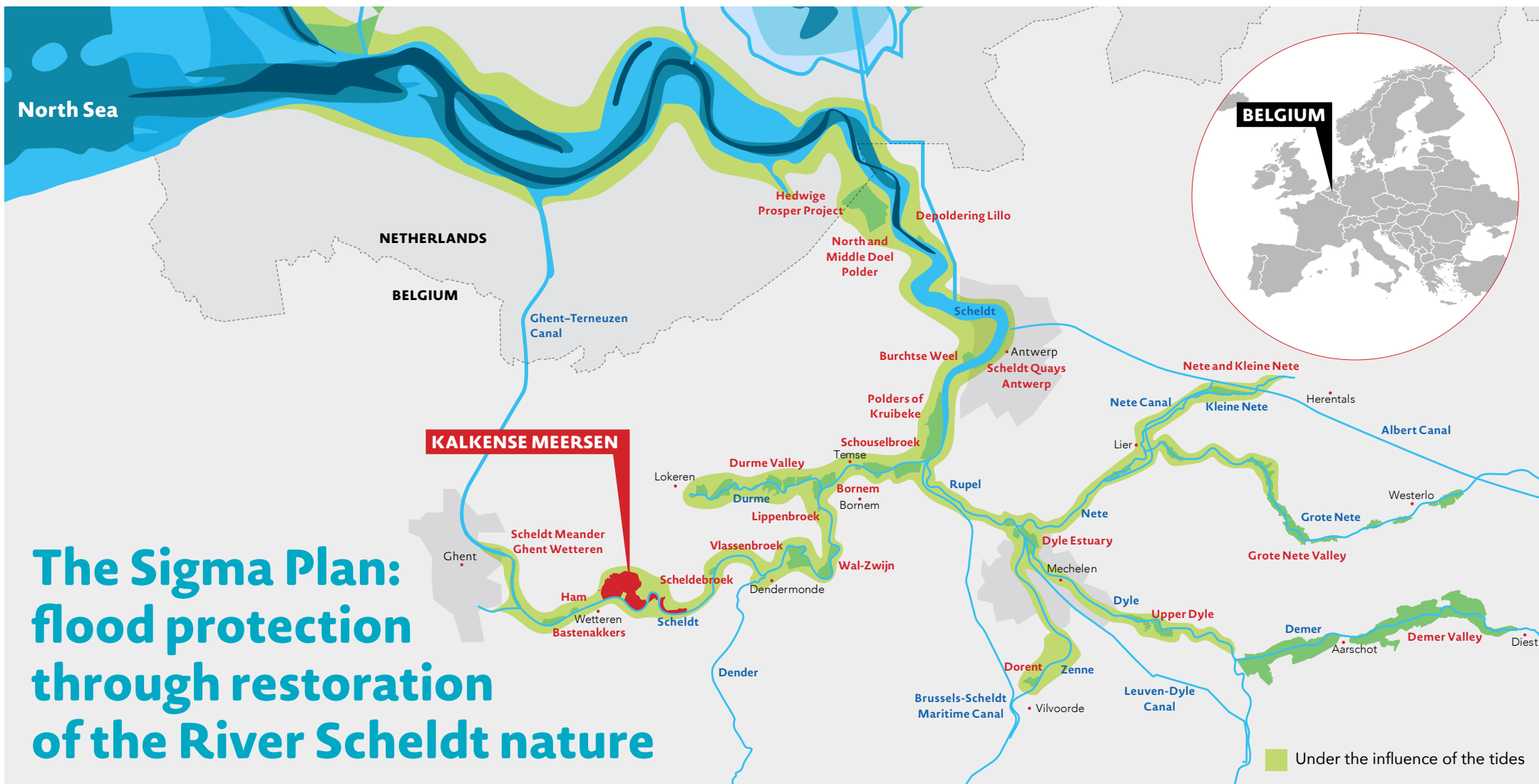


An aerial photograph of a flooded landscape, likely a wetland or agricultural area. The water is a murky brownish-green, reflecting the sky. In the center, a large, dark, circular pond is visible, with a vibrant rainbow arching over it. The surrounding land is a mix of green and brown, with some trees and structures visible in the distance. The overall tone is somber due to the flooding, but the rainbow adds a touch of hope and beauty.

Kalkense Meersen

Nature as an ally in the climate challenge



In the Belgian province of East Flanders, near Ghent, you will find the Kalkense Meersen: a project area of the Sigma Plan. With this plan, Flanders is protecting the Scheldt valley against flooding and the consequences of climate change. At the same time, we are creating beautiful nature areas bursting with

biodiversity. How are we doing that? By using nature as a partner against floods and the consequences of climate change.

Valuable pioneering work has been carried out in the Kalkense Meersen, which serves as an example for other Sigma areas. Controlled flood

areas such as Paardeweide and Bergenmeersen are ready to store water during storm tides, which generally occur as a result of a combination of spring tides and a north-westerly storm in the North Sea. Depoldering Wijmeers gives the River Scheldt extra breathing space. This decreases the strain on

the dikes along municipalities such as Wichelen and Berlare so these areas will remain dry. Finally, wet grasslands such as Paardebroek and the Wijmeers wetland form a habitat for rare plants and animals while protecting the region against water loss at the same time.

6 zones, 3 functions

The Kalkense Meersen Sigma project is divided into a number of carefully chosen sub areas. They are designed in such a way that the environment is protected against flooding, giving nature every opportunity. Each area has a specific role.



Wetland Kalkense Meersen

- 606 hectares
- nature reserve
- wetland*
- municipality of Laarne, Wetteren, Wichelen and Berlare



Paardebroek

- 28 hectares
- nature reserve
- wetland*
- municipality of Berlare



Paardeweide

- 85 hectares
- controlled flood area*
- floods on average once a year
- wetland*
- municipality of Berlare and Wichelen



Wetland Wijmeers

- 159 hectares
- controlled flood area*
- floods every 50 years
- wetland*
- municipality of Berlare



Controlled flood area

... is an area next to the river that can store large amounts of water when the water levels are high. We will build a ring dike inland to protect the region. Along the river is a lower, reinforced overflow dike, over which water can flow into the area without damaging the dike. Sluices in the overflow dike allow the water to flow back to the River Scheldt when its water level has fallen sufficiently. We have designed the area within the dikes to be wetlands that are full of biodiversity.

Wetlands

... act as a large sponge that collects rainwater and drains the water back to the river in a delayed manner. They help prevent flooding and keep nature fresh during dry periods. The wetlands of the Kalkense Meersen consist of extensive wet grasslands with scattered open water, which is lined with reed land. They are home to a wide variety of rare plants and animals, such as the marsh-marigold and the black-tailed godwit.



Bergenmeersen

- 41 hectares
- controlled flood area*
- floods on average once or twice a year
- tidal nature*
- municipality of Wichelen



Depoldering Wijmeers

- 28 hectares
- depoldering*
- tidal nature*
- municipalities of Berlare and Wichelen



Controlled flood area with reduced tides

... combines the safety function of a controlled flood area with the development of rare tidal nature. An inlet sluice high in the overflow dike allows a little water in every day at high tide. At low tide, the water flows back to the river via a drainage sluice. During storm tides, the area can store large amounts of water.

Depoldering

... is a formerly reclaimed area that we return to the river. Here, too, we first build a ring dike, then we make breaches in the old dike. This allows the river to flow back in and out of the area to the rhythm of the tide, creating rare tidal nature. The extra space for the river reduces the risk of flooding further inland. The depoldering tempers the strength of the tides.

Tidal nature

... is a special kind of nature that develops where the tides are given free rein. The Scheldt water deposits layers of silt, causing the build-up of tidal flats, teeming with invertebrate life. Higher-lying parts that only flood during spring tides are called tidal marshes. Plants that can tolerate regular flooding grow here. In this part of the River Scheldt, freshwater marshes with purple loosestrife, bullrush, reed and eventually willows will develop. The willow forests along the River Scheldt resemble tropical mangroves. They are dense, impenetrable forests in the water. On a European scale, they are an extremely rare biotope.

Smart interventions for extra benefits

In the Kalkense Meersen, we are working with nature to mitigate the effects of climate change. Attention is also paid to nature management and enjoyment. In recognition of the innovative interventions applied here, the Kalkense Meersen received the prestigious Working With Nature certificate from PIANC, the international organisation for water-bound transport infrastructure.



Bergenmeersen: a first for the combination sluice

Bergenmeersen can store 1.5 million m³ of water during a storm tide, but it is the sluice that makes it unique. It is the first controlled flood area in the world where the intake and discharge sluices are combined into one whole.

This combination sluice allows water to flow in and out twice a day to the rhythm of the tide. Thanks to a system of bulkheads, we can adjust the inflow of water and thereby also adjust the erosion and sedimentation in the area. We call this Belgian innovation a controlled flood area with reduced tides.



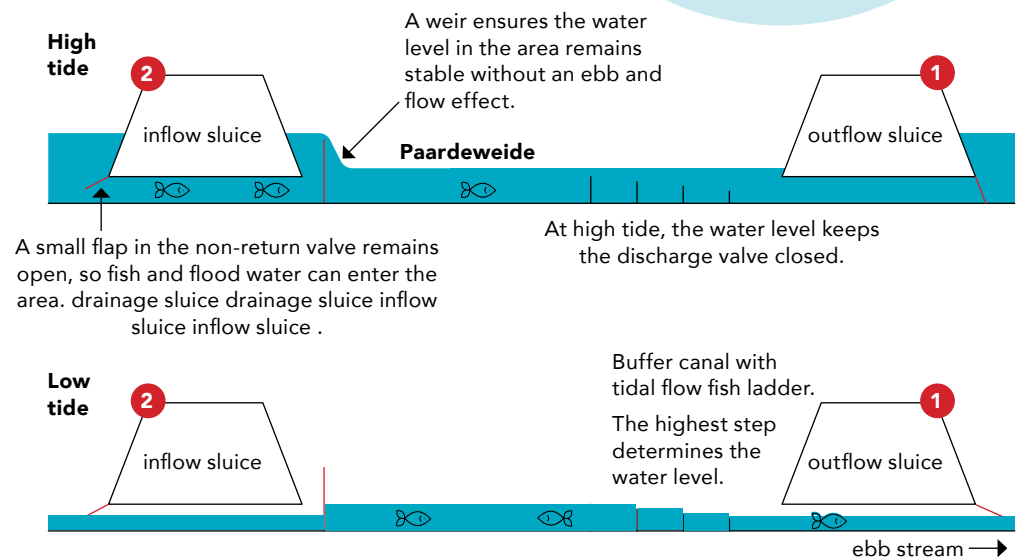
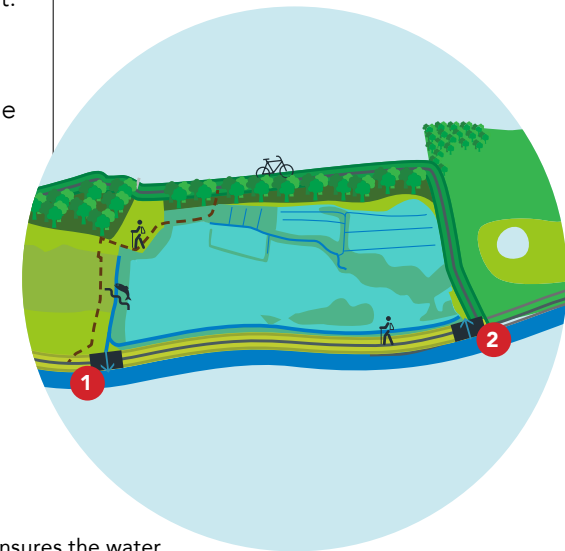
The innovative combination sluice of Bergenmeersen

Paardeweide: more fish friendly innovations

The easternmost part of Paardeweide is a wet area with water features and reeds: a reed atoll. This zone is connected to the River Scheldt via two sluices, in combination with a fish ladder. The fishway system has been specially designed for this area so that fish can swim to and from the Scheldt. This part of the valley is functionally attached to the river Scheldt without propagating the tidal wave: hence the name non tidal attachment.

The fish-friendly link has worked brilliantly. One year after completion, sixteen different fish species were found in Paardeweide, including eel, perch and roach.

The other sub-areas of the Kalkense Meersen were also designed with a focus on fish migration. Fish can find a quiet place where they can reproduce. This is not only improving the fish stock. The animal species that depend on the fish also benefit.





2016

The Old Scheldt before the works



2019

The Old Scheldt restored to its former glory

Wetland Kalkense Meersen: the return of the Old Scheldt

In the Kalkense Meersen, at the end of the 19th century, the River Scheldt was straightened. A river bend (or meander) was cut off and subsequently filled in and planted with poplar trees. In an extensive restoration project, the Old Scheldt was dug out and wet habitats were recreated for the particular animal species that the Sigma Plan wants to attract, such as the spotted crane for

example. Fish also feel at home here. In turn, they lure in rare birds such as the bittern. The birds can find shelter between the reeds and the marsh plants in the shallow parts and along the banks.

The Old Scheldt now connects the Kalkenvaart (draining an important catchment area) with the River Scheldt through a new sluice and fish ladder. This ensures free passage for fish and acts as a gravitational spillway, greatly reducing energy usage at the Kalkenvaart pumping station.

The Old Scheldt has many assets to attract the spotted crane.



Depoldering Wijmeers: easy depoldering with the flood channel

A depoldered area goes through a whole evolution under the influence of the tides. In the initial phase, a lot of fresh silt regularly floods in. Over time, the sludge accumulates and most evolves into tidal marshes, which rise above the water. Unfortunately, this dry sludge initially forms an ideal breeding ground for midges: small mosquitoes. Gradually willow tidal forest develops, which houses more plants and animals such as the bluethroat, shelduck and roach, which are a natural enemy for the gnats. In order to facilitate this process in the

depoldering of Wijmeers, two new breaches were made in the Scheldt Dike. A trench was also dug out for water to flow through at high tide: a flood channel. As a result, the river water can flow in and out more easily and the depoldering can optimally absorb the force of the tides and also drain faster. The extra current also washes away the larvae and eggs of the midges. The excavation works were partly financed by Europe through the Interreg project Immerse.

At high tide, the flood channel fills with water.



Wetland Wijmeers: free roaming Galloways

To support the development of a rich and diverse wetland in Wijmeers, the site must be managed in a specific way. By grazing parts of the area with Galloway cattle, the landscape remains open and valuable plants are given space to develop.

The breed is particularly well suited to this job because it consumes twigs and even thorny shrubs as well as grass. In addition, Galloways are well suited to adapted outdoors in winter.

Galloway cattle: independent, not aggressive and hardy for the winter.



A willow mat is transported over the water.

Less dredging thanks to willow mats

The River Scheldt is sensitive to erosion and silting in many places. This means the river must be dredged regularly for it to remain navigable, which is quite expensive.

A pilot project was therefore set up in the Kalkense Meersen as part of

the sustainable management plan for the Boven- Zeeschelde. At Uitbergen, large mats of braided willow branches were laid on the river bottom with stones on top. The mats change the pattern of erosion and deposition in a favourable way and severely reduce the necessity for dredging.

Facts

Butterfly-friendly mowing

The embankments are regularly mowed as part of the maintenance cycle. To propagate wildflowers mowing is done sufficiently late and the cut grass is removed to reduce nutrients. We have also started butterfly-friendly mowing schemes. We alternate which parts of the overflow levees in Wijmeers, Paardeweide and Bergenmeersen are left uncut. This way there is always food (nectar) and habitat available to butterflies and other insects. The result is impressive: you will now find rare butterfly species such as the Small Heath, the Queen of Spain fritillary and the Mallow Skipper.

Queen of Spain
fritillary



The Salicetum:
a living work
of art.

Land art

Visitors to the Kalkense Meersen should not miss the Salicetum. This artwork consists exclusively of living, natural materials. Young willow branches were woven around pollard willows that were moved when the Wetland Wijmeers was constructed. The Salicetum grows and changes through the seasons. Artist Will Beckers comes by every year to steer his wild growth in the right direction.



The enthusiastic
tree planters at
work!

13,000 trees planted

During the creation of the Wijmeers flood area, a number of exotic trees that were scattered throughout the area were cleared. In their place, a continuous forest of native species was planted in Wetland Wijmeers and in Paardeweide. Local students helped. They planted as many as 13,000 trees.

Unexpected swallows tales

Barn swallows, swifts and housemartins are doing surprisingly well in the Kalkense Meersen, even though the measures were not aimed at attracting these particular species. Thanks to the nature management efforts here, the birds can find plenty of insects. And they build their nests with silt from the River Scheldt.

A barn swallow collects material to build a nest.



Invasive exotic species

The Kalkense Meersen have to deal with a number of exotics: species that you would not find in our regions originally, but which now thrive due to globalisation and climate change. The Chinese mitten crab is a good example of this. The crabs scour the river bottoms in their millions. In addition, they strip water plants bare, dig into banks and disturb the soil.

In the Kalkense Meersen we are trying to limit their numbers using a crab trap. It is located at the fish ladder near the Old Scheldt. The trap has been specially developed to catch crabs: it resembles a large letterbox buried in the bottom with the opening facing up. Because crabs crawl on the bottom, they fall through the slot in the trap, while fish swim past it unhindered. The crabs are subsequently removed.

The Chinese mitten crab is an unwelcome glutton.



Come and discover the Kalkense Meersen!



This map shows all subareas of the Kalkense Meersen.



Nature as a good neighbour

The project areas of the Kalkense Meersen are spread over the municipalities of Berlare, Laarne, Wetteren and Wichelen. The Sigma Plan protects against inundations and aids in water regulation, but also contributes to the region's economic and recreational assets through strong cooperation with the municipal authorities and with local associations. A few examples:

The construction of a new jetty with mooring posts in collaboration with Schellebelle offers more options for passenger shipping on the River Scheldt.

Beautiful cycling and walking routes allow visitors to fully experience the peace, vastness and diversity of the Sigma areas and the nearby Donkmeer and Berlare Broek.

The local catering industry is boosted by the visitors who are attracted to the Kalkense Meersen.

With the support of:



Would you like to know more about the Kalkense Meersen?

Visit
sigmaplan.be/en/projects/the-kalkense-meersen-cluster



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