

# Models shaping rivers and rivers shaping models

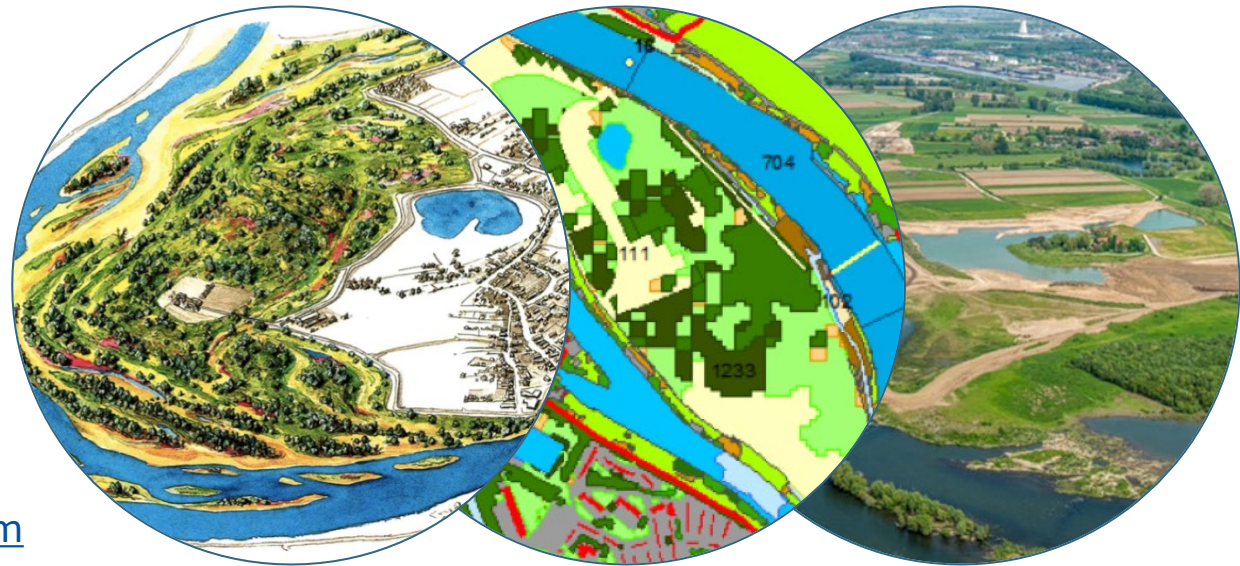
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MSc Thesis

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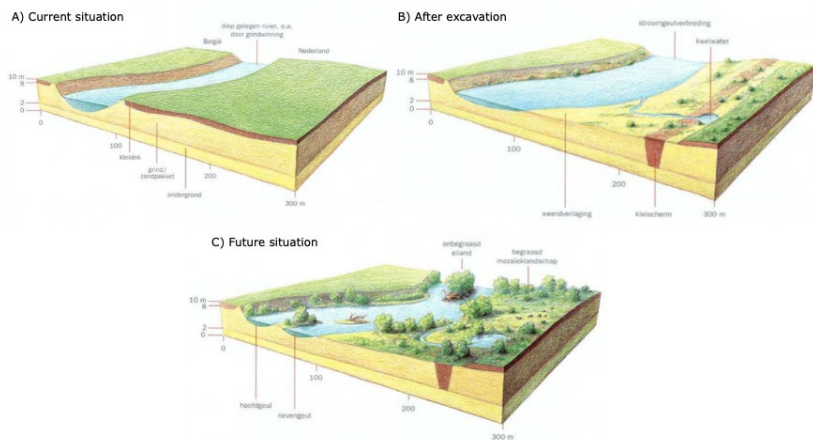
# Introduction – The subjectivity of hydraulic modelling

- Models as widely used tools in Dutch water management, but not neutral tools
- Models as a product of knowledge production
- What power do models hold and how do they influence the natural environment?

-> Case study on the Maasmodel (Meuse model) and the Border Meuse project

# Introduction – The Border Meuse project

- Border Meuse: unnavigable part of the Meuse on the Dutch-Belgian border
- *Grensmaas Project* (Border Meuse Project)
  - Improve flood safety
  - Develop dynamic nature



Source: Provincie Limburg (1998)



Source: Meertens (2013)

# Introduction – Co-production of river and model

- Co-production:

*"Scientific knowledge both embeds and is embedded in social identities, institutions, representations and discourses" (Sheila Jasanoff, 2004)*

- How do the Meuse model, the Border Meuse and ways of thinking about the river co-produce?

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# Methodology

- Qualitative case study
- Interviews (Autumn 2023)
  - People involved with modelling of the Meuse or with the Border Meuse project
  - Questions about knowing and acting towards the river, now and in the future, for example:
    - What could and should the Border Meuse look like in the future?
    - What interventions need to be done to achieve this?
    - What is the role of models in this?

# Results

- Concrete examples of 3 moments of co-production in 2021
  - The extreme weather event of July 2021
  - The aftermath and discussions on vegetation
  - The lawsuit Rijkswaterstaat vs. nature organizations



# Moment 1: Extreme weather event July 2021

- Extremely high precipitation levels leading to high river discharge and floods of the Meuse
  - Precipitation and river discharge systematically underestimated up until during the event itself
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- Model itself not contested
  - Model shapes response to high water levels



# Moment 2: The aftermath of the floods and the debate on vegetation

- Debate about predictability of the model in relation to vegetation
- Two lines of reasoning;
  - 1) Vegetation in and around the river is often harmful, it increases the water level: model perfect tool to regulate this
  - 2) Vegetation can be helpful in decreasing flood risks, especially with high flow velocities: model lacks complexity to calculate more effects than backwater
- Vegetatielegger (Legal vegetation map)
  - Model is contested in this case
  - River shapes (debate about) model



# Moment 3: The lawsuit

- Natuurmonumenten & ARK Rewilding **vs.** Rijkswaterstaat (RWS)
  - **Claim:** *vegetatielegger* (legal vegetation map) is not in line with vision of the Border Meuse project
  - **Outcome:** claim unfounded, RWS is allowed to prioritize flood safety, but should develop nature as much as possible within flood safety restrictions
- **Model shapes river:** model as legal tool to determine where vegetation can and cannot grow
- **River shapes model:** willingness to include more ecological knowledge in river management, still within model centric approach

**Trouw**  
JURZAAMHEID&ECONOMIE   RELIGIE&FILOSOFIE   OPINIE   CULTUUR&MEDIA

Wilde natuur

**Natuurmonumenten daagt Rijkswaterstaat voor de rechter over kappen van begroeiing langs rivieren**



H<sub>2</sub>O

H2O ACTUEEL - H2O VAKANTIELEN - H2O PODIUM - H2O MENSEN - H2O TECHNIEK - H2O PREMIUM - WATER MATTER



Natuurmonumenten en ARK verliezen rechtszaak riviernatuur Grensmaas

# Discussion and conclusion – Why is this relevant?

- Model shapes river, river shapes model
- Models are not neutral, models have power
  - Model represents a certain way of understanding the river
- To model or not to model: that is **not** the question
- Make modelling more democratic and transparent, whose future are we predicting?
  - Even within the consortium different futures exist (lawsuit)
- Food for thought and scope for collaboration

*"The more powerful our tools become, the harder it is to imagine the world without them" (Turkle, 2009, p.8)*

Thank you for you attention!  
Any questions?

