

## Ecological Continuity of Weir Complexes for Fish in the WFD Explorer

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# Content

- Weir complexes in the main Dutch rivers
- Renewal and Renovation
- Quantifying the impact of weir complexes on fish
  - Fish passability assessment tool
  - Water Framework Directive Explorer
- Key takeaways

NIEUWSBERICHT

## Stuw Borgharen beschadigd; effect op waterstanden

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NIEUWSBERICHT

## Stuw Grave: problemen met 2 jukken, Maas tussen Sambeek en Grave gestremd

Gepubliceerd op: 1 september 2023 - Laatste update: 20 oktober 2023, 12:02

NIEUWSBERICHT

## Schade aan stuw Lith

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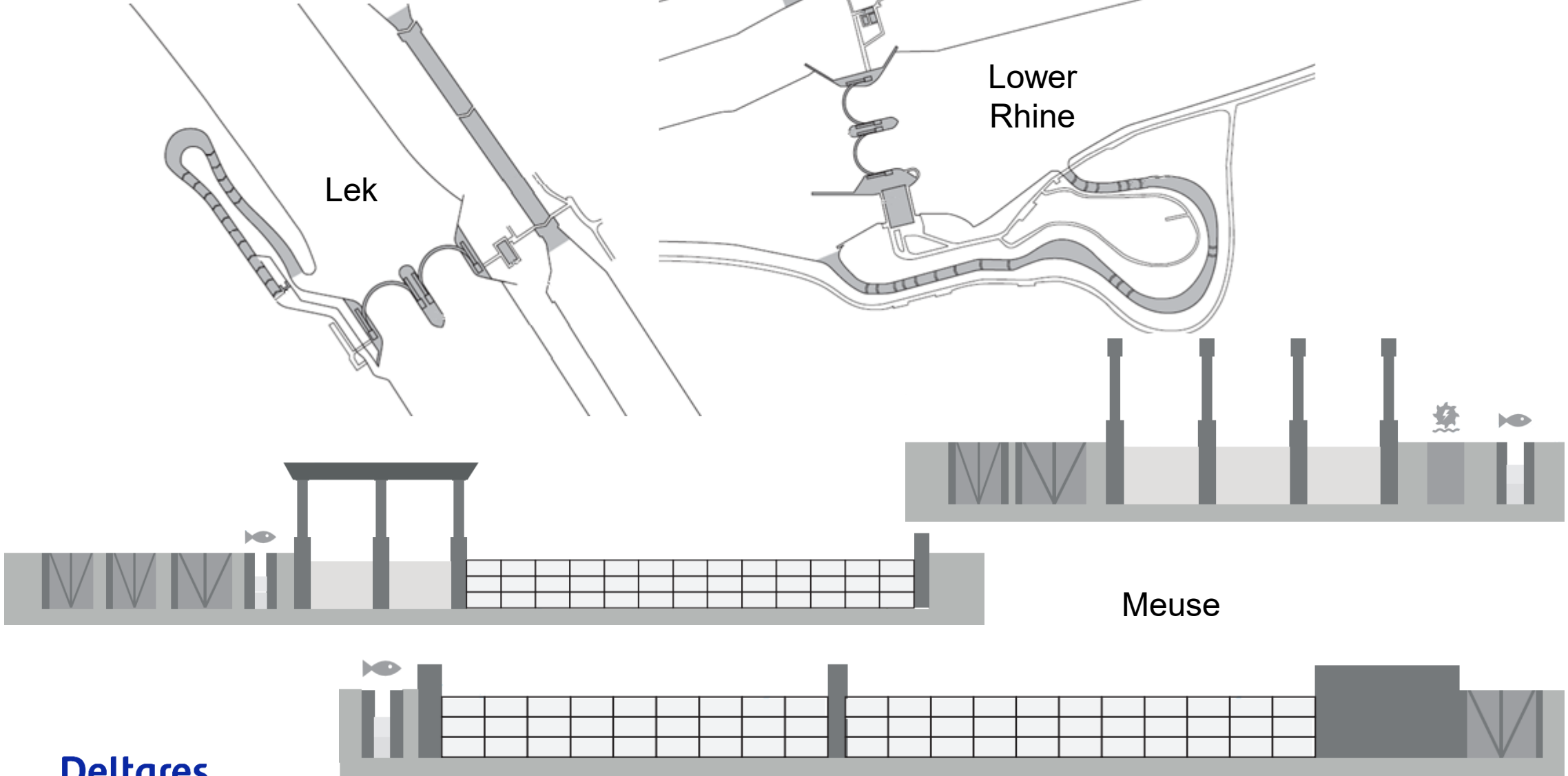
# Weir complexes

Lek

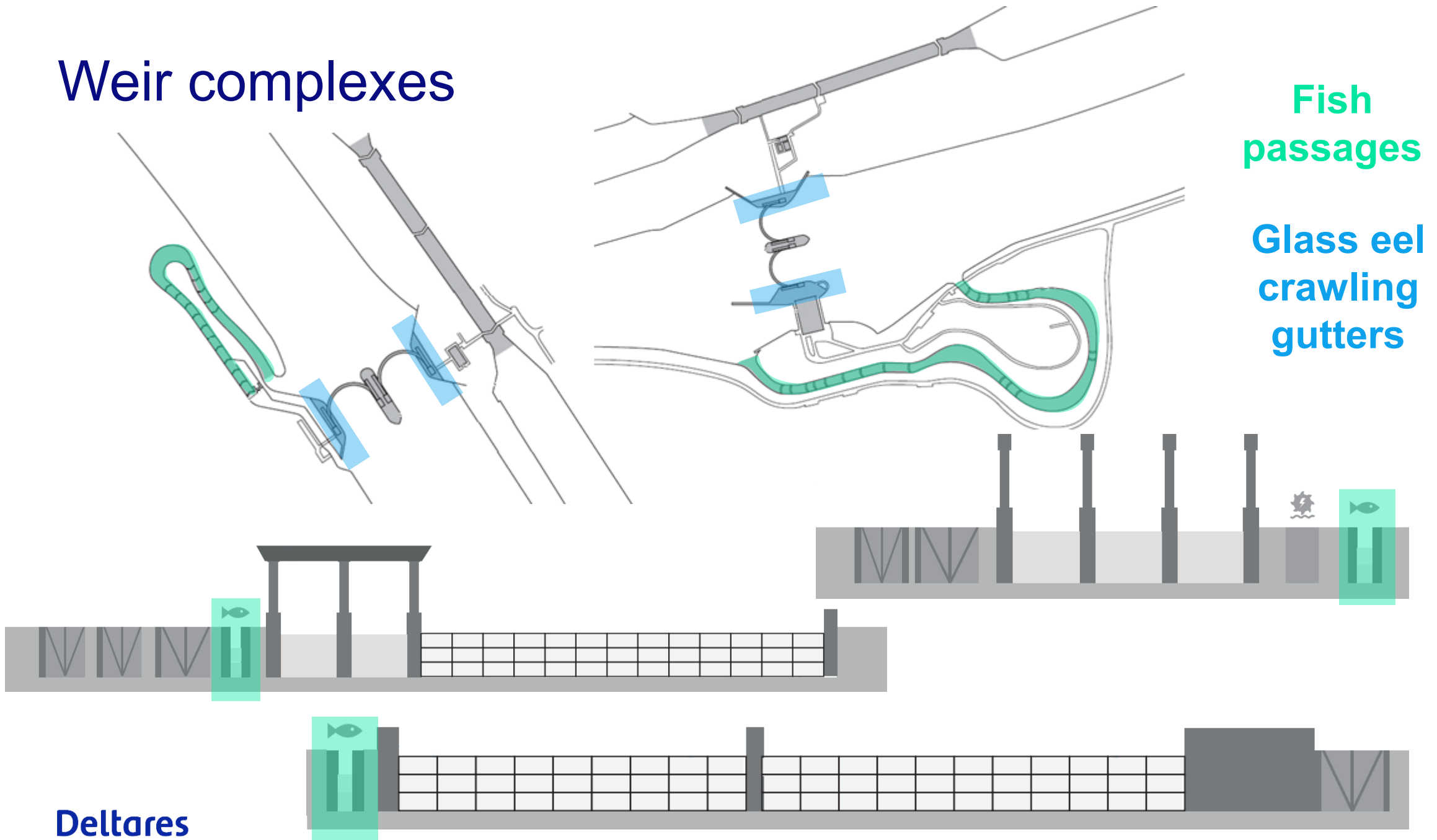
Lower Rhine

Meuse

Deltares



# Weir complexes

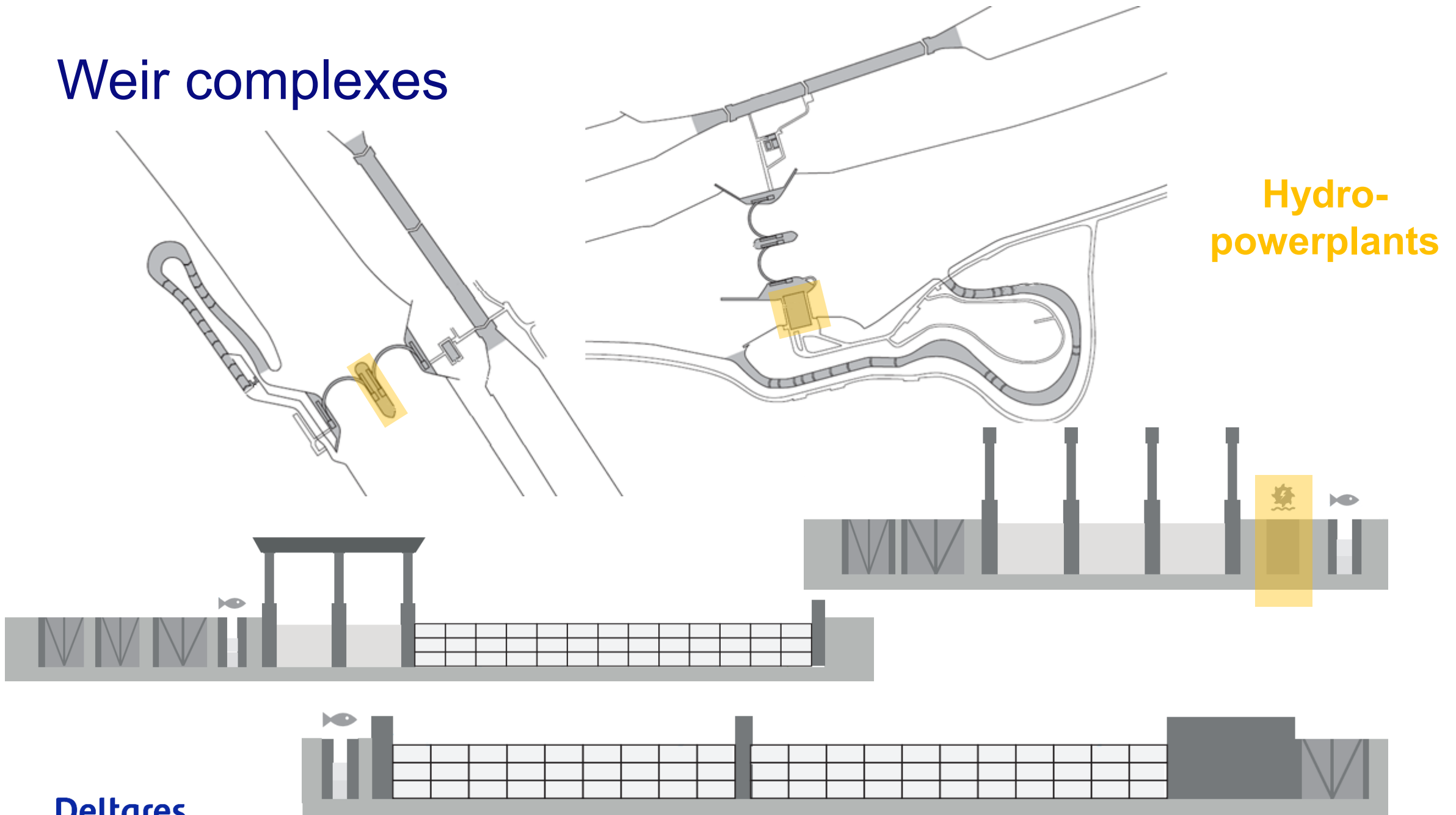


Fish passages

Glass eel crawling gutters

Deltares

# Weir complexes



**Deltares**

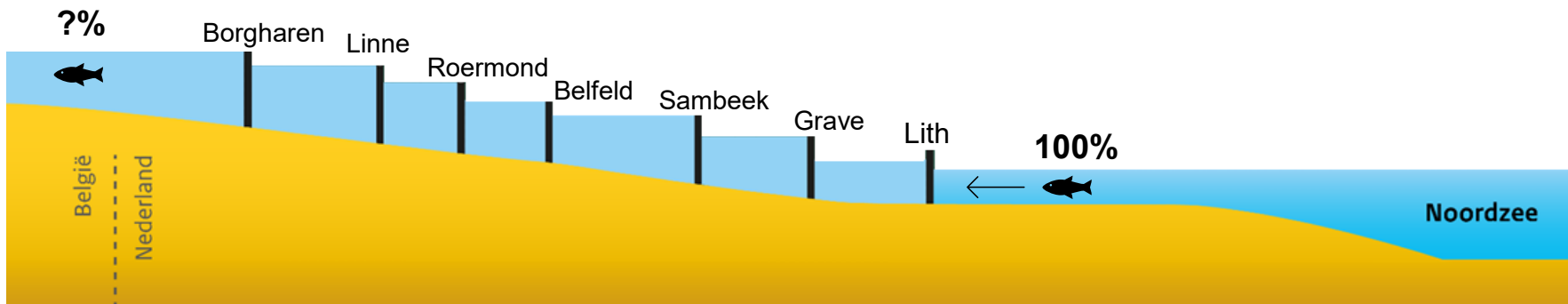
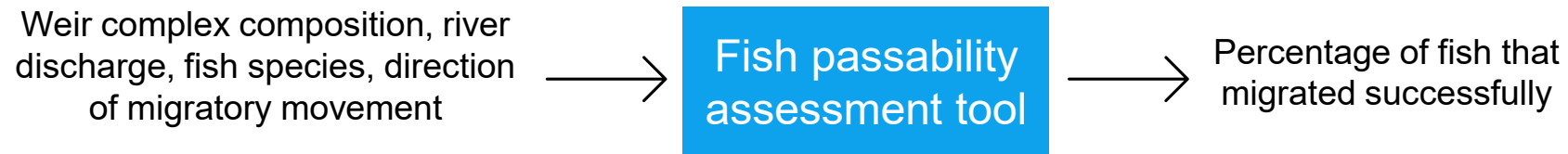
# Renewal and Renovation

- Many hydraulic structures in the Netherlands are reaching the end of their lifetime in the coming decades
- Ideally, there wouldn't be any barriers... But the current weirs will be renewed in some way
- Options for renewal are weighed by how well a weir can fulfill its functions in the water system
  - Historically, the design process would mainly focus on flood safety and navigation
  - First order quantification of the consequences for fish gives them “a seat at the table” early in the decision-making process

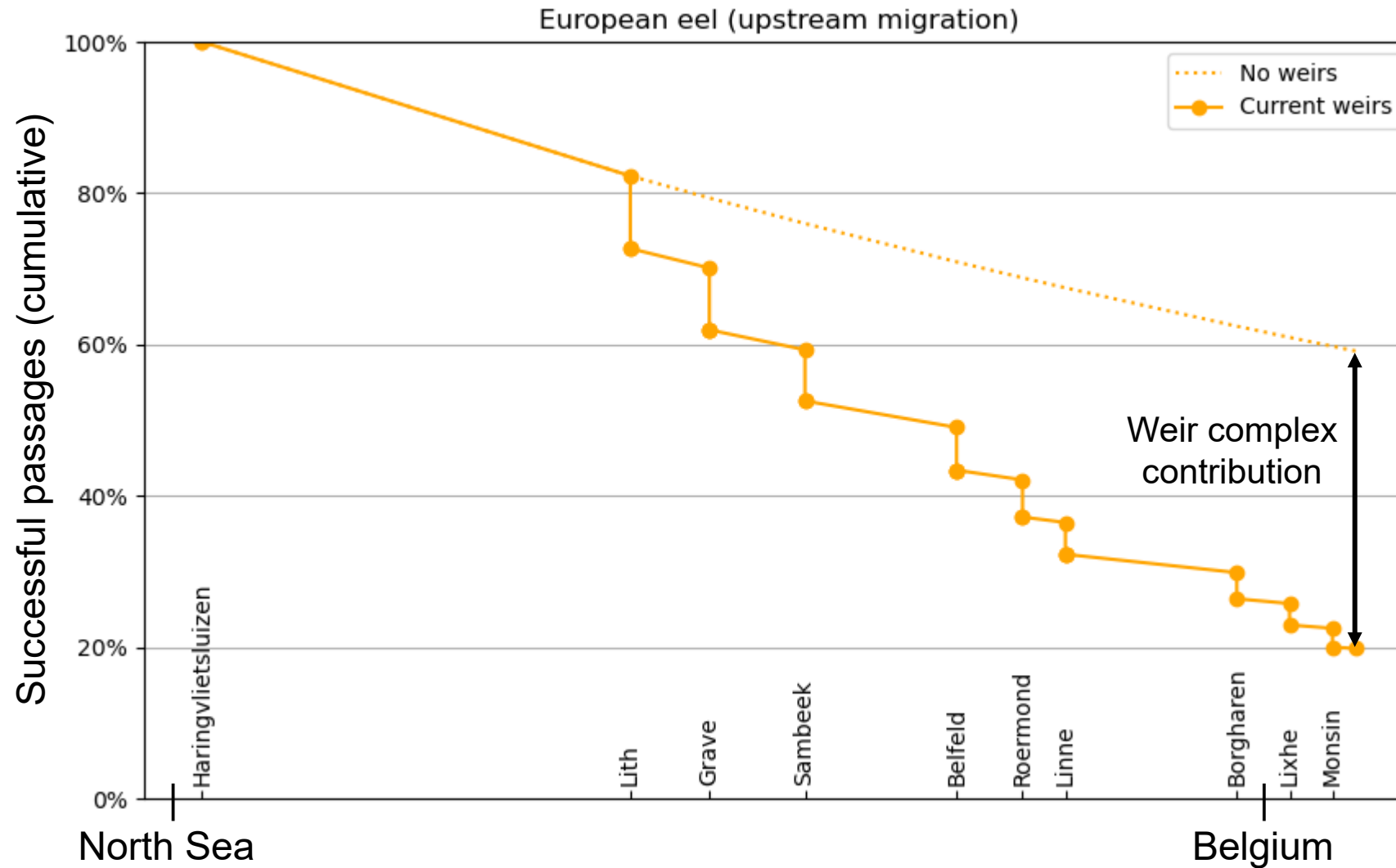


# Quantifying: Fish passability assessment tool

Deltares developed a tool <sup>[1]</sup> to assess the loss of fish (**order of magnitude**) at weir complexes in the Meuse and Lower Rhine based on literature, observations and expert judgement

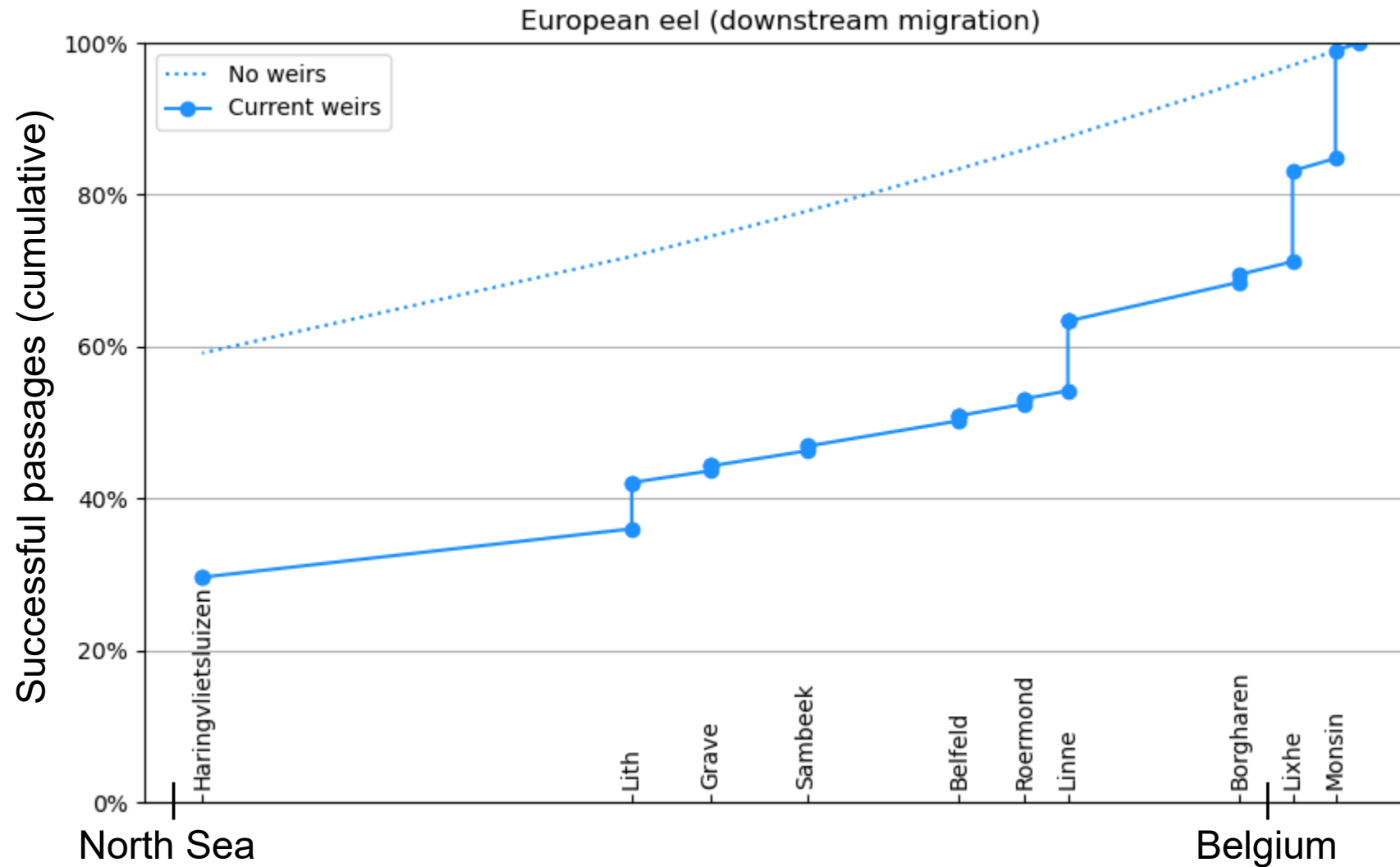


# Quantifying: Fish passability assessment tool

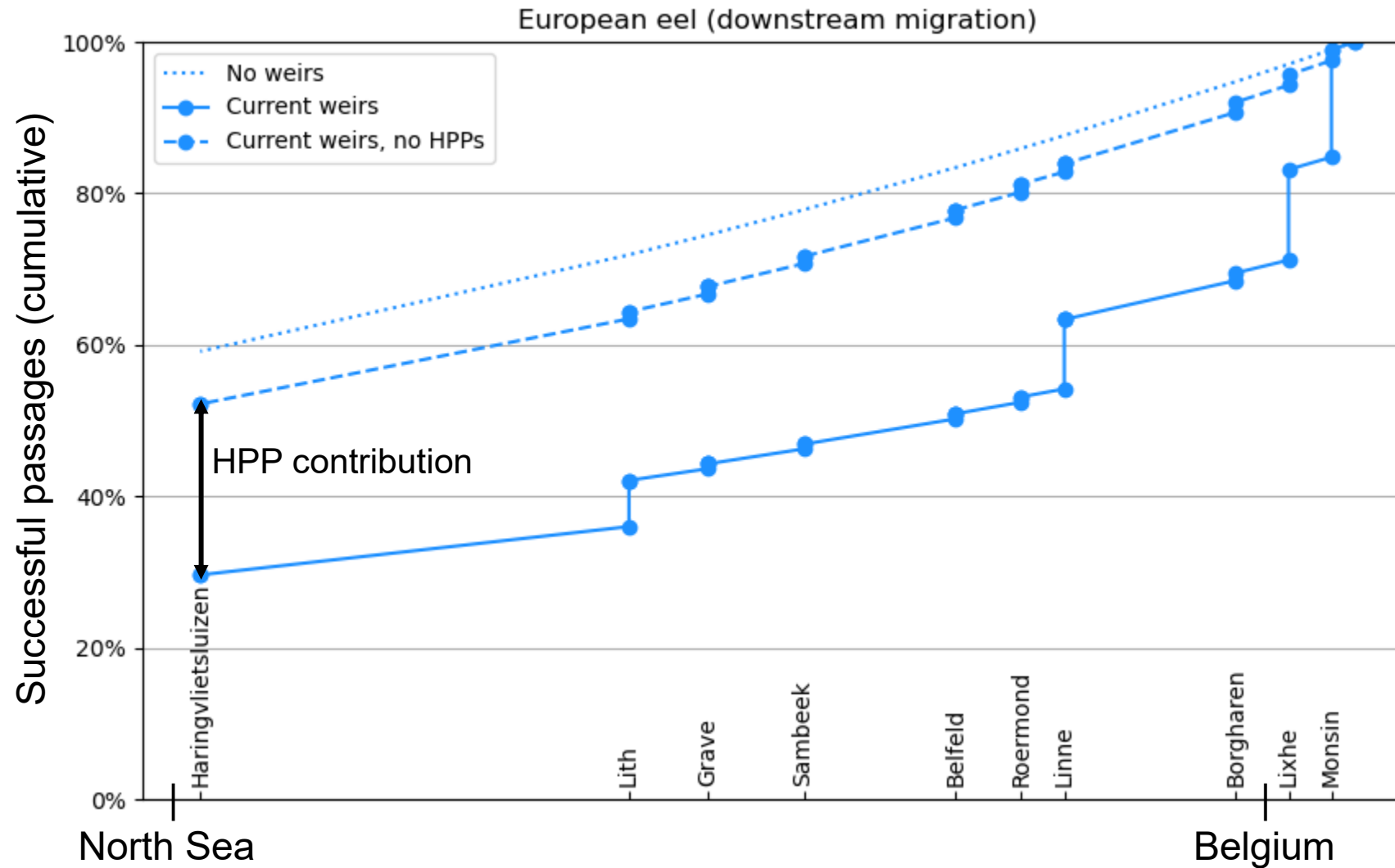


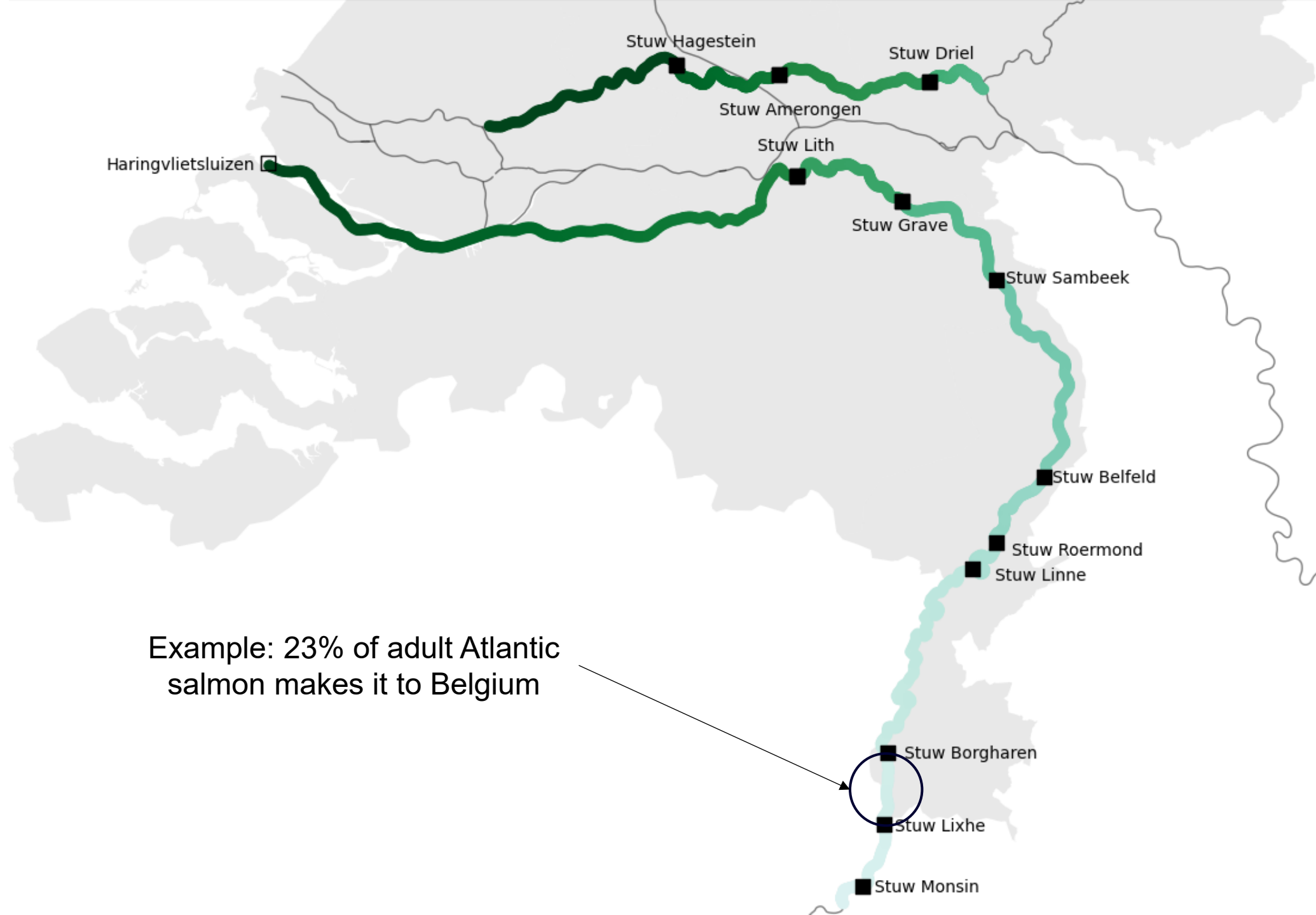
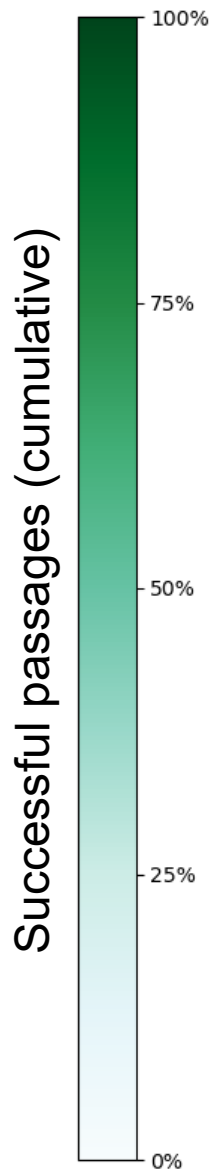


# Quantifying: Fish passability assessment tool



# Quantifying: Fish passability assessment tool



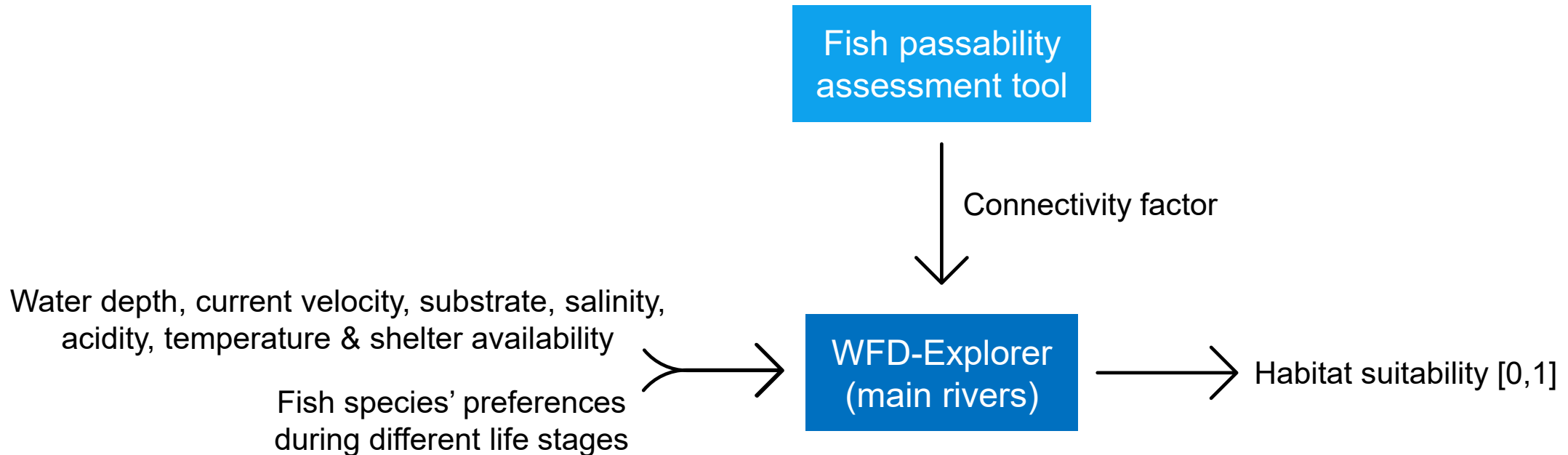


Example: 23% of adult Atlantic salmon makes it to Belgium

# Quantifying: The WFD-Explorer

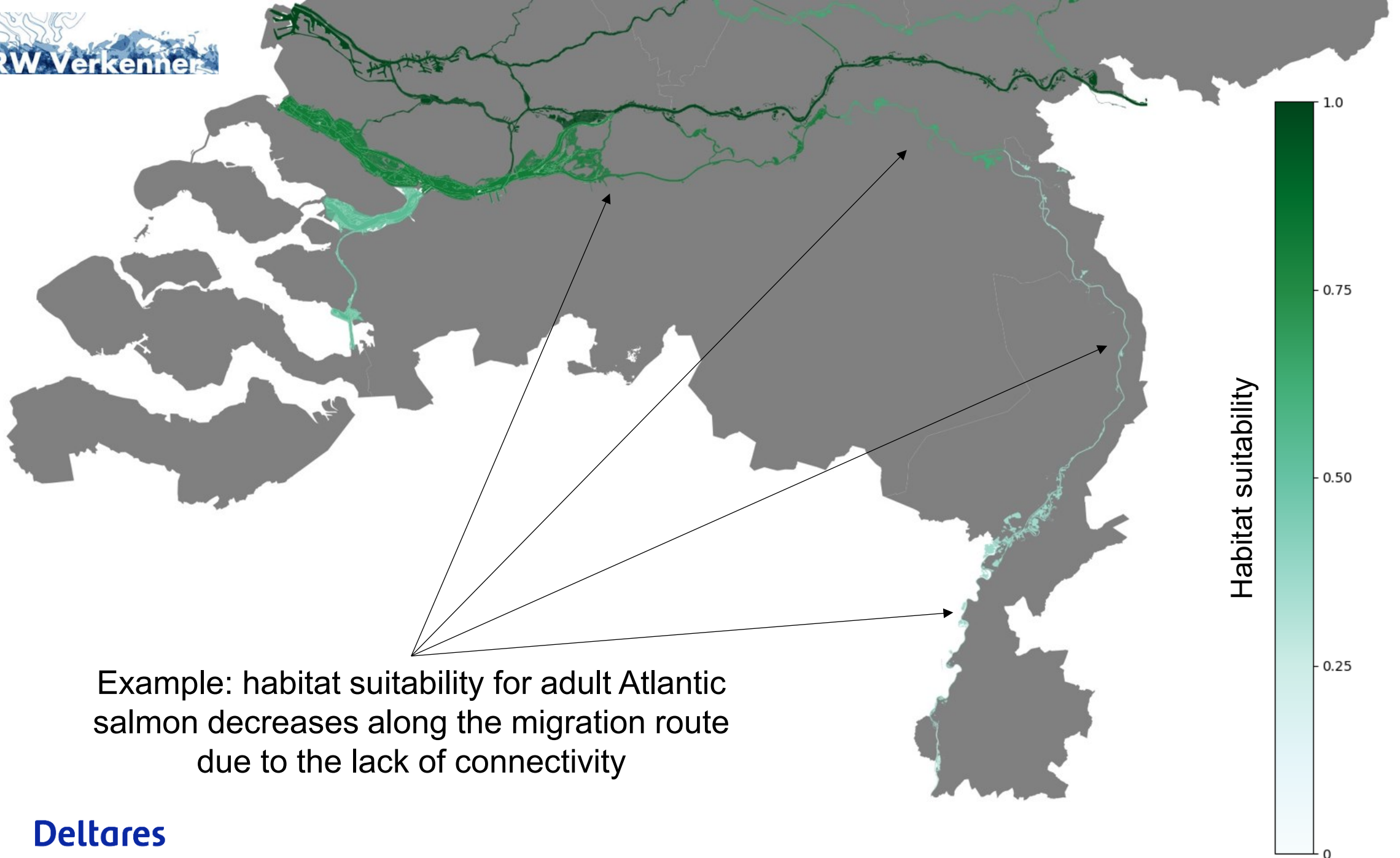


Deltares developed the WFD-Explorer by assignment of Rijkswaterstaat to quantify the effect of restoration and mitigation measures on WFD waterbodies.

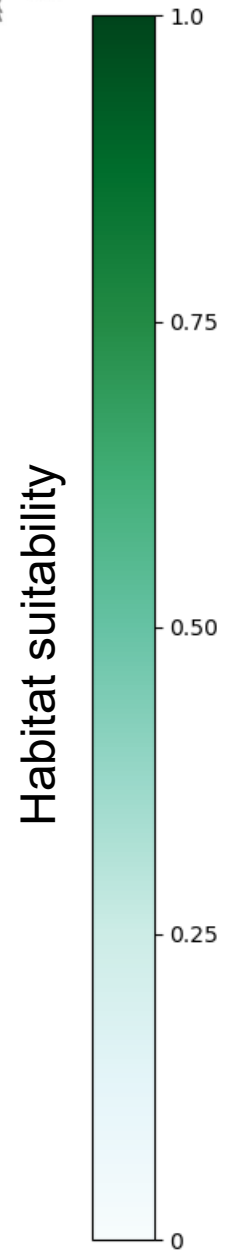




Example: habitat suitability for adult Atlantic salmon **without** taking connectivity into account



Example: habitat suitability for adult Atlantic salmon decreases along the migration route due to the lack of connectivity



# Key Takeaways

- The Renewal and Renovation task is the perfect time to improve the state of our rivers
  - Removal of the large weir complexes may be unlikely, but alternate designs should be subject to discussion
- Designing new weir complexes should be a multidisciplinary collaboration between ecologists, hydrologists and hydraulic engineers

Do you have ideas about improving the weir complexes? Feel free to share them with me!

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