

# An evaluation of water retention measures and their effects

T.J. (Tjitske) Geertsema, A.J. (Ryan) Teuling and A.J.F. (Ton) Hoitink

## Challenge

Water management in lowland areas has focused on rapid drainage over the past centuries leading to increased flows during wet periods, prolonged droughts during dry periods and lower groundwater tables, which has impacted the society e.g. by increased need for artificial watering and subsidence of soils. The water management in lowland areas therefore needs to focus on precision management, wherein water is as much as possible retained. This study focuses on local and regional effects of increasing water levels and delaying discharge for water retention with the subjects:

- backwater effects by wood and bends in streams,
- effects of river lowering on the environment
- and simultaneous occurrence of discharge peaks at confluences.

## Innovative components

- Discharge effects on backwater effects by wood in streams and flow patterns at sharp bends
- The probability of simultaneous occurrence of flood peaks at confluences and its backwater effects on the tributaries
- Effect of river lowering on the groundwater levels in the environment and the effect of retention of rain events

## For whom and where?

Any researcher or professional interested in applying water retention techniques.

## Application development and findings

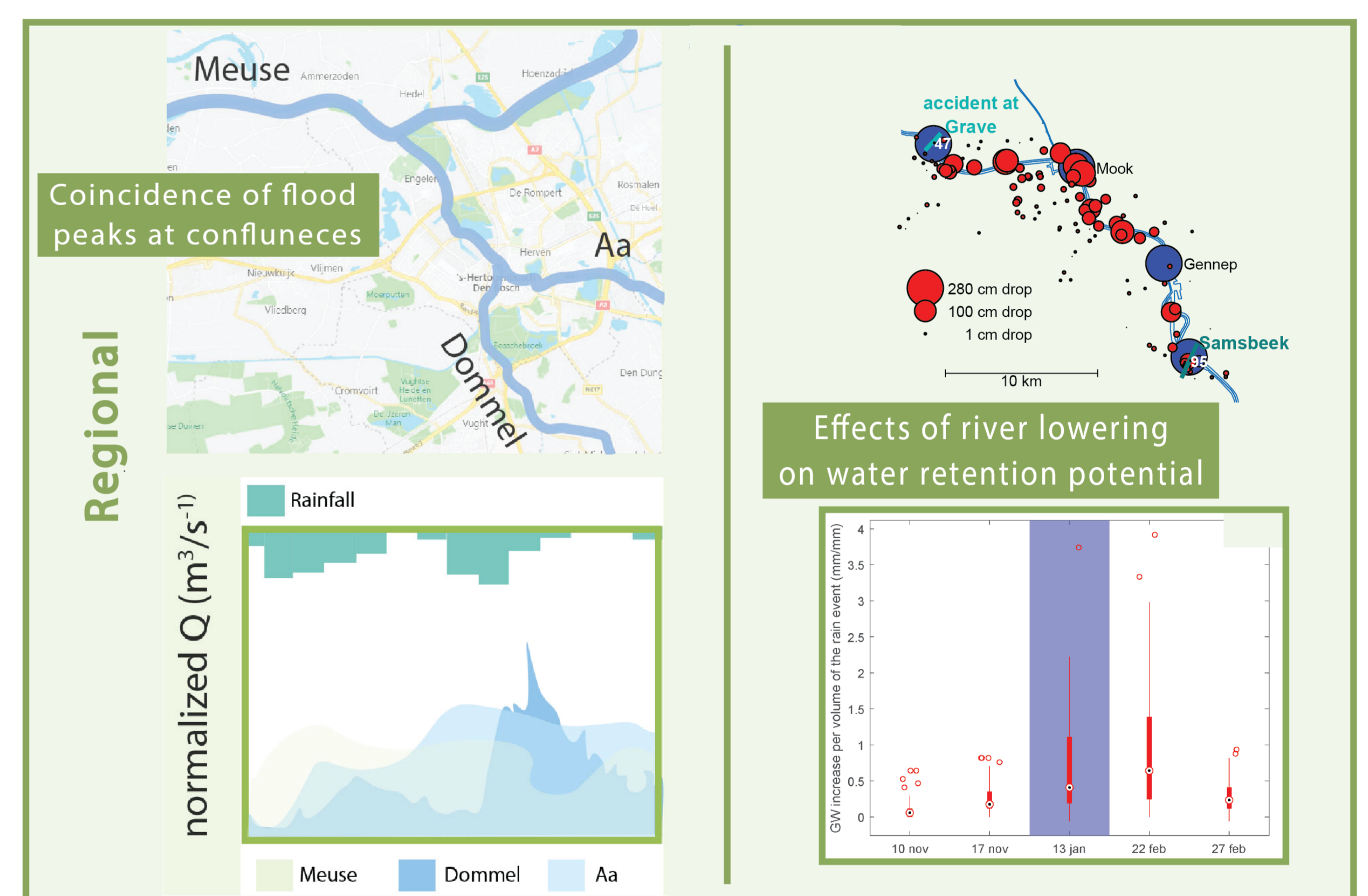
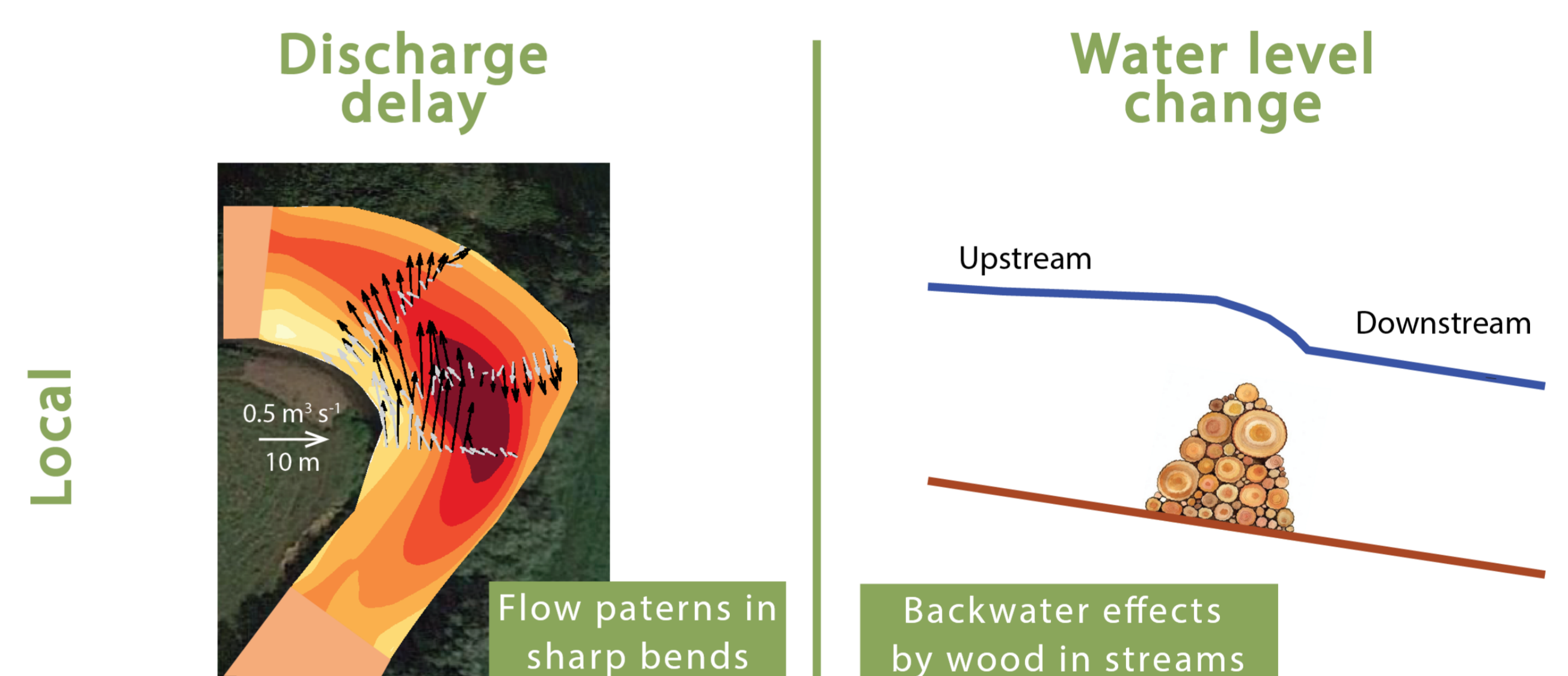
- Backwater effects by wood in streams can be minimized by adapting the wood or channel geometry, which can be investigated by free and user-friendly application.
- Bends in streams do not result in significant water level upset despite the complex dynamic flow patterns.
- River water lowering can result in additional retention using the lowered groundwater potential.
- Simultaneous occurrence of flood peaks at confluences is a common phenomenon in lowland areas and does therefore not add an extra flooding proneness.

## Status for day-to-day practice and next steps

I have informed the water boards and gave everybody access to the wood-induced backwater model. I hope it will be used.



Explaining the flow pattern effects of sharp bends in the field



The water level change measures are more successful than the discharge delay measures. Are you going to apply them?

Overview of the research and the output

## Interested?

Email to: [tjitske.geertsema@wur.nl](mailto:tjitske.geertsema@wur.nl).  
Explore more in the stream restoration effects [project description](#)

