

**Projectdirectie ontwikkelingsschets Schelde-estuarium**

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# Ontwikkelingsschets 2010 Schelde-estuarium

## Summary

**Flanders and the Netherlands  
commit to developing a Safe,  
Accessible and Natural Scheldt  
Estuary**



The estuary of the Scheldt River is located partly in the Flanders region of Belgium and partly in the Netherlands. In 2005, the respective governments decided to jointly address several important issues. They recently approved the 'Scheldt Estuary Development Outline 2010', which contains dozens of resolutions regarding how the two governments intend to improve the safety, accessibility and natural environment of the estuary. This brochure describes the principle features of these resolutions.

Flanders and the Netherlands have three long-term objectives for the Scheldt estuary:

- safety: maximum protection against flooding in the region
- accessibility: optimum accessibility to the harbours on the Scheldt estuary
- natural environment: a dynamic, healthy natural environment



Map of NW Europe with the Scheldt estuary outlined.

A coordinated approach is necessary to achieve an ideal situation in this region, which extends from Ghent to the mouth of the estuary on the North Sea. Since ancient times, the Scheldt estuary has been a vital artery for Flanders and Zeeland. The entire region developed around the estuary. The tides, the economy, and the natural environment pay scant regard to the national border. The only way to properly consider all the various interests in this region is to regard it as a whole.

The basic principle for both governments is that the Scheldt estuary must remain a dynamic estuary. Here 'dynamic' means a constantly changing pattern of channels and intertidal flats, regular variation in salinity, and the formation of new salt marshes and mud flats while old ones disappear. Safety, navigability, and the natural environment all benefit from maintaining the dynamic vitality of this system.

The Development Outline does not deal with all of the problems in the Scheldt estuary. For instance, it does not address the issue of improving water quality. This issue is already being dealt with jointly by Flanders and the Netherlands, along with the other Belgian regions and France, in the International Commission for the Protection of the Scheldt ([www.isc-cie.com](http://www.isc-cie.com)).

**The Scheldt estuary:**

*the part of the Scheldt River that is subject to tidal action, consisting of the Zeeschelde, the Westerschelde and the mouth region.*

**Zeeschelde:**

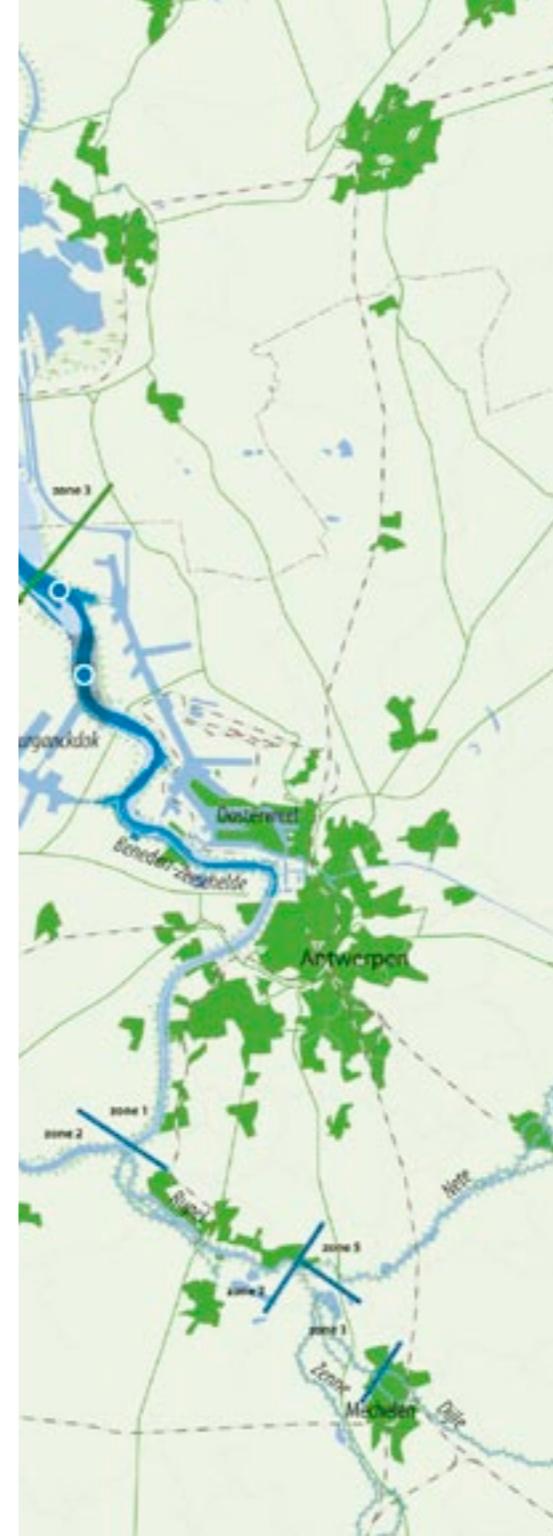
*the part of the Scheldt River between Ghent and the Belgium-Netherlands border*

**Westerschelde:**

*the part of the Scheldt River between the Belgium-Netherlands border and Vlissingen*

**Mouth region:**

*the part of the Scheldt River seawards of Vlissingen*



**Indicative General Map**

- Salt marsh
- Mud flats and sandbanks
- Intertidal areas, other water
- Principal waterways
- Deep water
- Shallow water
- Other water
- Core built-up areas
- Railway
- Roads & motorways
- Existing dykes
- National border
- Shallow (bar) in shipping channel
- Widened shipping channel
- New environmental areas
- Zone boundary of the updated Sigma Plan; target region for controlled flooding areas with the greatest possible environmental configuration
- Zone boundary of the Westerschelde ecological areas; target region for estuarine environments



## Safety

### Problems

*Zeeschelde: flood protection is presently inadequate. Safety has been improved by establishing the Kruikeke-Bazel-Rupelmonde controlled flooding area, but is still inadequate, and during the coming century it will decline in effectiveness due to climatic change and rising sea levels.*

*Westerschelde: flood protection is presently adequate, but long-term safety is inadequate due to climatic change and rising sea levels.*

### Flood disasters

*In 1953, there was a disastrous combination of a spring tide and a severe storm on the North Sea. The dykes broke at dozens of locations in the southwestern portion of the Netherlands, and more than 1800 people drowned. This disaster formed the stimulus for a large-scale flood protection project called the Delta Plan. Since then, most estuaries in the Netherlands have been isolated from the sea by barrages and flood barriers. One example is the flood barrier on the Oosterschelde. The only estuaries that have not been blocked off are the Nieuwe Waterweg and the Westerschelde, in order to avoid obstructing shipping traffic to the harbours of Rotterdam and Antwerp. The solution that was chosen for these areas was to raise the height of the dykes.*

*The region was again struck by a storm tide in 1976. This time the Netherlands remained unscathed, but major floods occurred along the Scheldt in Flanders. Shortly after this, Flanders instigated the Sigma Plan, whose most significant elements consisted of reinforcing all the dykes along the Scheldt and establishing controlled flooding areas. This plan also originally included construction of a flood barrier, but this was later dropped.*

## Resolutions

### • Increasing dyke heights and establishing flooding areas along the Zeeschelde

The regional and national authorities have decided to increase safety along the Zeeschelde by establishing controlled flooding areas no later than 2030. Where space for flooding areas is lacking, such as in urban areas and industrial areas, the heights



Map of the areas flooded in 1953 and flooding in Ruisbroek

of the dykes will be increased. Flanders aims to establish 280 hectares of controlled flooding areas by 2010. Of this, more than 200 hectares will be configured as estuarine environment areas. The specific locations of the controlled flooding areas, the configuration of the estuarine environment areas, and the increases in dyke heights will be specified by the Flemish government before 1 July 2005.

### Establishing controlled flooding areas for safety in Flanders

		completed in 2030	completed in 2010	natural environment portion in 2010
zone 1	Zeeschelde from the Belgium-Netherlands border to Rupelmonde	Probably only increasing dyke heights, but safety will also benefit from new natural environment areas in the Hedwigspolder and Prosperpolder		
zone 2	Zeeschelde from Rupelmonde to Dendermonde, the Rupel, and the Durme	approx. 1000 ha	approx. 200 ha	150 ha
zone 3	The Dijle from Rupel to Mechelen	approx. 250 ha	n/a	n/a
zone 4	Zeeschelde from Dendermonde to Ghent	approx. 400 ha	approx. 80 ha	60 ha
zone 5	Remaining portions of the Zeeschelde (portions of the Kleine Nete and Grote Nete, Dijle, and Zenne)	Total area not yet determined, but in the long term a considerable number of flooding areas will probably be necessary		
total		approx. 1650 ha	approx. 280 ha	210 ha

### • Common approach to safety

Flanders and the Netherlands calculate the required level of safety in different manners. In the process of selecting the safety level, Flanders considers the amount of damage that could be caused by a flood. Locations where a large amount of damage could occur are given increased protection. The approach taken by the Netherlands is based on an equal chance of flooding along the entire Westerschelde. The Netherlands is presently examining whether a risk approach such as that used in Flanders is also desirable and possible in the Netherlands. Both governments wish to better align the safety approaches used on both sides of the border.

### Risk approach

*A risk approach means that for each area, an attempt is made to find a good balance between the costs and benefits of protective measures. The benefits are large if taking the measures in question prevents major damage in the event of flooding. In areas with large economic value, such as urban regions and industrial areas, damage in the event of flooding can be quite extensive. In such cases, it can be worthwhile to make large investments in protection and safety. In regions with relatively low economic value, such as agricultural regions, the benefits of expensive measures do not match the costs. Flanders is already using the risk approach in the*

*updated Sigma Plan. The Netherlands is exploring the advantages and disadvantages of the risk approach in a national study entitled 'Veiligheid van Nederland in Kaart' ('Mapping the Safety of the Netherlands').*

### • The 'Overschelde' is not an option

Two years ago, the governments agreed to study whether a canal connecting the Westerschelde and the Oosterschelde would be a good way to reduce extreme high-water levels on the Zeeschelde. From the study, it is evident that such a canal (dubbed the 'Overschelde') would have unacceptable environmental impacts. It would also be an expensive solution, since the same reduction in water levels could be achieved at a considerably lower cost using other methods. Consequently, the two governments have decided not to implement the Overschelde project.

### • The Oosterweel flood barrier is no longer an option

Construction of a flood barrier on the Zeeschelde has been considered in the past, including during the preparatory stage of the Sigma Plan. During public hearings on the draft version of the Development Outline, the possibility of a flood barrier on the Zeeschelde near Oosterweel was again examined.



map with proposed safety measures

## How the Scheldt Estuary Development Outline 2010 came to be

### What knowledge was used to generate the Development Outline?

Several studies were carried during recent years to allow the projects to be selected in a well-considered manner:

#### Strategic environmental impact report

The impact on the natural environment was determined for each of the proposed projects. As the proposed projects have not yet been elaborated in concrete terms, it was not possible to identify the impacts in detail. Nevertheless, the strategic environmental impact report provided enough insight to allow the individual projects to be compared with each other.

#### Social cost/benefit analysis

The social cost/benefit analysis examined the effects of the projects on prosperity. A project contributes to improved prosperity if its benefits are collectively greater than its costs for all affected parties.

#### Study of measures for developing the natural environment

The governments jointly studied which measures were possible for improving or restoring the ecological values of the Scheldt estuary. This study formed the basis for the resolutions regarding the natural environment of the Scheldt estuary.

#### Birds and habitat criterion

The European Wild Birds and Habitat Directive prohibits interventions that cause damage to protected natural environments unless the intervention serves a major social interest and no alternatives are available. Results of studies show that the overall package of measures in the Development Outline does not cause any damage to protected natural environments. In fact, the measures increase the robustness of the natural environment of the Scheldt estuary.

### Which people were consulted?

During the formulation of the Development Outline, Flanders and the Netherlands consulted various parties, including:

### Overleg Adviserende Partijen (OAP)

The involved governments, official bodies and interested parties joined together to form the Overleg Adviserende Partijen ('Consultative Committee of Advisory Parties'). On significant occasions, the OAP issued independent advice on individual topics before decisions were taken. The OAP also issued a unanimous recommendation in favour of the draft Development Outline.

### Public hearings

The project organisers held public hearings regarding the results of the strategic environmental impact report, the social cost/benefit analysis and the draft version of the Development Outline. The results were explained in informational meetings. The responses from the public hearings were compiled and published, and they were used in formulating the final version of the Development Outline.

### Communications

During the preparation of the Development Outline, interested parties made contributions during working meetings and in other manners. Such contributions could take the form of 'joint conceptualisation', 'joint knowledge', or 'joint participation'. Interested parties were regularly informed of the state of affairs via brochures, newsletters and the website, among other means.

**For additional general information about the Scheldt estuary, please visit: [www.scheldenet.nl](http://www.scheldenet.nl) | [www.scheldenet.be](http://www.scheldenet.be)**

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**From outline to implementation**

The governments have decided to execute a series of projects during a period ending in 2010, with the objective of improving safety, accessibility and the natural environment. The Development Outline also contains resolutions regarding how the authorities will jointly tackle the execution of these projects.

**• Maintaining the momentum**

The governments will work energetically to implement the Development Outline. They have resolved to do so using an ‘overlapping’ approach. This means that preparatory work for a new procedural step will start even before the previous step has been formally concluded. Of course, the legally required periods for public hearings, objections and appeals will remain in force.

**• Coordination within the estuary**

The governments will again establish a joint project organisation in order to ensure a coordinated approach during the subsequent stage (ProSes2010). The task of ProSes2010 is to coordinate the various measures and procedures and clearly communicate information. New websites for this purpose are already available: [www.proses2010.be](http://www.proses2010.be) and [www.proses2010.nl](http://www.proses2010.nl). Specific implementation of the individual projects will be carried out in the regions in question in cooperation with the directly involved and affected parties.

**Scheldt Landscape Park**

*Flemish administrators in regional, provincial and municipal government organisations will look after mutual coordination of projects for the natural environment, landscape, urban development, agriculture, and infrastructure. They will do this under the name ‘Scheldt Landscape Park’. This manner of working will make it easier to properly integrate the various projects into their surroundings. It is also planned to involve Netherlands municipalities along the Westerschelde in the Scheldt Landscape Park at a later stage.*

**• Flanking policy for agriculture**

Some of the projects identified in the Development Outline can have consequence for the agricultural sector. The governments will establish a policy framework with appropriate agreements

for offsetting these consequences. For directly affected parties, the policy framework will include financial arrangements or offering land in replacement. For indirectly affected parties, the policy framework will include assistance in creating new business opportunities and improving water management. Land will be purchased on a voluntary basis as much as possible. The governments will define the policy framework before commencing concrete elaboration of the projects.

**• New treaties**

The governments will soon sign a Memorandum of Agreement in which (among other things) they specify the financing of the resolutions. They will also anchor the most significant resolutions in the Development Outline in a treaty. In addition, the authorities will formulate a treaty regarding how they will further proceed to attain the target situation in 2030. These treaties will be ready for signing in January 2006.



Studies have shown that a flood barrier would be much more expensive than a combination of raising dyke levels and establishing controlled flooding areas, which is the option that has been selected. In addition, a flood barrier would not provide any new environmental values and would require dykes in Flanders and the Netherlands to be raised even further. For these reasons, the governments have agreed that, at least in the short term, the flood barrier is not an option.

**Three types of flooding areas**

*Three different types of flooding areas are distinguished in the Development Outline. The more the flooding corresponds to the natural flooding of a tidal area, the greater the environmental value it has for the estuary. De-poldering thus makes the greatest contribution to the estuarine environment, since the de-poldered area becomes part of the estuary and is flooded daily by tidal action. A controlled flooding area, which is only rarely under water, contributes the least to the estuarine environment. With regard to safety, the ranking is exactly the opposite. Compared with a de-poldered area, a controlled flooding area allows water from a storm tide to be stored at a more favourable time.*

	Flooding	Contribution to safety	Contribution to estuarine environment*
Controlled flooding area	In case of emergency Water inlet via sluices	high	none
Area with controlled reduced tides	Daily water inlet via sluices (subdued tides)	high	moderate
De-poldering	Daily flooding by natural tidal flows	low	hoog

*\* Assuming optimum configuration of the natural environment of the area.*

**ACCESSIBILITY**

**The Scheldt River: a vital artery of Antwerp Harbour**

*Antwerp owes its size and importance to its location on the Scheldt. At one time, Antwerp was even the most important city in the Low Countries. However, it lost this status for an extended length of time starting in the sixteenth century. In 1572, the Protestants rebelled against their Spanish rulers, who were Catholic. Antwerp remained in Spanish hands, but the northern provinces separated from the rest. In 1585, the northern provinces of the Netherlands barricaded the Scheldt, the vital artery of Antwerp harbour, in order to thwart the Spanish. Antwerp merchants who had fled to Amsterdam were among the principal proponents of this barricade, which was intended to improve their own business prospects. The blockade of the Scheldt lasted more than two centuries. When the Belgian and Netherlands provinces came under French rule after the French Revolution, and the northern and southern provinces of the Netherlands were merged into a single Kingdom of the Netherlands, seagoing vessels were again allowed to sail into Antwerp. However, the population of the southern provinces revolted a few years later and declared the independence of Belgium, and the Netherlands again blockaded the river. In 1839, Belgium and the Netherlands finally signed a peace treaty, and one of the most significant elements of this treaty was freedom of navigation on the Westerschelde.*



*Platte grond der Schelde, Clermans, Museum Plantin-Moretus, Antwerpen: collectie Prentenkabinet*

## Problems

*Antwerp harbour: seagoing vessels with a draught of up to 11.85 metres can now sail as far as Antwerp regardless of the tide. Ships with deeper draughts must wait for a favourable tide so they can sail over the various bars in the shipping channel. In the future, shipping lines will make increased use of relatively large container ships. They will also operate using tighter schedules in order to reduce costs. Long waiting times make Antwerp Harbour unattractive, which is undesirable since a flourishing harbour is important for prosperity in the Scheldt estuary.*

*Risks from transport of hazardous materials: transport of hazardous materials over the Scheldt creates risks for the surrounding area. In the Netherlands, the risks comply with the standards for 'external safety'. No standards have been set in Flanders. The governments have agreed that in the future, the risk must remain at the 2000 level.*

## Resolutions

### • Deepening and widening the shipping channel

Flanders and the Netherlands have decided that ships with a draught of 13.1 metres must be able to sail as far as the harbour of Antwerp regardless of the tide. For this purpose, the authorities will lower the level of the sills in the channel by 1.4 metres. In the vicinity of the Deurganck Dock, the Zeeschelde will be widened from 250 metres to 370 metres over a length of 5 kilometres.

### • Flexible dumping locations

To achieve optimum conditions in the Scheldt estuary, it is important to maintain the vitality of the estuary and its network of multiple channels. Changing the way the shipping channel is maintained can help achieve this objective. Regular dredging is constantly necessary to maintain the sills at the desired depth.



proposed accessibility measures



proposed accessibility measures

## Resolutions

### • More room for estuarine environments

Flanders and the Netherlands will create more space for estuarine environments. At minimum, they will execute the following projects in the period up to 2010:

#### Cross-border:

- designation of the Vlakte van de Raan as a 'marine reserve'
- enlarging the Zwin by at least 120 hectares, and possibly 240 hectares
- developing a 440-hectare intertidal area in the Hertogin Hedwigepolder and the northern part of the Prosperpolder

#### In Flanders:

- restoring the conditions necessary to allow fish migration in the Zeeschelde
- reconfiguring the Durme and its valley
- developing 125 hectares of estuarine environment in existing controlled flooding areas
- establishing 600 hectares of wetland in the Kalkense Meersen
- developing 210 hectares of estuarine environment in locations still to be chosen, in combination with establishing flooding areas



## In the Netherlands:

- developing approximately another 300 hectares of estuarine environment in locations still to be chosen

Both governments will designate the remaining environmental projects, which still have to be determined ultimately July 1st 2005. In total, at least 1000 hectares of new estuarine environment will be added to the Scheldt.

### • Increased vitality

In combination with activities for improving safety, accessibility and the natural environment, the governments will also take measures to restore natural vitality where possible. Some examples of such measures are using alternative dredging and dumping strategies, constructing or removing breakwaters, excavating old salt marshes, and increasing or decreasing the depths of channels. Specific plans for such activities will be made during the implementation phase.

### • Multifunctional environment

Flanders and the Netherlands wish to make the new natural environment areas usable for other purposes where possible. They foresee possibilities for combining natural environments with other objectives such as safety, agriculture, marine aquaculture, recreation, and residential/employment initiatives.



## NATURAL ENVIRONMENT

### Problems

*Environmental habitats: the total area of salt marshes, mud flats and shallow water has decreased dramatically during the last century. The estuary has too little space and too much tidal energy to allow such areas to develop or allow existing areas to be maintained. This causes a decline in the environmental diversity of the Scheldt estuary.*

*Flora en fauna: salt marshes, mud flats and shallow water are important to many species as feeding areas, breeding areas, and rest areas. The living conditions of a wide variety of species diminish when such shore regions are lost. As a result, important links in the food chain are threatened.*

*The natural environment of the Scheldt estuary is not sufficiently robust to enable it to absorb the impact of human interventions.*

### Environmental losses during recent centuries

*Salt marshes and mud flats harbour the most important environmental assets in the Scheldt estuary. Large portions of these habitats have been lost during recent centuries. In the Netherlands portion of the estuary, the total area of salt marshes and mud flats has been reduced by half since 1800. The area decreased from 15,000 hectares to 7000 hectares during this period, largely as a result of impoldering. Straightening dykes has also eliminated backwaters in the estuary. As a result, practically no new salt marshes or mud flats are created. In Flanders, the total area of salt marshes has decreased by nearly 25 percent since 1900, from almost 700 hectares to 550 hectares. All of the remaining salt marshes and mud flats in the Scheldt estuary fall under the protection of the European Habitat Directive.*

Silting-up of side channels and erosion of salt marshes and mud flats can be avoided by a careful selection of dumping locations. The authorities will make the selection of dumping locations more flexible in order to allow dumping to take place where it is most favourable for the vitality of the estuary. All maintenance dredgings will be dumped back into the estuary. To protect the side channels, a larger proportion of the dredgings will be dumped in the main channel in the future. In addition, more dredgings will be dumped in the eastern part of the Westerschelde and fewer in the mouth region.

### • Monitoring

Studies have shown that deepening the channel will have little effect on the vitality and natural environment of the Scheldt estuary, under the condition that the dumping strategy is modified and ecological development takes place. However, this conclusion cannot be stated with absolute certainty. For this reason, the governments will establish a measurement programme for monitoring developments in the Scheldt estuary during and after the deepening of the channel. The governments are still investigating whether measures can be devised in advance of the deepening so that any undesirable effects that may occur can be quickly countered. The party responsible for causing the undesirable effects will pay the costs of the measures. If the responsible party is not known, Flanders and the Netherlands will share the costs.

In deciding whether the measures are actually necessary, the authorities will also take into account the requirements of the EC Wild Birds and Habitat directives. These European directives oblige countries to maintain existing environmental values.

### • Acceptable risks

The Netherlands and Flanders desire to maintain safety in the Scheldt estuary at an acceptable level. They will request lower-level governments to always assess the effects on external safety when generating new spatial plans. The governments will improve the provision of information regarding safety policy to lower-level governments and the general public. They also wish to see improvements in the options for disaster prevention and relief, and they will request the responsible governmental organisations in Flanders and the Netherlands to take action to achieve this objective.



### Bars in the shipping channel

*Deepening the shipping channel only requires dredging in a limited number of locations. Due to natural processes, in most places the channel is already deep enough for the largest ships. The only obstacles are formed by the 'sills'. These are shallows that occur where the shipping channel intersects a side channel. There are eleven such sills in the shipping channel between Vlissingen and Antwerp harbour.*

### Costs and benefits of deepening the channel

*A social cost/benefit analysis indicates that deepening the Westerschelde yields a positive social return. The benefits will exceed the costs starting as early as 2008. Deepening the channel to accommodate ships with a draught of 13.1 metres is more favourable than less extensive deepening, such as for ships with a draught of 12.5 metres or 12.8 metres. Deepening the channel will contribute to the prosperity of Europe, Flanders and the Netherlands.*

	Europe	Flanders	The Netherlands
Benefits in 2030	€ 1.5-2.2 billion	€ 0,7 - 1,1 billion	€ 0,4 - 0,6 billion
Benefits in 2030 from deepening the channel to accommodate ships with a draught of up to 13.1 metres (tide-independent sailing)			



proposed environmental measures

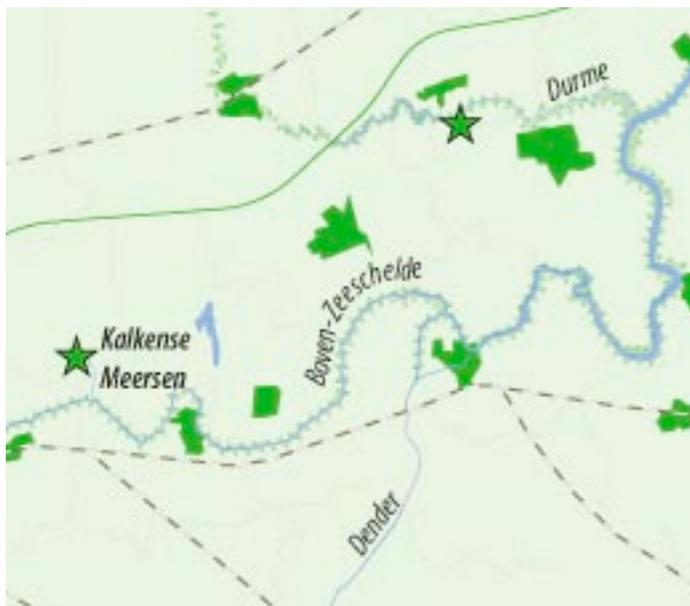
### Groot Saeftinghe

Flanders and the Netherlands will develop a 440-hectare intertidal area in the Hertogin Hedwigepolder and the northern part of the Prosperpolder. These areas border on an existing nature reserve called 'Het Verdrongen Land van Saeftinghe' ('The submerged land of Saeftinghe'). This will create a large, contiguous nature reserve to be called 'Groot Saeftinghe'. The new intertidal area is located in the brackish portion of the estuary, which means it will have major ecological value. This area will also provide valuable protection against flooding. It lies partly on Dutch territory (295 hectares) and partly on Flemish territory (145 hectares).



### Marine reserve

The Vlakte van de Raan is a shallow sand bank at the mouth of the Westerschelde. This sand bank is partly on Belgian territory and partly on Netherlands territory. The Vlakte van de Raan is an important nursery area for fish, and it harbours a rich variety of seabed life. This makes the sand bank an important feeding area for the sandwich tern, which is a protected bird species. Belgium and the Netherlands will nominate this area for designation as a protected area under the terms of the Wild Birds and Habitat Directive. This will give legal protection to the environmental assets of the 'marine reserve'.



proposed environmental measures



### Zwin

To combat silting-up of the Zwin, the International Zwin Commission has proposed to increase the tidal volume of the Nature reserve. Shifting the dykes along part of the Willem-Leopoldpolder further inland would increase the size of the Zwin by 120 hectares of intertidal flats and marshes. However, the authorities agree that a 240-hectare expansion is desirable in order to improve ecological values even more. They will investigate the feasibility of this in an Environmental impact Assessment. The International Zwin Commission will be asked to prepare an integral cross-border plan for the region in which the aspects of agriculture, natural environment, recreation and infrastructure are addressed in a balanced manner. This plan must be aligned to the time schedule described in the Development Outline

