Innovative flood management solutions and spatial development

A wider approach in coastal management

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ComCoast: a wider approach in coastal management

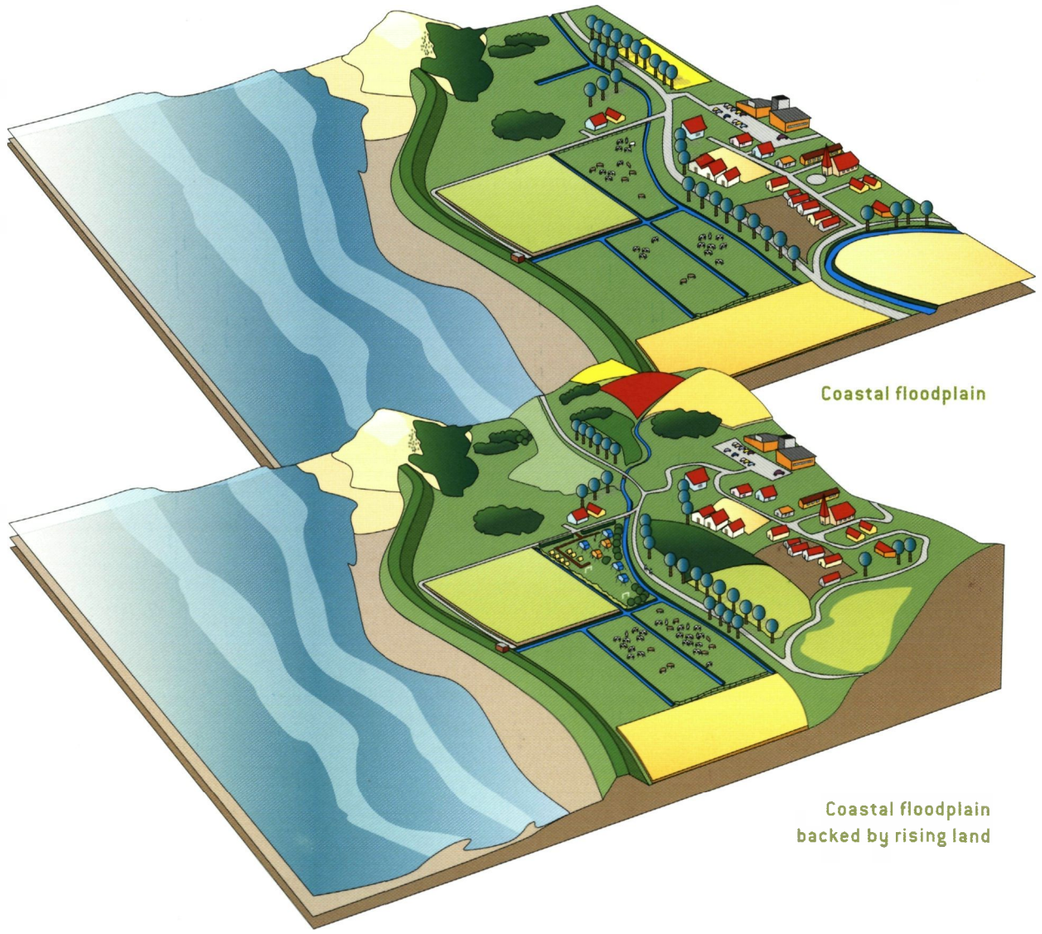
ComCoast is a European project which develops and demonstrates innovative solutions for flood risk management in coastal areas. The project is made up of five partner countries: Denmark, United Kingdom, The Netherlands, Germany and Belgium under the European Union Community Initiative Programme Interreg IIIB North Sea Region.

Interreg North Sea Region

ComCoast

Actual situation in coastal zones

Integrated Coastal Zone Management (ICZM) requires strategic, co-ordinated and concerted action at both a local and regional level, guided and supported by an appropriate framework at a national and European level. Local solutions will then be part of a bigger scheme to maintain the integrity of our coastal regions. As stated in the European Community's recommendation concerning the implementation of ICZM in Europe, 30 May 2002, measures are sought that are environmentally sustainable, economically equitable, social responsible, and culturally sensitive.



Coastal floodplain

Coastal floodplain backed by rising land

The first illustration shows the present situation for low-lying coastal land where flooding would extend far inland if defences were not in place (e.g. the Dutch polders)

The second illustration shows the present situation for low lying coastal land where there is a transition to high land and therefore less coastal land is at risk of flooding

Compare these illustrations with the innovative ComCoast concepts in this brochure (page 6 & 8)

Innovative flood management so

Vision

ComCoast aims to achieve a more gradual transition from sea to land creating benefits for the wider coastal community and environment. Balancing this with sound socio-economic options while meeting the requirements of flood risk management. ComCoast creates and applies new methodologies to evaluate multifunctional flood defence zones from an economical, technical and social point of view.
The aim of ComCoast is to explore the spatial potentials for innovative coastal defence strategies for current and future sites in the Southern North Sea.

Planning for climate change

Along the North Sea coast, water levels are rising and waves are intensifying due to climate change. The best scientific evidence suggests that this is likely to increase over the coming decades. In some North Sea coastal areas land is sinking, while tidal heights and rates of erosion are increasing. This means that the risk of flooding is increasing and more people are living, working and spending their leisure time within the coastal flood plain. With the pressure to build more housing, planners are considering options for development in coastal areas. Flood risk, the environment and a dynamic coastline have to be balanced with this pressure for development.

Multifunctional approach

ComCoast is looking at how we use the coastal flood plain today and is seeking multifunctional solutions for its sustainable use in future. The ComCoast concept is to create a more gradual transition from sea to land, instead of a traditional single line of defence. The project is developing innovative flood risk management strategies to include wider social and environmental functions such as recreation, fishing, tourism and habitat creation. This approach aims to highlight possibilities for developing the coastal area with respect to spatial planning, to benefit local and wider communities as well as maintaining the environment.

lutions and spatial development

Priorities

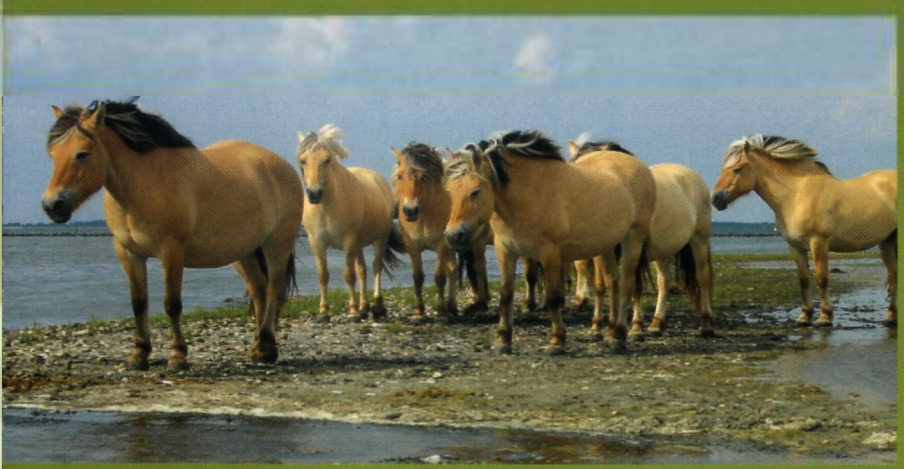
Raising awareness of coastal issues is very important. We need to plan now so we can move forward and maximise opportunities in the future. Changing coastal defence systems takes time, ComCoast aims to streamline the processes that influence spatial planning. This will allow us to reduce flood risk, enhance ecosystem quality and create wider societal benefits.

ComCoast Aims to:

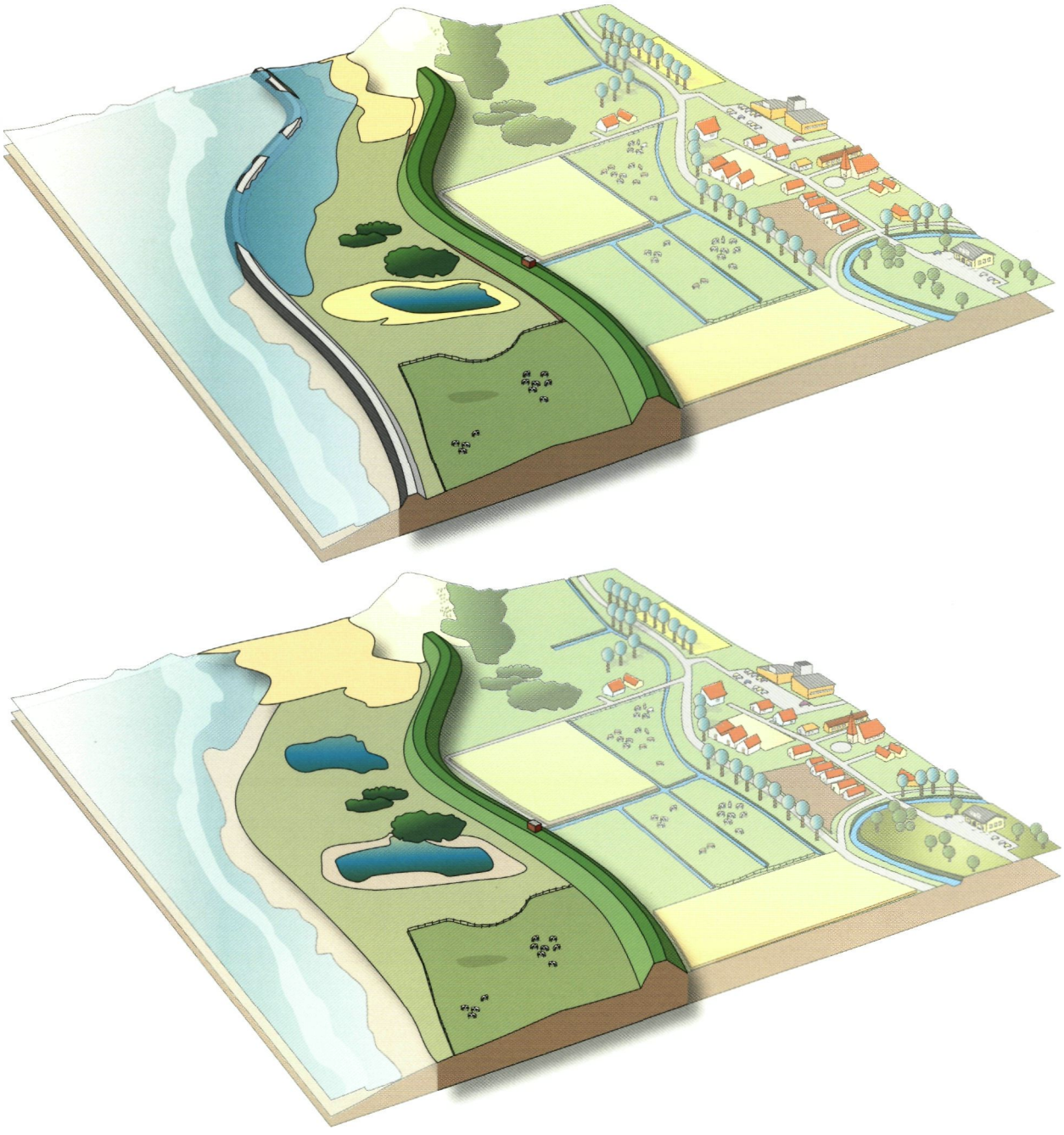
1. Identify suitable North Sea coastal locations, where multifunctional flood management schemes can be applied.
2. Evaluate the wider socio-economic benefits to increase the value of multifunctional sites.
3. Develop innovative technical solutions that promote alternative uses of flood management sites.
4. Influence current public participation techniques to improve stakeholder engagement.
5. Apply new approaches in coastal management, to be trialled at European Pilot sites.
6. Share knowledge and lessons learnt within and between the partner countries.

ComCoast adds credibility to flood risk management projects, it aims to increase public acceptance of new schemes and strategies through good public participation. Alternative solutions may be possible which will benefit local communities and the environment. You can find a list of some ComCoast solutions later in this brochure. These solutions are ideas for coastal management; how these ideas are used will depend on local circumstances.

This booklet is designed to inspire readers to consider different approaches to flood risk management and the development of the coastal areas.



ComCoast concepts for coastal zones



Compare with actual situation in coastal zones on page 3

Foreshore solutions

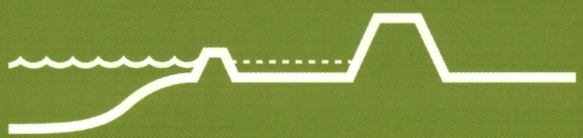
Foreland protection

Description

To build a sustainable defence in front of the primary defence to provide a brackish area between the defences for habitat or farming practices. This area can be flooded up to 10 x p/year.

Required actions (2 options)

- Protection of the foreland: to build a soft embankment to act as a buffer for the primary defence.
- Maintaining the foreland: to build and to maintain land reclamation fields; groyne systems.



Foreshore recharge to restore the coastline

Description

Eroded sediments are replaced by pumping dredged materials on top of the eroded foreshore. The dredging (mud, shingle, sands, and gravel) would otherwise be dumped at sea and lost. The new sediments reinforce the natural flood defence and also help to restore habitats for wildlife.

Required action

Replenishing the foreland with environmentally safe dredged sediments.

ComCoast concepts for coastal zones

Compare with actual situation in coastal zones on page 3

Landward solutions

Overtopping defence

Description

Making the defence resistant to wave overtopping and ensuring that any water that is washed over the top can be temporarily stored and drained away.

Required action

Replace the top of the defence and its inner slope with a revetment that will not wear away by severe overtopping.

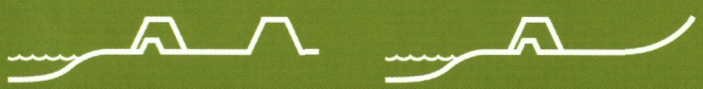
Managed realignment

Description

Allow tidal water to flow onto the coastal floodplain to reduce surge tide levels. The inter-tidal zone may silt up keeping (more or less) pace with sea-level rise and land subsidence.

Required action

Partial or full removal of a flood bank to allow managed tidal inundation of the floodplain creating a dynamic inter-tidal zone with considerable natural and recreational value.



Regulated tidal exchange

Description

Allow tidal inundation of the coastal floodplain in a controlled manner. This creates a transitional zone where the land can evolve over time into a more saline environment. The transitional zone may silt up keeping (more or less) pace with sea-level rise and land subsidence.

Required action

Regulation of tidal waters through a system of sluices pipes and /or pumps. Low-lying land may require a secondary line of defence.

Why ComCoast solutions?

1. **Managing Flood Risk**
   Due to climatic changes flood defences will have to cope with an increase in wave action and tidal levels. Consequently in the future the maintenance of flood defences will cost more. In some locations ComCoast concepts will provide better long-term solutions for managing flood risk.

2. **Spatial**
   Regions will benefit from developing a more environmentally friendly coastline which will also be more attractive for residents and visitors. For example, creating new surroundings for nature will help compensate the loss of natural coastal habitats. Land management in general is changing, for example farming practices are becoming less land based and therefore alternative incomes from recreational pursuits may prove viable at ComCoast sites.

3. **Coastal erosion mitigation**
   Increased sea level and wave activity results in loss of beaches and inter-tidal and supra-tidal areas. Loss of internationally important habitat has to be replaced under the EU Birds and Habitats Directive. By returning sands shingles and mud to inter-tidal areas in front of sea defences we can increase the amount of habitat while affording some protection to the existing flood defences. Much of this sediment would otherwise be dumped at sea and lost to natural coastal systems.

4. **Public awareness**
   It is important that people who live, work and visit the coast are aware of the affects of climate change. ComCoast aims to include local communities in order to create projects that meet their needs. However, expectation needs to be carefully managed and good public participation should ensure societal acceptance of the changing coastline. By identifying areas on the coast that may be suitable for ComCoast-type schemes we need to manage people's expectations and fully inform them of any changes. Visualisation tools will be key in helping stakeholders to understand how coastal areas could be developed. Through public participation we aim to inspire flood risk managemen with broader environmental and social appeal.

5. **Sustainability**
   The aim of any ComCoast solution is that future generations are not faced with difficult flood risk management decisions. We should act now to work with natural processes so that large towns and developments are protected while other areas of the coast are adapted for climate change. ComCoast engineering solutions will be economical while being environmentally and technically sound.

6. **Sharing Knowledge**
   By coming together with a joint approach all five countries are sharing common problems and solutions and our partner organisations will also benefit. The pilot projects will allow us to learn from each other's work and enable application of trialled techniques in our respective countries.

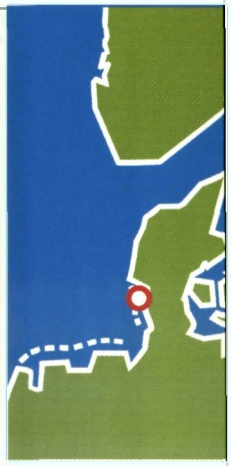
ComCoast into practice

Denmark (DK)

Rømø

Special remarks

The ground level sinks in the southern part of Denmark as the opposite happens in the north. Therefore flood risk solutions for the Danish coastal zone will differ. In Rømø realignment of the coastal defence is considered. The transitional zone of salt marsh can be used for recreational activities and farming purpose and a new inland embankment will protect the houses and farms. Various options for the area development will be considered in order to come to a definitive plan that includes a multifunctional use of the coastal zone.

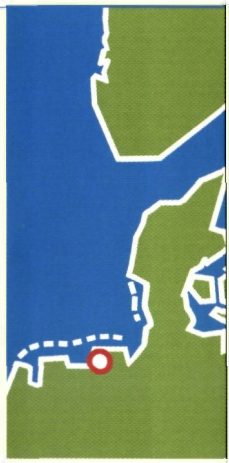


Germany (D)

Nessmersiel

Special remarks

Nessmersiel exists of a broad coastal defence system: land reclamation fields (groyne systems) and salt marshes, summer dike, summer polder, main dike, polder and second dike line. Between the main dike and the second dike line lies a polder that's intensively agricultural used. Based on scenarios for climate change different options for the coastal protection system will be developed. One option is to create foreland protection as coastal defence.

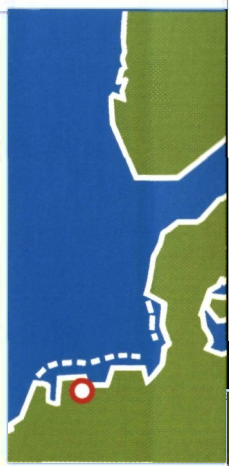


The Netherlands (NL)

Breebaart

Special remarks

The transitional zone can provide the hinterland with a barrier against salt-water intrusion and yields to other, saline functions, e.g. nature or agriculture. This is a coastal zone with regulated tidal exchange.



The Netherlands (NL)

Ellewoutsdijk

Special remarks

The transitional zone consists of an overtopping resistant defence preserving an old fortress (1830) - that will be adjusted to overtopping water under heavy storm conditions - and a high green defence that protects the hinterland.

The Netherlands (NL)

Perkpolder

Special remarks

The transitional zone comprises a managed realignment including a nature development area, a yacht-basin, and recreational and permanent housing and recreational activities. Various options for the area development will be discussed to come to a definite plan including reallocation and adjustments of defences in a multifunctional coastal zone. According to the planning execution of the plan will start in 2008.

The Netherlands (NL)

Petten

Special remarks

One of the alternatives to get the flood protection up to the required safety level, consists of an overtopping resistant defence and a nature area of salt water seepage in the neighbouring polder. During extreme storms this polder should store the overtopping water. In this ComCoast concept a secondary defence will prevent the hinterland from flooding.

United Kingdom (UK)

Horsey Island

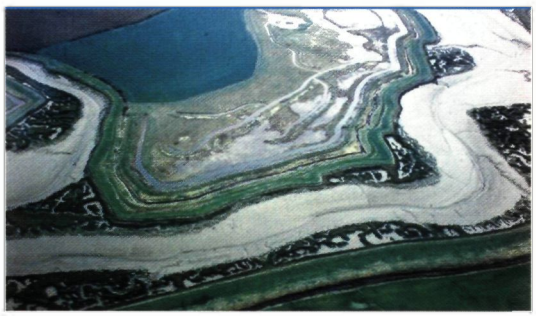
Special remarks

By recharging in front of a flood defence with mud we achieve several targets in restoring the coastline:

1. Reducing erosion of internationally designated habitats.
2. Reducing maintenance costs of a sea defence that protects farmland and internationally designated freshwater habitat as well acting as a strategic defence for communities landward.
3. Recycling sediments that would be lost to sea.

United Kingdom (UK)

Abbotts Hall



Special remarks

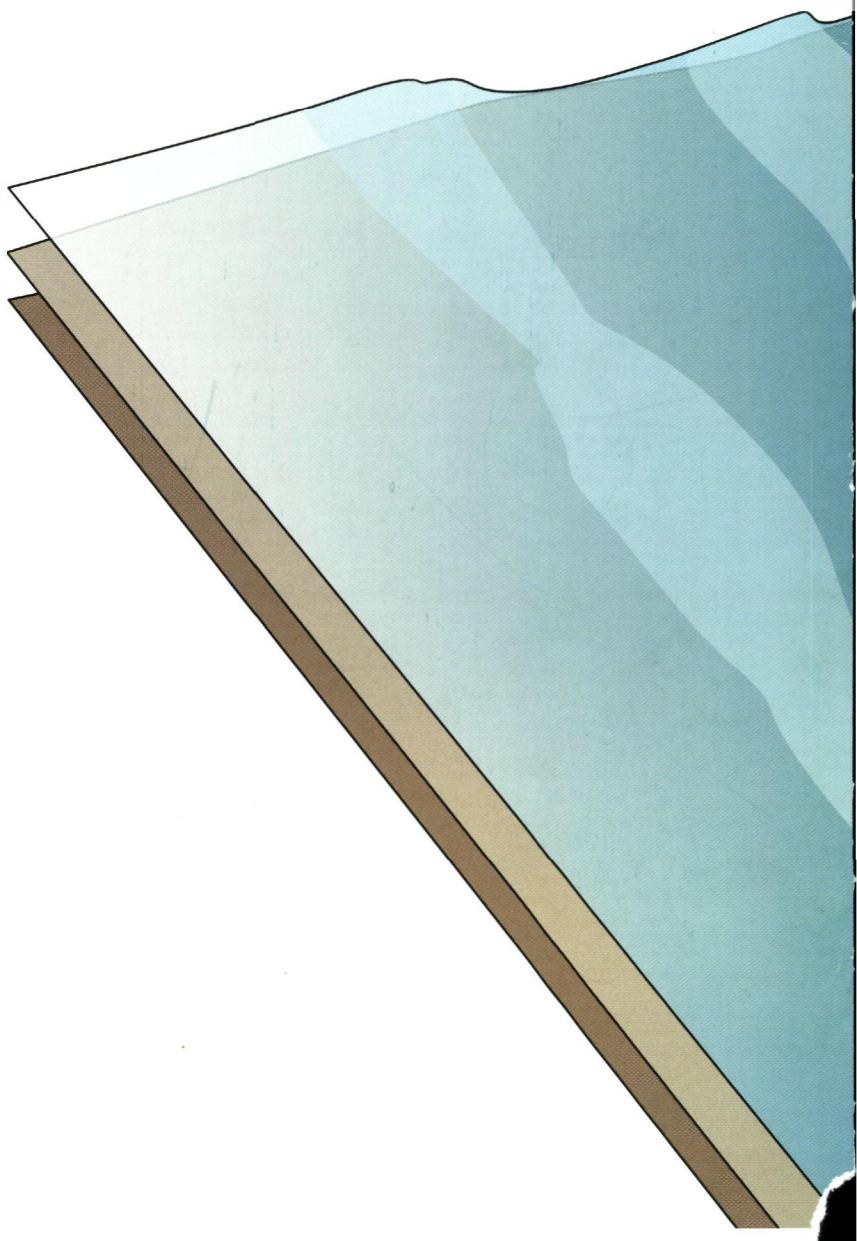
A completed managed realignment which rises to high ground creating rare transitional habitats. The saltwater areas sit well with traditional farming practices. The scheme is a partnership approach and has proved popular and successful with stakeholders and the public. The site is also proving to be used regularly for recreational and educational uses.

ComCoast is a European project (EU/Interreg IIIB North Sea programme) in which 10 partners collaborate to develop and demonstrate innovative solutions for coastal zone management.

10 ComCoast partners:

- Directorate-General for Public Works & Water Management, Rijkswaterstaat (NL) - Lead Partner
- Province of Zeeland (NL)
- Province of Groningen (NL)
- University of Oldenburg (D)
- Environment Agency (UK)
- Waterways & Seacanal NV, department 'Zeeschelde' (B)
- Danish Coastal Authority (DK)
- Municipality of Hulst (NL)
- Waterboard Zeeuwse Eilanden (NL)
- Waterboard Zeeuws Vlaanderen (NL)

www.comcoast.org



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Interreg North Sea Region