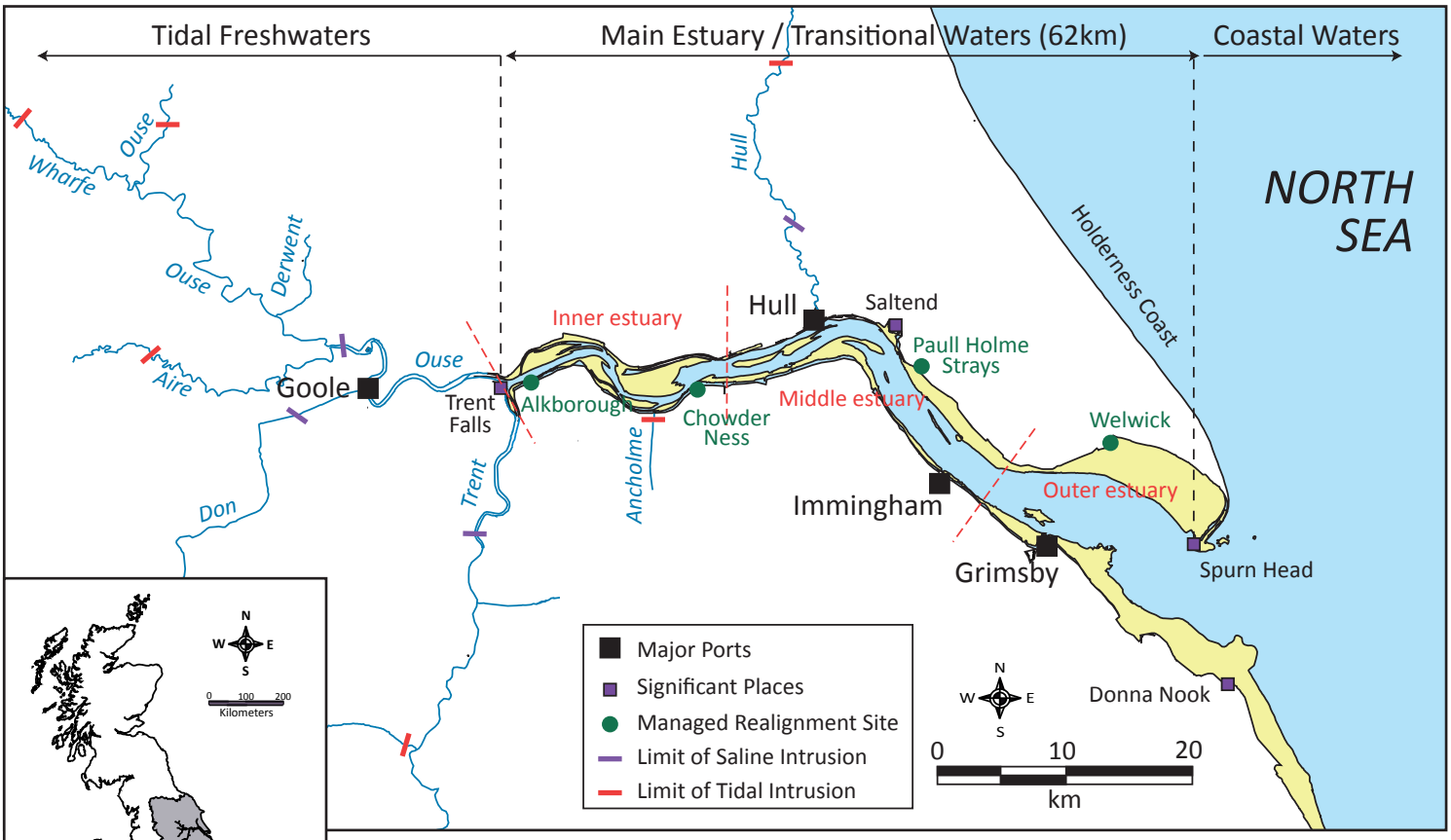
TIDE FACTS

Tidal River Development

The Humber Estuary

TIDE is an EU project which seeks to make integrated management and planning a reality in the estuaries of the Elbe, Scheldt, Humber and Weser rivers. It is partly funded by the INTERREG IV B North Sea Region Programme.

GEOGRAPHY OF THE REGION



The Humber Estuary is located on the north-east coast of England and borders the North Sea. Its catchment area drains one fifth of England (24,472 km^2), thereby providing the largest single input of freshwater to the North Sea from the English coastline. There are over 400,000 people living and working within the Humber floodplain and 12 million within the overall catchment area. With 480 inhabitants per km^2, the Humber is the most densely populated large European estuary.

The Humber's muddy appearance, known as turbidity, is due to suspended sediment, approximately 60% of which is derived from the North Sea, 37% from the eroding boulder clay cliffs along the Holderness coast and 3% from riverine input. Transport of this sediment is vital for the estuary's function, with over 1,500 tonnes carried in with every tide. It is estimated that up to 1.26 million tonnes of sediment may be present in the water column and the deposited sediments provide essential material to maintain important habitats within the estuary such as mudflats, sandflats and saltmarsh.

HUMBER ESTUARY LENGTH: 62 km from Trent Falls to North Sea
TOTAL ESTUARY LENGTH INC. TIDAL FRESH WATERS: 123 km
CATCHMENT AREA:
Humber Estuary floodplain: 1,124 km^2
Humber River Basin District: 26,109 km^2
TIDAL RANGE (Spring average)**:** 5.9 m at the mouth, 7.2 m at Saltend (35 km into the estuary), and 5.6 m at Trent Falls

The Interreg IVB North Sea Region Programme
European Union
European Regional Development Fund

A THRIVING PORT INDUSTRY

The Humber Estuary is one of the most important estuaries in the UK for commerce, with an expanding port complex and extensive bank-side industries. The four main ports on the estuary (Grimsby, Hull, Immingham and Goole) are operated by Associated British Ports. They constitute the country's largest port complex with approximately 40,000 commercial shipping movements per year, representing 16% of the UK's seaborne trade. Further smaller facilities are operated by independent port operators around the estuary and along its tributaries.

Industry on the Humber Estuary includes chemical works, oil refineries and power stations, with most of this activity located on the south bank of the middle estuary and around Hull on the north bank. The Humber is also the landing point for the longest sub-sea gas pipeline in the world, capable of delivering 20% of the UK's natural gas requirements from Norway.

DID YOU KNOW?

- The Port of Grimsby & Immingham is the largest UK port in terms of tonnage handled and the Port of Hull the largest UK timber port.
- The Port of Immingham handles the most bulk cargo in the UK and ranks 4th in size in northern Europe after Rotterdam, Antwerp and Hamburg.
- The Humber Ports account for the 2nd largest volume of RORO trade in the UK and almost 25% of the UK's car imports and exports.

Humber Ports Traffic (million tonnes) 1997 - 2009

	1997	1999	2001	2003	2005	2007	2009
Grimsby & Immingham	47.99	49.76	54.83	55.93	60.69	66.28	54.71
Goole	2.76	2.65	2.63	1.91	2.62	2.28	1.64
Hull	10.05	10.12	10.59	10.53	13.36	12.50	9.77
Humber Ports (including Trent & Ouse tributaries)	71.53	73.80	78.49	80.95	88.66	92.92	76.87

Source: Department for Transport

View over the Port of Immingham

AN ECOLOGICAL HAVEN

The Humber is of ecological importance for a number of habitats and species. In particular, the intertidal mudflats provide an internationally important feeding and roosting resource for migratory and wintering waterfowl, with a peak of around 175,000 birds in winter. These include over 5,000 common shelduck (*Tadorna tadorna*), over 45,000 Eurasian golden plover (*Pluvialis apricaria*), and over 40,000 red knot (*Calidris canutus*).

The mudflats and saltmarsh also provide nursery habitats for fish such as bass (*Dicentrarchus labrax*) and flatfish species including plaice (*Pleuronectes platessa*), sole (*Solea solea*) and flounder (*Platichthys flesus*). The estuary is also a migratory route for fish species such as lamprey (*Lampetra spp.*), shad (*Alosa spp.*) and salmonids. Donna Nook on the South Bank of the outer estuary supports one of the largest grey seal (*Halichoerus grypus*) breeding colonies in England.

THE HUMBER ESTUARY EUROPEAN MARINE SITE

Due to the presence of important habitats and species, the entire Humber Estuary and parts of its tidal river tributaries have been given a number of nature conservation designations under UK, European, and international law. The estuary is a Natura 2000 site, designated as a Special Area of Conservation (SAC), a Special Protection Area (SPA), and a Ramsar site, together forming the Humber Estuary European Marine Site.

HOW IS IT MANAGED?

The European Habitats Directive makes provisions for relevant authorities to establish a management scheme for a European Marine Site. The **Humber Management Scheme** is designed to secure compliance with these regulations and covers the marine components of the Ramsar site in addition to the SPA and SAC. The main aim of the management scheme is, subject to natural change, to maintain the favourable condition of the site through the sustainable management of activities.

Ramsar Convention

RAMSAR (Iran 1971)

Global convention designating wetlands important for their habitat and species, particularly birds.

EU Birds Directive

SPA

Special Protection Area

Protected areas designated for important numbers of birds, including vulnerable and migratory birds.

EUROPEAN MARINE SITE

EU Habitats Directive

SAC

Special Area of Conservation

Protected areas designated for rare, special or threatened habitats and species.

The Humber Estuary has been heavily modified by human activities for over 2,000 years. It is estimated that half of its intertidal area has been lost due to land claim for agricultural and industrial developments. Its shape has also changed over time, initially through gradual drainage of land around the estuary head, with more substantial modifications in the main estuary since the 17th century. Channel shape within the estuary and its tributaries has also been modified for flood defence purposes and to improve navigation access.

Prior to human influence, the tidal Humber was probably over 90,000 ha, but has been reduced to a current area of about 30,000 ha!

Areas of habitat lost on the Humber Estuary (ha) since *c.* 1800

Estuary Location	Mud	Sand	Salt-marsh	Dune	Reed	La-goon	Sub-tidal
Inner	225	-	110	-	420	20	
Middle	1,700	300	200	-	50	-	20
Outer	690	400	110	-	-	-	10
Coast	400	600	100	100	-	-	-
Total	3,015	1,300	520	100	570	20	30

Source: HARBASINS (www.harbasins.org)

Humber Estuary Admiralty Chart dating from 1734

Aerial view of the Humber Estuary in 2009

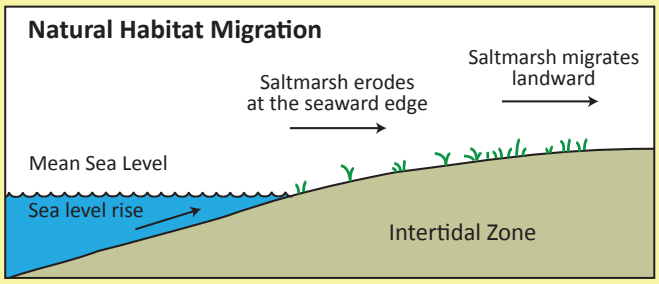
Intertidal habitat (those areas which are exposed to air at low tide but submerged during high tide) is currently being lost in the estuary due to coastal squeeze (see box opposite). This type of habitat is very important in providing food for birds and fish and reducing the impact of storm surges and extreme tidal events. A high value is thus placed on such habitat by regulators and a policy of "no net loss" has been implemented on the estuary. This means that any development project which will lead to a loss of intertidal habitat is required to provide compensatory habitat of a similar type.

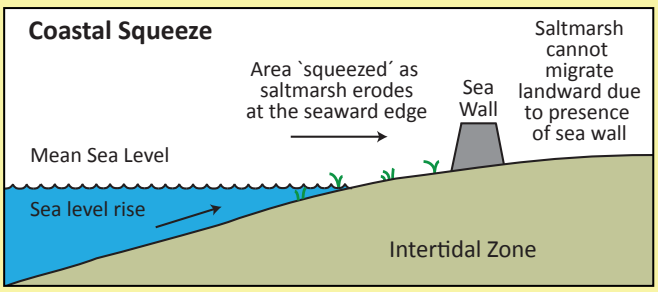
Subtidal habitat (those areas submerged under water at all times) has not been lost on the same scale as in the intertidal zone, although parts of the bed of the estuary are subject to modification through dredging work to maintain navigation channels. This process is now regulated and monitored and only occurs in limited areas of the estuary. The dredged material is disposed of within the Humber system to ensure there is no long-term loss of sediment.

The main challenge for estuary managers lies in allowing economic activity and development to continue within the estuarine system, such as expansion of the ports, against a background of large scale historical habitat loss, ongoing coastal squeeze and the possibility of more frequent storm events as a result of climate change.

WHAT IS COASTAL SQUEEZE?

The estuary is subject to a process known as "coastal squeeze", whereby ongoing relative sea level rise and the presence of extensive immovable flood defence embankments results in the gradual loss of intertidal habitat.





MANAGEMENT IN PRACTICE

Despite the history of large scale habitat loss in the estuary, there has been a small scale increase in some components of the intertidal area in recent years, both as a result of natural system responses as well as from habitat creation schemes including 'managed realignment' projects.

MANAGED REALIGNMENT
Managed realignment is the deliberate process of altering flood defences (where a flood defence is moved inland or set back from the river, estuary or coast) to allow flooding of a currently defended area. This allows for the development of habitats between the original line of the defence and the new line of the defence.

Both the Environment Agency and Associated British Ports (the main port operator in the Humber Estuary) have identified a series of such compensatory habitat sites. Schemes are already in place at Paull Holme Strays (80ha), Welwick (54ha), Chowder Ness (15ha) and Alkborough (440ha). Further sites have also been identified where future managed realignment may be used to compensate for both coastal squeeze losses and direct losses for port expansion.

Managed realignment can also be used as a means of flood management by reducing water levels in response to climate change and rising sea levels. Alkborough was designed with a dual purpose: creating habitat and reducing the impacts of sea level rise. Flooding the site will reduce extreme water levels up stream of Alkborough by up to 150 mm during a 1-in-200-year flood. The introduction of managed realignment sites constitutes a tool which is also part of the Humber Flood Risk Management Strategy. The maintenance of public safety against flooding is of prime importance in the Humber, given the low-lying nature of the surrounding area. The strategy, led by the Environment Agency, outlines a proposed approach for the sustainable management of flood risk around the estuary for the next 25 years and beyond.

Other management is carried out on an estuary-wide scale by Natural England, who are the government agency tasked with maintaining the components of the European Marine Site in favourable condition, with the Humber Management Scheme as a mechanism to bring together the management aims from a range of different estuary stakeholders with regards to nature conservation requirements.

Paull Holme Strays Managed Realignment Site

Alkborough Managed Realignment Site

Creation of Chowder Ness Managed Realignment Site

THE TIDE CONCEPT

Through the TIDE project, the challenge for the Humber Estuary is to undertake a process of 'joined-up environmental thinking' for estuarine management, whereby integration occurs across a range of sectors and scales.

The intention is to develop a strategy to move away from the traditional sectoral management approach to an integration of use and user in estuaries, taking into consideration the requirements of current European legislation to ensure the provision of both economic and ecological services.

The project also aims to deliver a framework for the sustainable management of critical environmental processes, areas and species whilst allowing ongoing and developing economic activity against a background of flood safety.

The Interreg IVB North Sea Region Programme
European Union
European Regional Development Fund
University of Hull Institute of Estuarine and Coastal Studies
Environment Agency
ABP
www.tide-project.eu