

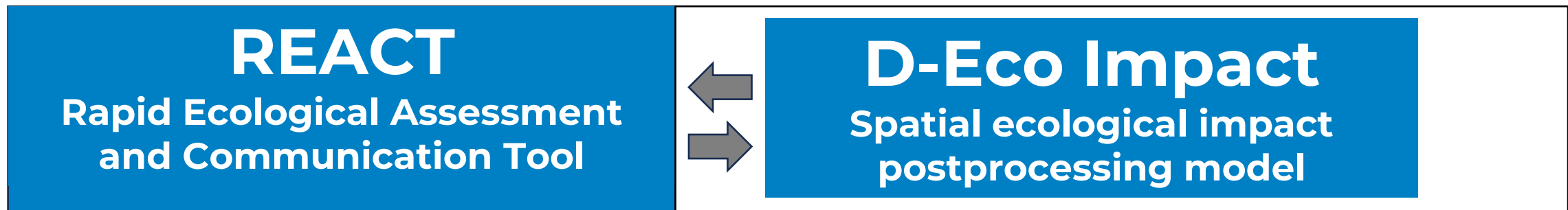
Joint fact finding supported by the REACT and D-Eco Impact tools

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Challenge of River restoration

- Interdisciplinary cooperation -> because ...
(Experts, Policy makers, Stakeholders)
- Requires a shared understanding
(current issue, (eco)system functioning, trade-offs)
- Bringing together data sources is key!
(models, measurements, satellite, literature, anecdotal)

We need joint fact finding!

We provide the tools:

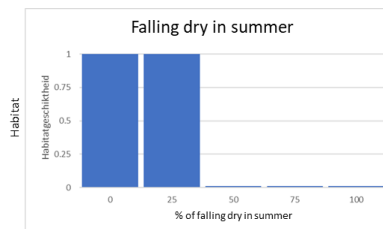
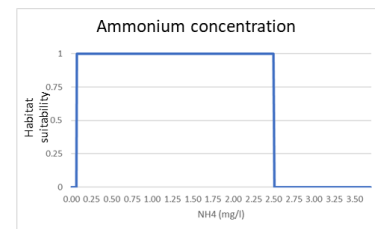
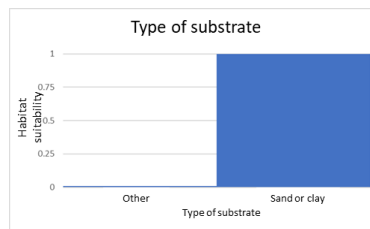
REACT :

Rapid ecological quickscan for any river catchment on earth using global data
(trait strategies, connection to available data sources, interpretation of results)

D-EcolImpact :

Flexible spatial ecological impact postprocessing model
(calculation core, processing of characteristics on provided data)

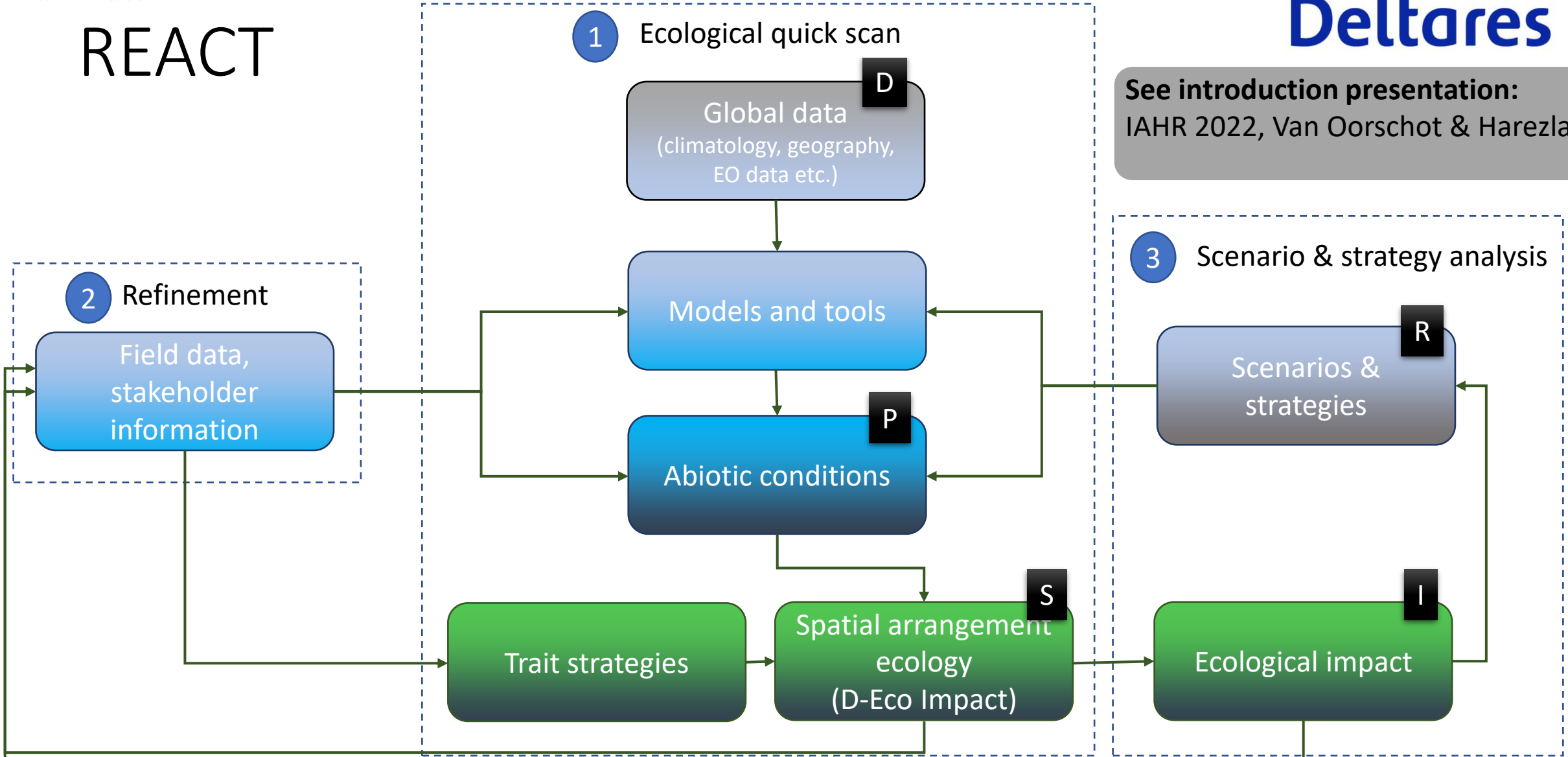
Together : Spatiotemporal potential habitat suitability -> integrity of river system



REACT

Deltares

See introduction presentation:
IAHR 2022, Van Oorschot & Harezlak



Workflow REACT

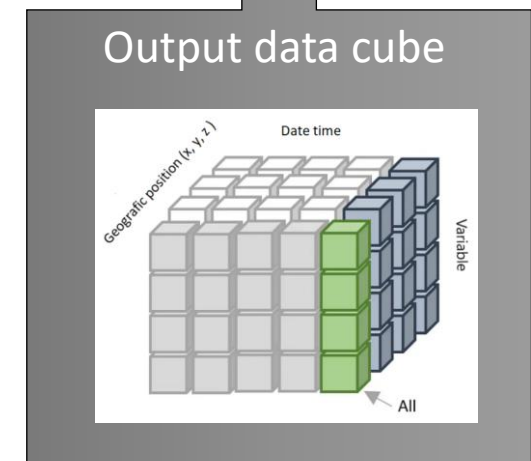
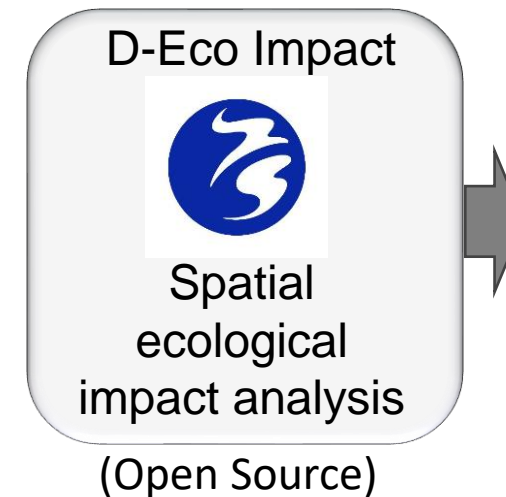
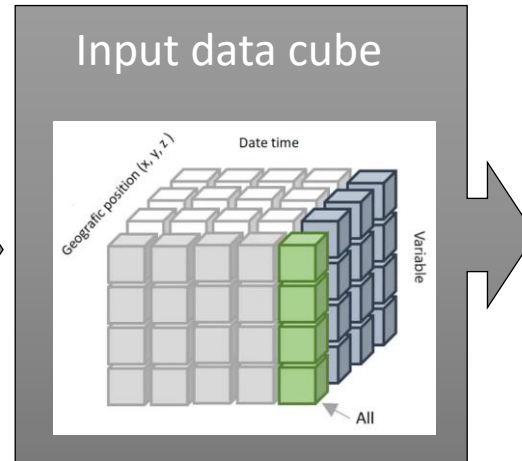
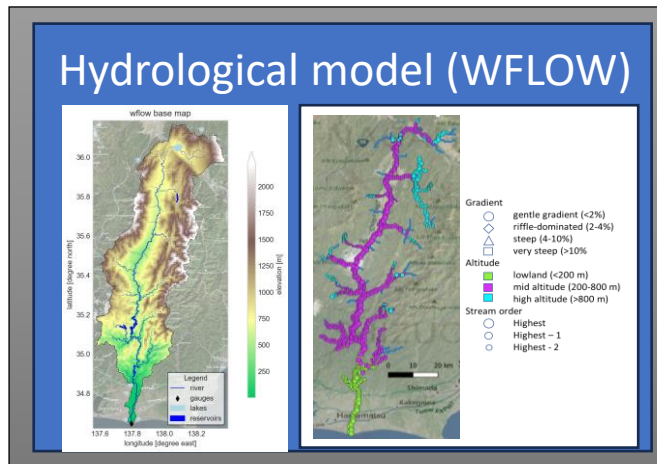
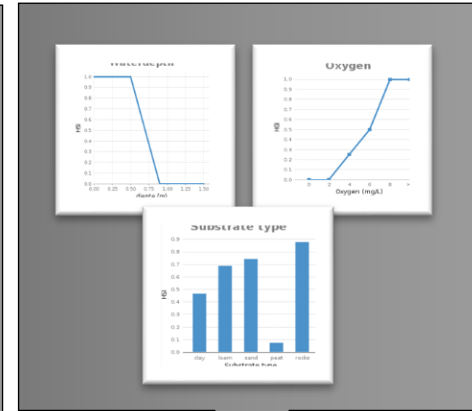
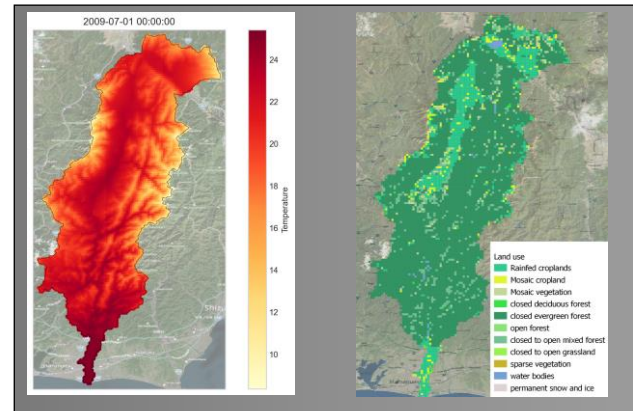
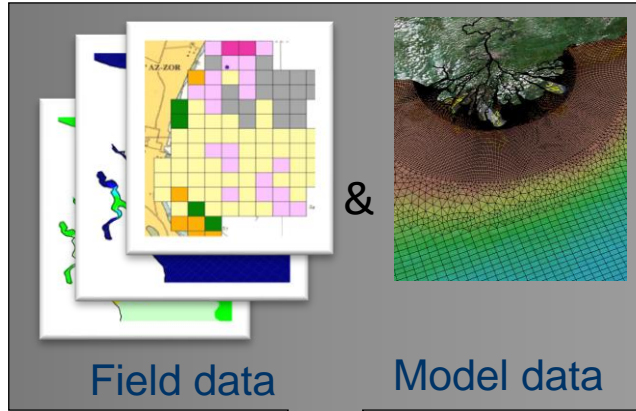
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Global datasets

Satellite derived datasets

Ecological relations

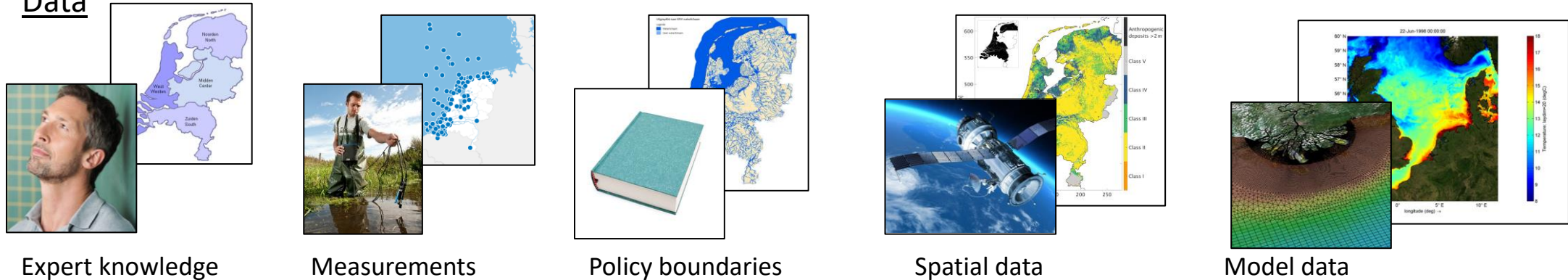
Results



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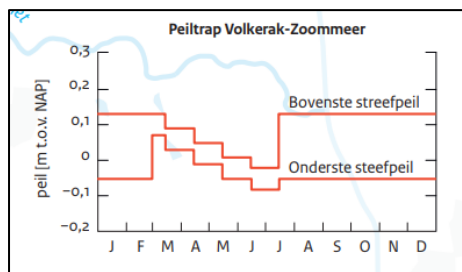
D-Eco Impact

Data

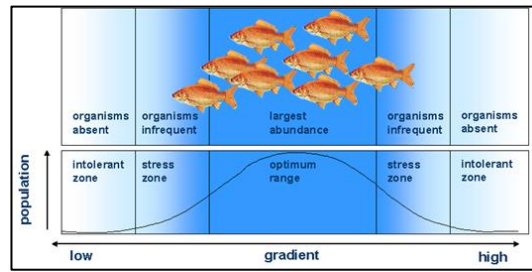


Knowledge rules (sets of ecological criteria)

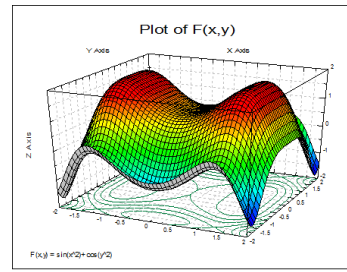
Process based model Process-guided model



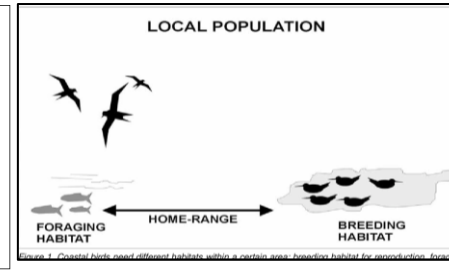
Policy criteria
(hard boundaries)



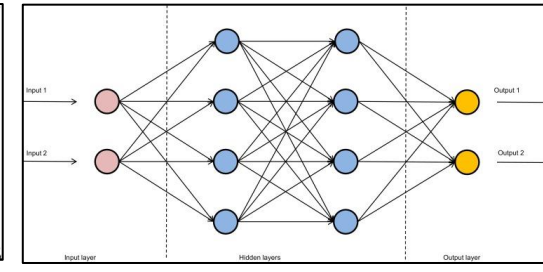
Simple species criteria
(gradual boundaries)



Complex species criteria
(Multivariate and interactive)



Life cycle criteria
(Spatial relationships)

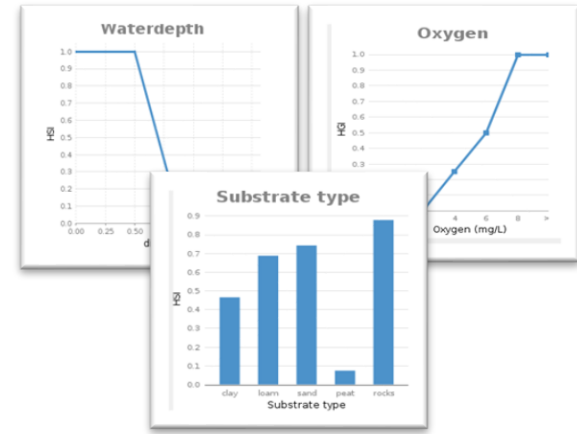


Trained species criteria
(Black box)

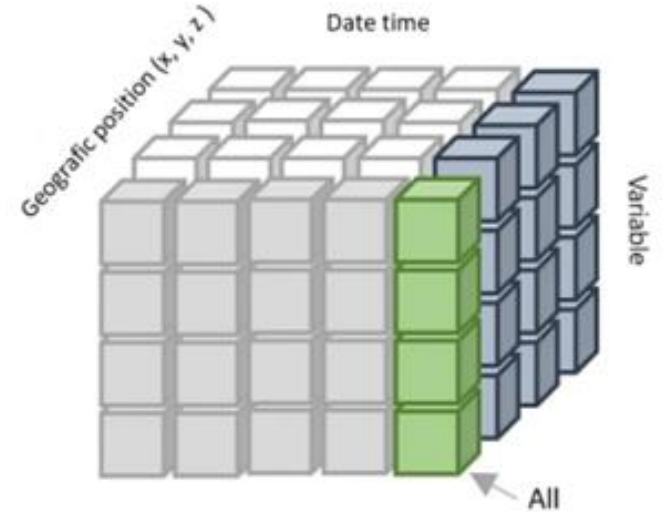
D-Eco Impact : benefits

- Spatial & temporal:
 - Spatial and temporal resolution
(small scale, local, global, short term, long term)
 - Model schematization
(point, polygon, grid, mesh)
- Use-ability:
 - Ease of use
(input file and/or scripting)
 - Expandable
(Python based)
 - Connectable to multiple hydrodynamic/hydrological models
(e.g. Delft-FM, Delf3D, IMOD, WFLOW)
- Supports **FAIR** data processing:
 - **F**indable, **A**ccessible, **I**nteroperable and **R**e producible
(data availability, UGRID NetCDF int. standard, software versioning, Yaml input file, large development team)

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Flexible YAML format



UGRID NetCDF format

First results (WFLOW analysis)

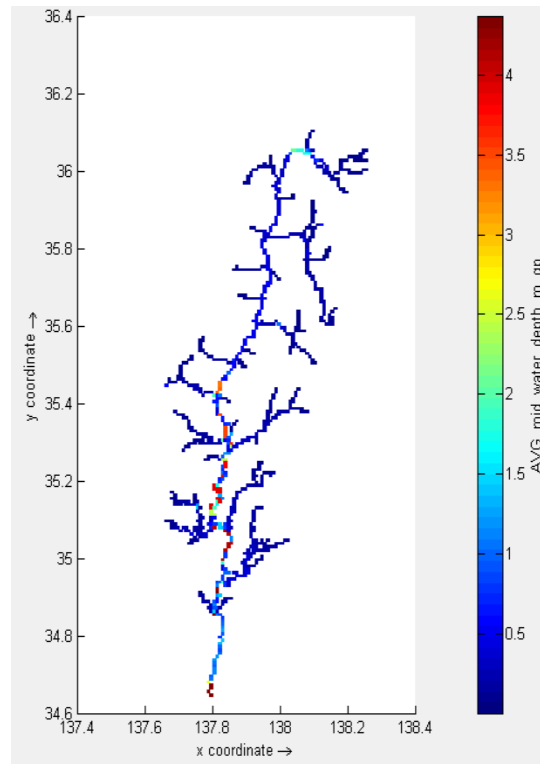
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Fish trait class suitability
(derived from Aarts et al. 2004)

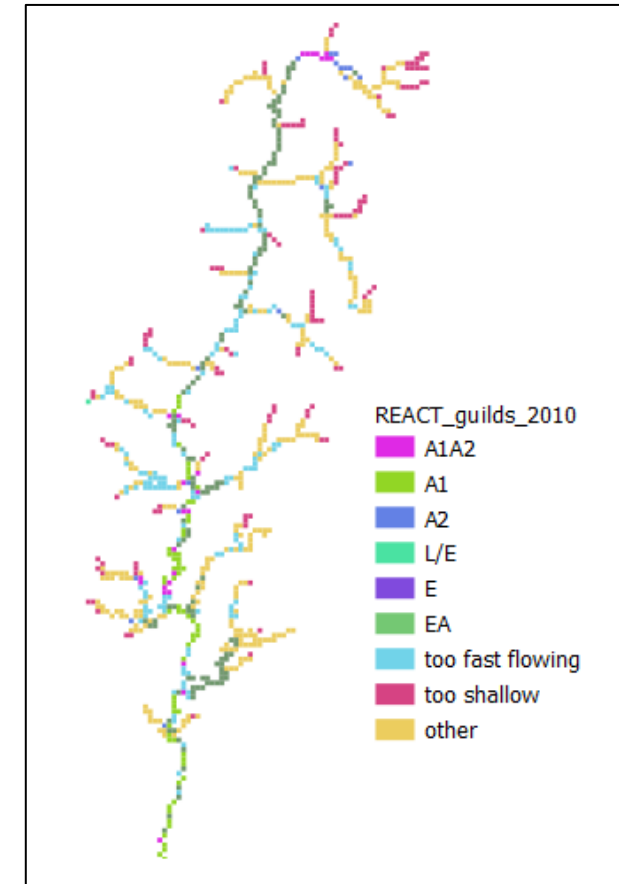
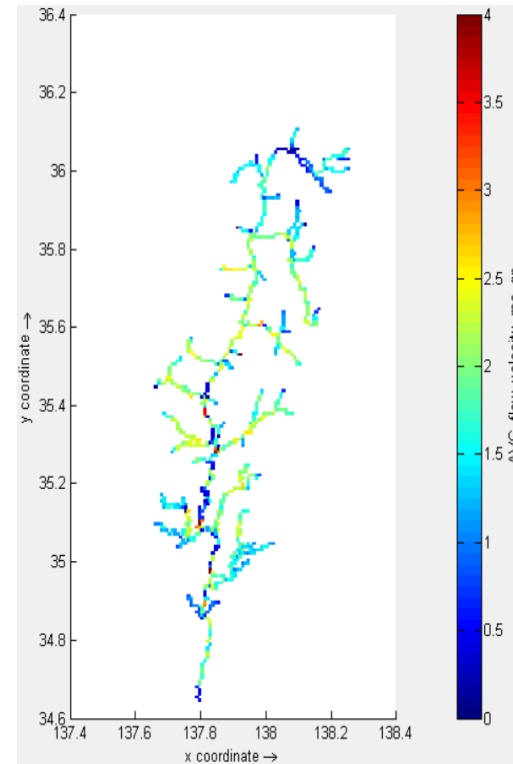


WFLOW: grid based hydrological modelling platform

Water depth
(summer period)



Flow velocity
(summer period)



First results (Delft3D 4 analysis)

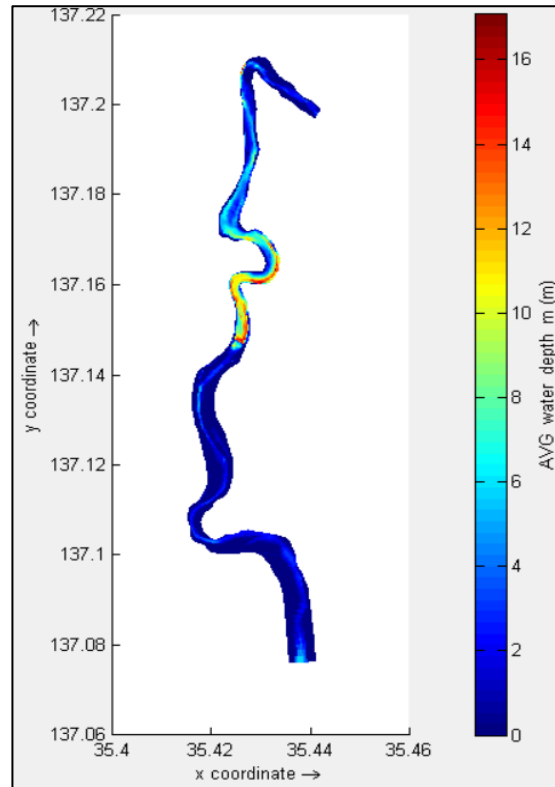
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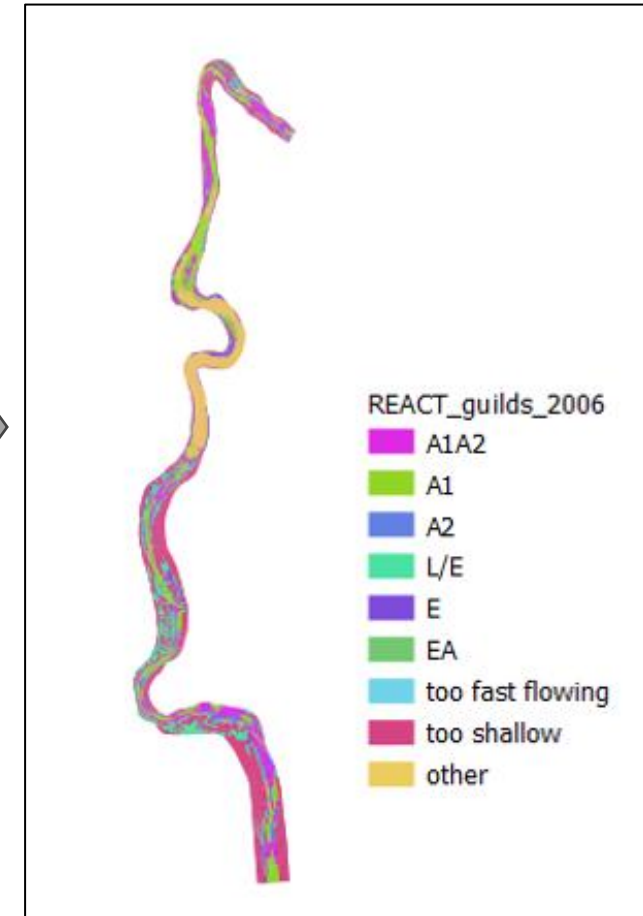
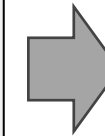
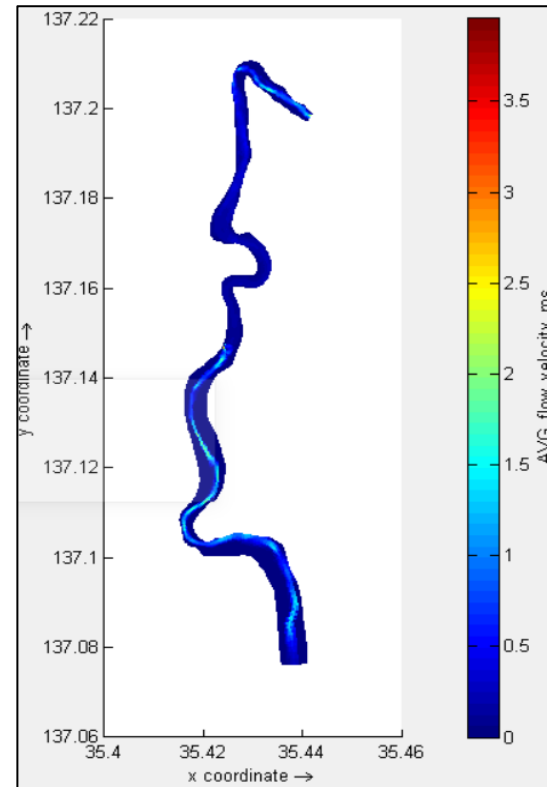


Delft3D4: structured hydrodynamic model

Water depth
 (summer period)



Flow velocity
 (summer period)



Thank you



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Next steps

- Apply to (more) case studies
- Facilitate workflow and key findings results

Take home messages

- REACT:
 - an ecological quickscan of any river catchment
 - Global data & innovative tools
 - Early engagement of stakeholders
- D-Eco Impact:
 - a flexible broad ecological impact module using data cubes
 - Looking for co-creation partners (going open source)
- **Looking for more partnerships & case studies**



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REACT

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D-Eco Impact

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