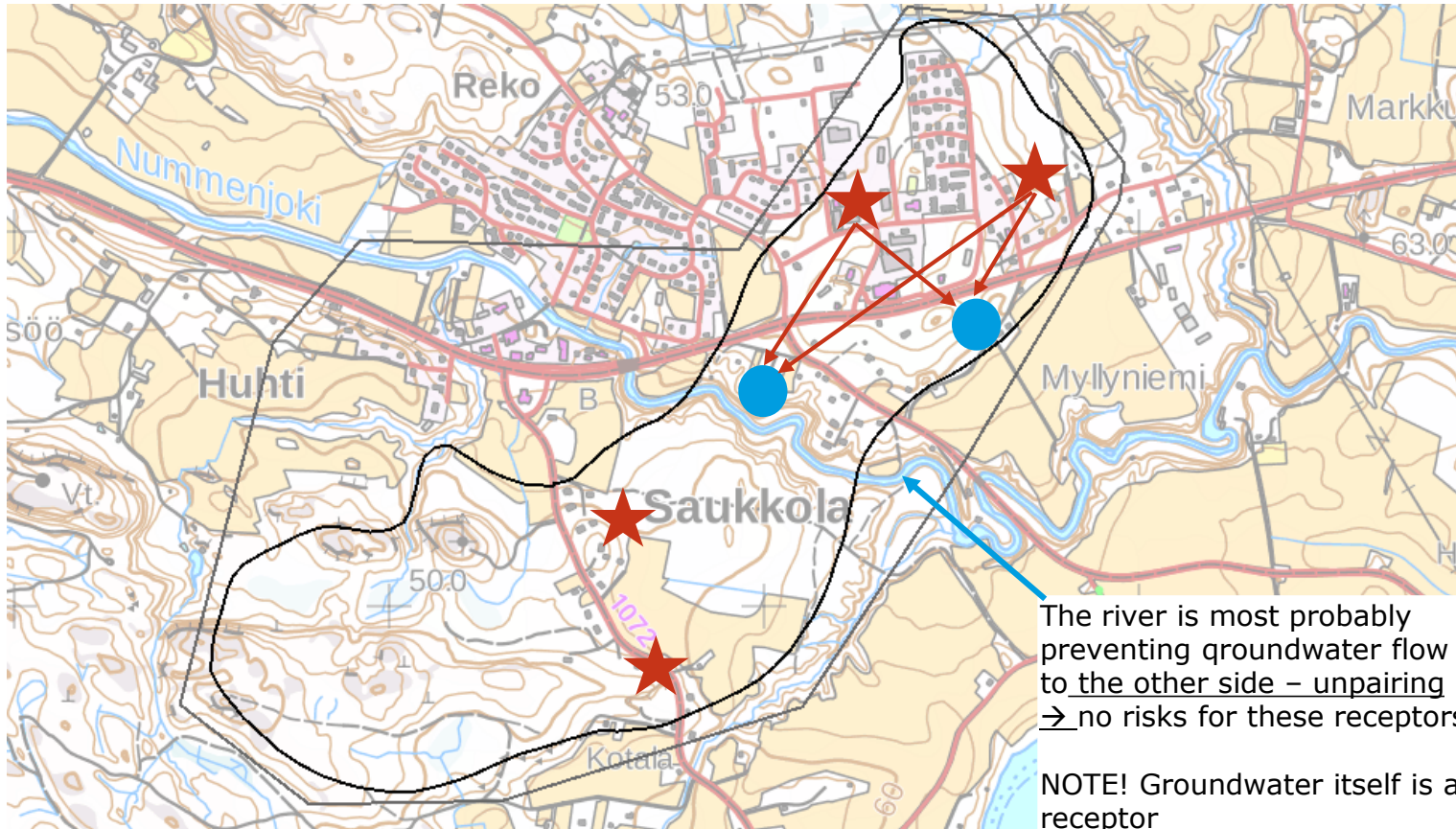
SOURCES AND RECEPTORS



SOURCES AND RECEPTORS



FIRST PHASE PROBABILITY



SECOND PHASE

PROBABILITY

- This **GIS-based phase** contains open data parts from DRASTIC vulnerability index
 - The contaminant(s) and its qualities (water solubility)
 - Distance to groundwater
 - Slope/topography
 - Surface soil
 - Aquifer and vadose zone soil media
 - Hydraulic conductivity
 - Groundwater flow direction
 - Distances
 - Land use
 - Etc

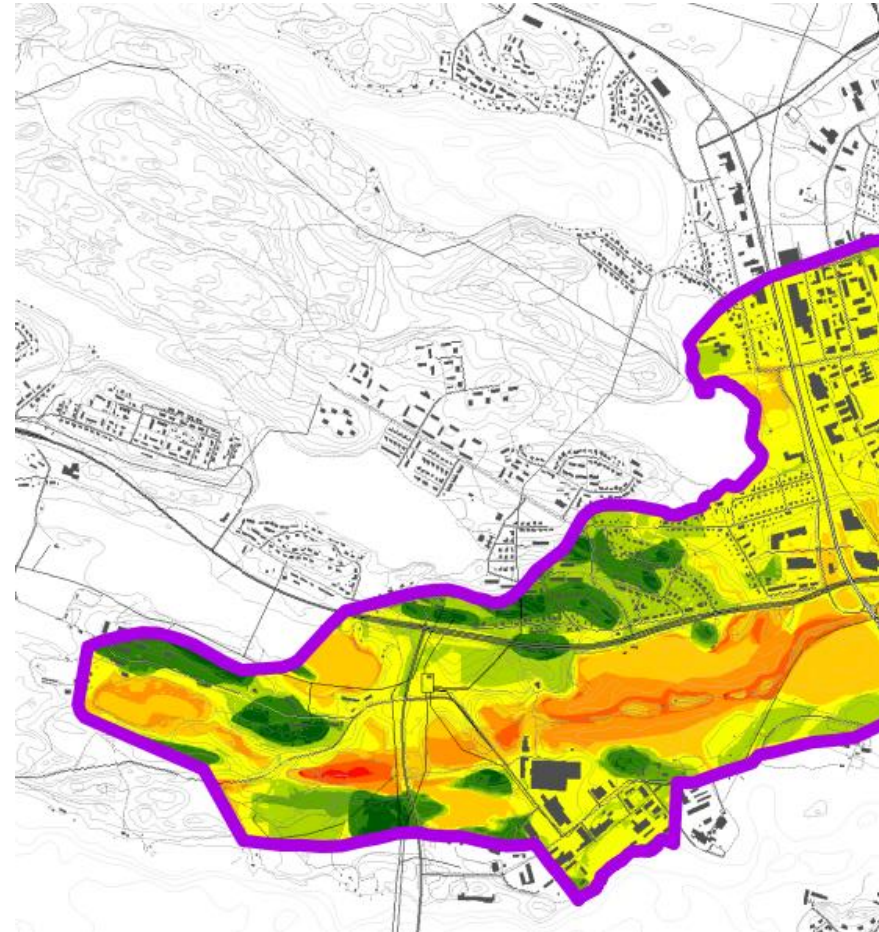
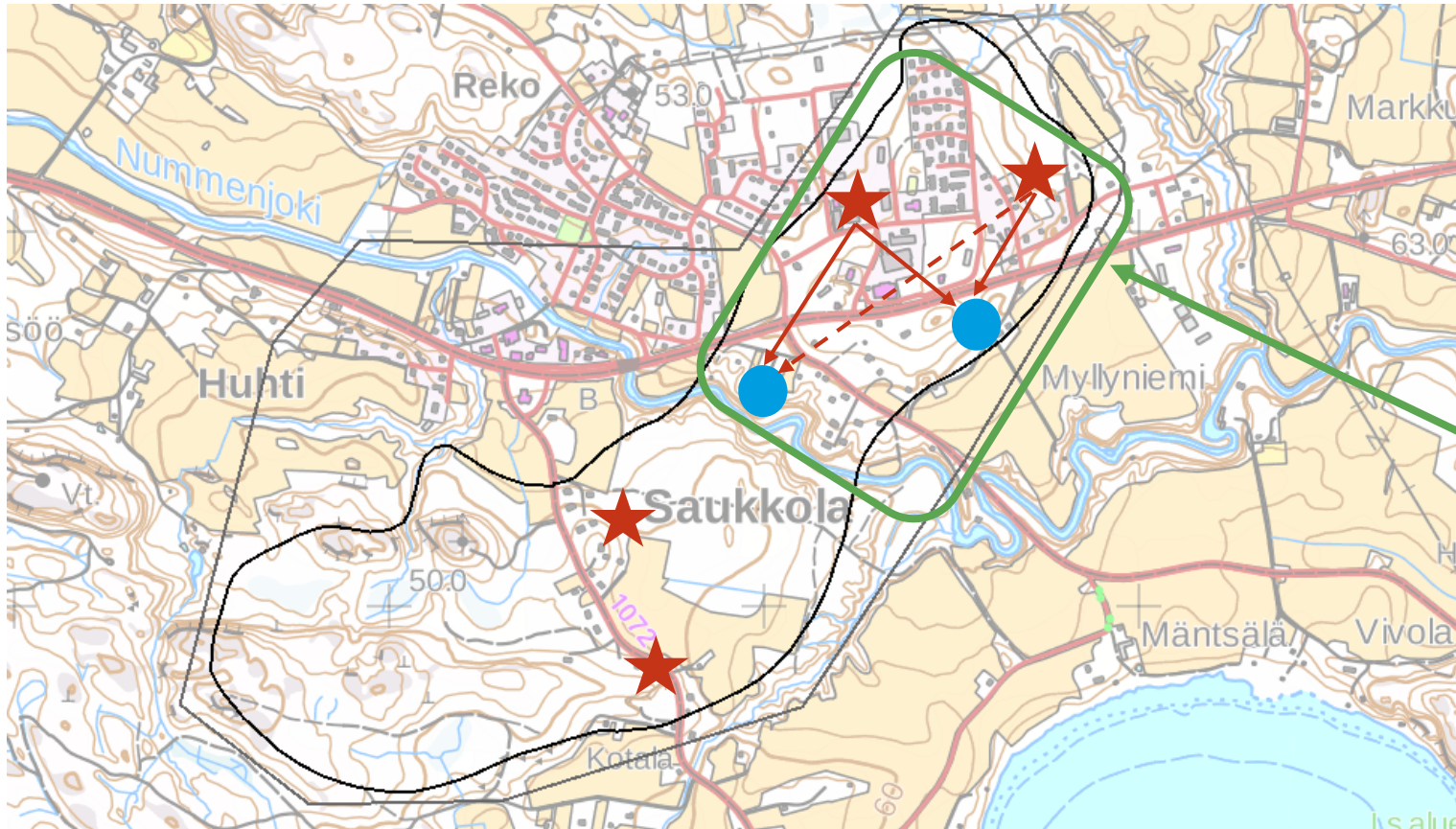


Image: Arto Hyvönen, GTK

SECOND PHASE PROBABILITY

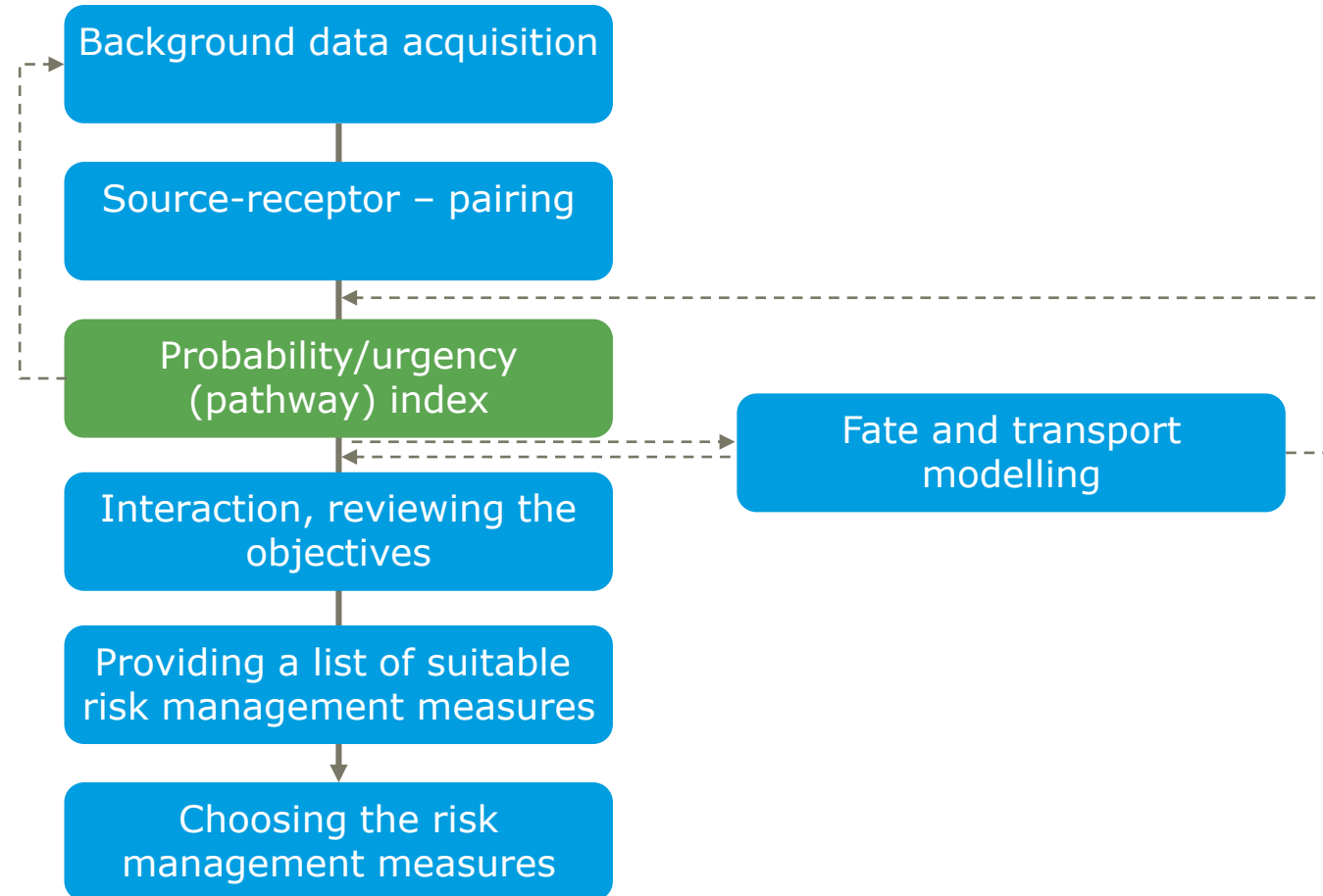


As a result, the probability of the pathways is weighted and can be prioritised

If required, a more complex model can be constructed

NEXT STEPS

- Finalising **step 3**
- Testing the approach for one of our pilot study areas – comparing with the results gained from complex modeling
- Conclusions
- Applications
- Final report



THANK YOU!
QUESTIONS?

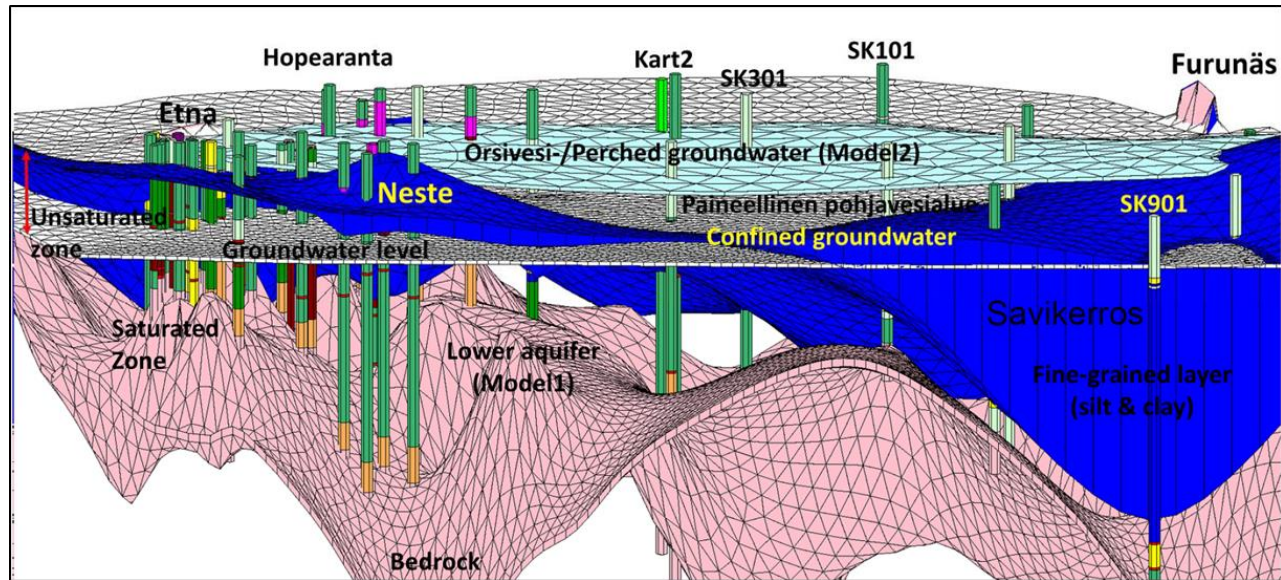


Image: Samrit Luoma, GTK

Liisa Koivulehto

liisa.koivulehto@ramboll.fi

Jarno Laitinen

jarno.laitinen@ramboll.fi

Kimmo Järvinen

kimmo.jarvinen@ramboll.fi

Esa Rouvinen

esa.rouvinen@ely-keskus.fi