

Adapting to climate change



Layman's Report



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LIFE Sparc: nature and participation



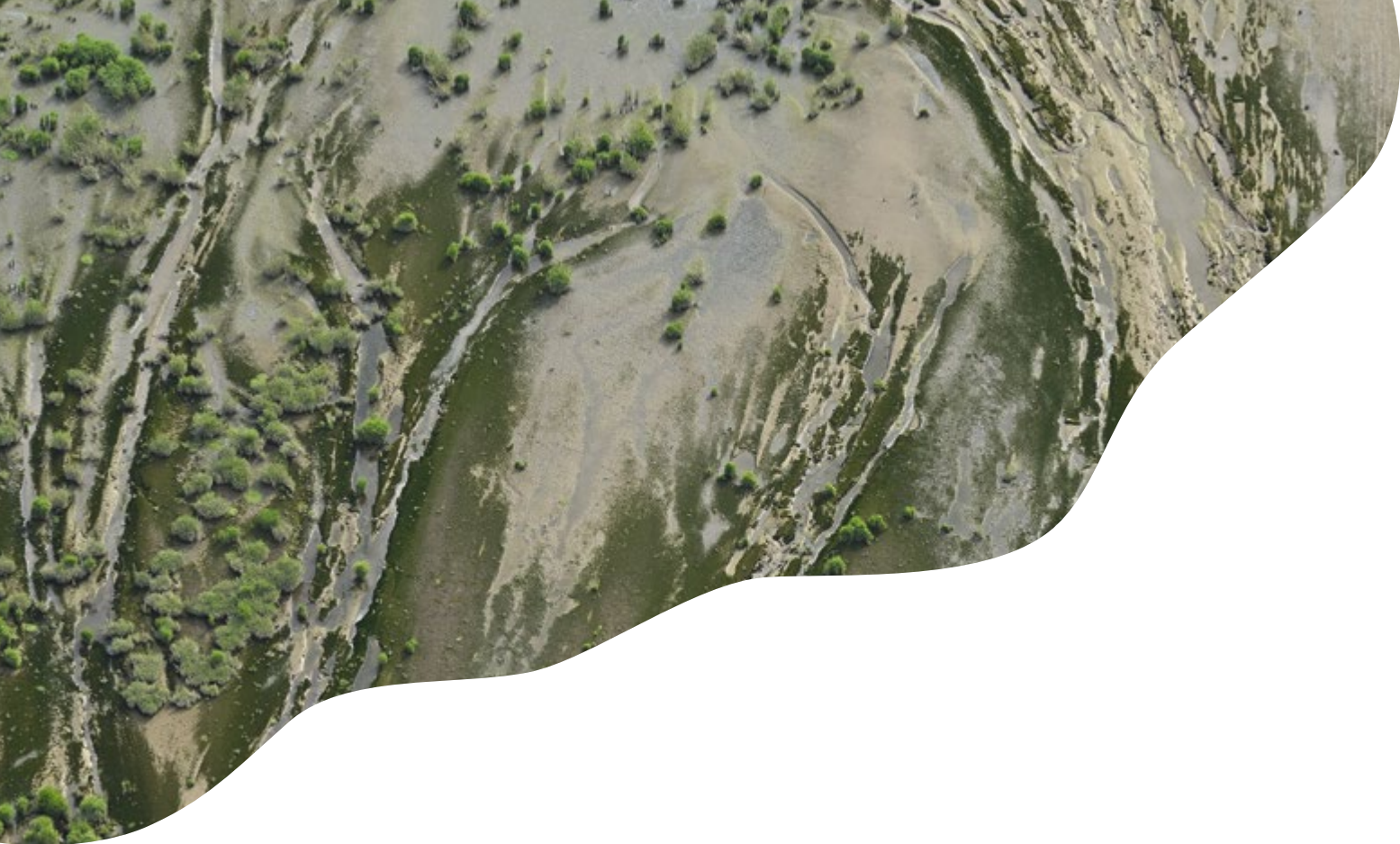
**Envisioning
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Climate change is happening now

At the end of 2023, sea levels reached a record high: they had risen by an average of 23 centimetres worldwide compared to 1900. Due to the high number of days with extreme rainfall, 2024 went down in history as the wettest year since 1833, when the Royal Meteorological Institute started recording weather conditions in Belgium. That same year, storm Boris succeeded his predecessors (Corrie, Pia, Henk, Isha, Jocelyn, etc.), with noticeable effects in Flanders.

Climate extremes are becoming increasingly normal. As part of the Sigma Plan, the Flemish government is working on climate buffers to better cope with **more severe storms** and **rising sea levels**. The Sigma Plan provides more room for the river Scheldt and its tributaries. It also makes use of **original tidal nature**, such as mudflats and salt marshes. They restore the ecosystem in the Scheldt estuary and retain rainwater for longer. Therefore, the Sigma Plan also offers a way of coping with more frequent **heavy rainfall** and **extreme drought**.

Room for nature

The European Union supported the Sigma Plan with the LIFE Sparc (Space for Adapting the river Scheldt to Climate Change) project, which relied on four pillars:

- 1

We gave **room to the river Scheldt**: we depoldered areas and created flood control areas to absorb excess water during storm tides.
- 2

We restored freshwater **tidal nature** (428 hectares), increasing its resilience.
- 3

We **shared our knowledge**: the unique solutions we are developing in Flanders could also be useful in other European tidal areas.
- 4

We increased **support** for the project: residents and visitors should be able to fully enjoy the river Scheldt and the areas along its banks included in the Sigma Plan.



Project location
Sea Scheldt, Flanders, Belgium

Project start date		Project end date
01/09/2017		31/08/2025
Total budget	EU contribution	Percentage of eligible costs
€ 8,525,800	€ 2,351,175	60



Mudflats and salt marshes as a climate buffer

LIFE Sparc focused on **eight areas** along the Scheldt and Durme rivers: Groot Schoor in Bornem, Vlassenbroek and Uiterdijk in Dendermonde, Wal-Zwijn, De Bunt and Groot Schoor in Hamme, and Groot and Klein Broek in Waasmunster and Temse.



The team

De Vlaamse Waterweg NV, the autonomous agency of the Government of Flanders responsible for the inland waterways of the Flemish Region, constructed **eight flood control areas**. Flanders Hydraulics Research and Eigen Vermogen Flanders Hydraulics were responsible for **scientific research and knowledge sharing** with foreign river management authorities. The Schelde-Durme Regional Landscape organisation (Regionaal Landschap Schelde-Durme) rolled out **public activities** for local residents and recreational visitors. Lastly, the Agency for Nature and Forests (Agentschap voor Natuur en Bos) provided overall **coordination and communication** and **expertise on nature management**.

The project team collaborated with policymakers, scientists, local entrepreneurs and volunteers in adopting a nature-inclusive manner in their thinking and actions.



Nature restoration is crucial in the battle against climate change. In fact, biodiversity is not only about protecting endangered species: a healthy and resilient river provides greater resistance to extreme weather events and offers humans and animals a wide range of invaluable benefits.

Veerle Campens

LIFE Sparc project coordinator

LIFE Sparc brought together various organisations to implement nature based solutions on and around the Sea Scheldt and the Durme river.



LIFE Sparc: Eight areas, one objective

Flanders formulated the Sigma Plan to create a climate buffer against rising sea levels and extreme weather conditions. The European Union made a major contribution to the plan through LIFE Sparc (Space for Adapting the river Scheldt to Climate Change) by collaborating on the further development of **eight Sigma areas** in the provinces of East Flanders and Antwerp and making them more resilient to climate change.

Groot Broek - Depoldering

📍 Waasmunster - 58 ha - 2025

- Lowering the Durme dyke over a distance of 1,200 metres
- Creating two openings: one of 30 metres and one of 100 metres
- Onset of a creek

Vlassenbroek - FCA-CRT

📍 Dendermonde - 91 ha - 2026

- Building part of the ring dyke
- Building a northern inlet and outlet sluice
- Onset of a creek

Uiterdijk - Depoldering

📍 Dendermonde - 11 ha - 2026

- Lowering the Old Scheldt dyke to ground level



Klein Broek - Depoldering

📍 Temse - 38 ha - 2026

- Lowering the Durme dyke over a distance of 1,000 metres
- Creating two openings: one of 40 metres and one of 60 metres

Groot Schoor Hamme - Depoldering

📍 Hamme - 26 ha - 2021

- Lowering the Old Scheldt dyke over a distance of 1,500 metres
- Onset of creeks

De Bunt - FCA-CRT

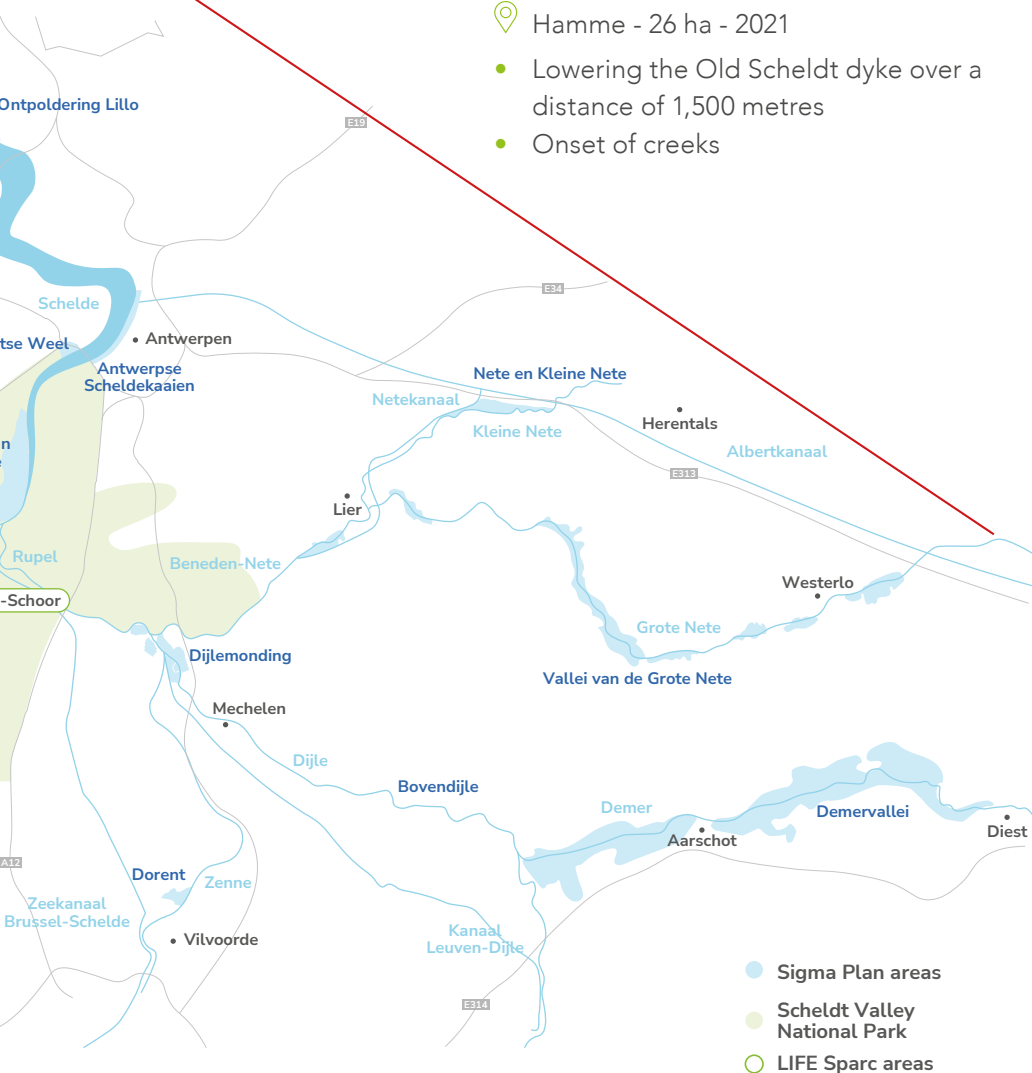
📍 Hamme - 99 ha - 2025

- Building an inlet and outlet sluice
- Onset of a creek

Wal-Zwijn - FCA-CRT

📍 Hamme - 148 ha - 2025

- Building two inlet and outlet sluices



Groot Schoor Hingene - Depoldering

📍 Bornem - 23 ha - 2026

- Building a ring dyke
- Creating a 100-metre opening in the Scheldt dyke
- Onset of a creek



Reducing the risk of flooding

During storm tides, water levels in the Scheldt estuary rise fastest in the region around Dendermonde. In this region, we created more space for water and developed tidal nature.

- **Depoldering:** we reconnected five areas to the river. The existing dyke was breached in several places and a new, higher dyke was built further inland.
- **Flood control areas with a reduced tide (FCA-CRT):** a high ring dyke was constructed in three areas. We built inlet and outlet sluices in the existing dykes. As a result, twice a day water flows in at high tide, and out again at low tide. During storm tides, the storm surge partly flows over the lowered overflow dyke, and the excess water is absorbed by this area.



If the full Sigma Plan (Most Favourable Alternative) is implemented, the risk of flooding drops from about 1 in 350 years to 1 in 1,000 years. By implementing LIFE Sparc, the high water level at Dendermonde decreases by about 35 centimetres during a 1,000-year storm.

Watch our videos



What is a depoldering?



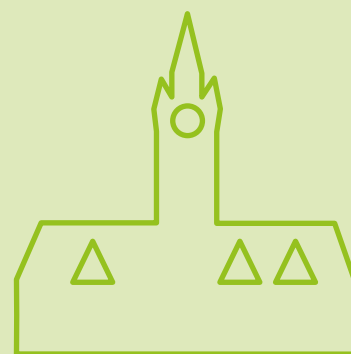
What is an FCA-CRT?

In total, this creates **428 hectares of tidal nature**: mudflats, salt marshes, channels and creeks. They provide habitats for species such as the bluethroat, beaver, spoonbill, black-crowned night heron and great egret.



428 ha

freshwater tidal nature developed



-35 cm

high water level at Dendermonde



Providing opportunities for nature restoration and tidal nature

From analysis to action

Temperatures are increasing, sea levels are rising and precipitation is becoming more erratic. Climate change not only affects people; nature is also put to the test. We conducted a **climate sensitivity analysis** in the Scheldt estuary to map the consequences for the Scheldt Valley. This formed the basis for measures we proposed for each project area to strengthen nature and preserve biodiversity. Some areas require more intensive management, for example at the riverbanks or to help specific animal and plant species. This general management vision was elaborated in an **exploratory memorandum**.

De Vlaamse Waterweg NV converted the proposed measures into concrete **nature management plans** for each project area.



Nature objectives as a compass

The main objective of the nature management plans is to enhance the **value of nature** while complying with European nature conservation directives. The LIFE Sparc areas are also home to a rich variety of different species and kinds of nature:

- **Tidal nature:** valuable tidal nature is found in De Bunt, Groot and Klein Broek, Wal-Zwijn, Groot Schoor Bornem and Vlassenbroek.
- **Varied landscape:** Vlassenbroek is also home to alluvial forest, shallow water, marshy grassland, reed beds and a drier forest type.
- **Birds take centre stage:** the common shelduck, common pochard, gadwall, common teal, pintail, lapwing and other waterfowl spend winter in the project areas or migrate through them. The Savi's warbler, black-crowned night heron, spoonbill and pied avocet nest in the areas; the latter two also feed there.
- **Underwater life:** fish fauna is varied, including smelt, common goby, flounder and tadpoles.
- **Bats galore:** the project areas are home to the common pipistrelle, Nathusius' pipistrelle, serotine bat, common noctule, Natterer's bat, Daubenton's bat and pond bat, among others.
- **Even more species:** species such as the caddisfly, brown shrimp and the oriental shrimp also feel at home there.



Monitoring and preparation

To ensure that the management objective is achieved, each nature management plan also includes a **monitoring plan**. It involves examining:

1. the development of vegetation;
2. ground and surface water levels;
3. the species present.

Nature also received a considerable amount of attention during the actual works. While waiting for the final design, we provided temporary management measures to attract animals or preserve an area's ecological interest. This took place, for example, in Vlassenbroek, Wal-Zwijn and Groot Schoor Hingene.





Creating support

The average Flemish person places the climate high on the agenda. Many people are convinced that we should continue to invest in dykes and flood control areas. Moreover, during the Covid-19 crisis, we rediscovered nature - that too is a priority for many people.

Yet local residents do not always react enthusiastically when work is carried out on a project area. The construction of flood control areas and depoldering have a major impact on the landscape, and changes to the living environment

can be challenging. Therefore, creating support is an essential part of each project. But what is the key to success?

Rather than one key, it turns out that rather than one key, there is a whole bunch of keys. As part of the Scalluvia LIFE project, we previously formulated '10 keys to co-ownership' - a guide to integrating personal visions, stories and commitments in a project. We also used this guide in LIFE Sparc to work together on a long-term, widely supported project.

LIFE Sparc: 2018 versus 2024

What impact did these keys have? We explored this with a baseline measurement in 2018 and a follow-up in 2024. Some striking results:

- **The effects of climate change are becoming increasingly clear: residents cite not only higher temperatures, but especially heavier precipitation.**
- **A (large) majority recognise the positive effects of river nature and continue to call for government measures, such as the creation of flood plains.**
- **One in two wants to participate in STROOM and twice as many people as in 2018 know about the Scheldt Valley National Park.**



10 keys to co-ownership

1

Listen to expectations

When LIFE Sparc was launched, we used a **survey** to identify stakeholder interests and needs. We surveyed local residents, entrepreneurs, recreational visitors and local politicians regarding their knowledge and expectations on issues such as climate change and protection measures against rising sea levels. We repeated the survey at the end of the project.

3

Exchange knowledge and concerns

Together with our stakeholders, we visited **Oosterschelde National Park** and the new tidal area **Waterdunen** (both in the Netherlands). Conversely, our approach also attracts **foreign attention**. We participated in knowledge conferences, were visited by the Danish Coast to Coast Climate Change LIFE project, and in 2024, participants of the IUCN Regional Conservation Forum had the chance to go and see Wal-Zwijn and Groot Schoor Hamme.

2

Invest in communication and focus on the end result

We delivered our message through, amongst others, newsletters, videos, social media, face-to-face meetings, information sessions and exhibitions. The emphasis was put on the LIFE Sparc areas as climate buffers. We also focused on **milestones**, such as depoldering Groot Schoor Hamme and approval of the Scheldt Valley National Park. People love **positive news**.



Discover the adventure trail

Go on an adventure in LIFE Sparc-areas



ls



Groot-Schoor Hingene-Bornem

Bird migration 5

Common spoonbill

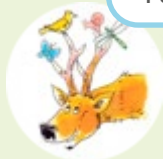
Turntables

Mailbox 6



Antwerp

Polders of Kruibeke



Experience all the trails!

In **Groot Schoor**, follow the osprey and fly with our migratory birds. **NEW**

P De Notelaer, Notelaerdreef, 2880 Bornem

In **Klein Broek**, join the bluethroat and cruise down the **NEW** re.

P Koolputten 2, 9250 Waasmunster

In **Vlassenbroek**, crawl into the beaver's lodge or climb the nest of the common warbler. **NEW**

P Vlassenbroek, Vlassenbroek 39, 9200 Dendermonde

Swim with the three-spined stickleback in the **Kalkense Meersen**.

P Paddenhoek, 9260 Wichelen

Jump as far as you can with Xavier the deer in the **Polders of Kruibeke**.

P Dulpop, 9150 Beveren-Kruibeke-Zwijndrecht







6

Map out walking routes on the site

To explain the how and why of our approach, we organised climate walks along the future project areas, accompanied by our **climate guides**. For those who preferred to explore at their own pace, we provided **site signs, info panels and mapped routes** via the RouteYou hiking app. This allowed visitors to discover how LIFE Sparc and the Sigma Plan create climate buffers in the Scheldt Valley.

4

Support actions by local partners and aim for quick results

Local organisations are often **the best partners**. For example, at the request of the local nature association VZW Durme, we brought forward our actions in Meulendijkbroek, a sub-area of Groot Broek. Subjecting the area to the influence of the tides allowed people to enjoy nature there sooner and gave them a taste of what to expect in the future on a larger scale.

7

Train ambassadors

We trained 35 business owners, entrepreneurs and tourism staff from the Sparc municipalities to become **Scheldt Valley ambassadors**. A visit to their establishments often results in great insider tips about the nature reserves. **Climate parents and climate guides** also received training so that they are fully up-to-date with the latest thinking on climate change and its impact on the Scheldt Valley.

5

Strive for external recognition

LIFE Sparc attracted a lot of **local, national and international interest** over the years. The Flemish documentary 'Onze Natuur' (Our Nature) dedicated an episode to the importance of making room for river water. In 2021, we joined the European Rewilding Network as part of the Sigma Plan. That same year, the internationally renowned Festival of Flanders decided to organise an annual sustainable festival near the river Scheldt: STROOM. During the first two editions, LIFE Sparc was one of the organising partners. We previously supported the festival's predecessor, Hoogtij.





A broad social movement is needed to really turn the tide, in which we make the indispensable voice of artists heard.

Sophie Detremmerie
manager of STROOM



10

Give your project an identity

Lots of people are working to put the Scheldt Valley on the map, both in a professional or voluntary capacity. We have been working together to build a strong identity for years through the Scheldt Sterk Merk (Strong Brand) and Scheldt Valley River Park projects. The new tidal areas were the face of the River Park for many years. In 2021, when the Flemish government launched a call to designate four national parks, the Scheldt Valley had to be included. On 13 October 2023, we got the green light: the **Scheldt Valley National Park** became a reality.

8

Invest in children and young people

In 17 municipalities, trained nature parents toured LIFE Sparc areas with engaging **outdoor lessons** on the topic of climate change and how we can adapt to it. Our **experiential climate trails** at Klein Broek, Groot Schoor Bornem and Vlassenbroek bring the theme to life in a playful way. They also illustrate how tidal nature can act as a climate buffer.

9

Adopt unambiguous rules and monitoring

Good agreements make good friends. This is why each nature management plan is also accompanied by an **accessibility plan**, stating what is and is not allowed. Before the plan was drafted, intense consultations took place with all relevant agencies.





Share knowledge and provide inspiration

The concept of **Flood Control Areas (FCAs)**, with or without a **Controlled Reduced Tide (CRT)** to give 'room to the river', is a Flemish invention that was developed, applied and monitored as part of the Sigma Plan. We are keen to share this unique expertise, beyond our borders as well.

An **ideal partner** was found in the **Waterdunen** project in **Zeeland, the Netherlands**: a new nature and recreational area of about 350 hectares that, just like LIFE Sparc, is committed to tidal nature without compromising on safety. During three contact moments, we got to know each other's project and exchanged data and technical knowledge. We also supported Waterdunen in calculating the resulting tide if the inlet and outlet construction had been carried out according to the Sigma Plan approach.

To disseminate our knowledge of the effect of flood control areas **on a European scale** as well, we sought contact with research institutes working on other European estuaries, such as those of the Ems, Weser, Elbe, Seine and Humber.





From previous projects, we already had data concerning the form of each estuary and concerning tidal characteristics. We used this as the basis to develop **simplified computer models**, allowing us to simulate the tide and predict the impact of flooding models. By adjusting the location, size and design - such as the height of an overflow dyke or the design of culverts - we obtained an initial insight into the applicability of flood control areas with controlled reduced tides in other estuaries.

Finally, we are also committed to **more informal knowledge exchange**. For example, we were visited by the Danish Coast to Coast Climate Change LIFE project, and participants of the IUCN Regional Conservation Forum were able to go and see our Wal-Zwijn and Groot Schoor Hamme projects. These were fascinating days with plenty of exchanges on water management and the challenges of climate change.

**Several vulnerable or
rare nesting birds found
a home at Wal-Zwijn**



Monitoring: from oxygen to birds

Monitoring is crucial in order to track the project's impact. For example, the Environmental Effects of the Sigma Plan Research Programme (OMES) maps how the Sigma Plan affects **water quality** and life in the Scheldt estuary. There is a specific focus on the amount of oxygen in the water, as this largely determines how much life there is in the river. In September 2022, oxygen levels were found to have increased significantly once more.

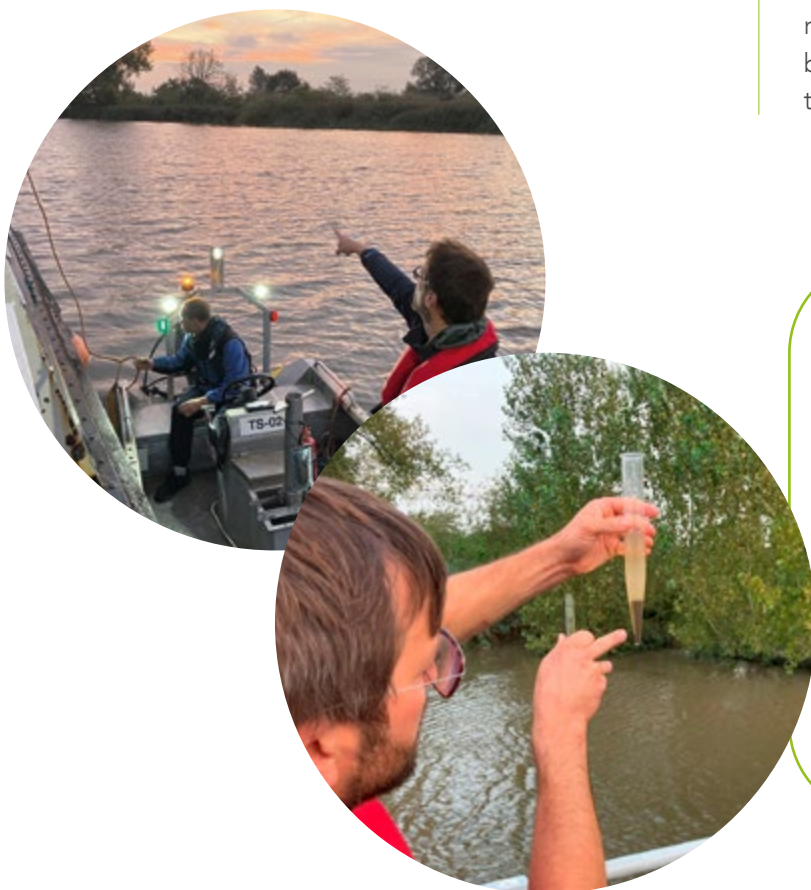
We also monitor the impact on **biodiversity**. In 2022, for example, the temporary management measures for Wal-Zwijn transformed the area into the scene of a very successful breeding season. A number of vulnerable or rare breeding birds found a home there: a pair of black kites, two pairs of black-winged stilts and several pairs of garganeys and little bitterns. The great reed warbler, Savi's warbler and great bittern have also nested in the LIFE Sparc area.



It is important that monitoring is carried out over the **long-term** to clearly show the evolution. In late 2023, for example, the Klein Broek depoldering area on the Durme was opened temporarily. On 5 September 2024, Flanders Hydraulic Research carried out a measurement campaign there: throughout a complete tidal cycle, scientists took samples and measured the flow rate from the Veremans measuring vessel and a dinghy. In doing so, they recorded the exchange of water and sediment between the Scheldt and the Durme rivers.

In 2019, 2021 and 2023, the same measurement campaign took place at the same location, allowing us to also identify subtle effects. The results of the 2024 measurements are currently being analysed; once the analysis is complete, they will be made public.

LIFE Sparc not only carried out monitoring activities, but also engaged in communication. Visitors to our website could check in real time how salty, cold and oxygenated the river Scheldt was. Today, we refer interested parties to the website waterinfo.vlaanderen.be where they can consult current data on Flemish watercourses.



Envisioning the future



Groot Schoor Hamme 2017



Groot Broek 2019



De Bunt 2015

Before

Areas in constant evolution

The LIFE Sparc areas have changed significantly over the past eight years.

Groot Schoor in Hamme was depoldered in 2021, followed by **Groot Broek** (2025) and **Groot Schoor Hingene** and **Uiterdijk** (2026).

The **three flood control areas with a controlled reduced tide (CRT)** created within LIFE Sparc will first be used in 2025. There has been minimal use of CRT at Vlassenbroek since May, Wal-Zwijn will follow in August, De Bunt in the final quarter. With each tide, the three areas exchange water with the river Scheldt. The water from the river Scheldt

contains fine sediment, which is deposited in those areas. This natural raising of the riverbed - a process that takes place over decades - alters their water storage capacity, and hence the flood pattern.

This affects vegetation, soil life and the ecosystem services an area can provide. If the development deviates too much from the original targets, the sluices can easily be modified, for example with sheet piles. By adapting the tide in this way, we adjust the natural processes.

Sedimentation results in carbon and nutrients being captured in the soil, which means the areas contribute to climate mitigation and improved water quality. The same happens with toxic substances: they do not disappear from the ecosystem, but underground they are less harmful to plants and animals.

In addition, **microorganisms in the water and soil** play an active role in improving water quality. They break down excess nitrogen, while the LIFE Sparc areas simultaneously add silicon to the water in the river Scheldt - a nutrient that is often in short supply. By improving the ratio of silicon to nitrogen, they contribute to a healthier population of diatoms. And because diatoms are at the bottom of the food chain, this has an effect in all higher trophic levels: from plankton to fish, birds and mammals.

We monitor soil dynamics through the **OMES monitoring programme**. We monitor the targets of the CRTs using baseline monitoring of sedimentation and erosion, vegetation and soil properties. By closely observing the tide, we can optimally align the sheet pile configuration to the desired sedimentation or erosion. Every three years, we prepare an ecotope map to track habitat development. And additional monitoring allows us to assess whether an area is moving in the desired direction. As a result, we can detect potential problems early on and make adjustments if necessary. Lastly, through adapted management, we try and prevent pest species such as sandflies.



**Discover the OMES-
monitoring programme**

After



Groot Schoor Hamme 2024



Groot Broek 2024



De Bunt 2024

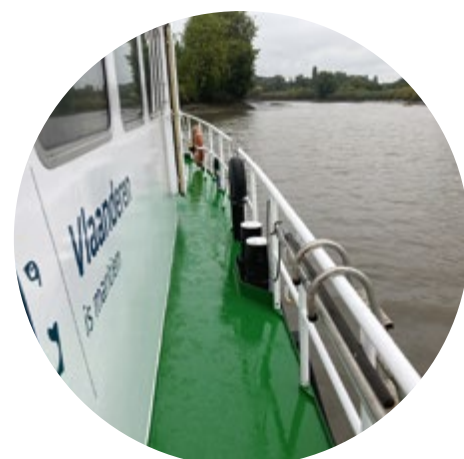


Measuring with the future in mind

The water levels in the CRTs within the Sigma Plan are operationally monitored and publicly disclosed on the website waterinfo.vlaanderen.be. Data from Groot Wal, Klein Wal, Zwijn and De Bunt will be online in 2025; Vlassenbroek will follow in 2026. No operational measurements are carried out for the depoldered areas, but as they are directly connected to the river Scheldt, using data from a nearby tidal station is sufficient.

Once an area is connected to the river Scheldt, Flanders Hydraulic Research includes it in its operational models. The models enable us to include the water storage effect of the areas in the expected water levels, for example during a storm. That information helps managers take informed decisions.

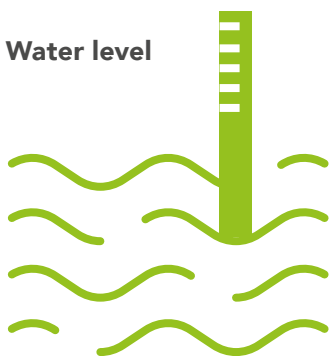
According to calculations by a computer model, the eight LIFE Sparc areas can lower the maximum water level by up to 35 centimetres during a very severe storm (which occurs on average once every thousand years). LIFE Sparc - and by extension the Sigma Plan - thus makes the Scheldt estuary demonstrably safer for local residents.





What do we measure?

Water level



How high is the water?

Current



How fast is the water moving?

Flow rate



How much water flows by per unit of time?

Nurturing life sustainably

LIFE Sparc was embedded in and linked to several other projects from day one. Two of them will ensure that our work continues to have a positive impact on **Flemish water safety and recreation**.

Sigma Plan: the broader context

The Sigma Plan prepares today's Flanders for **tomorrow's climate**. At the same time, it helps **restore** rare and valuable riverine nature, in line with European nature objectives. The LIFE Sparc project enabled the Sigma Plan to obtain European support to develop eight areas more quickly.

In the coming years, we will continue working with the Sigma Plan to make the river Scheldt and its tributaries **climate-proof and restore riverine nature**. The result? Nature reserves with European allure, where visitors receive a warm welcome and can use a network of cycling and hiking paths.



More info about the Sigma Plan





The Scheldt Valley National Park will continue to support interlocal initiatives, building on a resilient Scheldt Valley prepared for climate change. Together with all our partners, we drew up a plan to invest in a broad spectrum of actions with the support of VISITFLANDERS: from visitor centres to nature experiences. We are ready to build on what LIFE Sparc has already achieved.

Bart Mels

Project officer at Scheldt Valley National Park

Scheldt Valley National Park

Many LIFE Sparc initiatives will be followed up under the auspices of the Scheldt Valley National Park. One highlight is **STROOM**, a classical music festival in the middle of nature and close to some real heritage gems - with climate change as the common theme. The **trained guides and entrepreneurs** from LIFE Sparc will continue to play an important role in the National Park.



**More info about the
Scheldt Valley
National Park**





NATIONAAL PARK
scheldevallei



Scheldt Valley National Park
Here flows beauty!

www.nationaalparkscheldevallei.be