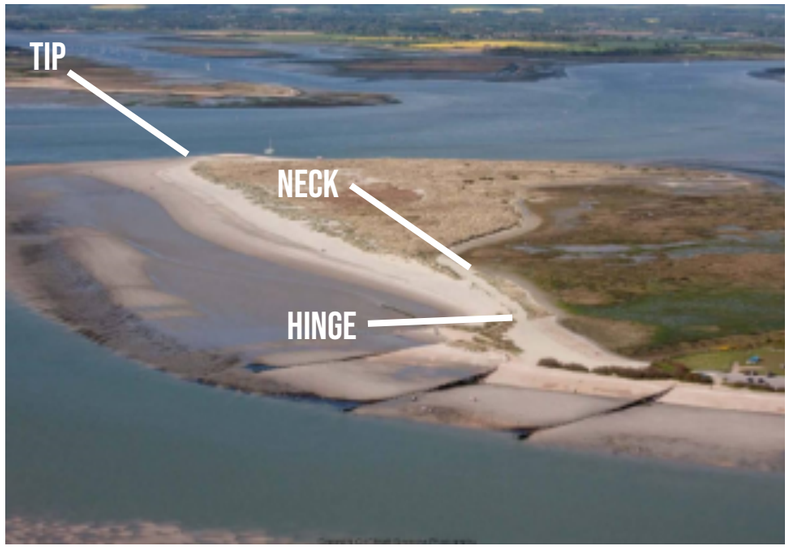
EAST HEAD
COASTAL MANAGEMENT

East Head is an important **sand and shingle spit** at the entrance to Chichester Harbour AONB. It was formed by the process of **longshore drift** and over the years a **sand dune** habitat has established upon it. The point at which East Head connects to the mainland is known locally as the **'Hinge'.**



Over the last two centuries, East Head has been slowly rotating clockwise about the Hinge and now lies with a North-South orientation ***(see History of East Head)***. It remains a **dynamic environment** and its shape is continually changing as a result of natural processes and human intervention.
The northern end of the spit is currently over 400m wide but it narrows to less than 25m at the narrowest point, known as the 'neck'. The hinge and the neck are particularly vulnerable to the threat of coastal erosion and being breached (broken through) by the sea. The management of East Head is a complex task and there are many stakeholders whose views need to be taken into consideration. A range of coastal defence techniques are being used under the current coastal management strategy of **'Adaptive Management.'**

WHY IS EAST HEAD IMPORTANT?
WHY DOES IT NEED TO BE PROTECTED?

The rare sand dune habitat on East Head is an important part of the **AONB (Area of Outstanding Natural Beauty)** landscape. It is a Site of Special **Scientific Interest (SSSI)** and has international designation as a **Special Area of Conservation (SAC), Special Protection Area (SPA)** and as a **Ramsar Site** because of its importance for coastal birds.

East Head is used for **recreation** by many thousands of walkers and tourists every year. It is a popular destination during summer months for family picnics and amongst the many harbour sailors who anchor their boats at the northern tip for a welcome rest during a day's sail.

The spit also provides some **vital protection** to the rest of the Harbour coastline from erosion and flooding. Its location narrows the entrance, helping to keep the harbour sheltered. Houses on the southeast shoreline of the harbour are partially shielded from storm waves, significantly reducing their risk of erosion and flooding. The calmer and sheltered water provides protection to the large number of yachts and boats that use the Harbour.

WALKERS ON EAST HEAD - CONSERVANCY

A PLOVER - COURTESY OF WILDLIFETRUST.ORG

CHICHESTER HARBOUR CONSERVANCY

WHO IS INTERESTED IN THE MANAGEMENT AND PROTECTION OF EAST HEAD?

East Head is owned and managed by the **National Trust**. They manage and protect the sand dune habitat whilst enabling access for visitors. As it is a SSSI, **Natural England** also play an important role in its management.

The **Conservancy** are interested in the management of East Head for two reasons. Firstly, it is a valuable habitat within the AONB and secondly the Conservancy is a Harbour Authority and has responsibility for navigation within the harbour. If the hinge/neck of East Head is breached (broken through by the sea) it may have a significant impact on the flow of water through the harbour entrance, therefore affecting the deep-water channels and ultimately the use of the harbour for recreational sailing and marine related businesses.

The management of the coastline along West Wittering beach and East Head falls under the responsibility of **Chichester District Council** in conjunction with the **Environment Agency.**

People who own property or businesses around the harbour or use the harbour for recreational purposes also have a vested interest in how East Head is managed and how this potentially impacts on the harbour and its coastline. All these groups are known as the **stakeholders**.

LIST OF STAKEHOLDERS:

National Trust	Natural England
Chichester Harbour Conservancy	Chichester District Council
Sailing Industry *(e.g. sailing clubs, marinas, boat yards, sailing schools)*	Fishing Industry
West Wittering Estate	Landowners within the AONB *(e.g. farmers,/private individuals)*
Residents in the AONB	Parish Councils
Tourism Industry within the AONB (e.g. hotels, pubs, café, boat trips)	

WHAT IS THE COASTAL DEFENCE STRATEGY FOR EAST HEAD?

In 2008, the coastal defence strategy of **'Adaptive Management'** was agreed for East Head and West Wittering for the next 100 years. It forms part of the **'Pagham to East Head Coastal Defence Strategy'** which was produced by the Environment Agency in conjunction with Chichester and Arun District Councils following local consultation. As with any coastline, it is important to consider how a whole stretch of coastline will be managed, rather than focus on one small section of coast in isolation. This is because coastal defences along one section of coastline, will have a knock-on effect further along the coast which needs to be taken into consideration.

The aim of adaptive management for East Head is to:

"MAINTAIN THE SOCIAL, ECONOMIC, AMENITY, ENVIRONMENTAL AND NAVIGATIONAL VALUE OF EAST HEAD, BUT WILL NOT TRY TO LOCK THE FEATURE INTO ITS CURRENT SHAPE, SIZE OR ORIENTATION".

In other words, the aim is to work with natural processes to achieve an equilibrium between the land and the sea. Implementing a flexible strategy that prevents a breach at the Hinge/Neck and the potential threats this may bring to the Harbour. The strategy also aims to maintain public access to East Head at all states of the tide whilst preserving the valuable habitat and aesthetics of the natural landscape.

Adaptive Management is an on-going process. East Head is actively monitored and there are agreed actions in place when certain trigger points are reached. (These trigger points include measurements such as critical changes in the height or width of the neck). However, decisions also need to be flexible to adapt to natural events that impact on the coastline and are very unpredictable.

The strategy is overseen by the East Head Coastal Issues Advisory Group (EHCIAG).
The purpose of EHCIAG is to monitor changes at East Head and to react to these changes. EHCIAG's role is purely advisory and seeks to ensure management decisions are well informed and based on the best available information.

EHCIAG
East Head Coastal Issues Advisory Group
East Head Adaptive Management

Advising on Coastal Defence Policy

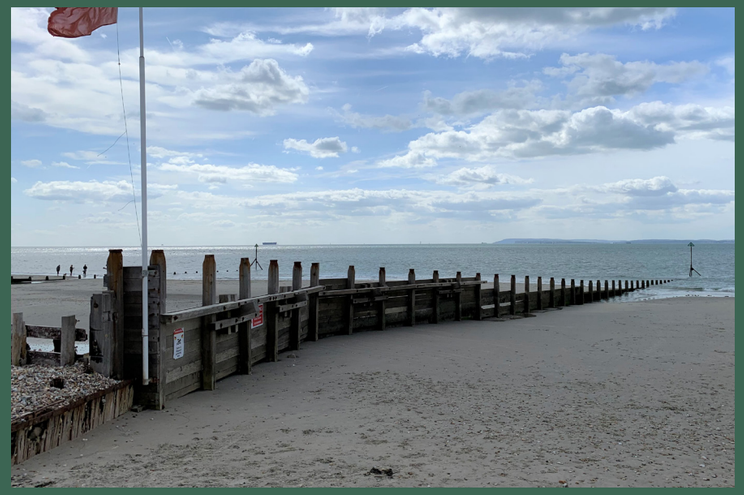
CHICHESTER HARBOUR CONSERVANCY

WHAT COASTAL DEFENCES ARE USED AT WEST WITTERING AND EAST HEAD?

The coastal defences used include both **hard** and **soft** engineering techniques. Hard engineering techniques are man-made structures built to control the sea and reduce erosion and flooding. Soft engineering techniques are schemes working with natural materials and processes used to slow down erosion and reduce the effects of flooding. All the coastal defences at East Head and West Wittering are working together under the adaptive management strategy to protect the coastline.

GROYNES

The groynes were first built during the mid-1800s along the coastline from Selsey to West Wittering. The shoreline was being heavily eroded by the large, destructive waves from the open sea and people wanted to protect these popular beaches.



Groynes are timber barriers that stretch from the top of the beach down into the sea. They are an example of a hard sea defence. They slow down the process of longshore drift by trapping the sand and shingle and building up the beaches.

The ends of the groynes are indicated by the triangle marker posts to assist sailors to navigate around them. By studying the sediment height either side of the groynes you can see how effective they have been in building up and stabilising the beach. Some of the groynes are now completely buried under the sand and all that is visible is the triangle marker!

Interestingly, soon after the groynes were first constructed, the orientation of the spit started to shift and gradually rotate to the current North-South orientation ***(see History of East Head)***. This is likely to be because the flow of sand and shingle onto East Head from the process of longshore drift was now reduced.
The last 4 groynes constructed at the Hinge (numbers 21-24) are critical for controlling the flow of sediment around onto East Head. These groynes are regularly monitored under the adaptive management scheme to ensure they are working effectively.

GABIONS

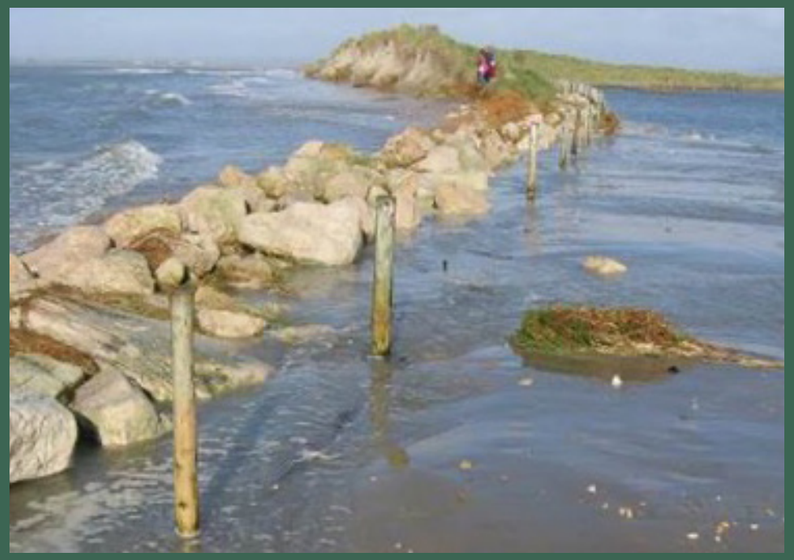
Gabions are a wall of wire cages, filled with medium sized rocks that act as a barrier to protect the edge of the coastline. They have been used over the last 60 years at several points to strengthen the hinge of East Head and are another example of a hard sea defence.

The photograph shows the gabions that were once situated across the groyne field between groynes 23 and 24. Gabions are effective as they absorb the energy of the waves when they are hit and are relatively cheap and easy to build. However, the wire cages corrode overtime, the walls lose their structure and effectiveness and must be gradually removed for safety reasons. Today only a small section of gabions remain at the hinge as natural processes are gradually building up a sloping beach, which is thought to be more stable and sustainable under the adaptive management strategy.

CHICHESTER HARBOUR CONSERVANCY

THE ROCK BERM

Lying beneath the neck of East Head, now completely hidden from sight, is a rock berm. This is a line of larger boulders that act as a ‘spine’ to strengthen the neck and is an example of a hard sea defence. The boulders were laid on the east side of the neck in 2000 to help strengthen this section of East Head and reduce the risk of it being breached. The picture shows the rock berm exposed in 2004 following a period of dramatic erosion. This event proved the rock berm to be a valuable defence, as without it, a full breach may have occurred, and it would have been significantly more difficult to rebuild the neck again.

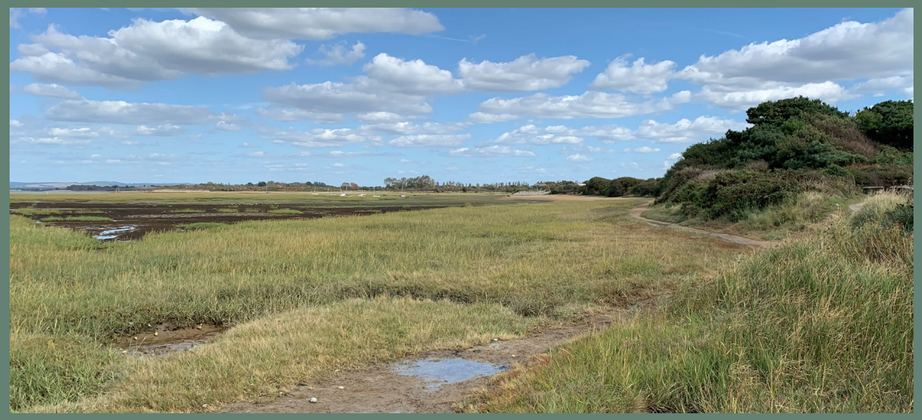


BEACH NOURISHMENT AND MARRAM GRASS PLANTING

Following the erosion of the neck in 2004, the neck was re-established using the soft engineering techniques of beach nourishment and marram grass planting. 13,000 tons of sand and shingle were removed from the far northern tip of East Head and transported back to cover the rock berm and form a foundation at the neck. Marram grass was then planted to promote the regeneration of the sand dunes.

This grass has long deep roots that spread outwards helping to trap sand. As it gets buried in sand, it continues to grow upwards encouraging dunes to grow in height. In 2009, a further 9 tons of sand and shingle taken from the northern tip were added to the neck to help increase its’ stability. The sand dunes have continued to accrete since this time and the neck has regenerated successfully. However, it is closely monitored under the adaptive management scheme as sand dunes are fragile and if the neck becomes vulnerable again further defence action may be required.

SALTMARSH



The water on the east side of East Head is known as Snowhill Creek. This sheltered environment has enabled a large area of saltmarsh to develop and establish. Saltmarsh is not only an important habitat within the Harbour, but it also acts as a soft sea defence. It helps to absorb some of the energy of the waves that wash over it, therefore reducing the erosional power of the waves that reach the edge of the harbour coastline.

CHICHESTER HARBOUR CONSERVANCY

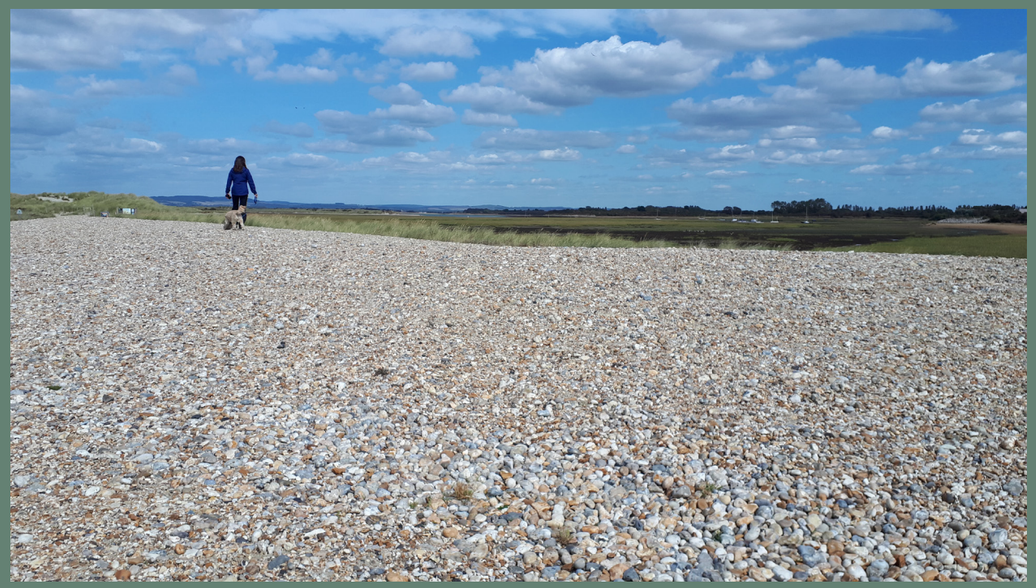
SEA WALL

A wooden sea wall runs along the back of West Wittering beach and around the hinge of East Head. Much of the wall is now buried by shingle and sand and can no longer be seen. A sea wall is a hard sea defence and reflects waves back out to sea. It acts as a barrier to prevent erosion and flooding of the land behind it.

Unfortunately, when waves hit a sea wall and are reflected out to sea, it creates a strong backwash which can cause a scouring effect at the foot of the wall, eroding the beach material in front of it. Sea walls are also veryexpensive to build and maintain.

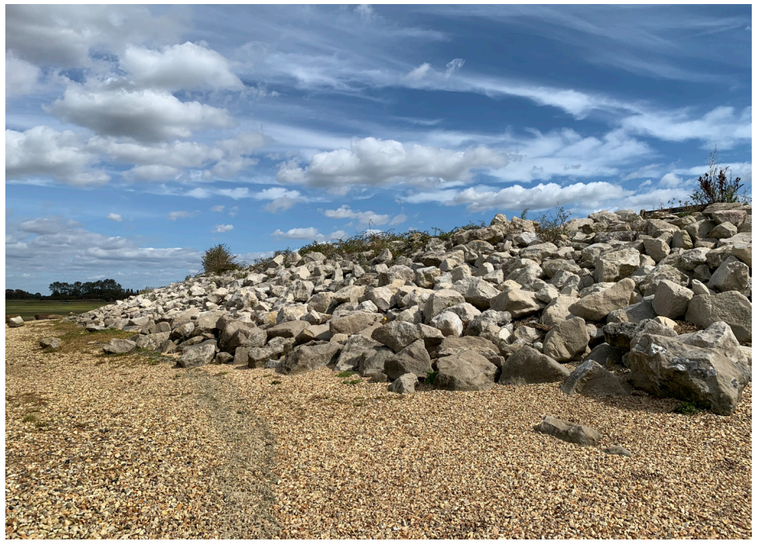
Within recent years, the sea wall at the hinge started to deteriorate and was reaching the end of its effective life. Rather than replace it, the timber wall is gradually being removed to enable a more natural sloping beach to develop. Under the adaptive management scheme, the edge of the coastline at the hinge will be realigned through the sea's natural processes, creating a sloping beach that will help to absorb some of the energy of the waves and stabilise the beach. Scientific studies predict that this will be more sustainable than continuing to fight against the sea's increasingly challenging natural processes.

SHINGLE BUND



In January 2016, prior to commencing the removal of the sea wall at the hinge, a shingle bund was created north of the beach along the centre of the hinge. 2.5 tons of sand and shingle were transported from the northern tip of East Head to this area. It was spread out along the centre of the hinge and blended into the profile of the landscape to raise the height of the ground level by 2m. This was to increase the level of defence at the hinge during the gradual removal of the sea wall and prevent it from being breached by the sea. It is a form of soft sea defence.

ROCK ARMOUR



The coastline on the east side of Snowhill Creek is protected from the full impact of storm waves by the position of East Head. However, this low-lying ground is still vulnerable to erosion and flooding, placing housing and property at risk. In 2012 a new sea defence was constructed to replace an existing concrete revetment that was being over washed by spring high tides and flooding the land behind. The new defence has raised the embankment by 1.5m and rock armour (also known as rip-rap) has been placed along the edge. Rock armour is a hard sea defence and consists of piles of boulders sloping up the edge of the land. It absorbs the energy of the waves as the water can pass between the boulders and hence reduces the risk of erosion. The boulders however can be moved around by very strong waves and therefore sometimes need to be replaced.

REFERENCES

West Wittering Parish Council – EHCIAG

http://www.westwitteringparishcouncil.gov.uk/east-head-costal-issues-advisory-group

Pagham to East Head Coastal Defence Strategy

https://www.gov.uk/government/publications/pagham-to-east-head-coastal-defence-strategy/pagham-to-east-head-coastal-defence-strategy

CHICHESTER HARBOUR CONSERVANCY