

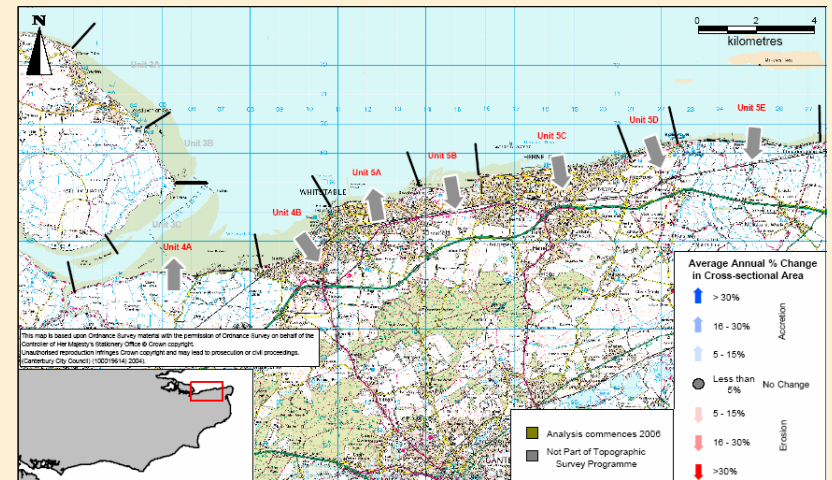
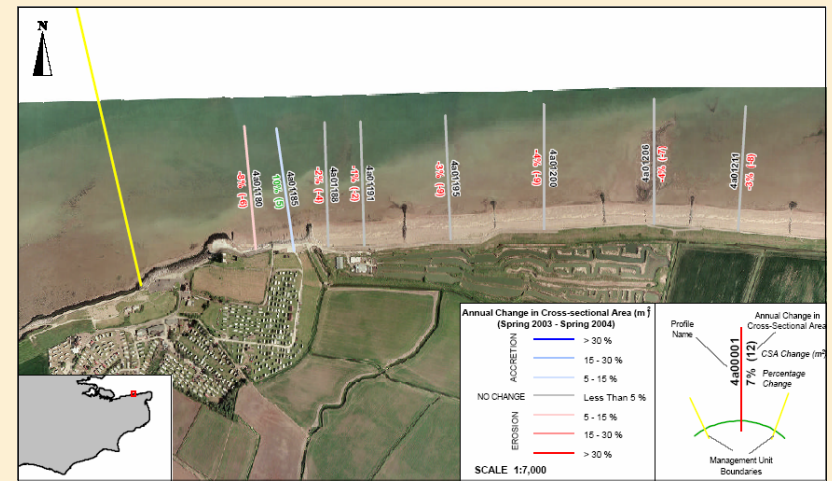
# Indicator 26 Coastal erosion and accretion

Percent of the coastline that is eroding, accreting or stable  
Zeeland coastal management units (RWS/RIKZ 2005)



Beach Change summary - Graveney Marsh to Reculver (including Northern Kent Wall)  
Spring 2003 to Spring 2004

(SECG 2003, courtesy City of Canterbury Council)



## Key Message

- Different methods are in place for the evaluation of changes in the morphology of the coastlines and for measuring erosion in the countries bordering the Southern North Sea. The differences are such that comparison is difficult.
- In Nord-Pas de Calais, 90% of the 24 kilometres of chalk cliffs are eroding; erosion will continue affecting two-thirds of the 63 kilometres of coastal dunes. Similarly in Kent, the chalk cliffs of Dover - symbolic of the entire nation - are subject to strong erosion rates.

## Why monitor coastal erosion and accretion?

The coast is by nature a dynamic interface between land and sea. Coastal areas perform crucial functions - tidal mudflats and salt marshes absorb wave energy, dunes form a natural flood barrier and a natural filter for drinking water. A range of factors affects the dynamics and the evolution of coastlines, in particular climate. In the last decades, however, infrastructure such as harbours and 'hard' defences interfere with the natural transport of sand, causing coastal erosion further down the coast. Of the 875km coastline that started eroding in the past 20 years, 63% are located less than 30km from coastal areas altered by recent engineering works. Coastal erosion results in loss of land with economic or ecological value, destruction of natural sea defenses and undermining of artificial sea defenses. Besides the local impact of erosion, there is a greater concern for the risks of coastal flooding due to the undermining of coastal dunes and sea defenses. Monitoring the evolution of accretion and erosion, sea level rise and the effects of extreme weather is of crucial importance for developing proper local risk assessment and adequate policies in shoreline management.

## Where do the data come from?

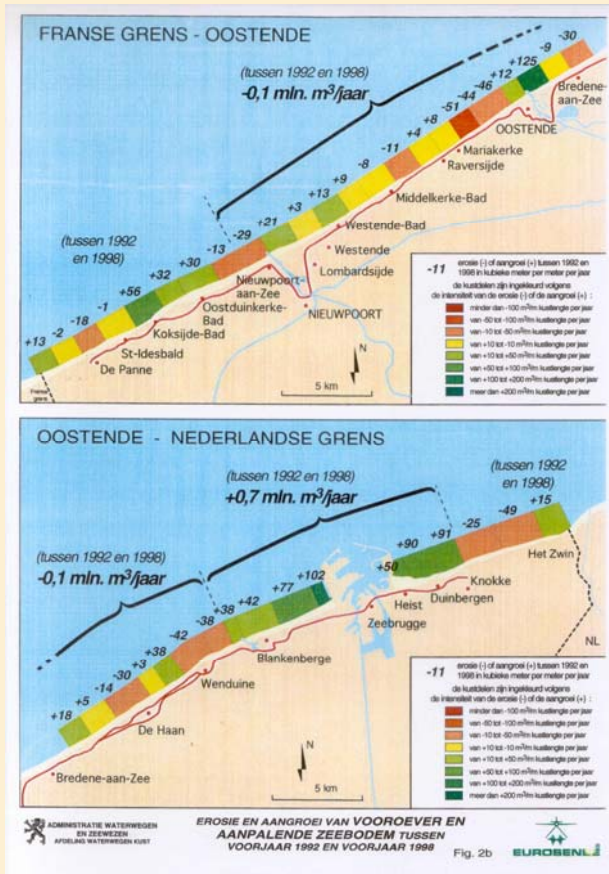
Coastal erosion and accretion is measured in all SAIL countries but different methodologies are employed. The Dutch National Institute for Coastal and Marine Management (RWS/RIKZ) produces annual maps (Kustlijnkaarten) with the position of the coast compared to a baseline (BKL) which is linked to the national grid. The Syndicat Mixte de la Côte d'Opale (SMCO) has carried out studies for the purpose of shoreline management and risk assessment in the coastal zone of Nord-Pas de Calais (Plan Littoral d'Actions pour la Gestion de l'Erosion-PLAGE). In the UK, regional 'coastal groups' comprising local authorities, the national Environment Agency and Natural England have been set up to monitor erosion and propose shoreline management schemes which, if approved, are funded by national government. The Channel Coastal Observatory provides on-line data and information on coastal processes; the website is hosted by New Forest District Council, in partnership with the University of Southampton and the National Oceanography Centre of Southampton. The Flemish Agency for Maritime Service & Coast-Division Coast, is the authority for monitoring coastal processes in Flanders. The EU EuroErosion Project provided additional data for the purpose of broad-scale analysis.

## What does the indicator show?

Shoreline management plans in Essex (UK) were reviewed from Harwich to Canvey Island in summer 2005. In general, more surveys are needed in order to calculate trends for a significant number of units. From the 54 units located along the South East shoreline from Isle of Grain to Eastbourne, no surveys are planned for 11; analysis for a further 27 units commenced in 2006. A trend is calculated for the remaining 16 units, based on a minimum of 4 surveys. From these, all 16 were considered stable in the sense that overall gain or loss was less than 5% of the actual beach volume; 6 showed a net loss and 8 a net gain. Still, within units large differences occur: 'Graveney Marsh to Reculver' (unit 5C-overall loss of -1.2%) includes a sub-unit where as much as 33% of beach material



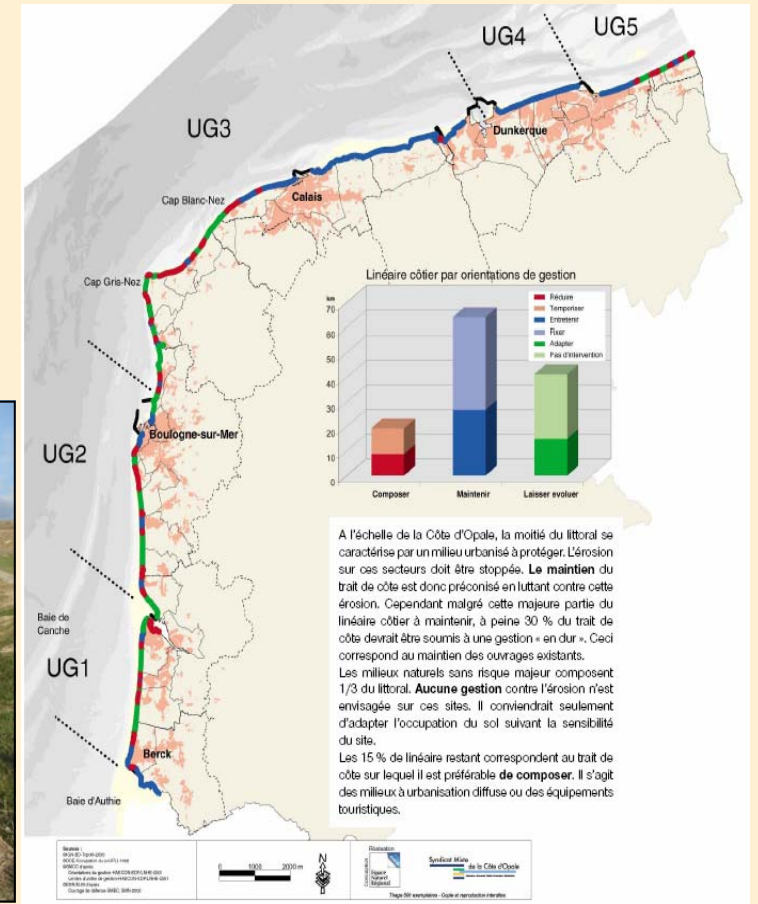
Overview of erosion and accretion in management units of the Belgian coast, including the foreshore (MDK, Eurosense 1998)



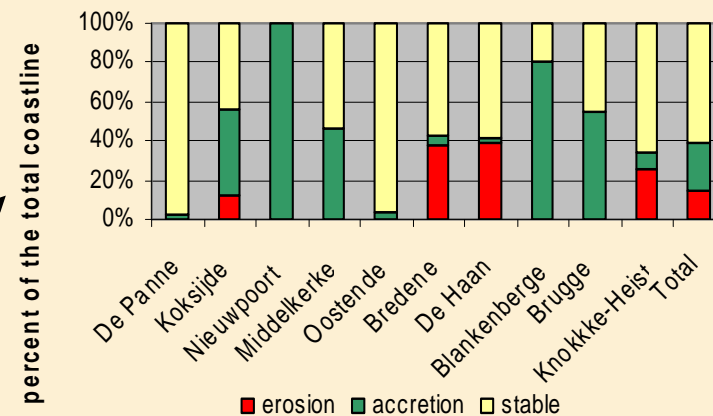
Management options as stated in the **PLAGE** Action Plan for shoreline management (SMCO 2003): Restoring (red), Holding the line (blue), No-action (green)

UG- Unité de Gestion (Management Units)

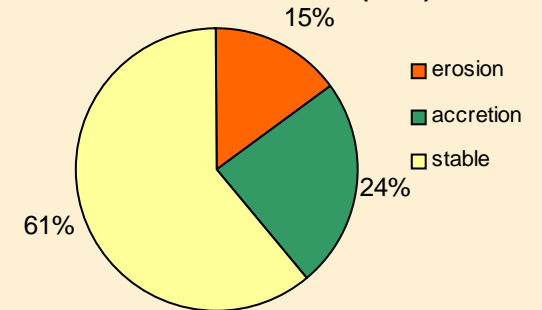
Source: Syndicat Mixte de la Côte d'Opale, Espace Naturel Régionale



Percent of the coastline (beach) that is eroding, accreting or stable, coastal communes West-Vlaanderen, 1983-1998 (MDK)



Percent of the coastline (beach) that is eroding, accreting and stable - West-Vlaanderen (1998)



was lost (2004). The Northern Sea Wall in Kent (4.5km) is a specific case for concern, since it protects saline lagoons designated as SSSI. High erosion rates ( $-7,000\text{m}^3/\text{year}$ ) were encountered at the Western End of this section during biannual monitoring schemes (Sept 1997-Nov 2002). Results of the benchmarks are fed into the Ordnance Survey national network and serve as a basis for the Strategic Regional Coastal Monitoring Project.

Of the 140km coastline in Nord-Pas de Calais, 40% is protected by constructions (of which 10% dykes and 30% soft protection), while 60% of the coast remains with a 'natural and agricultural' character. Of these, 45% are dunes and 15% are cliffs which are severely affected by erosion. The PLAGÉ assessment indicates that 90% of the 24km of chalk cliffs are eroding at rates which range from 10 to 80cm per year. Erosion will continue to affect two-thirds of the 63km of coastal dunes - rates of up to 2.5m/year are expected at particular locations.

In 1990, The Netherlands decided to implement 'the dynamic maintenance of the coastline'. Consequently, the Basal Coastline (BKL) was determined. Where the coastline lies (temporarily) landwards from the BKL (erosion), sand is supplied. A large portion of the coastline in Zeeland is eroding. Except for the management unit of Noord-Beveland to the North, close to 80% of the management units are in retreat. Zeeuws-Vlaanderen is particularly affected. This data is not disconnected with the efforts made with regard to sand suppletion. The Dutch coastline has in any case been maintained overall since 1990, by means of sand suppletion.

In Belgium, about 50% of the 72km coastline has defence works (MDK, 2006). In 1998, 15% of the coastline (beach only) was evaluated as 'in retreat' and 24% in accretion, compared to the situation 1983/1979 (MDK). The beaches located in the central portion and the coastline near the border with Zeeland are particularly affected by erosion. A complementary study (Eurosense) commissioned by MDK (1998) on the dynamics taking place in the foreshore, shows a wider context; data indicate a loss of sediment in the western part (foreshore) as opposed to the foreshore to the east of the harbour of Zeebrugge, where accretion has taken place compared to 1976.

### **What are the implications for planning and managing the coast?**

Erosion is of crucial importance in coastal zone management because it poses a major risk for the populations, investments and protected areas in the lower-lying hinterland. Important European legislation affects policy-making on erosion processes in coastal zones. The Strategic Environmental Assessment (SEA) Directive, which came into effect in June 2004, will force

investors and regional authorities to identify and prevent adverse impacts of development proposals on coastal erosion. Both the natural processes and coastal defence policies have an impact on habitats that are designated under the Habitats Directive, the Birds Directive and the Ramsar Convention, and which are particularly well represented in coastal zones (see indicator 6). Reliable information is needed on the (potential) nature and importance of these impacts to inform policy decisions on the legal and funding aspects of coastal defence options and possible habitat replacement, as required by European legislation (Habitat Directive).

In the UK, the likely costs of freshwater and brackish habitat replacement due to predicted loss in the coming 50 years, has been estimated to be in the order of £50-60million. In 1995 the National Rivers Authority (NRA) reported that 80 metres of salt marsh in front of a sea wall would reduce its necessary height from 12 to 3m, representing savings of £5million/km.

#### **How reliable is the indicator?**

The concern for the morphological evolution of the coastline varies between Member States and is reflected in the knowledge that MS have of the coastal evolution and the means of evaluation of coastal erosion. As such, inter-regional comparisons are very difficult to make. Information can be provided by measurement networks (The Netherlands, France and Belgium) or inventories (Great Britain). Nation-wide networks such as in The Netherlands and Belgium do not exist in most EU countries. Long-term series are needed in order to calculate reliable trends. Sand suppletion events affect the monitoring results of the actual erosion processes taking place.

