A HISTORY OF EAST HEAD

East Head is a sand and shingle spit on the east side of the entrance to Chichester Harbour. It has been formed by the process of longshore drift along the coastline between Selsey and West Wittering. The spit is attached to the mainland by what is known locally as the ‘Hinge’.

There are other sources of sediment supply to the shore and dunes of East Head. The most important is the large sand bank located off its’ western shore towards the entrance of the Harbour, known as ‘The Winner’. The Winner has been created by shoaling waves approaching the Harbour from the south and southwest.

As they enter the Harbour mouth the waves bend or refract as the water depth changes around the shape of East Head. Waves travel more slowly in shallow water compared to deeper water, causing the wave crest to bend. As the water slows down, it loses energy and deposits sand originally disturbed from the Solent seabed, building up the sandbank.

At low tide, a large expanse of The Winner is exposed. The surface sediment dries out and is then blown towards East Head by the prevailing onshore winds, providing a supply of sand to build up the sand dunes. In the sheltered area behind East Head, silt and clay have been deposited and a large area of saltmarsh has established.

Aerial image of EH at Harbour entrance - Google Earth

Saltmarsh behind East Head

The sand dunes of East Head

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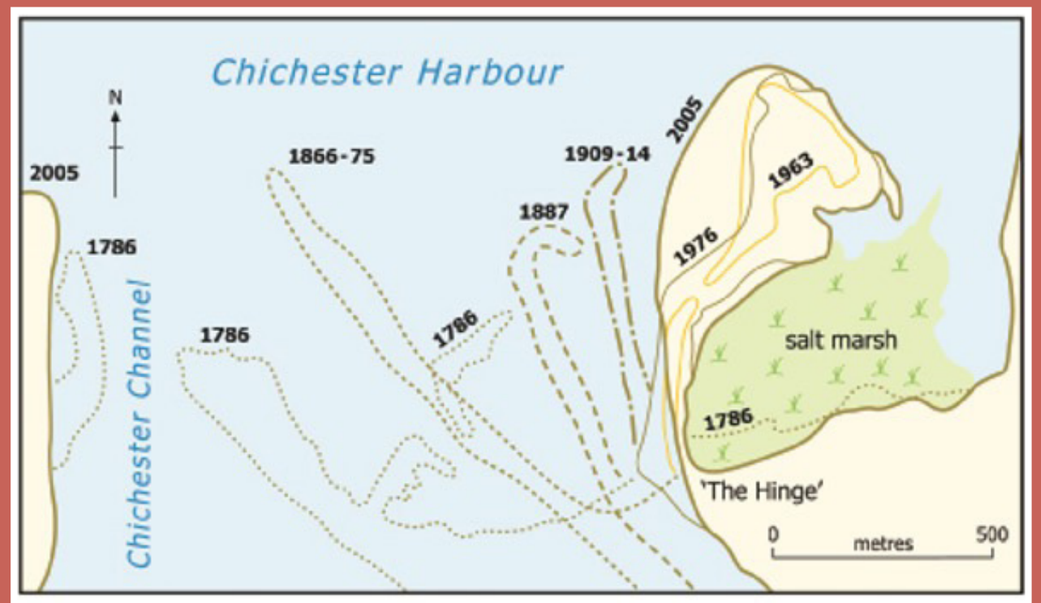
THE CHANGING COASTLINE



East Head: Retreat and Rotation, 1786 - 2005

THE FIRST BREACH

The first fully recorded breach of East Head occurred during stormy conditions in November 1963, when the sea cut a channel through the spit north of the Hinge. The map of East Head's Retreat and Rotation, 1786 -2005 shows the location of this breach. It was subsequently blocked by placing rock-filled gabions across the gap which then became buried under natural sand deposition.

Following this crisis, work was started by the Sussex Rivers Authority to strengthen and stabilise East Head. This work was continued by the National Trust who took over ownership in 1966. They erected brushwood fences at an angle to the prevailing onshore winds, close to the western edge of the sand dunes at that time. These helped to trap wind-blown sand and build up the dunes. Small wave screens were also built close to the northern tip of East Head to encourage beach build up. These management techniques substantially increased the total area of East Head.

In the early 1980s, the National Trust stopped this programme of work, as East Head was larger than at any time in its recorded history.

The earliest map showing a recognisable spit at the entrance to Chichester Harbour dates to 1587. At this time, the spit protruded across the entrance towards Hayling Island, continuing the southeast to northwest trend of the coastline. Over the next 250 years, the coastline steadily retreated due to frequent high energy erosive waves from the English Channel hitting the shore.

From about 1860 East Head began to rotate in a clockwise direction about the Hinge. As it did so, the Harbour entrance became wider, reducing the velocity of the flood and ebb tides. By 1930, East Head was lying in its current north to south orientation. The northern end of the spit was growing wider with a recurved end at its' furthermost tip. The Hinge was becoming thinner and lower, creating a very narrow 'neck' compared to the main 'head' end of the spit.

The onset of the significant changes to the orientation and shape of East Head coincide with the introduction of groynes in the 1840s along the Selsey to West Wittering coastline. These were constructed to stabilise the coastline and have been maintained almost continuously ever since. However, their presence has consequently reduced the amount of sediment flowing onto East Head. It is estimated that before any coastal management along the shoreline, the annual drift of sediment onto the Hinge of East Head was 70,000m^3; by 1980, this was calculated to be only 6,500m^3

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THE ERODING HINGE

During the 1970s, it became clear that the groynes were impacting on the supply of sediment onto East Head. Between 1975-8, several of these wooden barriers became less efficient at trapping sediment; consequently, some 7,000m^3 of sand and shingle were moved onto the hinge and neck of East Head. This area built up and grew substantially wider, however the benefits of this was relatively short term.

Following this large deposition of sediment, the groynes were repaired and upgraded, which included the construction of a new final groyne at the Hinge which is now numbered 24. The extra sediment at the neck of East Head was gradually transported to the northern tip of East Head by longshore drift, but it was not however replaced by new sediment moving around the Hinge. In the mid-1990s, erosion at the Hinge began to accelerate rapidly.

The reasons for this are not fully understood, but the supply of sediment had clearly been reduced by the work completed on the groynes and there appeared to be an increase in scouring around the end of groyne 24. Waves swirled around the end of this groyne removing sediment at a rapid rate. Between March 1999 and October 2004, erosion averaged 0.57m per month, peaking at more than 1m per month during 1998. There was a significant threat of storm waves causing a permanent breach at the hinge and neck, forming a second tidal entrance channel. This would be detrimental to the Harbour and bring several potential threats, such as the silting up of the deep-water channels and increased risk of erosion to the coastline.

At this time, a coastal management strategy for East Head had not been agreed and there was much debate about what should be done. Opinion was split between those who favoured a ‘do nothing’ approach (allowing East Head to return to its natural evolutionary behaviour) and those who supported coastal defence intervention. An agreement was finally made to place a natural rock berm along the landward slope of the Hinge and neck.

The rock berm was constructed in 2000, buried beneath a layer of sand taken from the northern tip of East Head and planted with marram grass. It was given a five-year conditional planning permit as it could not be certain that this technique would be effective and not have a negative impact on the dunes and adjacent saltmarsh. At the same time, groynes numbered 21-24 at the Hinge were shortened and lowered in height to increase the flow of sediment onto the neck.

THE NEAR BREACH OF 2004

In October 2004, a combined storm and tidal surge over washed the Hinge and the neck, causing it to be narrowed further and flattened. Some of the eroded sand was pushed landwards and spilled across the saltmarsh behind. This dramatic event might have been a full breach if the rock berm had not been present as it kept the residual spine of the Hinge and neck in place.

The debate on the long-term coastal management strategy continued, but as an immediate, short-term response 13,000m^3 of sand were recycled from the northern tip of East Head and brought back to rebuild the neck. Marram grass was planted to help stabilise the sand and encourage regeneration of the dunes at this location.

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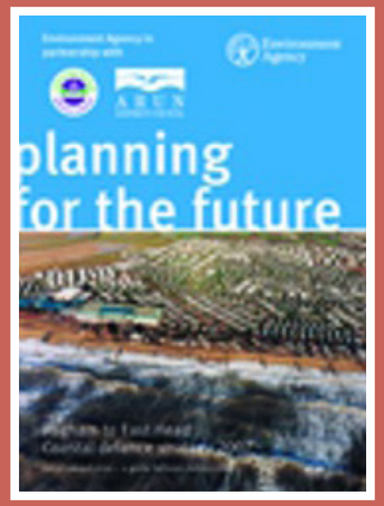
COASTAL DEFENCE STRATEGY AGREED

In November 2006, the Environment Agency released the first draft of the coastal defence strategy for the West Sussex coastline running from Pagham to East Head. As part of this strategy, the proposed management approach for East Head, was one of 'Adaptive Management' for the next 100 years. Local consultation took place, before the whole strategy was finally agreed in July 2008 by the Environment Agency in partnership with the Chichester District Council and the Arun District Council.

The aim of adaptive management for East Head is:

'to preserve the social, economic, environmental, navigational and amenity value of East Head to the community for the life of the strategy. The emphasis will not be on trying to lock the feature in its present size, shape and location, nor should it be encouraging orientation in a pre-determined direction'.

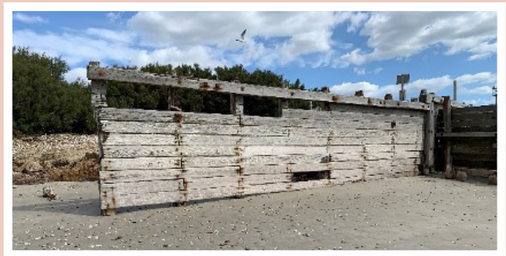
Adaptive Management is an on-going process and East Head has been actively monitored and managed under this strategy since it was agreed. The approach is to enable change to occur, but with controlled and measured responses. It is overseen by the East Head Coastal Issues Advisory Group (ECHIAG). Their role is purely advisory and seeks to ensure management decisions are well informed and based on the best available information. Under this strategy, a range of sea defences and techniques are used that work in combination with natural processes, helping to protect and stabilise the spit.

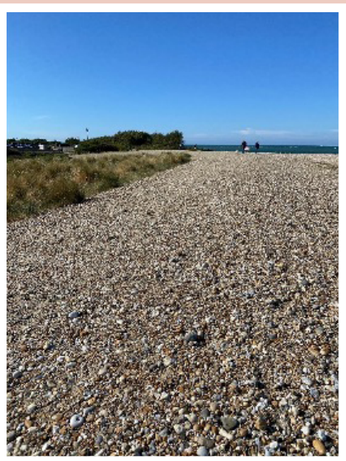


(See East Head – Coastal Management Strategy)

In 2009, the hinge and neck were recharged with 9000 tonnes of sand and shingle taken from the northern tip of East Head. This was carried out in preparation for the failure of the breastworks at the Hinge that were clearly deteriorating and to provide sufficient beach-width to allow natural re-alignment of the coastline.

Damaged gabions were removed between groynes 23 and 24 encouraging a more natural beach profile to develop. Planking was lowered on groyne 22 to allow the onward movement of shingle around the Hinge and raised on groyne 24 to retain shingle.





In 2015 the wooden breastworks at the Hinge were starting to fail and the land behind was beginning to erode. Plans were being made to commence the gradual removal of this breastwork, to allow a natural sloping beach to develop and for the coastline to re-align.

In January 2016, a further 2.5 tons of sand and shingle were moved to the Hinge forming a bund and raising the height of the ground level by 2metres. This was to ensure that the height of the land behind the breastwork was sufficient so that it would not be over washed by a tidal storm surge after this defence was removed.

Since this time, the gradual removal of the wooden breastwork has continued, allowing the beach profile to naturally evolve slowly and steadily, whilst keeping the area safe for visitors. The coastline is gradually realigning whilst being closely monitored, and time will tell where the edge will finally lie. But the main objective to ensure that access to East Head is maintained and a tidal breach is prevented, will continue to guide the on-going management decisions and intervention.

ON-GOING ADAPTIVE MANAGEMENT

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THE EAST HEAD TIMELINE

1587 Earliest map to show a spit at the Harbour mouth

1840 Groynes built along the Selsey to West Witterings coastline

1860 East Head begins to rotate clockwise with the Hinge staying stationary. Entrance to Harbour becomes bigger.

1930 East Head has a south to north orientation. North end getting wider and neck getting thinner.

1963 A breach is caused by storm conditions.

1964 Dune stabilisation and building work begins

1966 The National Trust take over ownership of East Head

1980 The groynes are repaired and upgraded.The National Trust discontinue their dune building work.

1995 The rate of erosion begins to increase rapidly at the Hinge and neck.

1998 The rate of erosion reaches 1m per month.

2000 The rock berm is constructed, creating a hardened ‘spine’ for the Hinge and neck.

2004 The Hinge and neck is overwashed, leaving it narrowed and flattened.

2005 13,000m³ of sand and shingle are moved from the northern tip to the Hinge and neck.

2006 The Environment Agency release the first draft of the ‘Pagham to East Head Coastal Defence Strategy’.

2008 Coastal Defence strategy is agreed. The approach for East Head is Adaptive Management.

2009 The Hinge and neck is recharged with 9000 tons of sand and shingle recycled from the tip of East Head.

2015 The wooden breastworks at the hinge start to fail.

2016 A further 2.5 tons of shingle and sand are moved to the Hinge, creating a bund. The gradual removal of the wooden breastworks begins and the coastline at the Hinge starts to realign.

2019/20 High rainfall and storm surges during the winter months causes dramatic erosion along the western face of the sand dunes.

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