



# WaalSamen

Working Together for Sustainable Living with Water





# Introduction

Photos: Tom Buijse

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## Who, what, where... WaalSamen!

WaalSamen is a unique collaboration between Rijkswaterstaat, BLN-Koninklijke Schuttevaer, Hengelsport Federatie Midden Nederland, Sportvisserij Nederland, Deltares and four Dutch universities (from Delft, Wageningen, Nijmegen and Twente). Together, they monitor the effects of longitudinal dams on the use of the river Waal for recreation, nature, shipping and flood protection.

*The collaboration agreement for 'WaalSamen' was signed by all partners during a festive gathering on June 26th 2015.*

The research and monitoring collaboration within WaalSamen was established on the initiative of Rijkswaterstaat. On the next pages, the WaalSamen partners will introduce themselves and explain the unique features of this collaboration. Four main themes will guide these stories: Sedimentation and Flow, Shipping, Plants and Animals, and User experience.

*The central meeting place for WaalSamen ('Veerhuis' in Wamel).*



Photo: WaalSamen



Photo: Laura Verbrugge

## Longitudinal dams in the Waal

The redesign of the Waal with longitudinal dams is a pilot of Rijkswaterstaat. The aim is to more sustainably manage the allocation of water, sand and biotics in the system. The constructed dams divide the river into a main channel and a shore channel.

WaalSamen is a collaboration for the planning and execution of the different monitoring activities that take place. Progress meetings are held twice a year and attended by all WaalSamen partners. A broader group of stakeholders, including the municipalities, province, and nature and recreation organizations, called the 'Platform group' also convenes twice a year. In case of specific questions, other research partners are asked to provide expertise. For example, 'Bureau Stroming' is conducting research into bank erosion and sediment deposits at high water levels.

Engaging in a dialogue with residents and other stakeholders is considered to be of great importance for WaalSamen. This opens up new opportunities, but is also useful to identify potential bottlenecks.

### WaalSamen field day

A field day with the slogan 'Working Together for Sustainable Living with Water' was organized on 11 October 2018. The aim? To collect as much information as possible about the effects of longitudinal dams on currents and sand transport in the river, underwater life, shipping and the experiences of residents and visitors, all in one day.

The location of the field day was the inlet of the shore channel at Ophemert, near Zennewijnen.

During this special event, the researchers conducted many measurements of the water and shore conditions. There was also an opportunity for locals and visitors to take a look and meet the WaalSamen partners. The day's events were filmed and reported in several local and regional media.



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# Sediment and flows

Photos: Timo de Ruijsscher

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Wageningen University collected data throughout the day with three measuring vessels, and the assistance of two consultancies (AquaVision and IGL).

The entrance of each shore channel has a sill that enables you to control how much water and sediment can flow into it. At low water levels, the channel is largely disconnected, so that more water becomes available for the main channel (to keep it at navigation depth). At high water levels, the shore channels accelerate the flow of water to the sea. According to Timo, the measurement day was a unique opportunity for data collection:

“The field day with all WaalSamen partners offered a great opportunity to collect an extensive data set near the inlet entrance at Ophemert. Our focus was on four aspects: flow velocity, sediment, bed topography and river dunes. We monitored the flow velocity in both the main and shore channel. We collected more than forty water samples with the aim to determine the concentration and size of sediment particles in the water. The bed topography was mapped using special measuring equipment. And finally, it was an excellent opportunity to experiment with different methods to determine sediment transport with data from the movement of river dunes.

All in all, a very successful day with a good result!”



*Timo de Ruijsscher, a PhD student at Wageningen University, works together with professor Ton Hoitink to investigate the effects of longitudinal dams on sediment transport and flow patterns in the Waal.*



Photo: Timo de Ruijscher

## Learning by doing

In April 2018, the sills of the inlets of the shore channels near Wamel and Dreumel were heightened by stacking stones. These physical changes are part of a experiment to test the functioning of longitudinal dams at different conditions. A number of adjustments to the design are planned during the 3-year monitoring period, so that the effects of each of these changes can be measured. In some places the situation will remain unchanged, to provide a good basis for a comparison.

In addition to the field measurements, a part of the research takes place in using a scale model (1:60) in the lab in Wageningen. This scale model is identical to the inlet opening at Ophemert.

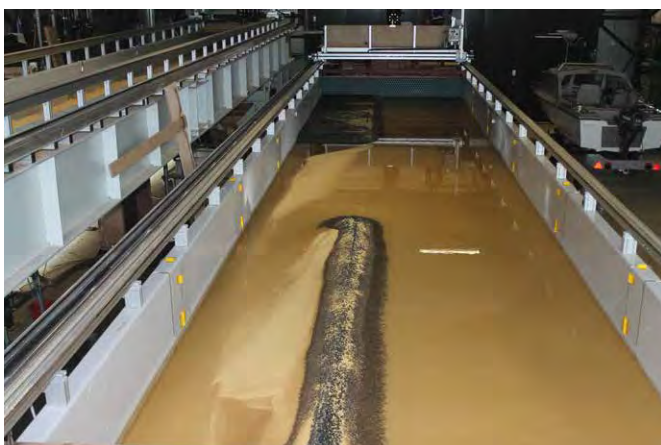


Photo: Guy Ackermans

*"WaalSamen is an exponent of the golden triangle between government, universities and business".  
(Ton Hoitink, Wageningen University)*



# Shipping

Photo: Beeldbank Rijkswaterstaat | Small photos: Laura Verbrugge



*The Waal is the busiest river in Europe.*

The construction of longitudinal dams divided the Waal into a main channel and a shore channel. This has consequences for water distribution but also for shipping traffic.



*Leny van Toorenborg (Royal BLN-Schuttevaer) participates in the project to represent the interests of all waterway users.*

During the field day she was able to give visitors a glimpse into the world of inland shipping. She explained that the Waal in their backyard, is also "the highway" of inland shipping. Not all shipping professionals are yet convinced of the benefits of the longitudinal dams. Leny: "Shipping professionals express concerns about the longitudinal dams, and this is understandable because the dams make the fairway smaller. However, it is necessary to halt river bed erosion, and if the dams can achieve this, then it can be of great importance for inland shipping".





## Safety first... also in the future

*Rijkswaterstaat works together with Deltares on a research agenda for a climate-proof inland waterway network.*



To continue transporting goods over water in the future, innovative solutions such as the longitudinal dams are urgently needed. They can stop processes of erosion. At the field day, Rolien van der Mark (river and waterway expert) of Deltares emphasized that monitoring the effects of the longitudinal dams is very important, especially if this measure is going to be applied on a larger scale.

In addition to their work on achieving a climate-proof inland waterway network, Deltares also works on defining a target river bed elevation. Rolien: "Ideally, the river depth is neither too high nor too low, so that the river can maintain its diverse functions (water drainage, shipping, cables and pipes). To fulfill these functions, we must limit erosion processes, and longitudinal dams can help us with this".

Deltares is planning to organize a webinar to explain how the longitudinal dams work and how they influence shipping. The aim is to enable the partners of WaalSamen to learn from the experiences of shipping professionals and to inform them about longitudinal dams.

*"WaalSamen is a great example of how research benefits from collaboration"*  
(Erik Mosselman, Deltares)



Photo: Thaiënne van Dijk

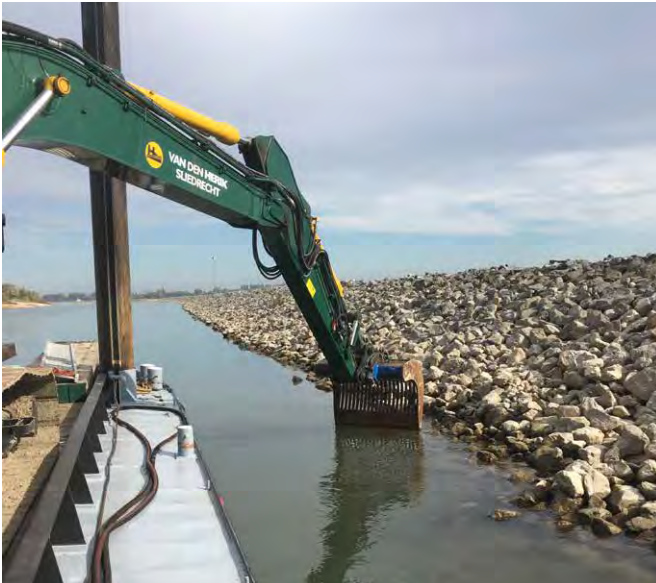


*The low water levels in 2018 were a major problem for inland shipping. Vessels had to reduce their loads for several months.*

Photo: Frank Bosman

# Plants and animals

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Photos: Frank Collas

*Frank Collas, PhD student at Radboud University, and professor Rob Leuven started their research in 2015. They are sampling fish, macrofauna (snails and mussels) and aquatic plants in the shore channels and in other parts of the river Waal.*



Their research reveals that more fish and macrofauna can be found in the shore channel, compared to other locations in the river nearby. Rare species, such as *River Lamprey* and *River Clubtail*, were also found in large numbers in the shore channel. These findings can be explained by the reduced influence of shipping waves in the shore channel and the water flow. However, no research had been done yet concerning the animals that live on the stones of the dams. They took the opportunity to do this during this field day!

Using the boat of contractor Van den Herik (photo above), a number of stones could be lifted with an excavator (photo in the middle). A quick inspection showed that several types of mussels and crustaceans had colonized the stones (photo below).

Most animals were found at lower parts of the dam where there is an exchange of water between the shore and main channel. The densities on the inner side of the dam appeared to be higher than on the outer side. This is most likely also due to the reduced influence of shipping.

*"We need different perspectives to properly evaluate the effects of the longitudinal dams. WaalSamen makes this possible". (Frank Collas, Radboud University)*



Photo: Nils van Kessel





*For recreational anglers, it is important to know whether the longitudinal dams provide better conditions for fishing. Recreational anglers contributed to the field day by reporting their catches.*

## Collaboration

Radboud University  
 Rijkswaterstaat  
 Hengelsport Federatie Midden Nederland  
 Sportvisserij Nederland  
 Deltares  
 University of Twente

*Photos: Frank Bosman*

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**‘Sportvisserij Nederland’ gave an electrical fishing demonstration during the field day. The catches were shown to the public in plastic containers.**

*‘Sportvisserij Nederland’ and the ‘Hengelsport Federatie Midden Nederland’ participate in the fish monitoring at the longitudinal dams.*



They conduct independent research and coordinate the monitoring traps with volunteers. They use a small trawl for monitoring fish at the deeper parts of the channel and electro-fishing on the shallower bank zones. The monitoring traps includes ten traps at three different locations. The fish stock is sampled in the late spring, summer and autumn. Until now, 27 fish species were caught using these methods, including rare species such as the *River Lamprey* and *Chub*. The largest fish that was caught with this monitoring traps is a *European Catfish* of 1.30 m. long.

*A citizen science initiative enables recreational anglers to report their catches near the longitudinal dams.*



This citizen science project started in 2016 and will continue until the end of 2019. In addition, local competitions are organized twice a year. Roland van Aalderen (Sportvisserij Nederland) explains why this is so valuable: “With the aforementioned sampling methods, we mainly catch juvenile fish and very little larger, adult fish. Volunteers mainly catch the larger individuals and thus provide a valuable addition to the fish monitoring”. In the field, especially *Roaches* were easy to catch.



Photo: Laura Verbrugge

## A hike with... Hans Heerdt | Text Hans Heerdt

"As a 'Rivierenlander', living on a boat near the Waal, I embrace the water - the river - as my habitat and I walk almost daily alongside the shore channels of the longitudinal dams. I follow everything that is directly or indirectly related to the Waal with great interest, such as nature in the floodplains, but also the cultural history of the river. After all, it is our most important lifeline and "blue thread" for the economy and ecology. Experiencing the river was also the main driving force for organizing the 'Ri4daagse' expeditions (four days of walking along the river) ([www.ri4daagse.nl](http://www.ri4daagse.nl)).

The longitudinal dams project is very interesting, because it combines various interests. Safety is important for Rijkswaterstaat, but I welcome the increasing attention for nature and recreation. The current monitoring program is important to measure the effects of this pilot. It is a pity that this causes limitations for fishing and recreational boating. But the low water levels in the summer of 2018 also partly influenced this.

Low water levels also reveal beautiful discoveries, such as old shipwrecks of hundreds years old, but also new developments such as beaver constructing dams along the banks of the shore channel. I look forward with anticipation to the final conclusions of this remarkable project."

Shipwreck at Dreumel



Beaver dam under construction



Photos: Hans Heerdt



## A hike with... Frans de Visser

| Text Frans de Visser

"From April to October, the campsite at Zennewijnen is my "second home". My favorite activity is fly-fishing and I have been fishing at this location for seven years. I fish while walking through the water, starting near Zennewijnen and following the Waal for 2-3 km upstream. With the construction of the longitudinal dams in the Waal, I have seen the changes in the banks and the flow conditions of this part of the river.

In 2016 (just after the construction) a lot of fish were present in the shore channel, but this year the catches were disappointing. The fish migrated to the shore channel very late in the year; only at the beginning of July. Every year is different, but I am curious to see whether the fish will thrive in this new environment. The variations in flow velocity are good for certain fish species, such as *Common Bleak*, *Asp* and sometimes *Common Nase*. At other places, you can almost see stagnant water. On the two-kilometer route there is also a lot of variation in the embankments (with stones, sand, vegetation, slope).

The low water level this year exposed the obstacles and other soil profiles that I encounter during fishing. Including the clay edges that can be quite disastrous for fishing gear if this get stuck. There are also many groyne materials (stones, other materials and geotextile). It is important to clean this up in the case of future constructions.

Photo: Frans de Visser



Photo: Laura Verbrugge



Photo: Frank Bosman



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In comparison with other years, fewer dead fish washed ashore. The longitudinal dam is probably a barrier and the fish, especially *El* or *European Catfish* after a ship collision, float away elsewhere.

The Waal banks at Zennewijnen are unfortunately very difficult to access for visitors, for example due to the many wires that you encounter along the way. As a result, fellow fishermen only fish at the start of the longitudinal dam, and sometimes at the path near the campsite. This is a shame because the entire area is a very beautiful and dynamic place for fishing."

Photo: Frank Bosman



# To conclude



The monitoring activities will be completed by the end of 2019. Deltares will then prepare an integral report to present the research findings from all partners. This report forms the basis for the evaluation of the longitudinal dam pilot by Rijkswaterstaat.

*Drones are used during the monitoring to take aerial photos of the area. An underwater drone helps to map the river bed and the available habitat for animals and plants.*

*Photo: Frank Collas*

## Contributors

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