Meet the Scheldt

The Sigma Plan: Roadmap to an invigorated Scheldt region

Sigmaplan
Meet the Scheldt

Preface

For centuries the Scheldt and its tributaries have ensured a 'land between the rivers' bursting with dynamism. Tidal rivers, however, can also cause much misery. Better protecting Flanders (Belgium) against flooding by the Scheldt and its tributaries: this is the Sigma Plan's starting point. At the same time, the magnificent nature of the Scheldt region is also being restored. And, the Sigma Plan includes a focus on the economic role the Scheldt plays as one of Europe's busiest navigable rivers.

How did the Sigma Plan come about? How did this progressive plan evolve into an intelligent, future-oriented project that goes much further than flood management? Where in Flanders are the project areas located? The answer to all of these questions can be found in this brochure.

Colophon

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The origin of the Sigma Plan

When an infrequent north-westerly storm coincides with a strong spring tide, the water rises to unprecedented levels. A downright dangerous situation that in 1953 and 1976 resulted in disastrous floods. The Sigma Plan was the outcome.

1953: the Delta Plan in the Netherlands

The disastrous flood of 1953 is a black mark in the history of the Low Countries. In the Dutch Delta region, the hardest hit area, 1836 died. In Flanders, 18 people died.

The Dutch government devised the Delta Plan as a response to the disaster. This revolutionary project consists of raised and reinforced embankments, and flood barriers to protect the Netherlands against the rising water. The Dutch dikes can withstand water levels that occur only once in 10 000 years. In Flanders, the Polder Act is intended to ensure the future maintenance of the dikes. The creation of the Civil Defence also guarantees rapid and targeted help in the case of future flooding.

Ruisbroek under water (1976)

1976: Flanders also takes a beating

In 1976, a merciless storm tide strikes again. In addition to two fatalities, the material damage to the Scheldt basin is incalculable. In Antwerp, the water levels approach 8 metres: more than 3.5 metres above the average high water level. The polders to the north of Antwerp and the Waasland are also unable to escape the rising water. Up to 12 metre wide breaches in the Scheldt dike occur in Oorderen. Lillo and Hingene suffer the same fate. The municipality of Zandvliet is three fourths under water. In Ruisbroek on the Rupel, the dike on the river Vliet bursts. The village is completely flooded. People flee to the roofs, angry residents express their displeasure. Politicians must pay the price, and in Ruisbroek then monarch King Baudouin is told that "30 billion Belgian francs is available for aircraft that roar above our heads, but there is insufficient money to reinforce dikes."

The disastrous flood of 1976 puts everything into high gear. The Flemish government decides that better flood protection is necessary. This comes in the form of the Sigma Plan, an ambitious and large-scale project to ensure flood safety.

Progressive water management in Flanders

The Flemish vision on water management was already progressive for the time. While neighbouring countries only focused on raising the heights of embankments and flood barriers, Flanders also opted for a more natural form of water management that gave the river room to breathe. The original Sigma Plan contained three measures: 1) stronger and higher dikes, 2) flood control areas to absorb the excess water and 3) a storm surge barrier in Oosterweel. This plan represented Flanders' answer to storm tides in the future and abundant precipitation in the higher areas.

The dike works and flood control areas of the first plan are almost complete. Only the flood control area Polders of Kruibeke, which in one blow will make the Sea Scheldt basins five times safer, is yet to be completed. This project area is expected to be functional in 2014.

A storm surge barrier, however, is not in the immediate plans. Analyses showed that the benefits did not outweigh the costs. The payback period is also long, and a storm surge barrier is not perfect. If the barrier fails, the consequences would be incalculable. This in contrast to a chain of flood control areas.

© Lido Geossens

Storm on the Western Scheldt

The Sigma Plan today

Created as a water management plan, in the meantime the Sigma Plan has expanded into a much more extensive project. The goal: a multifaceted Scheldt that combines many functions.

New insights, an updated plan

Scientific insights have evolved. Thus today we know that due to climate change, the sea level will continue to rise, thereby increasing the likelihood of a storm tide. There will also be more frequent and heavier rains, increasing water drainage from areas upstream. Hence, the measures in the original Sigma Plan are no longer able to adequately ensure our safety.

Our understanding of water management has also changed. A river needs space in which to flow and to flood. And: safety goes hand in hand with developing nature. These principles are more explicitly contained in the up-to-date Sigma Plan developed by the Flemish government since 2005.

View of the Doel cooling towers from the banks of the Scheldt in the Paardenschor

Soon safety and nature will harmoniously come together in the Durme Valley.

Safety hand in hand with nature

Waterways and flooding risks were identified, the biodiversity along the Scheldt evaluated, the economic possibilities of the river and land use on the banks examined. The consequences for people, society, agriculture and environment were carefully determined for several scenarios.

Based on this analysis, the dikes along the Scheldt and its tributaries are made stronger and higher. A chain of new flood control areas aims to give the river more room to breathe.

Along with the safety aspect, Flanders is committed to restoring the river's natural quality. This development of nature is vital to achieving Europe's nature objectives for Flanders. Neighbouring countries in the meantime have also come to share this opinion. The Netherlands and Flanders engaged in discussions to map out a common vision of the Scheldt. Together they aspire to a safe, natural and navigation-friendly Scheldt in the Scheldt Estuary Development Outline 2010. The updated Sigma Plan was included as one of the measures.

A smart, future-oriented project for a multifunctional Scheldt

The new Sigma Plan aims for a sustainable Scheldt, with all the functions of the river being developed in a balanced way. Thus a robust and powerful river will emerge, one able to fulfil its functions brilliantly, not only today, but also tomorrow and well into the future.

Protection against floods is the first priority of the Sigma Plan. Restoration and development of the European protected nature of the Scheldt region is another priority. The Sigma Plan also improves the possibilities for recreation on and along the Scheldt, and focuses on the economic functions of the Scheldt region such as shipping and the countryside economy.

Finally, the Sigma Plan is developed in such a way that the disadvantages to agriculture are kept to a minimum. In short, the up-to-date Sigma Plan creates a Scheldt with many functions. The efficient and multifunctional use of space is essential in Flanders, where available open space is scarce.

Better protection against floods

Tidal rivers such as the Scheldt are not without risk. Extra-high water levels in the case of storm tide and large amounts of precipitation result in the risk of flooding. The Sigma Plan presents an intelligent concept for increasing safety.

The Sigma Plan includes various types of measures to better protect Flanders. Dikes are being constructed along the Scheldt and its tributaries. Moreover, a chain of flood control areas will absorb the excess water in the case of extremely high water levels. Depoldering is another method used in the Sigma Plan to restore breathing space to the river.

Well thought-out dikes

The entire region of the Scheldt and its tributaries was mapped out using computer models. Experts calculated the pressure of the water on the dikes. Storm tides were simulated with the help of models. Thus we were able to calculate the required thickness and height of the Scheldt dikes. Dikes along all the tidal rivers were increased to this safe height. The Sigma Plan includes a total of 645 kilometres of dike works. Dikes are adapted to the landscape as much as possible.

Dikes are necessary to protect populated areas along the tidal rivers.

The Scheldt at the flood control area Polders of Kruibeke

Flood control areas let off the steam

If a powerful tidal wave flows into the Scheldt, the river must absorb a huge amount of water in a short amount of time. Flood control areas are zones around which a ring dike has been constructed. The water flows into the flood control area over the lowered Scheldt dike, and can only flow back into the river once the water level there has decreased sufficiently. This takes place via a discharge construction.

The river is thus given extra space, but within the contours of the flood zone. Hence, we speak of a flood control area or FCA. There is also less pressure on the river dikes due to the amount of water entering the flood control area. This reduces the chance of a dike bursting.

In certain flood control areas, safety is combined with estuarine nature. In these areas, the tides are allowed to flow to a limited degree into the flood control area every day via an intake and discharge construction. This gives rise to a unique tidal nature area (mud flats and marshes). We then speak of a flood control area with reduced tide.

Depoldering gives the river more space

In the case of depoldering, the polder is literally given back to the river. A new dike is built further inland. Then breaches are created in the old dike, allowing the polder between the two dikes to again come under the influence of tides: this gives tidal nature every opportunity to develop. Depoldering also mitigates some of the water's force in the river itself. Steam is thus released from the kettle, thereby decreasing the likelihood of floods further inland.

© Vilda / Yves Adams

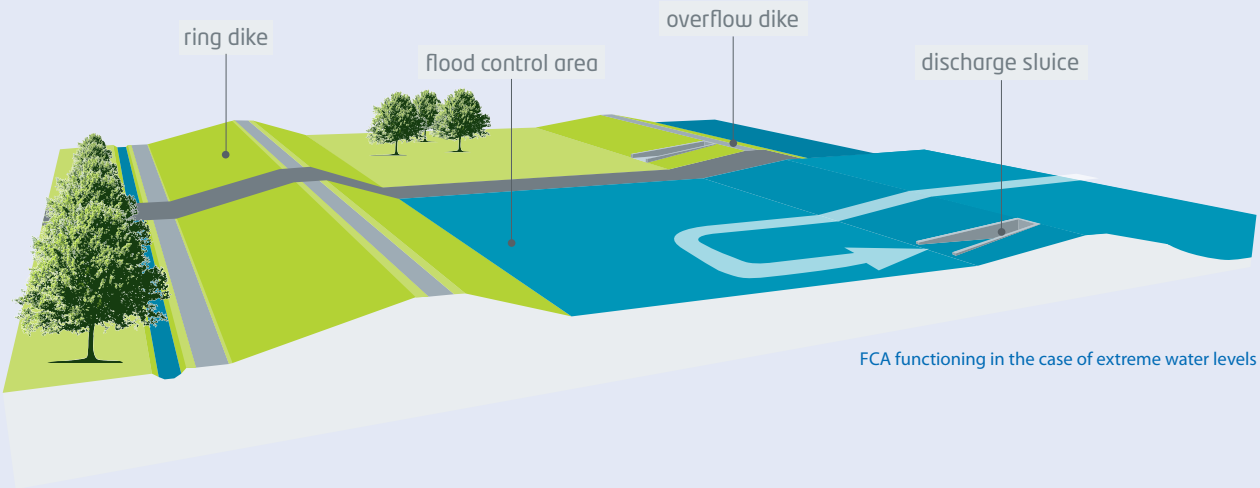
Birdsfoot trefoil at Lippenbroek

How does a flood control area work (FCA)?

A flood control area (FCA) only floods in the case of a storm tide. This combination of spring tide and an extreme north-westerly storm happens approximately once or twice a year.

In the case of high water levels, the water flows over the overflow dike into the flood control area. This causes the tidal wave to lose strength. The overflow dike is the original dike, which has been lowered and reinforced to withstand the river water flowing over it. The water flows back via special discharge constructions once the water level of the river has gone down.

To prevent residential areas, roads and other infrastructure from coming under water, the hinterland of a flood control area is always protected with a ring dike. The new ring dike is built first, and only then is the old dike lowered.



FCA functioning in the case of extreme water levels

Nature that is both beneficial and breathtaking

The Sigma Plan gives rise to high quality nature. The Sigma Plan in this way helps realise Europe's nature objectives. The tides are again given free play in many areas. But typical river landscapes, with wet nature not under the influence of the tides, are also given new opportunities.

Natura 2000

Europe has drawn up directives to ensure the survival of typical European plants and animals: the Birds Directive and the Habitats Directive. All Member States are required to allocate special protected zones that together form a network of protected areas. This network is also known as Natura 2000. Many parts of the Scheldt, its tributaries and the valley are designated as areas of the Habitats or Birds Directive.

Over the years, much valuable nature has been lost along the Scheldt and its tributaries. In the meantime, European nature objectives have been formulated for much of the Scheldt region, for species as well as for habitats. The project areas of the Sigma Plan include measures that give these special habitats and species every opportunity to develop.

Which nature is being restored?

Tidal nature

When Scheldt water flows into and out of an area twice per day, a tidal nature area develops with mud flats and marshes. There is the rhythm of ebb and flow, the unique transition from fresh to salt water, and the interplay between water, sand and silt. In this world of differences, the river moulds a network of mud flats and shoals, marshes, channels and brooks. Each of these biotopes has its typical residents. Downstream from Antwerp and in the Netherlands there is predominantly saltwater, upstream along the Sea Scheldt there is a 60 kilometre long freshwater tidal area, unique in Europe.

Freshwater marshes on the Scheldt bank of the Vlassenbroek Polder

Mud flats are the lower-lying parts of the bank that are flooded with each flow. Few plants are resistant to this abundance of water. The flats, however, teem with small creatures such as worms, crabs and crayfish, which are eagerly consumed by various waterbirds and fish. For geese, ducks and waders, the mud flats and shoals are an ideal location to rest and forage for food.

With each tide, the retreating water leaves behind a layer of silt in the mud flats that starts to accumulate at certain places. When these silted areas protrude above the average waterline, we can speak of **marshes**. Low marshes flood only a few times during the month, high marshes only flood at spring tide, approximately twice a month. Plants grow here that can thrive in flooding: sea lavender and glasswort can handle salt water well. In the fresh water part of the Scheldt, in turn, grow reeds and extremely rare tidal willow forests.

Wetlands

Valuable nature can also be present in areas not under the influence of the tides. We call these wetlands. They are extremely varied: from open water to reed beds, which in turn changes to marsh forest. Alder marsh forests form a rare type of nature in the polders. The roots of these trees are under water almost year round. They form an excellent hiding and nesting place for various birds.

In areas where grazing or mowing occurs, flowery hay and grasslands develop. Especially meadow birds are perfectly at home in vast meadows. The ditches, brooks and pools are inhabited by fish, amphibians and dragonflies. The water level of wetlands is low in the summer and high in the winter.

Nature's services

Mud flats and marshes are extremely beneficial. They form a natural buffer that protects us against floods. They collect sand and sludge, reducing the need for dredging. They purify the water, and bring the natural food chain back into balance.

The Scheldt also provides opportunities for recreation and relaxation: hiking, bicycling and endless enjoyment. This is also good for the hotel and catering industry and the tourism sector. These natural services are necessary to the functioning of our society. This also gives them an economic value.

Ragged robin grows abundantly in Scherenmeersen (Cluster Kalkense Meersen).

The former Lippenbroek Polder was put into service in 2006 as pilot project for a flood control area with reduced tides.

How does a flood control area with controlled reduced tides (FCA-CRT) work?

An FCA-CRT is an adaptation of a flood control area that focuses on developing nature. This system supplements the safety function of a flood control area with the restoration of rare tidal nature. With the rhythm of ebb and flow, water flows into a flood control area with reduced tide twice per day. In recent years, we have tested the recovery and functioning of tidal nature in the pilot project Lippenbroek.

At flow, the area comes into action. A limited amount of water flows in via an intake sluice. The tide is thus 'reduced'. This imitates the natural action of a tidal river. The area becomes, as it were, part of the Scheldt ecosystem. At ebb, the water flows back into the river via the discharge sluice.

Enjoying the water

What could be more delightful than hiking or bicycling along the river? Extended hiking and bicycling networks, log roads, bird watching huts and look-out points ... The Sigma Plan brings you close to all of these benefits nature has to offer.

The nature of the Scheldt region also provides opportunities for recreation and relaxation.

Healthy recreation

The landscape of the Scheldt and its tributaries is a pleasure to behold. The river valleys, from Ghent to beyond Antwerp, are a delightful place to hike, bicycle, fish, boat or simply relax. The Scheldt and its countless towpaths provide healthy relaxation for thousands in Flanders.

New bicycle and hiking paths are being constructed in and around the Sigma areas. Bird watching huts, viewpoints, log roads and forest playgrounds, moorings for boating, and fishing ponds are on the menu.

Want to contribute?

As many people as possible should be able to enjoy the natural splendour along the water. Without, however, endangering safety and the developing nature. What makes an area attractive to hikers, bicyclists, fishermen, playing children? We are studying this question together with the Flemish Tourist Board, provincial tourist services, the Agency for the Advancement of Physical Development and experts from associations and interest groups.

In the project Polders of Kruibeke, a visitor management plan was developed to solicit input. The associations, the hotel and catering industry, hunters, fishermen, local residents … were given numerous opportunities to share ideas concerning 'their' polder of tomorrow. In the project Sustainable Tourism in Estuary Parks (STEP), a European project to promote sustainable tourism in estuary parks, Parkschap Nationaal Park De Biesbosch (the Netherlands) and Broads Authority (United Kingdom) joined forces. This partnership facilitated the preparations for access to the 'new' polders.

In any case, on the dike along the ferry to Hoboken an initial prototype is on display of the new house style from the hand of top designer Stefan Schöning. Still in the context of STEP, the Agency for Nature and Forests (ANB) and waterway manager Waterwegen en Zeekanaal (W&Z) are working together with the municipality of Kruibeke to construct two fishponds, a reed bed and footpaths in the Kortbroek Polder. This marks the launch of a project to make the polders a multifunctional nature reserve. The Scheldelei is being redeveloped at the same time as one of the four planned gateways to the area.

The Scheldt, life vein for the economy

The Sigma Plan includes a focus on the economic role the Scheldt plays as one of Europe's busiest navigable rivers. Moreover, new forms of activity are also developing along the Scheldt.

Shipping and ports

The Scheldt, as one of the busiest navigable rivers in Europe, plays a prominent economic role. The river is a major shipping route, responsible for transporting tonnes of goods each year to and from the ports of Antwerp, Vlissingen, Terneuzen, Ghent and even Brussels. The Scheldt connects Flanders and the Netherlands with France via the Leie and the Upper Scheldt. Via Antwerp, ships can enter the Albert Canal to the east, in the direction of the Meuse basin and further. Countless companies are located in the ports and along the banks of the Scheldt. They employ tens of thousands of people and are crucial to the economy of all of Flanders. The Sea Scheldt in fact belongs to the TEN-T, the Trans-European Transport Network that constitutes the economic artery of Europe. Hence, it is only logical that access to the Scheldt is given attention in the Sigma Plan.

Scheldt Estuary Development Outline 2010

The Sigma Plan is part of the Scheldt Estuary Development Outline 2010. This combined package of measures and projects in Flanders and the Netherlands aims at a safer, more accessible and more natural Scheldt. The main objective of the Scheldt Estuary Development Outline 2010 is sustainable and balanced development, with an eye for all functions.

Reviving the local economy

An entire economy is developing around the experience of the Scheldt. Pavement cafés and restaurants along the towpaths, bicycle rental companies, cruises and boat trips ... The hotel and catering industry and service companies throughout the Scheldt Valley profit from the richness of the Flemish tidal rivers.

Local groups, associations and town councils assist in the search for the ideal recreational services. Farmers too can contribute to tourist projects in order to expand the services provided by their farm: a farm shop with traditional regional products, guided farm tours, a bed & breakfast ...

© Vilda - Yves Adams

The Port of Antwerp underscores the importance of the Scheldt to our economy.

Eye for agriculture

In the implementation of the Sigma Plan, we are taking maximum account of the consequences for local farmers. Agriculture remains possible in certain Sigma areas. In other areas, farmers were involved in managing the transformation. In consultation with local farmers and the agricultural organisations, we search for liveable solutions in each area.

Agriculturally sensitive areas spared

Together with the Flemish Land Agency (VLM), we analyse the effects of the Sigma Plan on a farm. We also listen to the expectations of farmers. This information is compiled into an agriculture impact report for each project area. On its basis, a programme with support measures to compensate farmers is developed.

Intensive agricultural land is preserved where possible. Access to fields is also retained as much as possible. We also avoid fragmenting existing fields.

Support measures help mitigate the effects of the Sigma Plan on farmers.

Farmers contribute to realising the objectives for nature.

Support measures

Support measures are available to mitigate the effects on the affected farmers. The central focus in all of these measures is the farm's viability.

These support measures are very diverse. The Sigma-related work, for example, can be spread out in time. This gives farmers more time to convert their farms. Or we offer the farmer assistance in finding exchange land or moving a farm via the land bank. Compensation for drops in yield is also possible.

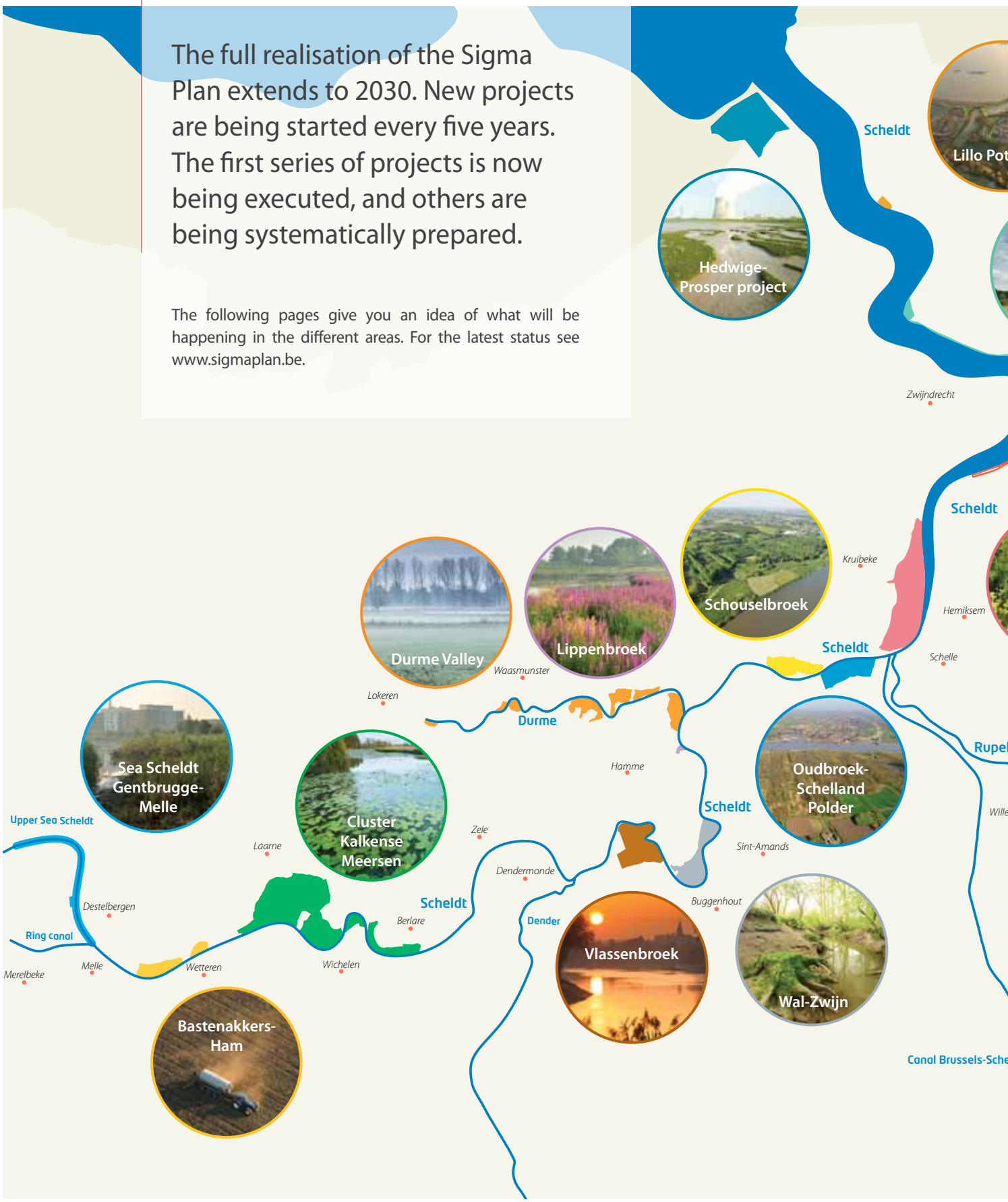
Farmers managing nature

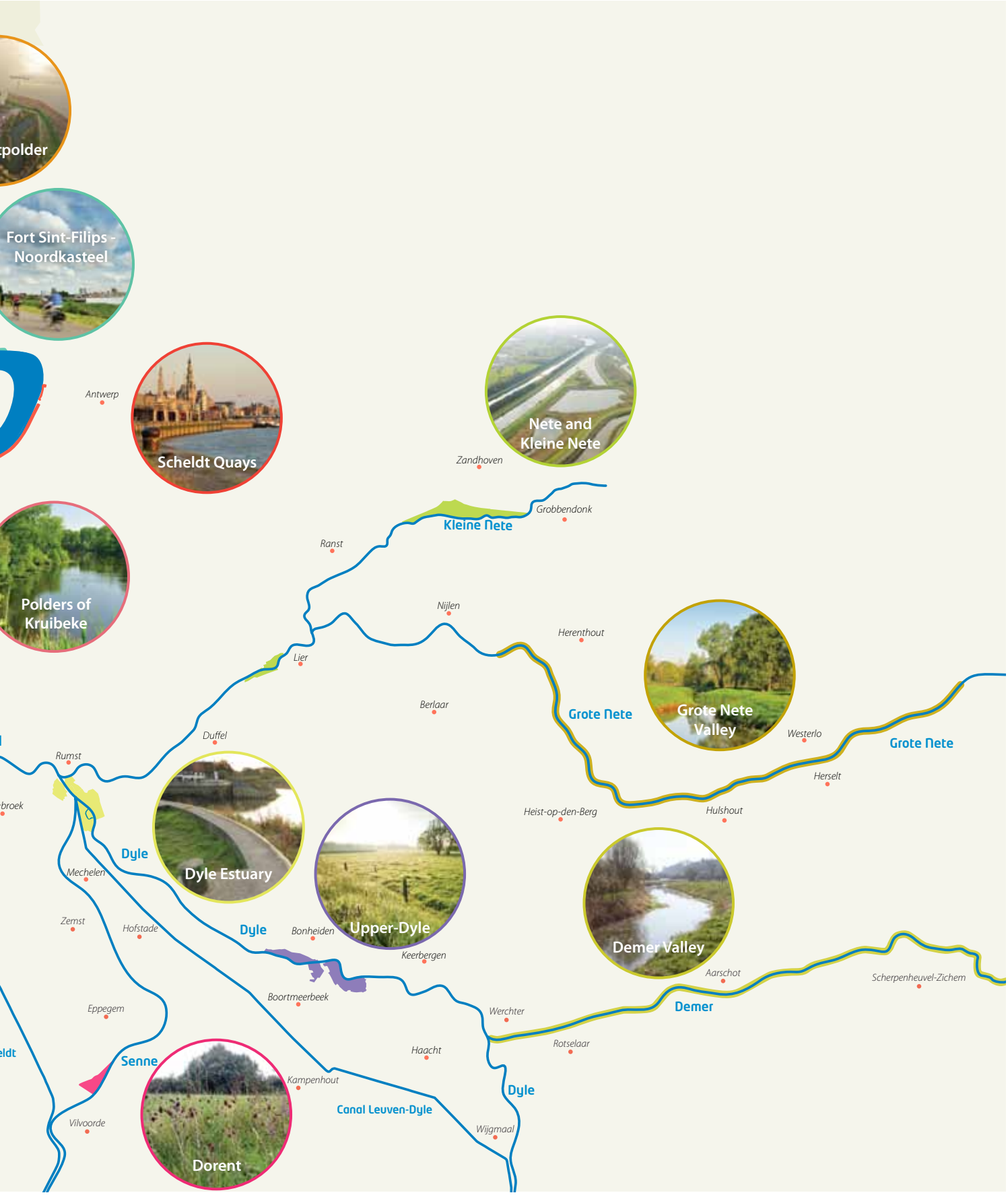
As a transitional measure, farmers can also assist in realising the objectives for nature. This is made possible via land conversion contracts. In exchange for compensation, the farmer manages the land according to strict agreements. This principle is being applied, for example, in the wetlands of the Kalkense Meersen. Such a five-year land conversion contract gives the farmer the time to reorganise his farm, or to find alternatives for the lost ground. The areas in question are rewetted only after this five-year period.

The Sigma projects: a bird's eye view

The full realisation of the Sigma Plan extends to 2030. New projects are being started every five years. The first series of projects is now being executed, and others are being systematically prepared.

The following pages give you an idea of what will be happening in the different areas. For the latest status see www.sigmaplan.be.

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Fort Sint-Filips - Noordkasteel
Antwerp
Scheldt Quays
Nete and Kleine Nete
Zandhoven
Grobbendonk
Kleine Nete
Ranst
Polders of Kruibeke
Nijlen
Herenthout
Lier
Berlaar
Grote Nete
Grote Nete Valley
Westerlo
Grote Nete
Duffel
Rumst
Herselt
broek
Heist-op-den-Berg
Hulshout
Dyle
Dyle Estuary
Mechelen
Upper-Dyle
Demer Valley
Zemst
Hofstade
Dyle
Bonheiden
Keerbergen
Aarschot
Scherpenheuvel-Zichem
Boortmeerbeek
Eppegem
Werchter
Demer
Rotselaar
Haacht
Senne
Kampenhout
Dyle
Canal Leuven-Dyle
Vilvoorde
Wijgmaal
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Lippenbroek

The Lippenbroek project is a pilot project to test the innovative concept developed by Flanders to combine safety and the restoration of nature. In March 2006, this former polder was put into service as a flood control area with reduced tides (FCA-CRT). The universities of Antwerp, Ghent, Brussels and Utrecht are monitoring the functioning of the sluices and the development of the tidal nature. The area is a world premiere, which is attracting many visitors from Belgium and abroad. The results until now are very positive.

A sluice construction puts the area in contact with the Scheldt. At high tide, Scheldt water flows into the area, at low tide, it flows back out. The flood control area and the sluice construction protect the surrounding land against excess water. The FCA-CRT stimulates the self-purifying action of the Scheldt system and contributes to restoring the food chain and the ecosystem.

Lippenbroek is located along an extended bicycle and hiking network. While it is not possible to bicycle in Lippenbroek itself, the dike around it lends itself perfectly to cycling. As part of the Sigma Plan's educational project, a learning path was installed on the dike.

Where?

Along the Scheldt, in Hamme

Purple loosestrife colour the Lippenbroek purple.

Flanders' largest flood control area will be located in Kruibeke.

Polders of Kruibeke

At Kruibeke, the Rupel flows into the Scheldt. At this strategically chosen location, we are working further on the largest flood control area Polders of Kruibeke. The project encompasses 600 hectares. The effect on the safety of the Sea Scheldt basin is equally large. Once operational, the chance of flooding by the Scheldt and its tributaries will be five times smaller. At the same time, a unique nature reserve will develop that walkers and bicyclists can enjoy to their heart's content.

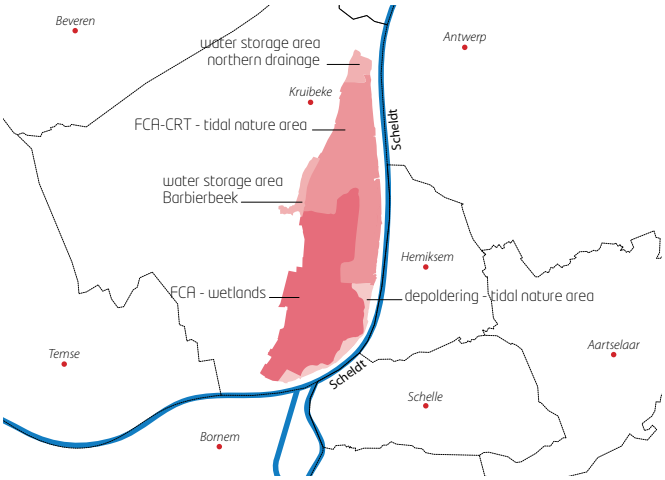
Excess Scheldt water flows into this area only once or twice per year, when storms coincide with spring tide. On all the other days, the area is left to develop on its own, making it an ideal habitat for countless plants and animals, thanks to the varied nature. A part of the flood control area will soon be home to tidal nature, another part will become wetlands. The project thus stimulates the development of the authentic Scheldt nature: no less than 300 hectares of mud flats and marshes, 150 hectares of meadow bird area and 92 hectares of alder marsh forests will be added.

Here, nature, people and animals will soon find a safe haven. To this end, partnerships are created within Belgium and abroad. For the management of the grasslands, we have been working together with local farmers for years. Together with the park managers from The Broads (UK) and the Biesbosch (NL), sustainable visitor management has been set up. The international STEP project (Sustainable Tourism in Estuary Parks) will result in a safe natural park for all. In any case, the new house style by top designer Stefan Schöning offers visitors a warm reception. A multifunctional nature reserve is being developed in the Kortbroek Polder. Two fishponds, a reed bed, footpaths and a redeveloped Scheldelei serve as gateway to the area. In 2014, the area will be accessible.

Where?

Along the Scheldt, in Kruibeke, Bazel and Rupelmonde

More info: www.gogkbr.be, and at the information point, Scheldelei 1, 9150 Kruibeke, tel. +32 (0)3 899 05 62, info@gogkbr.be

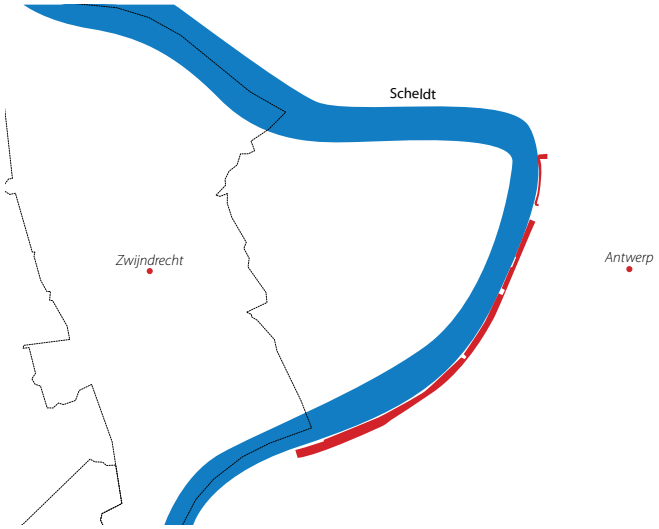


Scheldekaaien
Sigmaplan

Antwerp Scheldt Quays

Antwerp receives comprehensive redevelopment of its Scheldt Quays. The goal: to decrease the growing risk of flooding by increasing the height of the dike and stabilising the historical quay wall. The public space will also be beautified. The city in this way wishes to underscore its links with the Scheldt, and give the river back to the citizens of Antwerp. Flemish waterway manager Waterwegen en Zeekanaal (W&Z) is implementing the safety measures; the city of Antwerp is handling renovation of the public space.

More info on the Scheldt Quay project: www.onzekaaien.be and www.sigmaplan.be/scheldekaaien



A safe and elegant renovation of the quays aims to lure Antwerp residents to the water.

In the Prosper Polder, work is in progress on the ring dike around the intertidal area.

Hedwige-Prosper project

In the Hedwige-Prosper project, the Scheldt is given free reign. The two polders on both sides of the border between Belgium and the Netherlands are being depoldered and returned to nature. Right next to the 'Verdronken Land van Saeftinghe' (the Drowned Land of Saeftinghe), new submerged land will develop with splendid brackish water marshes. A fantastic pattern of mud flats, marshes and shoals will gradually develop. The depoldering is also good for safety. The depoldered area will allow the steam to escape during a storm tide. The tidal wave thus becomes less powerful and will cause less damage upstream.

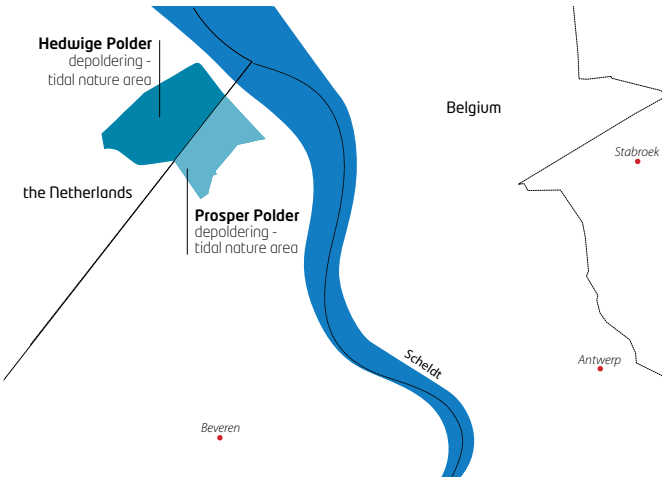
Where?

West of Doel in East Flanders to Emmadorp in Zealand (NL), and to the south of the 'Verdronken Land van Saeftinghe' on the Dutch border

Which functions?

Tidal nature area with mud flats and marshes created via depoldering

More info: at the information point, Zoetenberm 6a, 9130 Doel, tel. +32 (0)3 575 91 73, info@hedwigeprosper.be



Cluster Kalkense Meersen

In the Kalkense Meersen, a historic grassland area not far from Ghent, the Scheldt is given more room to flood. A limited part is being set up as a flood control area, perhaps with reduced tides (FCA-CRT). By giving the water more room, the extensive region around Wetteren, from Ghent to Dendermonde, will be better protected if a storm tide raises the water level. Depoldering is foreseen for one sub-project, a part of Wijmeers. Dikes are also being adapted or built as necessary.

Completing the picture is the fact that an enchanting nature reserve of almost 650 hectares of wetlands will also be developed, including lean grasslands and meadow bird areas, or tidal nature such as tidal forests. The magnificent grassland landscape, with numerous rare forms of nature, will soon be an even more splendid paradise for hikers and bicyclists.

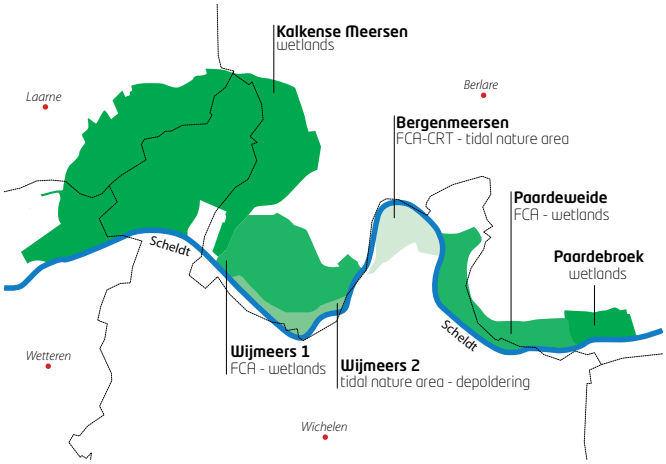
Where?

Along the Scheldt, in Berlare, Laarne, Wetteren and Wichelen

More info: at the information point, Grote Kouterstraat, 9290 Uitbergen (Berlare), tel. +32 (0)9 360 28 03

Which functions?

The Kalkense Meersen and Paardebroek sub-projects are being developed as pure wetlands. In addition to their safety function as flood control area (FCA), Wijmeers 1 and Paardeweide will also be developed as wetlands. In the meantime, Bergenmeersen has been developed into a flood control area with controlled reduced tides (FCA-CRT), which will soon allow tidal nature to develop. Wijmeers 2 will be depoldered. By giving this area back to the water, authentic tidal nature is given new opportunities here.



Hiking routes crisscross the Kalkense Meersen.

Tidal nature can revive itself at the mouth of the Dyle (Zennegat) in Mechelen.

Dyle Estuary

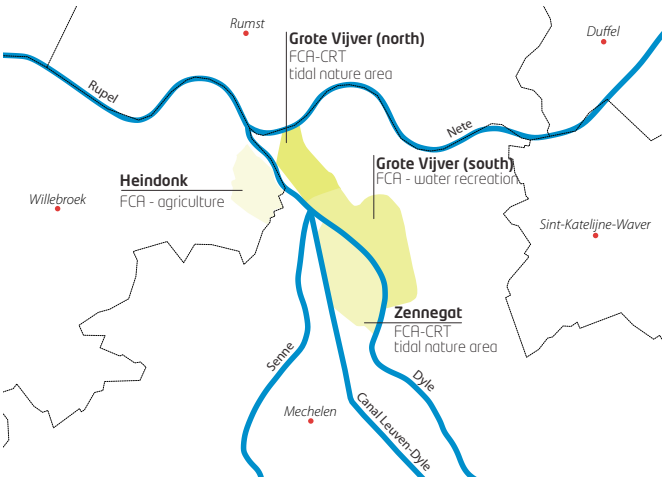
In the Dyle Estuary project, we will be installing three flood control areas (FCAs) in the coming years to better protect the land along the river against floods. Some areas will also include reduced tides. These will simulate the natural functioning of a tidal river. In the case of extreme high water levels on the Dyle and the Senne, these areas can also be used as flood control areas. The area offers excellent opportunities for healthy restoration of the extremely rare freshwater tidal nature typical for the Dyle. Agriculture, recreation and heritage also have their place here.

Where?

Along the border between Willebroek and Mechelen, at the Dyle estuary at the Zennegat. Here the Dyle, the Senne and the Nete come together to form the Rupel.

Which functions?

Heindonk and the southern part of Grote Vijver will become flood control areas with a safety function (FCAs). Furthermore, Heindonk also keeps its agricultural function, and in the south of Grote Vijver remains a place for water recreation. At the mouth of the Dyle (Zennegat) and in the northern part of Grote Vijver, protection against floods and the development of unique tidal nature go hand in hand (FCA-CRTs).



Durme Valley

The Durme was once a long river that rose in West Flanders and flowed into the Scheldt at Hamme. During the course of the centuries, humans have intervened strongly in the course of the Durme. The typical fauna and flora have also suffered. Presently, tides remain only in the downstream part of the river. The Sigma Plan aims to make these Durme tidal areas safer, and at the same time to increase their natural value.

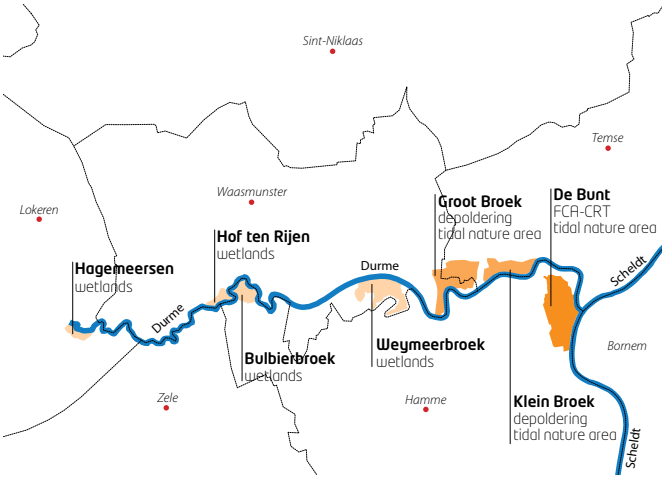
Here, we are creating additional water storage areas, mitigating the tides upstream, and improving drainage of the inland areas. Flood control areas with reduced tides (FCA-CRTs) and depoldering will allow tidal nature to develop. On the other hand, via rewetting, grasslands rich in animals and plants will again develop. The Koolputten site is also being redeveloped. This location will be given a tourist-recreational use as gateway to the Durme Valley. The details of what the site will look like have not yet been firmed up.

Where?

Along the Durme, in Hamme, Temse, Waasmunster, Zele, Lokeren

Which functions?

A mosaic of flood control areas, wetlands and depoldering will be added along the Durme.



The extraordinary nature along the Durme will soon be given more opportunities to develop.

De Kramp close to Vlassenbroek is home to typical tidal nature.

Vlassenbroek and Wal-Zwijn

Soon, the Vlassenbroek Polder in Dendermonde will give the Scheldt all the space it needs. It will become a flood control area: the northern part with controlled reduced tides (FCA-CRT) and the southern part as wetland. By creating wetlands and a tidal nature area (with rare freshwater mud flats and marshes), a wide range of typical river landscapes will develop. This can be enjoyed by visitors in a variety of ways including soft recreation such as hiking, bicycling, fishing, nature observation, the hospitality sector ...

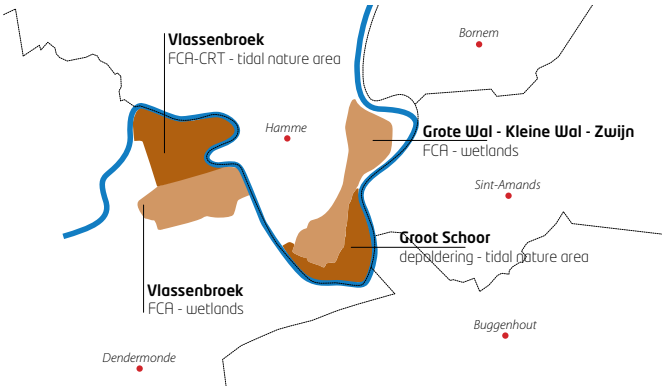
The project area Wal-Zwijn will become a flood control area (FCA), with wetlands and a tidal nature area in Groot Schoor. Over time, swamp forests and vegetation will develop such as reed, sedge or reed grass, and pools. The Wal-Zwijn flood control area is connected to that of Vlassenbroek. In order to absorb the most extreme water levels, first the sub-project Wal-Zwijn will flood, then Vlassenbroek. The ferry across the Scheldt in Baasrode ensures a quick connection between Vlassenbroek and Wal-Zwijn for hikers and bicyclists.

Where?

Along the Scheldt, in Dendermonde and Hamme

Which functions?

Vlassenbroek will become a flood control area, partly with reduced tides (FCA-CRT), partly with wetlands. Wal and Zwijn will also be developed as wetlands. The depoldering of Groot Schoor will stimulate the development of tidal nature.



Grote Nete Valley

In the Grote Nete Valley, between Nijlen and Geel, the winding river is again given more space, via a combination of the construction of a *winter bed and controlled water storage areas (i.e. FCAs without a ring dike). This results in a double benefit: the likelihood of undesirable flooding is reduced, and valuable nature is again allowed to develop in the form of wetlands.

The most suitable locations are being sought in an approximately 1300 hectare area to realise these objectives. This is being done thoroughly and intelligently, with scientific studies, models and an agriculture impact report. There are also opportunities for recreation in nature, via bicycle and hiking routes along meadows, fields and forests, strewn with castles and farm shops.

Where?

Along the Grote Nete, in Hulshout, Herenthout, Heist-op-den-Berg, Westerlo, Herselt, Laakdal, Geel, Nijlen

*Water flow is greater in the winter than in the summer, causing the river to take up more space and overflow its summer bed.

© Vlida - Yves Adams

The green banks of the Grote Nete in Zammel

Today the Anderstadt nature reserve is already functioning as a flood control area.

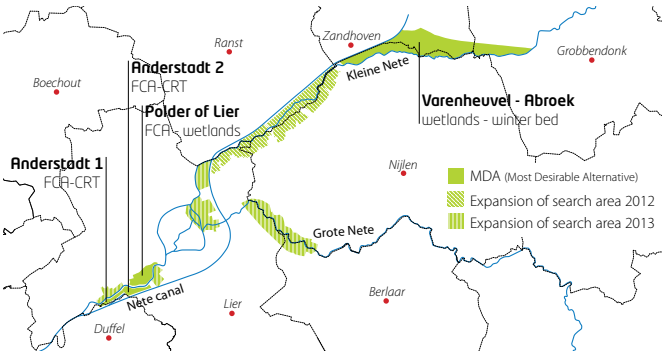
Nete and Kleine Nete

In the project area Nete and Kleine Nete, in the past dikes were raised and flood control areas (FCAs) constructed in order to increase safety. The goal now is to further increase the area's safety function. This can be done, on the one hand, by further optimising the existing flood control areas in function of new insights, and by locally lowering or interrupting dikes, so that the water is able to flow into the flood control area.

We also wish to upgrade the area's nature. By creating an FCA-CRT, tidal nature will develop in the flood control areas. Wetland, consisting of bogs and wet grasslands, will also develop in some zones. Intensive agriculture cannot always be combined with a flood control area or wet nature. Where possible, shared agricultural use can be organised.

Where?

Along the Nete and Kleine Nete, in Lier, Duffel, Nijlen, Zandhoven, Grobbendonk



Upper-Dyle

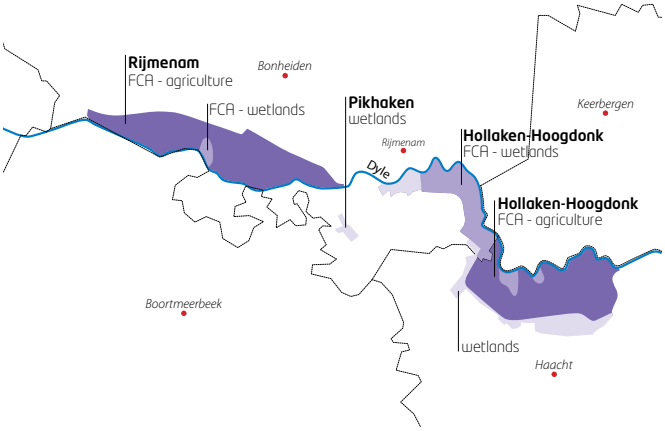
Between Werchter and Mechelen, the Dyle Valley will receive various flood control areas (FCAs). This will allow us to improve not only the safety in the immediate surroundings, but the cities and towns further inland will also be better protected. The new flood control areas will store the water of the Dyle during periods of extreme high water. Most of the farmers can remain active. The conditions are also ideal for the restoration of 70 hectares of wetlands. The possibilities for bicycling and hiking will be expanded.

Where?

Along the Dyle, in Bonheiden and Haacht

Which functions?

The Sigma Plan comprises four project areas with differing functions. Rijmenam will become a flood control area with retention of agriculture. Pikhaken will not be a flood control area, but will function only as wetlands. In Hollaken-Hoogdonk, the flood control area will obtain a nature function as wetlands and continue to allow for agriculture.



Hollaken-Hoogdonk in Rijmenam will become a flood control area with wetlands.

Bastenakkers will be developed as flood control area, with room for agriculture.

Portus Ganda and the charming inland waters of Ghent will soon be accessible to pleasure boaters.

Bastenakkers-Ham and Sea Scheldt Gentbrugge-Melle

A comprehensive land use plan is being developed for the Scheldt Valley between Gentbrugge and Wetteren. This plan ensures a safe and navigable Scheldt in the region, and includes attention for developing nature, agriculture, patrimony and recreation. The plan is needed to better protect the municipalities in the region against floods. Restoring the river also offers a solution to the silting of the river and the midge problem.

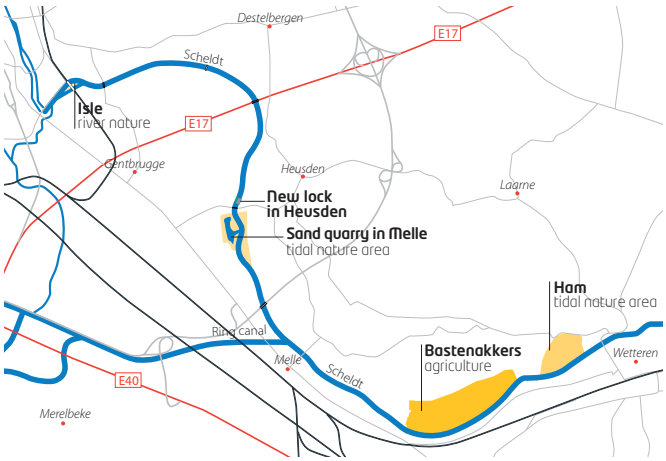
In Heusden, a new lock is being built, and the maintenance dredging work has been resumed. This will make the silted stretch of the Scheldt again accessible and navigable for passenger and recreational boating. The area of Bastenakkers, on the territory of Wetteren, is being developed as a flood control area (FCA), but there is also space for agriculture.

Both projects are connected to each other. The new lock will change the tidal nature of the Sea Scheldt between Gentbrugge and Melle into river nature that is not under the influence of the tides. The lost tidal nature area will be compensated for in Ham and in the former sand quarry in Melle.

Where?

The project Sea Scheldt Gentbrugge-Melle is located along the Scheldt in Ghent, Destelbergen and Melle.

The project Bastenakkers-Ham is located along the Scheldt, on the border between Wetteren and Destelbergen-Heusden.



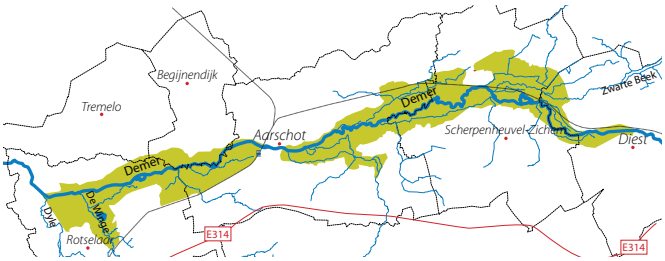
Demer Valley

The Demer Valley between Diest and Werchter will be fully redeveloped. The goal: to better protect the valley against floods and at the same time tackle the desertification problem. This is needed to give the valuable Demer nature the opportunity to recover. Barriers in the river will increase the groundwater level, and the winter bed is being restored at some locations. The natural meanders in the river will be restored. Thus, the natural flexibility and buffer capacity of the river will be restored. Such a resilient river is able to handle greater amounts of water and offers opportunities for nature to recover.

There are numerous possibilities for recreation, patrimony and regional development in the region. In short, the Demer Valley is bursting with challenges and opportunities. In recent years, numerous initiatives have been taken related to restoring the river, nature and recreation. The Demer Valley project is further developing these initiatives. Under the umbrella of the Sigma Plan, work is being done on a unified vision for the Demer Valley. The accent lies on water safety and nature development, but the project also includes a focus on soft recreation and regional development.

Where?

Along the Demer in Scherpenheuvel-Zichem, Aarschot, Begijnendijk, Rotselaar and Diest



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A bridge looks out over the winding Demer Valley.

Lillo Potpolder

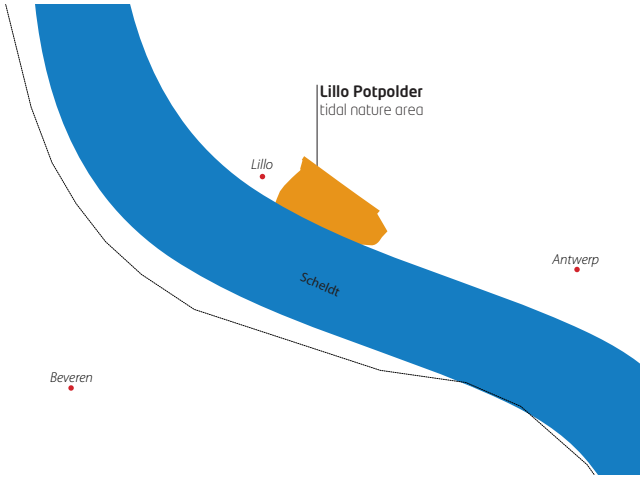
Work in the Lillo Potpolder was completed in the spring of 2013. This is the first project of the updated Sigma Plan to be completed. The depoldering of a ten-hectare area marks an initial step in protecting the Antwerp port district against floods. A several-kilometres-long ring dike was constructed around the Potpolder. The height of this ring dike meets the Sigma norms: it is strong and high enough to protect the hinterland against water from the Scheldt, even in extreme weather conditions.

The Lillo Potpolder is the first project of the updated Sigma Plan to be completed.

The existing dike along the Scheldt was breached, allowing water to flow into the polder. This depoldering project will soon give the Antwerp port district a piece of valuable tidal nature, with rare mud flats and marshes. This project enhances the function of the port area as international foraging and resting place for thousands of migratory birds. Outside the breeding season, the dike will be available as a lookout point. The service road over the ring dike allows hikers and bicyclists to admire the scenery from close up.

Where?

Southeast of Lillo, upstream from Fort Lillo, along the Scheldt



The Schouselbroek Polder area will soon come under the influence of the tide.

Schouselbroek

The Scheldt will also receive a flood control area with controlled reduced tide (FCA-CRT) on the territory of Temse. This area will not only improve safety in the immediate surroundings, but the cities and towns further inland will also be better protected. The new flood control area will absorb Scheldt water in cases of extreme high water. Thanks to the interplay of ebb and flow, the present nature reserve will develop into a valuable mud flat and marsh area.

Where?

Along the Scheldt, in Temse

Two flood control areas in the Oudbroek-Schelland Polder will soon protect the region against floods.

Oudbroek-Schelland Polder

A flood control area (FCA) in Bornem will absorb the excess Scheldt water in cases of extreme high water. The existing poplar plantations will become alder marsh forests: wet woodlands not under the influence of the tide. Where possible, we will be further expanding the bicycle and hiking network.

Where?

Along the Scheldt, in Bornem

The Senne Valley in Dorent will be transformed into wetland.

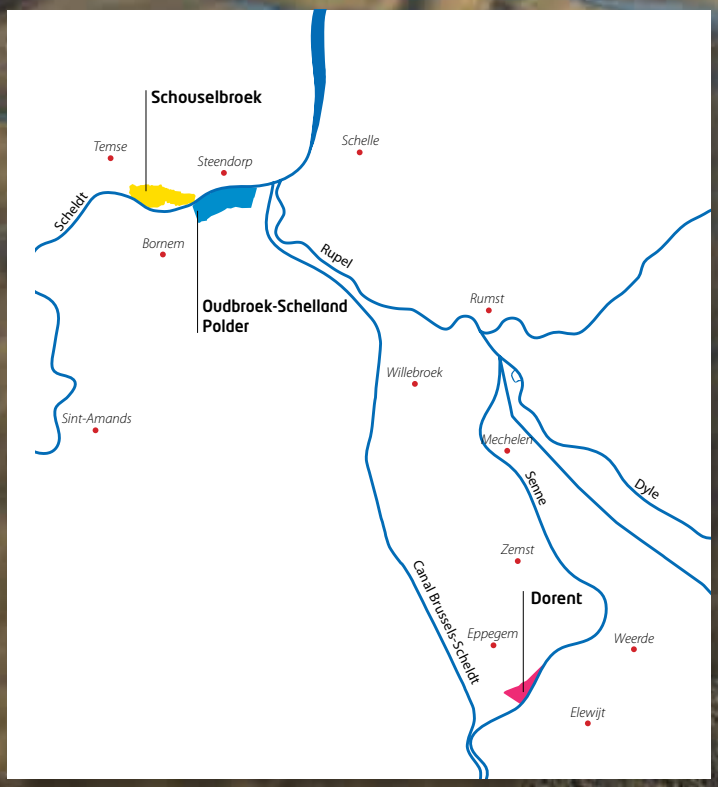
Dorent

The additional nature reserve was created in the Senne Valley on the territory of Vilvoorde and Zemst. The existing small-scale landscape will become wetland.

Where?

Along the Senne, in Vilvoorde and Zemst

Thanks to the interplay of ebb and flow, valuable freshwater marshes will develop along the Scheldt.



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