

6. South-West Heritage Sites - Case Studies

6.1. Identification of heritage sites currently or potentially at risk

The task of identifying potential coastal heritage sites in Dorset, Devon, Cornwall and Somerset involved three stages. The first of these was the development of a long list of possible sites of interest; these were gathered from a range of sources. First, from studies and investigations by English Heritage and Historic England, such as the '*South West Heritage At Risk*' report (Historic England, 2015¹), the Rapid Coastal Zone Assessments (RCZAS) that have been undertaken to date or are being progressed across the study area, the second round of Shoreline Management Plans, and discussions with heritage officers and coastal engineers within the local authorities and coastal groups, together with many other consultees. It is important also to note that much of the south-west coast may have undiscovered archaeological/heritage potential and, therefore, future changes to the coast are likely to expose further sites of great interest.

In parallel, a further review was made of reports relating to coastal erosion, cliff falls, landslides and flooding in the south-west through internet searches and newspaper and scientific article reviews. As a result of this wide-ranging research, a list of one hundred and seventy-six potential locations, comprising either coastal frontages or individual sites, was compiled. The second stage involved a review of these sites in order to establish those locations, which were not only affected by coastal risks, but also offered the best range of examples of heritage assets that might be affected by coastal change. This review was achieved through a second round of meetings with local authority Historic Environment officers. After this review, taking account, in particular, of the useful advice from heritage officers, the list was reduced to one hundred and four sites.

Bearing in mind that the purpose of the 'CHerISH' study is to illustrate how historical images (oil paintings, watercolour drawings, prints, old photographs and postcards) can inform heritage management; it was then necessary to ascertain whether there were sufficient suitable images to illustrate the point of this study at those locations identified as having heritage assets at risk.

The south-west of England has a very rich artistic heritage and was the venue for many of our leading artists in the late eighteenth, nineteenth and early twentieth centuries in particular. As a result, most of the locations identified as being at risk did have artworks of some kind to draw upon. Some locations were much better served than others, and the successes and limitations of the use of art to inform heritage risk management is drawn out both within the individual case study examples and also in the analysis of the results (see Section 6.4 below). Following the artistic appraisal of the various heritage sites, a final list of eighty-four locations was confirmed; this list is provided in Appendix two of this report. These sites were then grouped logically to form the project case studies.

For each of the twenty-three case studies, a concise summary page is provided at the beginning, which sets out the following key information:

1. Location
2. Why was the Case Study site selected?
3. Summary of the Geology, Geomorphology and Coastal Processes
4. Risks to Heritage Assets along the Case Study frontage
5. How can historical imagery inform Heritage Risk management?
6. Key issues – What can be learned from the site?
7. References.

The case studies commence at the Hampshire/Dorset County Boundary near Christchurch, and continue westwards along the Dorset and south Devon coasts to Cornwall and the Isles of Scilly. They continue up Cornwall's northern coast and those of Devon and Somerset, to the north-eastern project boundary at Clevedon. Of the twenty-three case studies, twenty are site specific, whilst three are generic in nature. The site specific case studies generally cover a short frontage and examine issues such as erosion, cliff instability, flooding and coastal change policy and its impacts on cliff base and cliff top heritage. By contrast, the generic case studies, which cover 'Cornish Harbours', 'Cornish Cliff Castles' and 'Mining and Civil Engineering Heritage in South-West England', provide and describe, through numerous examples, approaches to risk management and planning, as well as illustrating the potential for images to support our understanding of these topics.

In discussions with local authority staff in particular, the value of the range of images, particularly of the coastal towns and villages, which plot the patterns of development and change over time, proved to be of great interest. For example, at Torquay, Plymouth and many of the smaller coastal towns and villages which saw rapid change in the Victorian and Edwardian periods in particular, artworks provide a wealth of information on the development, alteration and, in some cases, loss of heritage features. As a result, examples of the way that such images can be interpreted successfully and used to support Conservation Area policy and planning policies, are provided. The full list of case studies is provided below:

CHerISH PROJECT CASE STUDIES – COASTAL CHANGE ISSUES AND HERITAGE INTERESTS

A. Dorset

1. Highcliffe – Hengistbury Head

Historical erosion and flooding issues; coastal change policies. Highcliffe Castle frontage, Christchurch Priory and Hengistbury Head.

2. Poole Harbour

Flooding and coastal change issues and policies. Brownsea Island and Studland.

3. The Isle of Purbeck

Erosion & cliff falls; Swanage Bay, Durlston, Windspit Quarries, St Aldheim's Head.

4. Clavell Tower and Kimmeridge Bay

Erosion; coastal change policy. Clavell Tower case study, Kimmeridge Quay.

5. Lulworth Frontage

Coastal erosion; earthworks, field systems.

6. Weymouth & the Isle of Portland

Erosion, cliff falls; castles, lighthouses, harbour breakwater.

7. West Bay to Lyme Regis

Coastal erosion and landsliding. West Bay Harbour and The Cobb.

B. South Devon Coast

8. Beer

Erosion and instability. Cliff top heritage sites.

- 9. Sidmouth**
Erosion and cliff instability. Shoreline and cliff top heritage; numerous listed buildings and Conservation Area.
- 10. Exmouth & Exe Estuary**
Erosion and flooding impacts on heritage.
- 11. Dawlish to Teignmouth**
Erosion risk. Dawlish Warren. Cliff top heritage and coastal settlements.
- 12. Babbacombe and Torquay**
Coastal erosion and cliff instability. Changing development patterns and heritage losses. Images interpretation. Conservation Areas.
- 13. Start Point to Salcombe**
Coastal erosion. Cliff top heritage sites.
- 14. Plymouth**
Development patterns; images interpretation; military history; Conservation Areas.
- C. Cornwall and the Isles of Scilly**
- 15. Cornish Harbours Studies**
Generic study of issues surrounding the illustration and the conservation of Cornish harbours.
- 16. St Michael's Mount**
Flooding and sea level rise. The Mount, The Causeway and shoreline heritage.
- 17. Prehistoric Promontory Forts and Later Cliff Castles**
Generic case study of the illustration of castles and the cliff instability and erosion impacts on heritage.
- 18. The Isles of Scilly**
Coastal erosion. Military heritage.
- 19. SW England Mining and Civil Engineering Heritage Study**
Generic case study illustrating the depiction of mining and other infrastructure sites and how they have been illustrated through art.
- D. North Devon Coast**
- 20. Hartland Point to Clovelly**
Cliff instability and erosion. Cliff top fortifications. Embury; Clovelly.
- 21. Ilfracombe**
Coastal management. Patterns of development change.
- 22. Exmoor Coast**
Coastal erosion and cliff instability. Cliff top heritage sites; Lynmouth and Porlock.
- 23. Minehead to Clevedon**
Coastal erosion and flood risk. Coastal development patterns. Conservation Areas.

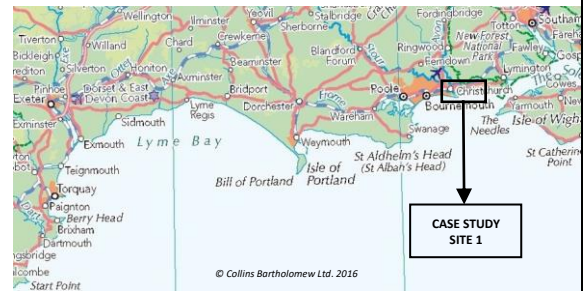
References

1. Historic England, 2015. *'Heritage at Risk – South-West Summary'*.

Case Study Site 1 – Highcliffe to Hengistbury Head, Dorset

1. Location

The study site extends from the Dorset - Hampshire border close to Highcliffe Castle westwards to include the Christchurch harbour frontage and Hengistbury Head; a total distance of 8km.



2. Why was the Case Study Site selected?

This site was chosen because it includes the soft cliff frontages at Highcliffe and Hengistbury Head that have been susceptible to coastal erosion, together with potential flooding issues within Christchurch Harbour. Over the last two centuries the study site has illustrated the impacts of coastal change on heritage assets, including the former Old High Cliff House, and Hengistbury Head, which was a defended site during the Iron Age.

3. Summary of the Geology, Geomorphology & Coastal Processes

The geology of this frontage comprises silts, sands and shelly clays of the Solent Group, Bracklesham and Barton Groups of the Eocene and Oligocene epochs. Historical accounts suggest maximum erosion rates of up to six metres a year after severe storms, although the average rate of cliff retreat over the last century prior to the construction of coastal defences averaged one metre per annum.

The direction of sediment transport in Christchurch Bay is from west to east with cliff and coastal slope erosion contributing to the sediment inputs. Sediments are also driven onshore by waves from Christchurch Bay both to the south of Hengistbury Head and to the east of Christchurch Harbour (New Forest DC & Halcrow, 2013²).

4. Risks to Heritage Assets along the Case Study Frontage

Working from east to west, coastal erosion has proved to be a significant risk to heritage in the past. The former Old High Cliff House was constructed by the third Earl of Bute from 1775; Lancelot 'Capability' Brown landscaped the grounds (Stevenson, 2016¹).

Figures 1.1 and 1.2 overleaf show views of the old house from the sea and from the east, whilst Figure 1.3 shows the grand north façade. A pair of elegant circular temples and a gazebo adorned the cliff edge. (See Figures 1.4 and 1.5). The unstable nature of the cliff can be observed in Figure 1.5 and rapid coastal erosion led to the loss of the temples and necessitated the demolition of the property from 1813.

The new Highcliffe Castle (Figure 1.6), a Grade I Listed Building, was constructed by Baron Stuart de Rothsay from 1830, and was set back much further from the cliff edge. The relative positions of Old High Cliff House and Highcliffe Castle are plotted on the 1980 Ordnance Survey map and indicate the extent of erosion at that time (Figure 1.7).

The frontage is now protected through cliff drainage works, together with rock groynes and beach replenishment (Figure 1.8).



Figure 1.1: *'High Cliff from the Sea'* by Adam Callader. Oil on Canvas. 1783. This view shows the proximity of the mansion to the unstable cliffline. By 1813 the property had to be demolished.

Image Courtesy of V. & A. Images.



Figure 1.2: *'High Cliff from the East'* by Charles Stewart. Oil on Canvas. 1783. The view shows the relationship between the house and the cliff. Christchurch Priory and Hengistbury Head can be seen in the distance.

Image Courtesy: Private Collection.



Figure 1.3: *'High Cliff'* showing the north façade by Charles Stewart. Oil on Canvas. 1783.

Image Courtesy: Private Collection.



Figure 1.4: *'High Cliff Mansion'* after its wings had been removed to make the residence a more manageable size. Brown wash watercolour by Elizabeth Fanshawe. 1811. The pair of temples or gazebos may have been lost as a result of coastal erosion and instability.

Image Courtesy: Ian Stevenson Collection.



Figure 1.5: *'Capability' Brown's early Beach Hut* on the cliffs below High Cliff Mansion. Workers can be seen repairing the slope and path down the obviously unstable cliff.

Image Courtesy: Ian Stevenson Collection.



Figure 1.6: *'Highcliffe Castle'* today. The Grade I Listed Building is set well back from the cliff. The Castle represents an early example of adaptation to a rapidly changing coastline.

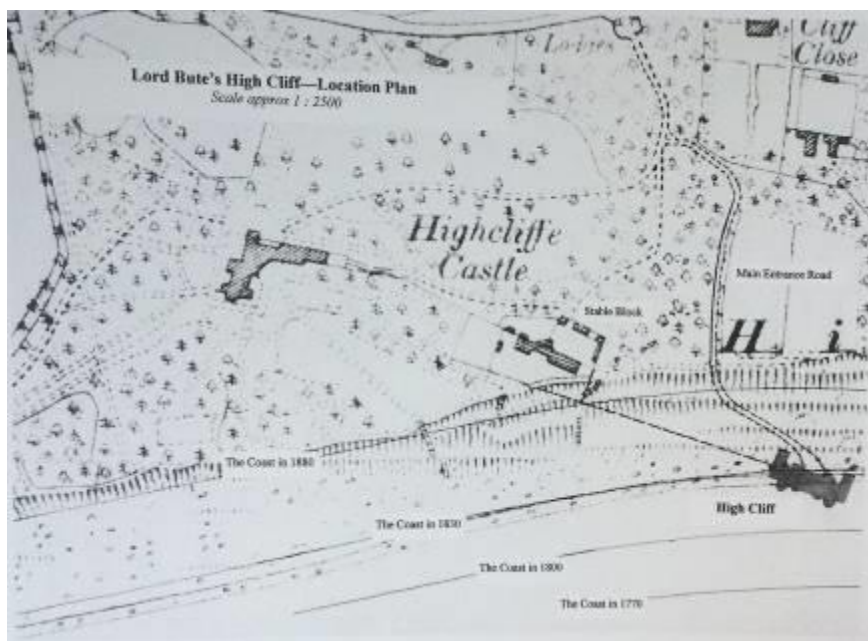


Figure 1.7: A map showing the relative positions of old High Cliff House and Highcliffe Castle plotted on the 1908 Ordnance Survey Map. The extent of land loss up to 1908 is clearly visible bearing in mind the old house was constructed perhaps 100-150 metres back from the cliff.

Map OS Crown Copyright.

Image Courtesy: Frank Tyhurst



Figure 1.8: Highcliffe beach today. The rock breakwaters, beach replenishment and cliff works help to protect the frontage. The frontage has a 'Hold the Line' coastal protection policy for the next Century.

Image courtesy of J. Salmon Ltd of Sevenoaks.

On the northern side of Christchurch Harbour lies the medieval town of Christchurch, which contains a designated Conservation Area with numerous Listed buildings (including five Grade I), and ancient monuments. One of these, Christchurch Priory, is located between the northern bank of the River Stour and the western bank of the River Avon. The area is partially defended by floodwalls, which offer some protection to the Priory Quay frontage. However, the walls have been classified by the Environment Agency as non-flood defence structures and consideration is being given to improving the flood defences in the area (New Forest District Council, 2013²). The picturesque Priory was a subject chosen by many artists from William Daniell RA (Daniell & Ayton, 1814-1825³) who painted it in 1825 (Figure 1.9) to the painter in oils, Sidney Pike in 1896 (see Figure 1.10). Later the prolific watercolourists and colour postcard artists Alfred Robert Quinton and Henry Wimbush painted the Priory in its waterside setting (Figures 1.11 and 1.12; Figure 1.13). The artist David Addey (Addey, 2002⁴), whilst retracing William Daniell's journey round the British coast, painted a watercolour of the same view in 2002 (Figure 1.14).



Figure 1.9: *'Christchurch'* by William Daniell RA. A hand-coloured aquatint engraving from his *'Voyage Round Great Britain'* (1825). Daniell was a fine, accurate draughtsman as well as a topographical artist. See also David Addey's view from the same location in 2002 (Figure 1.14 below).

Image Courtesy: Private Collection.



Figure 1.10: *'Christchurch Priory'*. An evening scene in oils by Sidney Pike painted in 1896.

Image reproduced with kind permission of the Russell Cotes Museum and Art Gallery, Bournemouth.



Figure 1.11: *'Christchurch Priory'* by the prolific watercolourist and colour picture postcard artist, Alfred Robert Quinton (c.1920). Quinton's work is generally very accurate and his output of over 4,000 British coastal views, like Daniell a century before, provide a virtual 'state of the coast' report for the time.

Image Courtesy: J. Salmon Limited of Sevenoaks.



Figure 1.12: A further fine watercolour of 'Christchurch Priory' by A. R. Quinton (c.1920). Water levels in these two views can be noted for comparison over time.

Image Courtesy: J. Salmon Limited of Sevenoaks.



Figure 1.13: 'Christchurch Priory' by Henry B. Wimbush (c.1910) who was a postcard and book illustrator who worked for Raphael Tuck (postcards) and A. & C. Black (publishers). The condition of the Priory buildings and their proximity to the water's edge is shown very clearly.



Figure 1.14: 'Christchurch Priory' by David Addey; a watercolour painted in 2002 replicating Daniell's view. The Priory and adjacent buildings are now largely obscured by trees although the eleventh century Place Mill, on the right, is still visible.

Image Courtesy of David Addey.

Hengistbury Head runs eastwards from Bournemouth for a distance of approximately 3km, and protects Christchurch Harbour from the prevailing south-westerly storm waves. The location is particularly well-known for the ‘*Double Dykes*’ which are at the seaward end of the Head. During the Iron Age the headland was defended by this parallel pair of dykes that ran from the sea to the south across Hengistbury Head to Christchurch Harbour to the north. The site is a Scheduled Ancient Monument and the frontage is defended by a substantial beach along the south side, which is controlled by rock groynes. The Long Groyne, and the seventeen associated groynes sited due north of it at Hengistbury Head, fulfil a key coast protection function. Because of the nature of this landscape it was not chosen by many artists as a subject in the past and there are very few historical artworks. A view from Hengistbury Head towards High Cliff was painted in watercolour by Nicholas Pocock in the nineteenth century (Figure 1.15), and, later, in the mid-nineteenth century an oil was painted by A. L. Baldry looking along Hengistbury Head towards Mudeford, which shows the ‘*Double Dykes*’ in 1890 (see Figure 1.16).



Figure 1.15: ‘*Christchurch and Old High Cliff House*’ viewed from Hengistbury Head. A watercolour by Nicholas Pocock (1740-1821). This general view was probably a sketch for a future studio work – possibly for High Cliff House.

Image Courtesy: The Red House Museum, Christchurch.



Figure 1.16: ‘*Mudeford from Hengistbury Head*’. An oil on Canvas painted in 1890 by A. L. Baldry. The ‘*Double Dykes*’ are visible in the middle of the painting. There are few artworks of Hengistbury Head perhaps because the location was not seen as sufficiently ‘*Picturesque*’ by visiting artists.

Image by kind permission of the Russell Cotes Museum and Art Gallery, Bournemouth.

5. How can historical Imagery inform heritage risk management?

In the case of the Highcliffe frontage, the impacts of erosion led to the loss of High Cliff House and an apparent lack of awareness of the rate of coastal retreat at that time. The images, however, provide a wealth of information on the property, architectural detail and the nature of coastal change. Historic evidence suggests that erosion rates of in excess of 1m per annum are likely to be experienced if defences are not maintained, and this rate would be likely to increase as a result of more changeable weather patterns and rising sea levels brought about by climate change.

In the case of Christchurch Priory, the watercolour drawings by Alfred Robert Quinton and others of the Priory adjacent to the river and water meadows suggest a vulnerability to flooding at this location, although it is understood that the Priory site has not flooded in the past. Flood risk is likely to be addressed further in the face of climate change and sea level rise over the next century.

The number of engravings or artworks of Hengistbury Head appears to be very limited. Perhaps the landscape was not deemed to be sufficiently 'Picturesque' to merit attention. Of those artworks that exist, the main focus is of general topography and the heritage interest in terms of the 'Double Dykes' is illustrated perhaps as part of the topography rather than a heritage feature.

6. Key Issues – What can be learnt from this site?

This study site clearly illustrates risks to heritage from erosional processes as witnessed by the cliff retreat at Highcliffe, and highlights an apparent vulnerability to flooding at Christchurch Priory (see Figure 1.17). It emphasises the vital role played by coast protection structures and flood defence measures in terms of protecting such coastal heritage assets. Likewise, at Hengistbury Head, the site is protected by significant coastal defences supported by a substantial beach accretion. Whilst artworks can support understanding of past conditions at Highcliffe and Christchurch Quay the heritage interest at Hengistbury Head will be illustrated most effectively through aerial photography.



Figure 1.17: A view of Christchurch Priory showing the waterside location. Consideration is being given to upgrading flood defences in the vicinity.

Image Courtesy of Jinny Goodman/Alamy.

7. References

1. Stevenson, I., 2016. 'Highcliffe Castle Guide Book'. Christchurch Borough Council. 32pps.
2. New Forest District Council and Halcrow Group, 2013. 'Christchurch Bay and Harbour Flood and Coastal Erosion Risk Management Strategy'. Report for Christchurch Bay and Harbour Strategy Group.
3. Daniell, W. & Ayton, R., 1814-1825. 'A Voyage Round Great Britain'. Longman & Co.
4. Addey, D., 1995. 'A Voyage Round Great Britain in the Footsteps of William Daniell RA (1769-1837)'. Spellmount Limited. ISBN: 9 781873 376348.

Case Study Site 2 – Poole Harbour and Studland, Dorset

1. Location

The case study site extends from Canford Cliffs to the west of Bournemouth southwards to the southern end of Studland Bay; it also includes Poole Harbour and Brownsea Island within it.



2. Why was the Case Study Site selected?

This case study site is of interest because it illustrates the impacts of coastal erosion and cliff instability on heritage assets at Canford Cliffs, together with new approaches to coastal management affecting environment and heritage sites owned by the National Trust at Brownsea Island and Studland beach.

3. Summary of the Geology, Geomorphology & Coastal Processes

The whole of this case study site lies within sand, silt and clay formations of the Bracklesham and Barton Groups of the Eocene epoch. In terms of sediment transport the prevailing direction is from west to east between Poole Harbour and Bournemouth, although there is some movement in the opposite (anti-clockwise) direction; beach sediments are also accreted from material being driving onshore. Within Poole Harbour, again the general trend is from west to east, with inputs from the Wareham Channel and Lytchett Bay in the west. Sediment circulates general from west to east along the south coast of Brownsea Island whilst erosion around the shores of the harbour contributes sediment to the overall system (Royal Haskoning, 2011¹).

4. Risks to Heritage Assets along the Case Study Frontage

Between Canford Cliffs and Poole Head retreating cliffs, as a result of coastal erosion of the soft sands and clays, have led to the loss of both Simpson's Folly at the foot of the cliff and a 'Martello Tower' on the eastern side of Canford Cliffs Chine (Figure 2.3). In Poole Harbour, Brownsea Island contains Brownsea Castle, originally a fort constructed by Henry VIII between 1545 and 1547 to protect Poole Harbour from French attack (Figures 2.6-2.8). In 1726 the castle was converted into a private residence and, together with adjacent historic properties, occupies a waterfront location on the Island's southern shore (National Trust, 1993²).

Seventeen properties on Brownsea Island are currently at risk of flooding in the vicinity and this number is likely to increase by the end of the century although existing defences limit the annual risk of flooding to less than 5%. The approach to coastal management at Brownsea Island represents an example of the National Trust's national planning policy for coastal change and a locally focused adaptation strategy for the future management of the Island based on the Shoreline Management Plan recommendations (Royal Haskoning, 2011¹).

Within Poole itself there are numerous Listed Buildings particularly in the Old Town, Quay and High Street Conservation Areas. Poole Quay has been subject to overtopping and since the 1950s it has been raised several times. Replacement with a new wall is now under consideration (Environment Agency, 2014^{3A}). The old quayside is depicted in numerous paintings with fine examples in the Poole Museum collection.

The Studland Bay frontage (Figures 2.11-2.14) has been included in this case study because, although there are no heritage assets in the immediate vicinity, the principles being established through the National Trust's approach at Swanage are likely to become more widely applied, in line with current government guidance, which is aimed at managing coastal change through taking a long-term perspective and working with natural processes (National Trust, 2014⁴; Environment Agency, 2014^{3B}). This policy has heritage implications elsewhere across the CHERISH case study sites such as Mullion Harbour in Cornwall.

5. How can historical Imagery inform heritage risk management?

Along the Canford Cliffs frontage two examples of the impacts of coastal erosion and cliff instability on heritage are illustrated. In 1874, a landowner, Captain John Hawkins Simpson, decided to build a row of seaside villas on the shore at Canford Cliffs between Flaghead Chine and Shore Road. Having obtained the permission of the landowner, and of the local authority the first of these houses was built (see Figure 2.1). The square flat-roof structure took four years to build and was completed in 1878 with a large seawall protecting it. However, the house had been built on a foundation of clay and sand and the sea quickly washed under the defences, making it unstable. The foundations were undermined and Captain Simpson was forced by the local authorities to abandon the property within weeks of its occupation. The property stood empty and the sea continued to undermine the property (Figure 2.2). By 1889 the whole property was collapsing. Poole Corporation ordered the demolition of the building for safety reasons and in 1890 the local authority blew up the remains of the property with gun powder. A high pile of concrete blocks and rubble was left in this location for many years until, in 1957, Poole Corporation was given the foreshore, and between 1960 and 1961 they constructed a promenade between the Shore Road promenade and the one at St Anne's, incorporating much of the rubble in the foundations of the new promenade, which was completed in 1962.

A structure known as a 'Martello tower' was situated on the eastern side of Canford Cliffs Chine; the stone for its construction is reputed to have been imported from Beaulieu Abbey. In fact, this structure was not a defensive Martello tower but was actually a gazebo/folly built in 1857 for Sir Charles Packe of Branksome Park. It was used as a smoking room for the owners of the Canford Cliffs Hotel in the 1930s, before serving as staff quarters for a time. It gave its name to a magnificent Edwardian house, Martello Towers, which was subsequently demolished to make way for the present block of flats. Although the old tower had been moved back previously from the retreating cliffs, eventually it succumbed following a cliff fall. These case study sites illustrate the vulnerability of properties constructed too close to eroding or unstable cliff lines. Although the tower had been relocated, this was insufficient to save it from further retreat of the sea cliff (Figure 2.3).

Brownsea Castle and the other historic buildings located along the southern waterfront of the Island are defended by modest seawalls and other structures, which are largely suitable for the more sheltered environment within Poole Harbour (see Figures 2.6-2.8). However, studies undertaken by the National Trust and others have indicated that there is a residual flood risk, which is likely to be exacerbated as a result of sea level rise over the next century. The Trust has implemented a policy of 'hold the line' for the historic frontage, whilst allowing around the remainder of the Island's coast natural coastal processes take their course. The need for effective maintenance and possible future improvement of flood defences is highlighted at this location.

Within Poole Harbour itself Poole Quay has a great maritime history, which has been illustrated by many artists. Their works often show the many historic building, which line the waterfront. Fine examples of detailed oil paintings exist showing gradual changes through the twentieth century as trading and development patterns have resulted in adaptation of many of the buildings (see Figures 2.9 and 2.10).

At Studland Bay the beautiful beach has been particularly popular with tourists for decades. As sea levels rise and weather patterns become increasingly unpredictable, it is unlikely that sufficient funds will be available to maintain locations such as Studland. Therefore, the National Trust has developed a national plan for coastal change, and a more locally focused adaptation strategy for the future management of the coast at Studland, which involves 'no active intervention'. Comparison of the watercolour drawings dating from the late nineteenth and early twentieth centuries with the present day photographs show how Studland's beach has continued to grow at its northern end near the entrance to Poole Harbour, whilst at the southern end coastal erosion is particularly active (Figure 2.11-2.14). This erosion process will continue and may increase, and inevitably result in the loss of space currently occupied by tourism facilities, such as the National Trust's current visitor at Studland. It has been recognised that the maintenance of such assets is not always practical in the longer term, hence the adoption of the 'no active intervention' strategy.

6. Key Issues – What can be learnt from this site?

In terms of the cliffed frontages a thorough understanding of coastal processes and the rate of change is essential for the safe and sustainable management of cliff top heritage assets. For locations prone to flooding, suitable

strategies for protection of assets such as those on Brownsea Island involves not only an understanding of the likely rate of change in sea levels and the impacts of storm surges and storm events, but also a necessity for funding to carry out necessary flood defence improvements in the future.

Policies for adaptation to coastal change, such as those being implemented by the National Trust at Brownsea Island and Studland Beach, are likely to be adopted more widely by necessity around the English coast. Long-term adaptation strategies are, therefore, likely to be required with implications for other heritage sites in the south-west particularly where maintenance of defences is no longer practical or economically justifiable.

7. References

1. Royal Haskoning & Bournemouth Borough Council, 2011. *'Poole and Christchurch Bays SMP Review'*.
2. The National Trust, 1993. *'An Illustrated Souvenir of Brownsea Island'*. 30pps.
- 3A. Environment Agency, 2014. *'Poole Bay, Poole Harbour & Wareham Flood and Coastal Erosion Risk Management - Final Strategy'*.
- 3B. Environment Agency and Partners, 2014. *'LICCO – Living with a Changing Coast'*. Final Report of the Interreg IV Project for the European Commission.
4. The National Trust, 2014. *The Residents' Guide to Coastal Change in Studland'*. Case study report from the European Union 'LICCO' Project.47pps.



Figure 2.1 (left): *'Simpson's Folly'* was built at the foot of Canford Cliffs near Bournemouth in 1878. Insufficient consideration was given to coastal erosion and the property had to be demolished soon after its occupation.

Image Courtesy: Private Collection.



Figure 2.2 (left): The remains of *'Simpson's Folly'* remained on the shore for many years until it was incorporated within a new promenade.

Image Courtesy: Private Collection.

Figure 2.3 (below): The tower on the cliffs, which succumbed to coastal erosion despite having been located further from the coast.

Image Courtesy: Private Collection.





Figure 2.4: *'Poole Harbour'* by William Daniell RA, an aquatint engraving produced in 1825. Although Daniell said that Poole's buildings 'did not bear much beauty' many still exist such as the Grade I Woolhouse or Town Cellars, which is incorporated in the Watersfoot Museum complex.

Image Courtesy: Private Collection.



Figure 2.5: The artist David Addey retraced Daniell's tour of the south-west coast of England and painted this watercolour from the same spot at Constitution Hill in 1990. This view shows the extensive harbourside development that has taken place.

Image Courtesy of David Addey.



Figure 2.6: *'Brownsea Castle'* – a nineteenth century engraving of this much illustrated building. Brownsea Island is in the ownership of the National Trust.

Image Courtesy: Private Collection.



Figure 2.7: A close view of Brownsea Castle, which dates back to 1548. The Castle had been extensively remodelled during the nineteenth century.

Image Courtesy: Private Collection

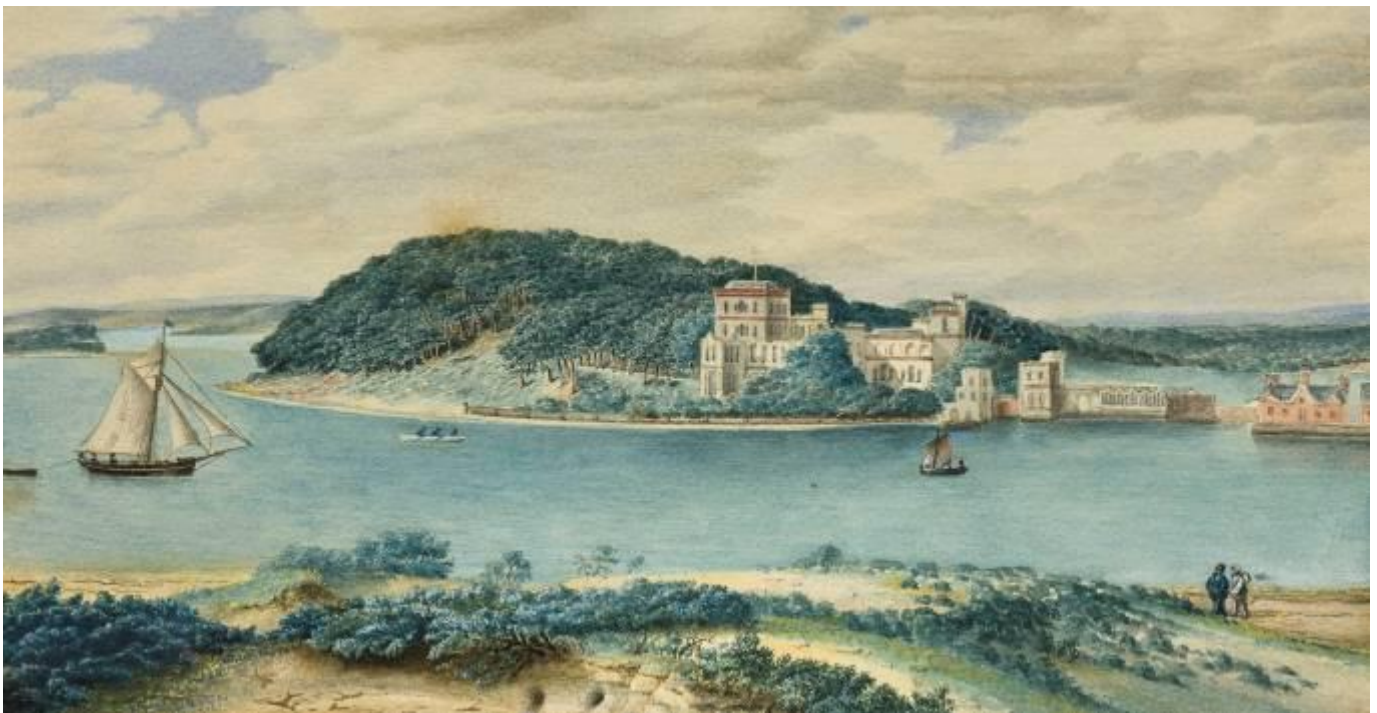


Figure 2.8: A detailed watercolour of 'Brownsea Island' by the Pre-Raphaelite follower, William Buck, c.1870s. Buck was renowned for his detailed and accurate observations of the coastlines of the Isle of Wight, Hampshire and Dorset.

Image by kind permission of the Russell Cotes Museum and Art Gallery, Bournemouth.



Figure 2.9 (left): *'Shipping in Poole Harbour'* by Herbert Kerr Rooke. Oil on Canvas. 1900.

Image Courtesy of Torre Abbey, Torquay, Devon/Bridgeman Images.

Figure 2.10 (below): *'Poole Quay on a Busy Day with Ships and Figures'* by Bernard Finnigan Gribble. Oil. C.1935.

Image Courtesy of Borough of Poole Museum Service.

Works of this kind provide a detailed visual record, in colour, of the changing Poole Harbour waterfront through the twentieth century providing physical, heritage and social detail. The Quay has flooded occasionally and proposals to reduce flood risk are currently under consideration.





Figures 2.11 and 2.12: The watercolour by Alfred Robert Quinton (left) was painted c.1920 and looks north along Studland Beach. Here the beach has been accreting towards Poole Harbour entrance. The present day view is shown below.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figures 2.13 (left): In this view looking south along Studland Beach by Quinton Handfast Point can be seen in the distance. The beach here has been subject to significant coastal erosion and has necessitated changes in future management by its owner, the National Trust. **Figure 2.14 (below)** shows the view in the 1950s.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Case Study Site 3 – The Isle of Purbeck, Dorset

1. Location

The case study covers the coastline of the Isle of Purbeck, extending from Handfast Point, southwards through Swanage Bay to Anvil Point, and westwards as far as St Aldhelm's Head.



2. Why was the Case Study Site selected?

The site was selected because of its diverse range of coastal management and heritage issues, which are well illustrated by artworks from the nineteenth and early twentieth centuries. They offer the opportunity to evaluate accuracy through comparison with present day photographs. The images show the effects of time on heritage structures such as Swanage Pier as well as illustrating the quarrying heritage sites along the coast of the Isle of Purbeck.

3. Summary of the Geology, Geomorphology & Coastal Processes

The geology is characterised by strata running east to west across the Isle of Purbeck, with the Chalk to the north and the underlying sands and clays of the Lower Greensand and Wealden Groups outcropping in Swanage Bay. The headlands of Pebble Point and south to Durlston are formed in the Purbeck Group of limestones and mudstones, which were quarried extensively in the past for their high quality building stone.

The eroding cliffs in Durlston Bay and the northern part of Swanage Bay contribute sediments to the overall system (Figures 3.1 and 3.2). The general trend is for sediment to move from south to north along the coastline, although there is a north/south movement further out to sea, extending from Handfast Point southwards. Historical rates of erosion along this frontage range from 0.3 to 0.7m per annum, and there are several locations where there have been coastal landslides and rock falls, the narrow foreshore being strewn with boulders and smaller debris along the toes of the cliff lines (Royal Haskoning, 2011¹).

4. Risks to Heritage Assets along the Case Study Frontage

The town of Swanage and its Conservation Area will continue to be defended in the future, although the coastlines to the north, up to Handfast Point, and Durlston Bay to the south, and the coastline westwards to St Aldhelm's Head have a policy of '*no active intervention*' (Royal Haskoning, 2011¹).

In Swanage, the present pier, which replaced an earlier structure, required significant investment to maintain its integrity and this was completed recently as an award-winning scheme. Along the coastline to the south of Swanage, between Durlston Head and Anvil Point, two pairs of towers mark the extent of a '*nautical measured mile*'. These towers enabled various ships to be timed over that distance.

The south coast of the Isle of Purbeck is particularly important for its quarrying heritage (Stanier, 1996²). The Jurassic limestones of the Purbeck Beds have been quarried since Roman times, whilst the Portland Series which underlie them were formerly worked along the coastal cliffs from St Aldhelm's Head to Durlston Head. A range of heritage features including rutways, sites of cranes and tramways, and other evidence of the quarrying industry are widespread.

At Emmet's Hill near Worth Maltravers the bowl barrow is a Scheduled Monument (List Entry Number: 1017268) and the site is at risk from coastal erosion. At St Aldhelm's Head the ancient Chapel is close to the sea cliff and could be lost eventually unless, at some time in the future, the structure is re-located further inland. Continued rates of erosion over the next 100 years, estimated at between 0.5 and 0.7m per annum, are likely to see the loss of some of these features as a result of episodic cliff failure events.

5. How can historical Imagery inform heritage risk management?

Early twentieth century postcards illustrated by the watercolour artists Henry Wimbush and Alfred Robert Quinton depict the coastal resort of Swanage in some detail; Swanage Pier is also featured (Figures 3.3 and 3.4). The quarrying industry and the major headlands including Handfast Point, Peverill Point, Tilly Whim Caves at Durlston Head and St Aldhelm's Head were engraved with views being published in important works such as Sir Henry Englefield's *'Geology and Antiquities of the Isle of Wight and the adjacent coast of Dorsetshire'* (Englefield, 1816³) – see Figures 3.5 to 3.8. Comparison of coastal artworks by artists such as Alfred Robert Quinton, a prolific Edwardian painter of coastal views, with recent photographs allow evaluation to be made of change of the reliability of art to inform us of the rate of change to coastal cliff lines over the last 200 years.

6. Key Issues – What can be learnt from this site?

The images describe the changing face of the popular seaside town of Swanage and its pier, as well as illustrating the cliff top heritage features including St Aldhelm's Chapel and the measure mile posts. The whole of this coastline has been engraved by numerous artists including W. B. Cooke and Sir Henry Englefield.

7. References

1. Royal Haskoning and Bournemouth Borough Council, 2011. *'Poole and Christchurch Bays SMP2'*.
2. Stanier, P., 1996. *'The Quarried Face: Evidence from Dorset's Cliffstone Quarries'*. Historical Metallurgy Society Special Publication: The Archaeology of Mining and Metallurgy in South-West Britain.
3. Englefield, Sir H., 1816. *'Geology and Antiquities of the Isle of Wight and the adjacent coast of Dorsetshire'*.



Figure 3.1: *'The Fine Sweep of Swanage Bay'*, a watercolour, c.1915 by Ernest William Haslehurst. The view looks south towards the headland of Ballard Point. The growing resort of Swanage can be seen in the centre of the Bay.

Image Courtesy: Private Collection



Figure 3.2: A close view of *'The Sands, Swanage'* showing the seafront and cliff top architecture. This watercolour was painted by Alfred Robert Quinton in about 1912.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figure 3.3: *'Swanage Pier'* painted by Henry B. Wimbush in c.1895 showing the stone structure at the landward end.

Image Courtesy: Private Collection.



Figure 3.4: *'Swanage Pier'* painted in watercolour by David Addey in 1990. Now the award-winning, restored pier (Listed Grade II) forms a focus for water-based recreation.

Image Courtesy of David Addey.

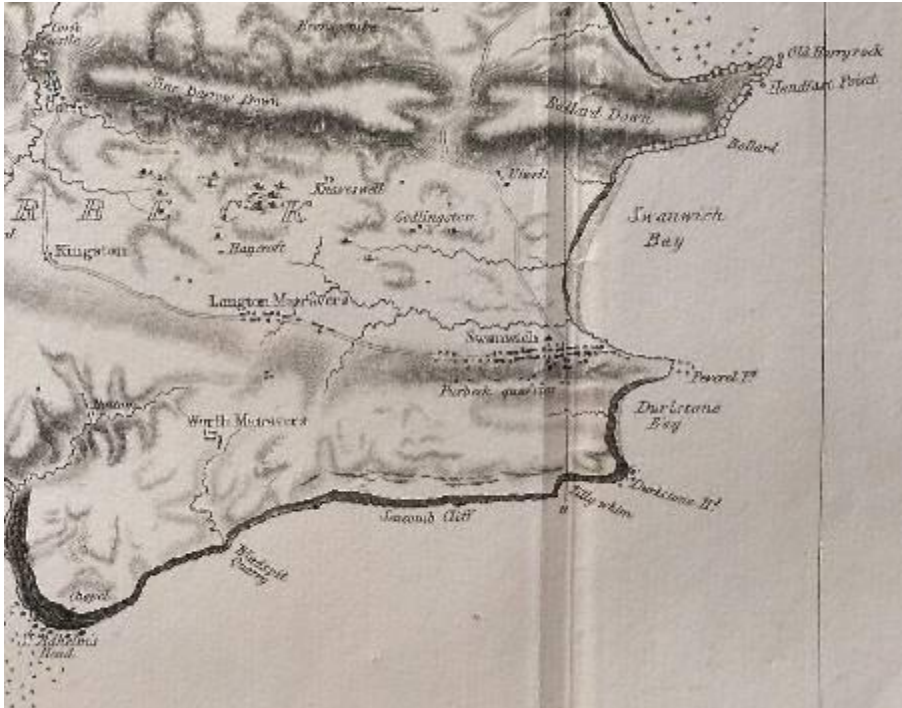




Figure 3.8: *'Tilly Whim Quarry'* drawn by Thomas Webster in 1816 illustrates work in progress at this site. Webster's detailed geological depictions of the Dorset coast, which he produced for Sir H. Englefield, provide a complete record of conditions here in the early nineteenth century. Because Englefield was a scientist and antiquarian with a fascination for geology, he was only interested in topographical accuracy rather than creating a 'picturesque landscape'.



Figure 3.9: *'The Quarries'* were also painted by A. R. Quinton, c.1920 and show little change from Webster's drawing a century before. One of the 'Measured Mile' posts can be seen on the hillside to the left with Durlston Castle beyond.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figure 3.10: This present day view of Tilly Whim Caves compares very closely with Quinton's watercolour (above), including details of the jointing in the limestone.

Image Courtesy of Andy Jamieson under Creative Commons Licence.

Figures 3.11 (right) and 3.12 (below) offer comparisons between artworks and photography and illustrate the topographical accuracy of artists such as A. R. Quinton. This view of Peveril Point near Swanage was painted c.1920.



Image Courtesy of J. Salmon Limited of Sevenoaks.

Photograph (above) Courtesy of Jim Champion, Creative Commons Licence.



Figures 3.13 (left) and 3.14 (below) again compare A. R. Quinton's coastal artworks with photography. Although Quinton's view is closer to Anvil Point and the Lighthouse, the detail he has achieved in his scene is very striking.



Image Courtesy of J. Salmon Limited of Sevenoaks.

Photograph Courtesy of Chris Downer, Creative Commons Licence.

Case Study Site 4 – Clavell Tower and Kimmeridge Bay, Dorset

1. Location

The study site is located at Kimmeridge Bay, to the south of the village of Kimmeridge, within the East Devon-Dorset Jurassic Coast World Heritage Site.



2. Why was the Case Study Site selected?

The site includes two features of heritage interest. First, the seventeenth century Clavell tower (MWX646), which was constructed in 1830/31 by the Reverend John Richards, and which is a listed building (National Heritage List for England 1120474). The structure was at risk from coastal erosion and was relocated approximately 25m further inland in 2006. Clavell Tower provides an interesting example of the impact of coastal erosion on heritage assets and illustrates the implementation of successful adaptation to coastal change (Stanford, 2008³).

The second feature is the remains of (the Scheduled) Kimmeridge Quay, together with jetties and breakwaters, which were associated with Sir William Clavell's alum works on the shore (Cornwall County Council, 2014¹; Parkins, 2013²). The works operated between 1605 and 1618, after which the site was converted to salt extraction.

3. Summary of the Geology, Geomorphology & Coastal Processes

The Kimmeridge frontage is situated exclusively within the West Walton, Ampthill Clay and Kimmeridge Clay formations of the late Jurassic epoch; these comprise mudstones and muddy limestones. The cliffs behind the Bay range in height between five and twenty metres but rising to sixty metres below Clavell Tower. Erosion rates in Kimmeridge Bay average less than 0.5m per annum, although erosion has been at a lower rate below Clavell Tower (0.13mpa) on account of the durability of the strata of that particular location. Sedimentary processes consist of a west to east transport system along the coast with inputs of material from the eroding cliffs at the back of the Bay (Figures 4.1 and 4.2).

4. Risks to Heritage Assets along the Case Study Frontage

Clavell Tower (listed Grade II) was constructed as an observatory and coastal landmark by the Reverend J. Richards in 1830/31 (Figure 4.3). The frontage formed part of the Smedmore estate, which had been owned by the Clavell family since the 1420s. At the end of the nineteenth century, until about 1914, the Tower served as a lookout post for coastguards and was vacated as the structure started to deteriorate (Figure 4.4). Coastal erosion posed an increasing risk to the Tower and, in 2002, with the support and advice from the owner, the Landmark Trust commenced investigations into the possibility of relocating the tower further back from the coastline (Stanford, 2008³).

The coastal defence policy for the frontage was '*no active intervention*' and, therefore, if the structure was to be preserved, an alternative solution was its relocation. This represents a good example of practical management on an eroding coast in order to preserve the integrity of heritage assets such as the Clavell Tower. Similar approaches to set-back of heritage features had been implemented successfully at Belle Tout Lighthouse at Beach Head in East Sussex in 1999 and at Compass Point at Bude in Cornwall. Set-back was preferred to cliff stabilisation such as that undertaken at the Mussenden Temple near Castlerock, Northern Ireland, on aesthetic and environmental grounds as well as the cost involved. The dismantling of the tower and its reconstruction approximately 25m landward of the cliff edge commenced in 2006, and the preservation of this landmark was concluded successfully, safeguarding the structure for the future (Figures 4.5-4.7).

A quay and associated jetties and breakwaters for the alum works and, later, the salt works, were located at Kimmeridge because of the readily available supply of fuel for the furnaces in the form of oil rich bituminous shales

which were exposed in the cliff. These industries flourished in the seventeenth century. However, the venture did not prove successful financially, and the location did not lend itself to easy transportation of materials from the site, and these industries ceased (Cornwall County Council, 2014¹). A small pier was constructed in 1858 to support extraction of bituminous shale for various uses, including fertilisers and oil production, but, again, this did not prove particularly successful. The remains of the quay can be seen in the aerial photograph (Figure 4.8). These features will be gradually lost as a result of sea level rise, erosion and undermining.

5. How can historical Imagery inform heritage risk management?

In this location artworks of the relatively undeveloped coast are limited, and it has not proved possible to find any detailed artworks showing the cliffline with Clavell Tower. However, Clavell Tower appears in numerous photographs and so in this case study photography is the most helpful medium available.

6. Key Issues – What can be learnt from this site?

The site illustrates the impacts of coastal erosion on a heritage site located at the top of an eroding cliff and how the 'set-back' solution can be adopted successfully. Here, the limitation on artworks means that photographic evidence is the only suitable medium to support understanding of long-term coastal change.

7. References

1. Cornwall County Council, 2014. '*Rapid Coastal Zone Assessment Survey for South-West England*'. Report by Carolyn Royall. Report Number: 6673.
2. Parkins, J., 2013. '*The Kimmeridge Shale Industry, Dorset*'. http://people.bath.ac.uk/exxbgs/journal_articles/01_Dorset.pdf.
3. Stanford, C., 2008. '*Clavell Tower History Album*'. Report for the Landmark Trust. Written and Researched by Caroline Stanford.

Figure 4.1 (right): A view of Kimmeridge Bay in about 1920.

Image Courtesy: Private Collection.



Figure 4.2 (left): A view of Kimmeridge Bay today looking westwards along the coast.

Image Courtesy: isleofpurbeck.com



Figure 4.3: Clavell Tower stands on the cliff edge above Kimmeridge Bay.

'Among the many interesting objects which present themselves to our notice on the North side of our beautiful bay, not one of the least is the OBSERVATORY, lately erected by the Rev. J. Clavell, of Smedmore, in the Isle of Purbeck; and, although at a greater distance than some, offers a most conspicuous coup d'oeil from our Esplanade. Its prominent situation and architectural construction display most prominently Mr. Clavell's taste in selecting such a spot, and reflect the highest credit on Mr. Vining, the architect, in the erection of it. This beautiful specimen of modern workmanship is built on the summit of the cliff, about half a mile from Smedmore House, and forms therefrom a very picturesque and pleasing object, it is placed upon the cliff two hundred feet above the level of the sea, at a proper distance from its precipitous termination' (Dorset County Chronicle 21/7/1831).

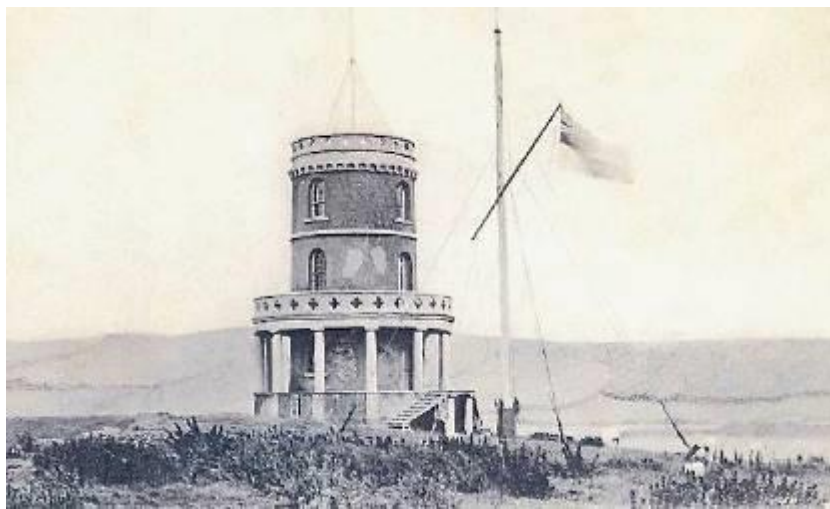


Figure 4.4: A view of the Tower with flagpoles from c.1920s.



Figure 5: Clavell Tower prior to the commencement of its relocation twenty-five metres inland.

Image Courtesy of The Landmark Trust.



Figure 4.6: Clavell Tower following its set-back. The former site can be seen on the sea cliff.

Image Courtesy of the Channel Coast Observatory, Southampton.



Figure 4.7: Clavell Tower following completion of the scheme by The Landmark Trust.

Image Courtesy of isleofpurbeck.com.



Figure 4.8: The remains of the former Quay at Kimmeridge Bay can be seen in this aerial photograph.

Image Courtesy of the Channel Coast Observatory, Southampton.

Case Study Site 5 – Lulworth, Dorset

1. Location

The study site is on the Dorset coast between the village of west Lulworth in the west and Warbarrow to the east; a frontage of approximately 3.5km; it lies within the East Devon-Dorset Jurassic Coast World Heritage Site.



2. Why was the Case Study Site selected?

The downland along this frontage forms one of the most extensive field systems of the Iron Age or Roman periods to be found along the Dorset coast. The most extensive of these is at the Warren, West Lulworth (MDO8266) whilst Flower's Barrow hillfort (MNO7654) is sited on the edge of the cliff at Ring's Hill, East Lulworth. At the western end of Bindon Hill, Lulworth there is an Iron Age defensive dyke and a structure that may be an uncompleted hillfort (Cornwall County Council, 2014¹). On the headland above Stair Hole at Lulworth Cove the Coastguard station was sited at this dramatic outpost; it features in numerous early engravings of the Cove. The site was closed following a major cliff collapse in the 1970s.

3. Summary of the Geology, Geomorphology & Coastal Processes

Lulworth frontage lies within rocks of the Jurassic and Cretaceous Periods. On the sea coast limestones outcrop, whilst behind, the softer formations of the Cretaceous Period have been eroded away to create remarkable bay formations, extending back as far as the outcropping chalk behind. The chalk, therefore, forms a steep back wall to Lulworth Cove, whilst the narrow entrance is flanked by overhanging cliffs of Portland Limestone.

Cliff falls and topples are characteristic of both the Chalk and Portlandian Limestones, whilst differential weathering creates the ribbed and recessed formations of the Purbeck Limestone outcrops. Stair Hole, to the immediate west of Lulworth Cove, was created as a result of wave energy breaching the Portland Limestone barrier, and causing the lateral expansion of a small inlet along the comparatively brittle and fractured Purbeck rocks. The coastal cliffline reaches a maximum height of 170m at Ring's Hill to the east, with an average general recession rate of about 0.15m per annum. The prevailing direction for sediment transport is west to east along the whole of this frontage, with significant contributions from cliff or coastal slope erosion processes; the whole of the frontage is undefended. This part of the Dorset coast is prone to occasional major landslides such as the failure nearby at Durdle Door, where a massive collapse over a 350m frontage occurred in April 2013 (Halcrow, 2011²).

4. Risks to Heritage Assets along the Case Study Frontage

The whole of this frontage is a naturally eroding coastline. As a result, any heritage assets located above or below ground in the hinterland will gradually be lost as the cliffs retreat. Whilst the average annual rate of the cliff retreat appears to be quite low, sudden catastrophic failures can result in the loss of substantial sections of the cliff top in one event. The rate of loss can be expected to increase as a result of climate change and sea level rise over the next century.

Coastal erosion also saw the loss of the Coastguard Station on the headland on the west side of Lulworth Cove above Stair Hole. This part of the Dorset coast was illustrated by numerous artists and depicted by photographers on account of the outstanding natural beauty.

5. How can historical Imagery inform heritage risk management?

There are many fine images (both artistic and photographic) of this case study site dating from the late eighteenth century (Figures 5.1 and 5.2). Lulworth was included in order to assess whether artworks have illustrated any of the surface or buried heritage features that have been identified, for example, in the Dorset RCZA, (Cornwall County

Council, 2014¹). A selection of images, including those by William Daniell RA from 1823 (Figure 5.3) and Alfred Robert Quinton, c.1925 (Figures 5.4 and 5.5), are illustrated below. These examples allow us to assess the extent and the limitations of data and information offered by such artworks.

6. Key Issues – What can be learnt from this site?

The artistic images illustrated in this case study provide accurate reflections of the physical nature of the coastline. They show the geology and geomorphology particularly well and, for example, the Coastguard Station on the headland. It is difficult to interpret whether any of the faint depictions on the hillsides relate to buried heritage sites or whether they are sheep tracks or footpaths but, bearing in mind the main focus was on the coastal scenery, buried heritage was not perhaps regarded as a priority, and as such more detailed illustrations were left to antiquarians such as Sir Henry Englefield (Figures 5.6 and 5.7), who had identified Flower's Barrow, for example, on the fine map contained in his 1816 publication (Englefield, 2016²). Taking account of the excellent aerial photographs that are available for this location aerial photography offers the clearest images of heritage sites whilst artworks illustrate changes to the coastal topography over time.

7. References

1. Cornwall County Council. 2014. '*Rapid Coastal Zone Assessment for South-West England*'. Report for English Heritage. Project Number 6673.
2. Halcrow, 2011. '*Durlston Head to Rame Head SMP2*'.
3. Englefield, Sir H. 1816. '*A Description of the Principal Picturesque Beauties, Antiquities and Geological Phenomena of the Isle of Wight and the Adjacent Parts of Dorsetshire*'. Payne & Foss. London.



Figure 5.1 (left): A late eighteenth century copperplate engraving of Lulworth Cove shows a stone harbour arm on the western side.

Image Courtesy: Private Collection.



Figure 5.2 (right): A fine aquatint engraving of the Cove by Samuel Alken from the 1790s looking across its mouth.

Image Courtesy: Private Collection.



Figure 5.3: William Daniell RA produced this view of Lulworth Cove on his '*Voyage Round Great Britain*' in 1823. It shows signalling masts on the western headland for the first time.



Figures 5.4 (left) & 5.5 (below) show the two watercolour drawings by the prolific Alfred Robert Quinton, who painted the English coast during the first three decades of the twentieth century. They show the construction of a '*Coastguard Station*' overlooking the mouth of Lulworth Cove. Although the downland behind, which contains significant buried heritage, is finely painted, heritage evidence is not immediately obvious.



Images Courtesy of J. Salmon Limited of Sevenoaks.



Figures 5.6 (left) and 5.7 (below left): Sir Henry Englefield appointed the geologist and artist Thomas Webster to produce images of the Dorset coast, which he published in 1816. The view (top left) shows the strata finely depicted, whilst figure 5.7 offers extensive views looking east along the Dorset coast. Although Englefield identified the site of Flower's Barrow on his 1816 map, there are no obvious heritage features highlighted in this image, perhaps confirming that absence of evidence is not evidence of absence.

This view does illustrate other features of heritage interest. For example, the use of the cove as a sheltered anchorage, the unenclosed grazing on the foreground hills and the pronounced lynchetting on the more distant ground to the left. These aspects all contribute to our understanding of the historical character of the area at this time.



Figure 5.8 (left): A view from Stair Hole, c.1960s showing the Coastguard Station, which closed soon after.

Figure 5.9 (below): A view of Stair Hole and Lulworth Cove today.

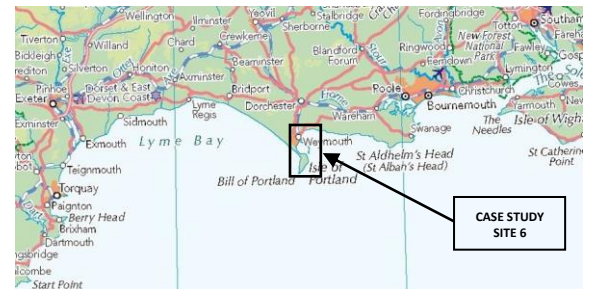
Image Courtesy of dorsettours.com.



Case Study Site 6 – Weymouth and Portland, Dorset

1. Location

The case study site extends from Redcliff Point at the eastern end of Weymouth Bay, westwards to the town of Weymouth and the Isle of Portland.



2. Why was the Case Study Site selected?

The study site was chosen on account of the rich and varied heritage, in the vicinity of Weymouth, Portland Harbour and on the Isle of Portland. Heritage sites include those relating to military activity, ranging from the Tudor coastal artillery fort of Sandsfoot Castle, Weymouth (MDO6598) to substantial nineteenth century coastal batteries and forts that formed defences for Weymouth, and Portland Harbour. These include the nineteenth century Verne Citadel (MDO6577), which was built to protect Portland Roads and Weymouth Harbour, and which is now a prison, the Breakwater Fort (MWX1380), the High Angle Battery (MDO6569), Nothe Fort (MDO6676) and East Weare (MWX1365). On the west side of Portland the Blacknor Battery was one of two coastal batteries planned to defend the West Bay area from attack. Portland is also well known for the extraction of its celebrated Portland Limestone, with quarries dating back to medieval times. On account of its exposed position, Portland Bill has played a significant role as a navigational aid warning shipping of the hazardous rocky coastline, three lighthouses of different ages exist on the Isle.

Some of the best preserved medieval open fields lie on Portland (MDO6521 and MDO6526) that date back to the eleventh century when the site was a Royal Manor. Parts of this coast, for example to the east of Weymouth, are affected by significant cliff erosion and instability, although, in contrast, the Isle of Portland is composed of highly durable limestones. However, even here substantial rockfalls occur periodically. There is a wealth of illustrations of this study site and these are assessed in terms of their contribution to heritage risk management.

3. Summary of the Geology, Geomorphology & Coastal Processes

The study site is comprised mainly of rocks of the mid and late Jurassic period, together with Purbeck Limestones; these form the bulk of the Isle of Portland.

The southern tip of Portland forms a major headland that protrudes some 10km into the English Channel. It forms a key regional sediment transport boundary along this part of the Dorset coast. Within Portland Harbour and Weymouth Bay the general direction of sediment transport is northern and easterly, whilst offshore sediments leave Weymouth Bay and are transported southwards to a sediment sink located to the south-east of Portland Bill. Dramatic instability has occurred at Bowleaze to the east where the cliffs can reach 30m in height although the whole of the Weymouth frontage is defended. On Portland, most of the clifflines comprise highly durable limestones, however, on the north and north-east coasts of the Isle of Portland the cliffs rest upon soft Kimmeridge Clay in a sequence that has resulted in deep-seated landslides. Around the coast of the Isle of Portland in the past the long history of quarrying resulted in much quarry waste being tipped around its coast, forming protective boulder aprons at the cliff toes.

4. Risks to Heritage Assets along the Case Study Frontage

Ongoing erosion and coastal instability has affected the Bowleaze Cove Roman site, with Romano-British pottery being visible in the cliff face over many years. At Sandsfoot Castle at Weymouth, a fort built in 1539 by Henry VIII which formed part of his defences along the Channel coast, has been affected by coastal erosion and instability with a greater part of the south front falling into the sea in 1837; at that time the masonry facing on the north front was removed. The construction of the Portland Breakwater in 1849 reduced the effects of coastal erosion on the cliff face at this location. The unstable remains of the castle were, subsequently, protected by the Council and the

grounds are now landscaped as a public amenity. As a result of the resilience of the strata on the Isle of Portland, most of the major heritage sites are unaffected in the short to medium term.

5. How can historical Imagery inform heritage risk management?

There is a rich resource of images relating to this area, and a number of these are illustrated below. These include Sandsfoot Castle (Figures 6.1-6.3), Weymouth Bay (Figure 4), the popular resort of Weymouth (Figures 6.5-6.8) and the lighthouses on the Isle of Portland itself (Figures 6.9-6.12). A further popular vantage point for artists was the view from Portland Heights looking north-west along Chesil Beach towards West Bay and Lyme Regis, Chesil Beach providing protection for the road on its lee side, which links the Isle of Portland to the mainland (Figures 6.13-6.15). Chesil Beach was severely affected by the coastal storms of winter 2013/14. The selected images depict heritage assets over time, and the changes that have affected Weymouth and Portland to a greater or lesser degree as a result of both natural processes and development.

6. Key Issues – What can be learnt from this site?

The Bowleaze Cove site, which is of considerable heritage significance, has been affected over time by coastal erosion and instability, however, because of the undeveloped nature of this section of coast it was not chosen as a subject by artists. By contrast there are many views of Sandsfoot Castle, which shows the chronology of coastal erosion over time. The town of Weymouth, together with the harbour and breakwater, were also illustrated by many artists dating back to the late eighteenth century and show the pattern of alterations and improvements that took place at this location over the last 200 years and particularly in the late nineteenth century. On the Isle of Portland, many views are taken from the sea showing shipping set against the impressive backdrop of the cliff line; Portland Bill lighthouse was also depicted by artists. Because of the durable nature of the coastal cliffs on Portland, the images demonstrate that the rate of coastal change, and risks to heritage is low. In terms of the early history of the Isle of Portland including the field systems and the quarrying history aerial photography forms the most valuable medium for study.

Figure 6.1 (right): A view of Sandsfoot Castle, Weymouth, in the 1840s. Lithograph. The seaward face of the Castle can be seen collapsing into the sea as a result of coastal erosion.

Image Courtesy: Private Collection.



Figure 6.2 (left): Sandsfoot Castle today. The site has been safeguarded following works by the Council and acquisition of the grounds as an amenity.

Image Courtesy: Eugene Birchall, Creative Commons Licence.





Figure 6.3: This watercolour by Alfred Robert Quinton, c.1925, shows the remains of Sandsfoot Castle on the cliff top and the commanding position it occupied looking towards the Isle of Portland.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figure 6.4: An aquatint of Weymouth Bay from the late eighteenth century.

Image Courtesy: Private Collection.



Figure 6.5: This view of the seafront at Weymouth painted in watercolour by A. R. Quinton, c.1920, shows the fine architecture at this flourishing resort. Quinton's eye for detail provides us with a wealth of information on the state of coastal towns and villages between 1900 and the early 1930.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figure 6.6: *'Weymouth'* by William Daniell RA showing the view at the mouth of the Little Wey. The elegant seaside resort became fashionable after a visit by King George III in 1789.



Figure 6.7: This watercolour by David Addey painted in 1989/90 shows the fine seafront buildings that Daniell depicted (above). The Georgian character of the town remains largely unchanged.

Image Courtesy of David Addey.



Figure 6.8: A. R. Quinton also painted Weymouth from Daniell's vantage point. The three images on this page show little change over the 170 year timespan.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figure 6.9: This view by W. Daniell RA is believed to depict the old High Lighthouse, which was replaced in 1869.

Image Courtesy: Private Collection.



Figure 6.10: David Addey's 1989 watercolour shows the same lighthouse as in Daniell's view. A new lighthouse was erected at Portland Bill in 1906.

Image Courtesy of David Addey.



Figures 6.11 (above left) and 6.12 (above right): 'Ruined Lighthouse on the Isle of Portland'. Watercolour. 1964 by Leslie Moffat Ward. Image Courtesy of the Russell Cotes Art Gallery and Museum, Bournemouth. The restored lighthouse is shown above right.



Figure 6.13: 'View from Portland over Chesil Beach'. Lithograph, c.1850s by Day & Sons.

Image Courtesy of Dorset County Museum and Heritage Service.



Figure 6.14: The same vantage point was chosen by Alfred Robert Quinton for his view of Chesil Beach, which he painted in about 1920. Quinton's views often show beaches (as well as architecture) depicted with considerable accuracy. This allows both quantitative and qualitative comparisons to be made with the present day situation.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figure 6.15: William Daniell RA produced an aquatint in 1823 from St Catherine's Chapel near Abbotsbury looking south-east over Chesil Beach to Portland. This image, one of 308 aquatints that he prepared for his publication 'A Voyage Round Great Britain' (1814-25), shows his skill as both an architectural draughtsman as well as a topographical artist.

Image Courtesy: Private Collection.

Case Study Site 7 – West Bay to Lyme Regis, Dorset

1. Location

The case study extends along the south Dorset coast from West Bay in the east (to the south of Bridport), westwards for a distance of approximately 10km to Lyme Regis. The location lies within the East Devon-Dorset Jurassic Coast World Heritage Site.



2. Why was the Case Study Site selected?

This is a dynamic coastline affected by a range of erosional, instability and sediment transportation issues. This coastline contains a rich heritage in terms of both built and buried features. These include the historic harbour at West Bay (Bridport Harbour) and its Conservation Area, cliff top sites extending along the frontage past Seatown to Charmouth, and at Lyme Regis the historic waterfront and the harbour arm known as The Cobb. The picturesque nature of this coastline and the dramatic landslide processes attracted artists and geologists in the late eighteenth and nineteenth centuries and, as a result, there are numerous images of this frontage, which illustrate this changing coast over time.

3. Summary of the Geology, Geomorphology & Coastal Processes

The coastal geology is dominated by the famous Lias Group of mudstones and limestones of the early Jurassic epoch, which are overlain by the Chalk. The Lias forms the dramatic cliffs to the west of the town of Lyme Regis, with parts of the exposures being obscured by the extensive landslide systems at Bindon and Downlands (Conybeare & Dawson, 1840¹).

The landslides along the coastal cliffs are composed of Jurassic clays and limestones with the tops of the cliffs at Black Ven, Stonebarrow and Golden Cap being capped by Upper Greensand. The combination of rapid coastal erosion and ground instability as a result of rainfall percolation and loss of support at the toe of the cliff has resulted in the dramatic coastal landscape.

The general direction of sediment transport is from west to east, as far as the harbour arms at West Bay. Here there is interruption to the sediment pathway and some transport movements both offshore and east to west before resuming an easterly direction on towards East Dorset. The eroding cliffs contribute substantial amounts of sediment to the overall system.

4. Risks to Heritage Assets along the Case Study Frontage

Atlantic storm waves attack the Lyme Bay frontage, causing rapid rates of erosion and promoting instability. Whilst heritage sites at West Bay and Lyme Regis have been protected and upgraded in recent years, much of the open coast remains undefended. Here, heritage assets located along the top of the soft cliffs and in the immediate coastal hinterland are vulnerable to the rapid rates of coastal retreat, which are likely to accelerate in the future.

5. How can historical Imagery inform heritage risk management?

The views illustrated below depict this highly varied coastal frontage at various points in time. They depict the nature of the coastal structures such as the harbour at West Bay (Figures 7.1 and 7.2) and The Cobb at Lyme Regis (Figures 7.14-7.16) in the early nineteenth and early twentieth centuries. Further views show the character of the foreshore at Charmouth (Figures 7.3 and 7.4) and the cliff top landscapes over the same time period (Figures 7.5-7.7 and 10). The images also illustrate the changing patterns of development since the 1840s (Figures 7.11-7.13).

6. Key Issues – What can be learnt from this site?

The images show that key structures such as West Bay Harbour and The Cobb at Lyme Regis appear to have changed little over the last 250 years. The structures have been upgraded and strengthened to meet the coast protection needs, for example at West Bay between 2002 and 2004, and, progressively, works have been undertaken along the Lyme Regis frontage over the last fifteen years.

The case study site shows how heritage, such as coastal Conservation Areas including listed buildings, can be protected if the measures required are economically justifiable and environmentally sustainable. However, long sections of this coast are likely to see the continuing erosion of the cliffline and increased exposure and loss of cliff top heritage.

7. References

1. Conybeare, Rev. W. & Dawson, W., 1840. *Memoir and Views of the Landslips on the East Devon & c.*



Figure 7A: 'View of Lyme Regis from the East'. Mid-nineteenth century lithograph.



Figure 7.1 (left): *'Bridport Harbour' or West Bay* by William Daniell RA. 1825. The aquatint engraving shows how the historic harbour arms cross the wide beach interrupting the west to east sediment transport along the coast.

Figure 7.2 (right): This view of the same scene (but from a lower vantage point) was painted in watercolour by David Addey in 1990. The harbour and flood defences were improved ten years ago.



Image Courtesy of David Addey.



Figure 7.3 (left): *'Lyme Regis from Charmouth'* by William Daniell RA. 1825. Lyme Regis was a small resort at this time. The view in **Figure 7.4 (below)** by David Addey (1990) shows the extensive beach at Charmouth at Low Tide. Daniell's view was taken from the stone building on the right of the picture.

Image Courtesy of David Addey.





Figures 7.5 (left) and 7.6 (below): An extensive view along the cliff top from Charmouth looking eastwards by Alfred Robert Quinton, c.1920. The cliff tops contain numerous buried heritage sites, which are exposed through rapid coastal erosion and landsliding (e.g. Dog House Hill, Chideock MDO7655).

Image Courtesy of J. Salmon Limited of Sevenoaks.



Figure 7.7 (above): A panoramic view of the coast from above Lyme Regis past The Spittles, Stonebarrow Hill, Charmouth and Golden Cap by G. Hawkins, c.1830.



Figure 7.8: The coastal geology and geomorphology was mapped and described by the Rev. W. Conybeare and William Dawson in 1840. They provided detailed maps of the landslips, as well as finely lithographed views of the major landslide events.

Image Courtesy of Dorset County Museum and Heritage Service.

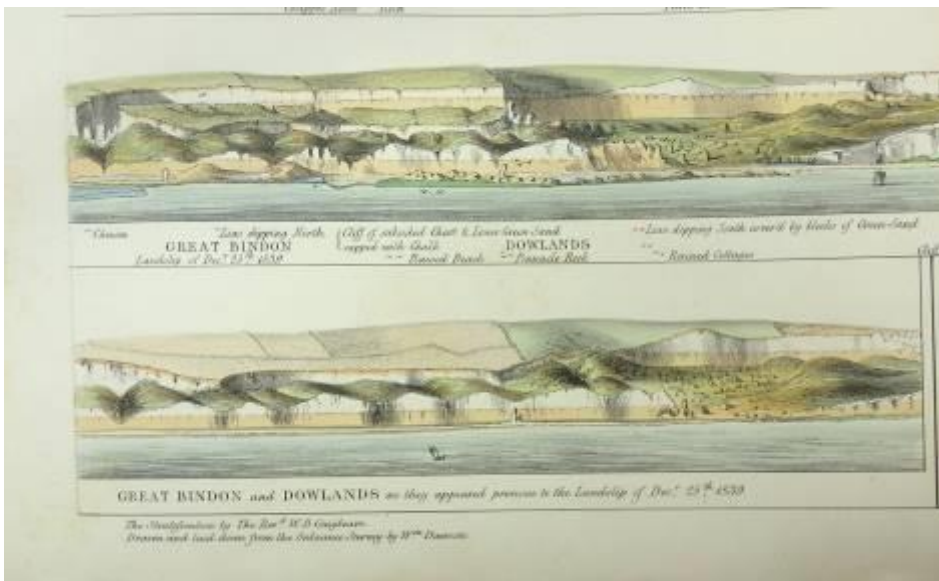


Figure 7.9: In addition to their maps and plates, Conybeare and Dawson produced detailed views of the coastline from the sea, which provide an accurate record of coastal conditions and developments along this part of the East Devon/West Dorset coast.

Image Courtesy of Dorset County Museum and Heritage Service.



Figure 7.10: 'Above Lyme Regis Looking Across Marshwood Vale, Dorset' by Thomas Girtin. Watercolour, c.1797. Girtin's view illustrates, in colour, the nature of the cliff top landscape of West Dorset two hundred and twenty years ago.

Image Courtesy of Christie's.



Figure 7.11: A fine lithograph of the beach at Lyme Regis by Daniel Dunster. Lithograph. C.1840.

Image Courtesy of Lyme Regis Museum.



Figure 7.12: A mid-nineteenth century view looking over the developing town of Lyme Regis from the east side close to Black Ven. The unstable nature of the coastal cliffs can be seen in the foreground.

Image Courtesy: Private Collection.



Figure 7.13: Lyme Regis has been protected progressively over the last twenty-five years with several phases of major coast protection and landslide stabilisation works. These have included the addition of rock armour at the end of The Cobb and, more recently, further works at the eastern end of the seafront below The Spittles.

Image Courtesy of the Wight Light Gallery.



Figure 7.14: *'The Cobb, Lyme Regis'*, c.1890 by Charles Robertson RWS. This was one of at least two watercolours that he painted of Lyme. Robertson was a follower of the Pre-Raphaelites and, as a result, his watercolour drawings are both detailed and accurate.

Image reproduced by kind permission of Sidmouth Museum.



Figure 7.15: *'The Cobb, Lyme Regis'* by Alfred Robert Quinton, who painted numerous watercolours of the town and seafront in the 1920s. The quality and detail of Quinton's work is obvious and compares favourably with the black and white photographic postcard published at about the same time (**Figure 7.16 below**).

The advantages of images in colour in terms of describing the coastal architecture and the construction of The Cobb can be readily appreciated.

Image Courtesy of J. Salmon Limited of Sevenoaks.



Case Study Site 8 – Beer, Devon

1. Location

The study site extends from east of the village of Beer southwards to Beer Head, and then westwards to the village of Branscombe, a coastal frontage of 4km.



2. Why was the Case Study Site selected?

Beer was a location chosen by many artists on account of its picturesque scenery. In particular, the cliff line was painted by the artist, Edward William Cooke RA (Munday, 1996¹). Cooke's portrayals of coastal cliff geology are some of the most detailed produced by any artist during the Victorian period. Along the top of the cliff line at Beer there are prehistoric field systems abutting the cliff edge at South Down Common (MDV19842), whilst, at Branscombe to the west, Bury Camp (MDV10899) is located on the cliff top between High Peak, Sidmouth, and Beer Head. This comprised a large defensible hilltop enclosure, which is believed to date from the first millennium BC and part of this important site has been lost through coastal erosion.

3. Summary of the Geology, Geomorphology & Coastal Processes

Beer is located in a valley within Cretaceous rocks comprising the Upper Greensand overlain by Chalk. The top of the cliffline is capped with more recent plateau Gravel deposits. The Chalk cliffs are well jointed and include horizontal bands of Flint, indicating the deposits within the Upper Chalk. The sediment transport direction along this part of the coast is from west to east; there are no significant coastal defences along the Beer frontage.

4. Risks to Heritage Assets along the Case Study Frontage

The Beer frontage is an eroding coastline, and is subject to cliff instability and rock falls particularly during and after severe storms or prolonged periods of heavy rainfall. Erosion of the near vertical Chalk cliffs at Beer Head, and instability to the west at Hooken Cliff towards Branscombe Mouth, present ongoing risks for heritage sites.

5. How can historical Imagery inform heritage risk management?

West of Beer the Hooken Cliff landslip took place in 1790 and ongoing failures are evidenced by Chalk debris that can be seen at the base of the cliff. Views such as *'The Fishing Cove of Beer'* by Edward William Cooke RA, painted in 1858, are remarkable for their clarity, as well as the attention to geological detail. This oil painting by Cooke (Figure 8.1) provides the most extensive view of the coastline looking eastwards. Cooke also painted a view from the opposite direction showing Beer Head in the distance in 1858 (Figure 8.3). The watercolour by Arthur W. Perry, painted c.1900, provides a closer view of the headland (Figure 8.6). The most recent view, a watercolour by Alfred Robert Quinton, was painted in the early twentieth century (Figure 8.7). What these artworks show is the remarkable similarity in terms of the form of the cliff line, the jointing in the cliff face, and the form, profile and nature of the beach. These paintings were all produced by artists who were renowned for their topographical accuracy, and visual comparisons of this kind help to provide confidence in artworks amongst professionals interested in coastal management, in support of their understanding of coastal change along their particular frontage.

These artworks indicate, first, that the cliffs at Beer are subjected to extremely slow change as a result of coastal erosion, cliff face weathering and instability. Second, the beach has remained relatively static over a period of some seventy years, even though there may have been fluctuations over the intervening period. Finally, they describe a slow but continuing risk to cliff top heritage sites, such as those at South Down Common and Branscombe, with increasing risks for the future as a result of an increased rate of erosion resulting from sea level rise and possible

changes in the severity and frequency of storms.

6. Key Issues – What can be learnt from this site?

The artworks that are available of the Beer frontage by artists such as Cooke, demonstrate how, alongside photographic evidence, art can provide detailed depictions of the state of the coastal frontage at various points in time with a high degree of accuracy. This information can help inform both coastal risk management and understanding by heritage managers of the potential risk to cliff top sites, looking ahead over the next century. What these images do not show are the heritage sites themselves. Generally such sites are best portrayed by aerial photography or Lidar. Where interested antiquarians lived in the vicinity (see Case study 9) the actual heritage sites may also be depicted.

7. References

1. Munday, J. 1996. *'E.W. Cooke RA FRS FSA LS FZS FGS – A Man of His Time'*. Antiques Collectors' Club. ISBN: 1-85149-222-4

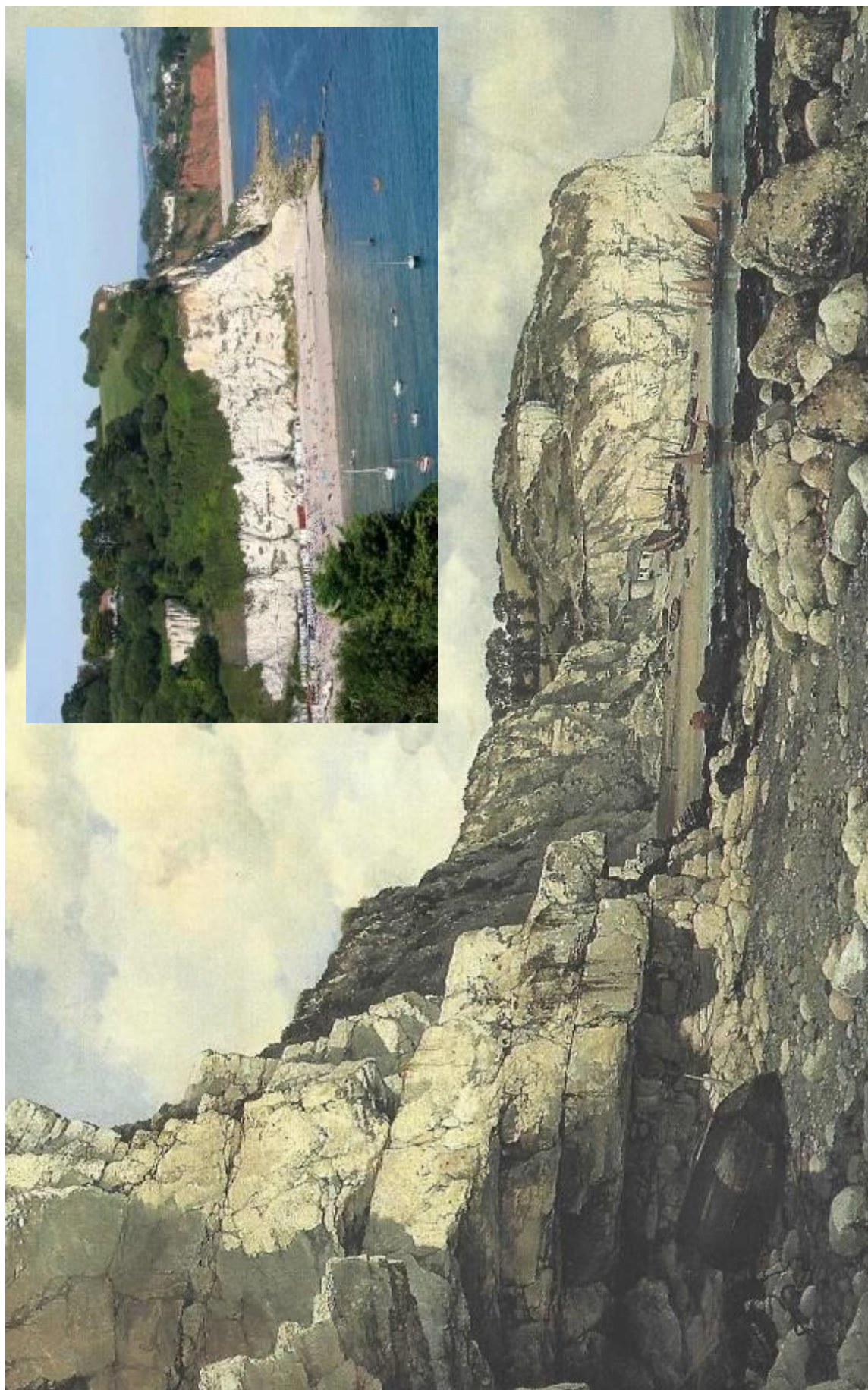


Figure 8.1: *'The Fishing Cove of Beer'* (1858) by Edward William Cooke RA shows the coastline in Pre-Raphaelite detail. The eastern part of Cooke's oil painting can be seen in the photograph as **Figure 8.2 (inset)**.

Image Courtesy of the late John Munday/Private Collection and © Ian West.



Figure 8.3: *'Distant View of Beer Head and White Cliff at Low Water'* by E. W. Cooke RA, 1858. This dramatic headland is captured well by Cooke and shows the end of the red sandstone cliffs, which extend eastwards towards Seaton on the right.



Figure 8.4: This photograph shows the headland on the left of Cooke's painting. The cliff tops contain heritage sites which are being lost progressively as a result of coastal erosion.



Figure 8.5: In this photograph the striking red and white strata, obvious in Cooke's oil painting, can be seen in the centre.



Figure 8.6: *'Beer, Devon'* by A. W. Perry, c.1900 showing the headland looking eastwards.

Image courtesy: Private Collection.



Figure 8.7: A similar vantage point was chosen by Alfred Robert Quinton for his watercolour painted ten years later. The depictions of the cliff geology are almost identical.



Figure 8.8: This photograph from about 1900 confirms the accuracy of these artists' works.

Image © Ian West.

Case Study Site 9 – Sidmouth, Devon

1. Location

The study site extends from the mouth of the River Sid at the eastern end of the Esplanade at Sidmouth, westwards, along the town frontage, to High Peak and beyond to the village of Otterton, a coastal length of approximately 3km.



2. Why was the Case Study Site selected?

The development of the town of Sidmouth typifies that of many small seaside towns in south-west England. There are numerous artistic views of Sidmouth and its adjacent coastlines as artists were attracted on account of its scenic location with the dramatic red sandstone cliffs rising steeply on both sides of the town (Figures 9.1-9.3). Apart from the main town frontage, the coastline is unprotected and is susceptible to coastal erosion and landsliding processes. However, even the town itself has experienced a long history of coastal erosion and flood events. Apart from the numerous listed buildings in close proximity to the seafront at Sidmouth, there are heritage assets at Connaught Gardens and Jacob's Ladder immediately to the west of the town, and at High Peak and on the cliffs beyond Otterton, a site which was identified in the late eighteenth century. The multi-period site at High Peak includes remains of an Early Neolithic enclosure and the buried remains of an early fortified settlement dating back to the 5th – 6th centuries. The High Peak site is affected by coastal erosion and a significant proportion of the site has been lost over the centuries (Figures 9.15-9.19).

Apart from the many engraved views and paintings of the town of Sidmouth, the contributions of the antiquarian and watercolour artist, Peter Orlando Hutchinson (Figures 9.8-9.11; 9.15-9.17; 9.20-9.23), which are recorded in his illustrated journals and sketch books (1871-1894), form a detailed and fascinating record of both coastal processes and heritage discoveries over that time (Devon History Society, 2012¹; Butler, 2010²).

3. Summary of the Geology, Geomorphology & Coastal Processes

The Sidmouth frontage is composed largely of mudstones, siltstones and sandstones of the Triassic Period, with intermittent outcrops of the Gault Clay and Upper Greensand of the Cretaceous Period. Although the town frontage is defended with a seawall, rock groynes and breakwaters, the undefended cliffs on either side are subjected to aggressive coastal erosion and weathering and resulting in cliff instability. Although coastal defences were upgraded in the late 1990s with the provision of offshore rock breakwaters and groynes, further proposals aimed at reducing the risks along the Sidmouth frontage for the future are currently being developed.

4. Risks to Heritage Assets along the Case Study Frontage

The whole of the Sidmouth Esplanade frontage and a large part of the town centre behind lies within the Conservation Area, which is protected by a substantial seawall. However, concerns about coastal erosion and flooding, particularly in the context of sea level rise and climate change, have resulted in the development of new proposals to protect property and assets located in the town and on the adjacent cliffs. Regency hotels and villas and later nineteenth century properties, as well as ornate cottages, are located close to the seafront, whilst to the south-west at High Peak the Dark Age defended settlement (MDV15124) is affected by cliff erosion. Connaught Gardens at the western end of the Sidmouth frontage, which comprises a castellated clock tower with belfry built over old underground lime kilns, is another important asset located immediately adjacent to the coast. It occupies the site of the former 'Cliff Cottage' (later re-named 'Seaview'). At Otterton Point there is evidence of a possible site of a Roman Villa (MDV36156) and investigations suggest that part of the building may have been lost as a result of coastal erosion.

5. How can historical Imagery inform heritage risk management?

Illustrated guidebooks (e.g. Butcher, 1820³) and a wealth of artworks, particularly engravings of the town of Sidmouth, including the famous ‘*Long Print*’ (after 1814⁴) by Hubert Cornish (Figures 4-7), and the numerous detailed watercolours by Hutchinson, provide a comprehensive record of the frontage. Cornish’s ‘*Long Print*’ has been studied in detail (Creeke, 2014⁴) and is interesting because, combined with Hutchinson’s watercolours, it shows the development of Sidmouth seafront prior to the existence of any coastal defences and later. In addition, many of the significant Regency and later buildings that exist today are finely drawn in Cornish’s print, set within the wider setting of the Sidmouth coastal frontage.

Numerous other steel engravings and lithographs assist in providing a chronology of the development of the town and the changing coastline on either side. More detailed specific sites are described and illustrated by Hutchinson in his very comprehensive diaries, which are in the collection of Devon Archives and Local Studies Service (Devon History Society, 2012¹). The Sidmouth frontage, therefore, provides us with comprehensive written and illustrated accounts of the development of a prosperous, heritage rich, small coastal town through the nineteenth century in particular. This includes the records of erosion and flood events and archaeological discoveries through the Hutchinson diaries. These artworks together with numerous photographs held by Sidmouth Museum collectively provide information on the rate and scale of coastal change and the impacts of past flood and erosion events on development and heritage.

6. Key Issues – What can be learnt from this site?

Views such as those available for Sidmouth show how many coastal towns were often developed on the back of the beach and also the extensive nature of such beaches prior to the construction of seawalls and esplanades, which often occupied much of the former beach area. The views also show that, even after the construction of the seawall along the town frontage, severe storms have caused damage through both erosion and flood events. Historical information of this kind can inform the planning of new coastal defences, taking account of the need to improve the standards of defence as a result of coastal and climatic change. Along the undefended or less defended coastlines information on cliff retreat can be gained through making comparisons, for example, of cliff change since the late nineteenth century when compared with the present day.

The town benefits from the wealth of information in both written and illustrated form in Hutchinson’s diaries. The diaries provide an excellent example of how archaeological knowledge can be enhanced through such detailed accounts by local antiquarians. Sidmouth is, therefore, one of relatively few locations where heritage sites themselves are actually illustrated rather than just views showing the locality of buried heritage.

7. References

1. Devon History Society, 2012. *The Diaries of P.O Hutchinson*. www.devonhistorysociety.org.uk/2012/08/peter-orlando-hutchinson-online.html
2. Butler, J. ‘*Peter Orlando Hutchinson - Diary of a Devon Antiquary – Illustrated Journals and Sketchbooks*’. Halsgrove. ISBN: 978-0-9512704-9.
3. Butcher, Rev. E., 1820. ‘*The Beauties of Sidmouth*’.
4. Creeke, J., 2014. ‘*Sidmouth’s Long Print – A Picture in Time*’. Publ. for Sidmouth Museum by The Sid Vale Association. ISBN: 978-0-9512704-7-9.



Figure 9.1: An aquatint engraving of the '*Views from Salcombe Hill*' by Havell, 1814, provides an early prospect over the developing town from the west.

Image Courtesy: Private Collection.



Figure 9.2: '*High Peak Hill from Sidmouth*' drawn on the spot by Peter Orlando Hutchinson on 16th June 1849. Hutchinson's fine watercolours, which are contained in his extensive diaries, are nearly always dated.

Image reproduced with kind permission of Devon Archives and Local Studies Service.



Figure 9.3: A fine mid-nineteenth century lithograph shows Sidmouth and the rugged coastline extending westwards. High Peak and the cliff tops beyond contain a rich buried archaeological heritage, which is being continuously eroded along this undefended coastline.

Details from Hubert Cornish's '*Long Print of Sidmouth*'. Aquatint engraving after 1815 (Images Courtesy of Woolley and Wallis Auctions).



Figure 9.4: This view looks east along the coast from the shore. The seawall and Esplanade were yet to be constructed. The building on the left is Prospect Place with the York Hotel beyond.



Figure 9.5: A second eastward view shows Marine Place and Portland Place. The entrances to the properties appear level with the back of the beach, which appears to be very extensive at the time.



Figure 9.6: This detail from the '*Long Print*' looks to the west and shows the thatched '*Fort Cottage*' with the signalling mast on Peak Hill. The fishermen's cottages on the shore to the left were destroyed in the Great Storm of 1824.



Figure 9.7: The westernmost section of the '*Long Print*' looks along the coast towards Brandy Head and Otterton. The unusual rock formed in the Day was known as '*Chit Rock*'.

The '*Long Print*' provides a fascinating, highly detailed, panorama of Sidmouth's historic seafront. The original watercolours from which the print was taken can be seen at Sidmouth Museum.

Coastal Erosion, Instability and Flooding at Sidmouth



Figure 9.8: A failure of the cliff near Peak Cottage, Peak Hill, Sidmouth, on 31st August 1847. A watercolour painted on the spot by P. O. Hutchinson.

Image reproduced with kind permission of Devon Archives and Local Studies Centre.

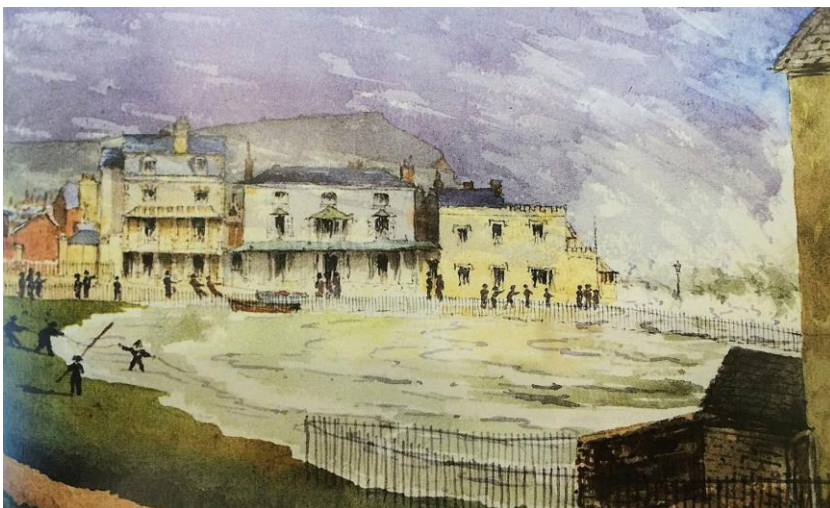


Figure 9.9: Serious sea flooding affected Sidmouth on 3rd/4th December 1876. The scene was captured in watercolour by P. O. Hutchinson and described in his diary.

Image reproduced with kind permission of Devon Archives and Local Studies Service.



Figure 9.10: Sketch by P. O. Hutchinson showing repairing storm damage to the Esplanade near the bottom of Peak Hill, Sidmouth, in January 1873.

Image reproduced with kind permission of Devon Archives and Local Studies Service.

Coastal Erosion, Instability and Flooding at Sidmouth



Figure 9.11: The west end of Sidmouth beach from an old print dated 1816. Painted in watercolour by P. O. Hutchinson, the view shows the row of fishermen's cottages that were washed away in the Great Storm of 23rd November 1824.



Figure 9.12: The exposed position of Sidmouth, facing the Atlantic's south-westerly storm waves, has led to frequent flooding events. Coastal defences have been improved since the 1990s and further upgrading is under consideration.

Image reproduced with the kind permission of Sidmouth Museum.

Figures 9.13 and 9.14 (below): show the devastation to the Esplanade after a severe storm.

Images reproduced with the kind permission of Sidmouth Museum.



Depictions of Sidmouth's Coastal Heritage by P. O. Hutchinson



Figures 9.15, 9.16 and 9.17: These three views by Hutchinson depict the remains of the old lime kilns near the Chit Rocks at Sidmouth. The earliest view (top left) was painted on 4th December 1871 with a ladder providing access to the shore (top right). The view (left) was painted in May 1888 and, by now, the base of the cliff has been protected.

Figure 9.18 (below left): Jacob's Ladder can be seen in this watercolour by Alfred Robert Quinton, c.1920.

Image Courtesy of J. Salmon Limited of Sevenoaks.

Figure 9.19 (below right): The view today of Jacob's Ladder.



Depictions of Sidmouth's Coastal Heritage by P. O. Hutchinson



Figure 9.20 (top left): *'High Peak from Peak Hill'* painted on the spot on 7th September 1849.

Figure 9.21 (top right): *'View from the summit of High Peak Hill looking south-west towards Otterton Point and Bury Head'*. The Signal Staff was erected in 1850 and was shattered by lightning. The conical mount was made by Ordnance Surveyors in 1857.



Figure 9.22 (left): The earthworks on High Peak Hill looking towards Sidmouth. Painted on 9th July 1851.



Figure 9.23 (left): Opening a stone heap on Littlecombe Hill, Bury Camp on 8th September 1858.

All images reproduced with the kind permission of Devon Archives and Local Studies Service.

Case Study Site 10 – Exmouth and Exe Estuary

1. Location

The study site comprises that section of the Exe Estuary from Topsham in the north to Exmouth in the south (the succeeding case study covers the Dawlish Warren to Teignmouth frontage).



2. Why was the Case Study Site selected?

The study site, an estuary on the South Devon coast, provides a contrasting physical environment to the predominantly cliffed frontages that have been selected as case studies along most of the Dorset and South Devon coasts. The estuary contains a range of sites of heritage and archaeological interest, and has also been a very popular subject for artists particularly since the late eighteenth centuries (Marjoram & Jones, 2014¹).

3. Summary of the Geology, Geomorphology & Coastal Processes

The Exe Estuary lies within sandstone, limestone, mudstone and shale formations of the Permian Period. The evolution of the estuary resulted from both an erosional period during the Quaternary (from approximately ten million years ago) and sea level rise after the last Ice Age, which resulted in the drowning of the river valley and the formation of the estuary into which it has evolved today.

4. Risks to Heritage Assets along the Case Study Frontage

The principal risk along the Exe estuary is from flooding, despite extensive coastal defences including seawalls, groynes, rock revetments and beach management measures. The pressure on coastal defences is likely to increase as a result of sea level rise and more unsettled weather patterns over the next century. The *'Exe Estuary Flood and Coastal Erosion Risk Management Strategy'* (Environment Agency, 2013²) has recommended a number of proposals to include improvement of tidal flood defences over the next decades, in particular with the aims of reducing overtopping of seawalls during storm events (Figures 6-8).

The Exe estuary and the settlements bordering it contain a rich heritage ranging from the Grade I Listed Powderham Castle on the western side of the estuary, to the numerous elegant buildings located within the Conservation Area of Exmouth. Other heritage interest includes the possible site of Exmouth Castle (MDV10649), the Artillery Fort between Star Cross and Exmouth (MDV9801) and relics of a limekiln on the Maer at Exmouth (MDV18738).

5. How can historical Imagery inform heritage risk management?

There are numerous artworks depicting the Exe estuary, which allow changes in conditions along its length to be compared over the last two and a half centuries (Figures 10.1-10.4). As part of the *'Living with Coastal Change'* (LICCO) project (www.licco.eu) a component of the project entitled *'Painting a picture of change around the Exe Estuary coast'* involved gathering together those artworks from the late eighteenth century onwards that portrayed the estuary and activities along its banks through history – see Figure 10.5 (Marjoram and Jones, 2014¹). This component represents a good example of the practical use of such historical images in support of estuary planning and management.

6. Key Issues – What can be learnt from this site?

The artworks show that there is a rich history of images painted along the banks of estuaries, and that these can inform us of changing conditions brought about as a result of both natural and anthropogenic influences since the late eighteenth century. Such images can support the development of flood risk management strategies by allowing an understanding of past conditions, including during periods of flooding. They can give an indication of the past

and potential vulnerabilities of heritage sites to flood risk and support the planning of sustainable solutions for their future preservation.

7. References

1. Marjoram, J. & Jones, H., 2014. 'Artists in Exmouth before 1910'. Report for the EU Interreg IVA 'LICCO' project. www.licco.eu.
2. Environment Agency, 2013. 'Exe Estuary Flood and Coastal Erosion Risk Management Strategy'. www.gov.uk/...exe-estuary-flood-and-coastal-erosion-risk-management-strategy...risk-management-strategy.
3. Warner, R., 1800. 'A Walk Through Some of the Western Counties of England'. Page 197.
4. Daniell, W. & Ayton, R., 1814-1825. 'A Voyage Round Great Britain'. Longman & Co.



Figure 10.1: 'A View of the Exe from Exwell Looking Towards Topsham' by Francis Towne, 1779. Watercolour. The writer Richard Warner in his 'A Walk Through Some of the Western Counties of England' in 1800 said "this estuary, sprinkled with shipping, enclosed between hills, which are ornamented with groves and mansions, castles and cities, present at full tide, and under a calm sky, the picture of an Italian Lake" (Warner, 1800³).

Image Courtesy of John Spink.



Figure 10.2: This aquatint engraving by William Daniell RA was completed in 1825 near the end of his eleven year 'Voyage Round Great Britain' (Daniell & Ayton, 1814-1825⁴). Some lodging houses were being built on the high ground known as The Beacon.



Figure 10.3: David Addey retraced Daniell's voyage and, in 1988, travelled to Exmouth where he painted this watercolour. This view, like Daniell's, is taken from Orcombe Point and shows Holy Trinity Church and the row of houses on The Beacon.

Image Courtesy of David Addey.



Figure 10.4: The prolific watercolourist Alfred Robert Quinton painted this view of the red sandstone cliffline and coastal path looking across the mouth of the Exe Estuary in 1915.

Image Courtesy of J. Salmon Limited of Sevenoaks.

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A Changing Coast through time in the Exe Estuary

Painting a Picture of Change...

Using art to tell the story of our changing coastline

The paintings shown here provide us with a fascinating insight into how the Exe Estuary would have looked to our great, great, great grandparents. Long before cameras were commonplace a considerable number of artists lived in and travelled to Exmouth to capture its beauty on canvas.

Some 60 artists producing works in Exmouth between 1700 and 1910 have been identified by the Exmouth Historical and Archaeological Society for the Living with a Changing Coast (LiCCo) project. This rich artistic legacy helps to tell the story of coastal change around the shores of the Exe Estuary – a story of an ever-changing, dynamic interface between land and sea. It shows that over time our coastline has never stayed the same and it never will.

'The visual delights of Exmouth'

During the nineteenth century painters were attracted by the broad panoramic views from the town, with a backdrop of hills, and by the quality of light over the sea and river, especially at sunset. Some artists chose to settle in the town, while others visited regularly or included Exmouth in their tour of the picturesque sites of Devon.

Apart from the visual delights of Exmouth, an advantage for visitors and residents alike was the richness of the climate and the health-giving properties of the air and sunlight. For artists who wanted to work outside in the open landscape this fine weather was a very particular advantage.

In 1791 Dr. Hall, the King's doctor, declared that the "purity and salubrity of the air" was "equal to that of the south of France", and bathing machines (for access to the healthful effects of seashore) were hired on Exmouth beach as early as 1759. Exmouth was the earliest, suitable resort to develop in Devon and the fact that it was becoming the "bandwaggon and most fashionable of watering places" meant that there was likely to be a ready market for artists' work.

Artists resident in Exmouth before 1910

The cross which many people associate with the town is Francis Denny who lived in Exmouth from about 1843 until his death in 1861. Denny lived first at 941 Cottage overlooking the river Exe and later at 5111 House on the Moor, where he devoted time to boatbuilding.

Another notable inhabitant was Conrad Martens (1801-70), the official artist with Charles Darwin on HMS Beagle in 1833, who painted in Exmouth from 1822 until 1832.

Other local artists include Henry Bellfield (1802-1892), James Bridger Goodrich (1816-1953), Richard Thomas Pomeroy (1816-1867), William Henry Hollett (1810-1858), Richard Dawkins (1825-1896) and Charles Edward Strong (1815-1899).

Artists portraying Exmouth before 1910

The landscape and marine painter William Dassel RA (1765-1837) was one of the artists who got Exmouth on the map when he travelled around the coastlines of Britain.

265 million years ago (Permian period)
Exe Estuary
Devon was part of a land mass just north of the Equator with a dry, hot climate. The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

260 million years ago (Triassic period)
Exe Estuary
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

7000 years ago
Dorset/Warman
As sea levels continued to rise, longshore drift from the west transported debris along the coast. The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1100-1300
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1270s
Exe Estuary
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1350s
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1600s
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1715-1845
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1811
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1824 22nd November
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1838 February
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1844
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1861
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1862
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1863
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1700-1850s
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1770-1820
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1817
Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1836
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1840s
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1850
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1869 31 January & 1 February
Exmouth, Dorset/Warman
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1790-1846
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1815-1856
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1825-1896
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1791-1861
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1815-1856
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

1825-1896
Exmouth
The Exe Estuary was a shallow sea. The land around it was covered by forests and the sea was filled with corals and fish. The Exe Estuary was periodically submerged.

www.licco.eu/exe-estuary/

Figure 9.5: Application of art to inform estuary management – the Interreg IVA 'LiCCO' Project.

...Around the Exe Estuary Coast

The coastline depicted of yesterday looks very different in parts to the one we see now. For example, the steep bluff visible in paintings at the end of Dawlish Warren was washed away by a hurricane which hit the local area in 1859 and the wrecks shown here may tell of devastating storms and exceptional high tides – known to have occurred in 1869, resulting in abandonment of local oyster beds.

Whilst we cannot be absolutely certain of the future challenges posed to our coasts by climate change and sea level rise we do know that the forces of nature – of tide and wind – and wave will continue to shape our shores for many years to come.

to paint watercolours for his book "A Voyage Round Great Britain". Many more notable artists painted landscapes and coastal scenes in Exmouth around the time, often exhibiting their works at the Royal Academy.

Of particular note were William Widdow (1826-1883) who is best known for his Dartmoor scenes but also painted the Exe Estuary coastline and James Bruce Bekington (1814-1897) who was head of both the Exeter School of Art and Exmouth art school. He was involved with the pioneering discussions, in 1852, for the proposed museum and public library building in Exeter (now the Royal Albert Memorial Museum) and was a member of the Devon & Exeter Graphic Society. At the end of his career a diploma from the Royal College of Art was conferred on him.

As the 18th century progressed artists were drawn to Exmouth just as they had been previously they were part of a continuum. The exceptional advantage which Exmouth had to offer still held (and holds) good: it is still true that "The situation of Exmouth is a fine one. It stands on the slope of a somewhat steep hill at the mouth of the Exe, and commands not only a fine coast view, but an extensive

range inland over the cultivated country in front of it, and the barren moors in the distant background. The Hebbles ridge, at an elevation of 800 feet, is about eight miles off, and forms a great feature in the landscape." The quality of the light looking off both the sea and the country and the richness of the climate – where "the sun seems to shine brighter and longer than in most parts of England especially towards evening when the sky frequently assumes an Italian colour" – are elements which continue to entice both visitors and residents.

With special thanks to April Marjoram and Howard Jones of the Exmouth Historical and Archaeological Society for their time, expert tips and permission to research.

The Living with a Changing Coast (LCC) project ran in the Exe Estuary between 2015 and 2016 to raise awareness of coastal change amongst coastal communities.

For more information on the Living with a Changing Coast project and the artists involved by this research see www.livingwithacoast.org/



James Bridger Goodrich (1826-1885)
View of the Estuary and Exmouth from a hill overlooking Exmouth Library



Frederick Christian Lewis (1779-1854)
Entrance of the river Exe from Exmouth 1818
© Devon Heritage Centre



Richard Beards (1824-1894)
The story of the wreck 1872
© courtesy Sunderland Museum & Winter Gardens



John White Abbott (1763-1851)
View of the port of Exmouth 1811
© Exmouth City Council (Arts & Heritage)

A Changing Coast through time in the Exe Estuary



1884 - November

Lyngstone

"At Lyngstone and Exmouth whole areas were under water"

1900

Dawlish Warren

Storms caused Dawlish Warren to breach once again. The seawalls were demolished, leaving bare soil of granite for some time.

1914 - 1915

Exmouth

The Pier at Exmouth was redone through construction of the granite blocks and stone behind.

1920s

Dawlish Warren

In the 1920s the Warren was increased by a low bridge to the Dawlish Warren at the end of the beach. This was a scheme to protect the beach from the sea. The scheme was approved by the local authority with the sea defences in mind. The bridge was built in 1920 and the beach was increased by 100 yards. The bridge was built in 1920 and the beach was increased by 100 yards.

1937-39

Dawlish Warren

A series of storms and high tides removed the bridge from Dawlish Warren. "The whole of the Warren was in danger".

1949-1950

Dawlish Warren

The end of Dawlish Warren was increased by 70 yards, but the storm of 1949 did not cause the beach to be changed. The beach was increased by 70 yards, but the storm of 1949 did not cause the beach to be changed.

1960

Lyngstone

Large-scale floods in September and October 1960 caused problems in Lyngstone – an area where people had to move to safety around the village. "A large-scale flood in the village caused from the Exe river was caused".

20th October was described as Black Thursday – a catastrophic flood caused over 1000 properties to flood.

Early 1970s

Dawlish Warren

Storms caused severe erosion of the beach and a number of houses were lost. It was clear that more sea defences were needed to protect the Warren. In 1970 the Warren was increased by 100 yards. The beach was increased by 100 yards, but the storm of 1949 did not cause the beach to be changed.

2000 8th December

Dawlish Warren

Extensive rain across Britain has triggered further flooding and a further 100 new flood warnings. A coastal peak at Dawlish Warren had to be removed.

2000

Dawlish Warren

Dawlish Warren was designated a National Nature Reserve. Along with the rest of the Exe Estuary, it is a nationally important for wild birds and wetlands. It is also home to at least 600 species of flowering plants, including the local Cistus (Rock Rose).

2006 10th March

Exmouth

In Exmouth, the heavy winds and powerful waves caused water spilled on to the main road making driving difficult.

2012

Dawlish Warren

In October high spring tides and strong winds washed away several metres of sand from the central part of the beach, exposing the pebbles that had been in place.

2015-2016

Dawlish Warren

As part of the Exe Estuary Strategy, the sea wall and groynes at Dawlish Warren will be reconstructed and the ground level raised in places to reduce the risk of sand flooding to property. Groynes will be removed gradually and beach sand brought in to reinforce the beach. This will help the dunes to recover and improve the quality of the beach for visitors. It should also lengthen the life of the sea wall and be a benefit for the rest of the estuary.

1880

Dawlish Warren

Thousands of tons of granite were removed from a bank off the village of Starcross for the building of the Exe Estuary in Torquay.

1890

Dawlish Warren

The first bungalow was built on the eastern end of Dawlish Warren. The bungalow was built on the eastern end of Dawlish Warren. The bungalow was built on the eastern end of Dawlish Warren.

1911

Dawlish Warren

"The sea" rather than several homes at Dawlish Warren. The heavy rain and high tide resulted in a portion of the lower part of Lyngstone being flooded.

1917

Dawlish Warren

The first sea defence (groynes) was built on the eastern end of Dawlish Warren to protect the railway line.

1932

Dawlish Warren

By this time the inland movement of the Exe Warren had caused it to join with the Exe Warren, enclosing Greenland Lake and creating a single sea.

1946-1946

Dawlish Warren

A series of storms between 1946-1948 washed away the sea wall at the end of Dawlish Warren. "The 1st December 1948 was the worst storm for 50 years" with waves washed up on the beach.

1962 21st March

Dawlish Warren

Seawalls changed Dawlish Warren to see the water was damaged to the beach. The beach was damaged to the beach.

1978

Dawlish Warren

The Warren was designated as a Local Nature Reserve.

1990

Dawlish Warren

After yet more storms in December 1989 and January/February 1990, the road around the Warren to the west and of the Warren was in great need of repair. 70,000 tonnes of granite were imported from Norway and deposited at the foot of the Warren and the promenade was built behind it.

2000 October 20th and 27th

Exmouth

Sea defences at Exmouth experienced a lot of damage. A section of the sea wall failed resulting in a dangerous crack and damage to the beach. The beach was damaged to the beach.

2006 27th December

Exmouth (M24)

Governor officially opened the M24 road, allowing the sea back in and allowing the park to be in a dangerous state.

2005

Lyngstone

In 2005 the Environment Agency spent £200,000 raising Lyngstone's sea defences. This scheme involved raising and strengthening the sea wall along the estuary, raising the sea wall and installing 7 new groynes to protect the beach from the sea.

2011 1st January 2011

Dawlish Warren & Exmouth

From October 2010 to February 2011 a series of storms caused severe erosion of the Exe Estuary. The sea wall was damaged and the beach was exposed. The beach was exposed to the sea.

2016-2016

Dawlish Warren

As sea levels rise and storms are predicted to become more frequent and more powerful it will become more difficult to protect Dawlish Warren from the forces of nature. The Warren is a 30m higher and coastal defences will need to be improved to protect the Warren.

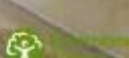
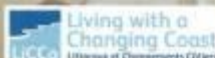




Figure 10.6: This photograph, taken in 1915, shows the view of Exmouth and the estuary from Beacon Hill. The elegant villas and Esplanade remain as a prominent architectural feature of the town today.



Coastal and flood defences help to protect the town frontage from erosion and flooding (**Figure 10.7 left**). However, the requirements are being reassessed through an erosion and flood risk management strategy. Damage caused during the severe storms of December 2013/January 2014 have highlighted the need for possible further improvements.

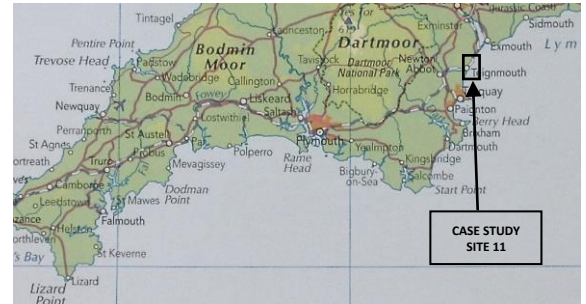


Figure 10.8: A view across the estuary mouth showing the extensive beach and Dawlish Warren beyond.

Case Study Site 11 – Dawlish to Teignmouth

1. Location

The case study continues from the previous Exe Estuary case study, and covers the frontage from Dawlish Warren southwards to the town of Teignmouth.



2. Why was the Case Study Site selected?

The case study illustrates the development of the popular seaside resorts of Dawlish and Teignmouth, which were developed on the open shore, and shows progressive development of the towns and construction of coastal defences. The site includes the Dawlish Warren Spit at the mouth of the Exe, and the famous railway line, which runs directly along this coastal frontage as part of the main line to Cornwall.

3. Summary of the Geology, Geomorphology & Coastal Processes

The whole of this coastal frontage lies within the Exeter Group, Appleby Group, and Kinnerton and Bridgenorth Sandstone Formations of the Permian Period. Dawlish Warren, at the northern end of the site, provides an element of protection at the mouth of the Exe Estuary, whilst to the south the open coast is exposed to attack from waves generated within the English Channel. The storms of winter 2013/14 demonstrated the vulnerability of the frontage in the face of exceptional storm events, which may become more frequent in the future as a result of climate change.

4. Risks to Heritage Assets along the Case Study Frontage

Substantial areas of the historic towns of Dawlish and Teignmouth are designated as Conservation Areas, and these are protected by coastal defences. Brunel's '*Atmospheric Railway*' was constructed along the seafront at Dawlish and was opened in 1846. A section of seawall was destroyed in the storms of January/February 2014 and raised questions about the vulnerability of the South Devon railway seawall to storm damage in the future. The exposure of Dawlish seafront to Channel-generated storms in this context is illustrated through a series of lithographs produced by William Dawson in 1848.

An early twentieth century scattered settlement at Dawlish Warren was recorded on the Second Edition Ordnance Survey map (1904-06) but this was largely destroyed as a result of flooding in 1948, with the last two remaining buildings being lost in 1965 (MDV42070). At Holcombe near Dawlish an octagonal 'Customs Lookout' was constructed alongside the coastal footpath (MDV105334).

5. How can historical Imagery inform heritage risk management?

The detailed images contained within this case study comprising engravings, lithographs and watercolours demonstrate the high degree of detail that was achieved by the best draughtsman/artists working in the mid-nineteenth century, and show, in particular, the extraordinary detail that could be achieved through the lithographic printing process. The views for the '*Atmospheric Railway*' at Dawlish provide some of the most detailed depictions of coastal frontages to be found along the south-west coast (Figures 11.10-11.13). The earliest view is that of Teignmouth by William Daniell RA (Figure 11.3), which he engraved in 1825. Sidmouth antiquarian Peter Orlando Hutchinson produced numerous watercolours to illustrate his extensive diaries including views on Dawlish Warren in the 1850s. Later the prolific painter of coastal towns, Alfred Robert Quinton, visited and painted at both Dawlish and Teignmouth in the 1920s (Figures 11.5, 11.6 and 11.9).

6. Key Issues – What can be learnt from this site?

The artworks from this frontage show the detailed record left by artists that can be interrogated to inform us of past conditions, often before the construction of coastal defences (as can be seen in the engraving of Dawlish beach). It also illustrates how artworks produced for construction projects such as the 'Atmospheric Railway' also provide a detailed record of past coastal environments and architecture.



Figure 11.1 (above): *'The Baths on the Beach at Dawlish'* by Thomas Allom; a steel engraving from 1832. As in the Sidmouth case study valuable properties at the back of the beach appear particularly vulnerable.

Figure 11.2 (below): This fine aquatint of *'Teignmouth from the Walk'* by W. Read, c.1825, shows the handsome eighteenth and early nineteenth century buildings at what was to become one of Devon's leading coastal resorts.





Figure 11.3 (above): William Daniell RA visited Teignmouth in 1825 and produced this view over the town looking westwards. In David Addey's 1988 watercolour in **Figure 11.4 (right)** the church is more prominent and the building across the river changes the character of the view.

Image Courtesy of David Addey.



Figures 11.5 and 11.6: Two views of Teignmouth by the prolific early twentieth century watercolourist, A. R. Quinton, show the general setting of the town (above) and the church, the pier and other prominent buildings view from the East Cliff (right).

Images Courtesy of J. Salmon Limited of Sevenoaks.





Figure 11.7: *'The Battery on the Warren opposite Exmouth'* sketched on the spot by Peter Orlando Hutchinson, 20th July 1858.

Image reproduced with kind permission of Devon Archives and Local Studies Service.



Figure 11.8: *'Mount Pleasant and the Coast near Dawlish from the Warren'* by P. O. Hutchinson, 15th April 1854. Hutchinson's numerous watercolours and pen and ink vignettes contained within his extensive diaries include a wealth of drawings of heritage features including artefacts.



Figure 11.9: The seafront at Dawlish by A. R. Quinton painted in about 1920. By this time the railway line and the coastal properties are protected by a stone-faced seawall.

Image Courtesy of J. Salmon Limited of Sevenoaks.

Views of Brunel's 'Atmospheric Railway' at Dawlish



Across the Warren to Langstone Sands; View south of the Line.



From the Parson Tunnel to the Teignmouth Tunnel; View South of the Line.



From the Kennaway Tunnel to the Parson Tunnel Dawlish; View South of the Line.



From the Kennaway Tunnel Dawlish to Langstone Sands; View North of the Line.



From the Kennaway Tunnel towards Langstone Sands.

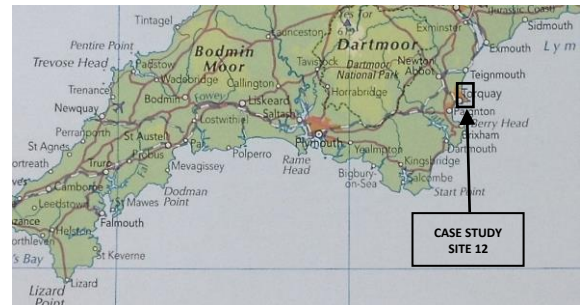
Figure 11.10: This series of views of Brunel's 'Atmospheric Railway' cover the Dawlish frontage. They were published as lithographs by William Dawson in 1848 and provide a detailed description of the coastal scenery and heritage at that time.

Images Courtesy of the Institution of Civil Engineers.

Case Study Site 12 – Babbacombe to Torquay

1. Location

The case study extends from Oddicombe Beach to the north of Torquay, southwards along the Torquay frontage to Hope's Nose, a distance of approximately 4km.



2. Why was the Case Study Site selected?

This particular site was chosen as a case study on account of Torquay's importance as a seaside resort with a rich architectural heritage and, adjacent to it, a number of popular bathing beaches, including Anstey's Cove and Oddicombe Beach, which have contained an interesting array of seaside properties of architectural quality. On account of the numerous images of this coastal frontage, the approach to this case study has been to examine changes to the built environment since the late eighteenth century (both physical and human influences) and to illustrate how, over this time period, artworks can improve our understanding of changes to the built environment.

3. Summary of the Geology, Geomorphology & Coastal Processes

Much of the coastline and hinterland along this part of the South Devon coast consists of sandstones of the Permian Period. However, at Torquay itself, the headland is composed of the Old Red Sandstone Group of the earlier lower Devonian epoch; in addition, there are outcrops of limestones, mudstones and slates of the Torbay and Tamar Groups. The Devonian limestones are resistant to erosion, whilst the softer mudstones and other outcrops form the recessed coastline of Torbay itself and extend southwards. The rates of cliff recession have been slow over the last 100 years although some eroded materials do contribute to beach-forming sediment, which is contained within the bays. The general direction of sediment transport is south to north around Torbay, with inputs from eroding or unstable cliffs, which give the beaches the typical reddish pink sand colour.

Although cliff erosion is slow, there is a wide distribution of relic or inactive coastal landslides along this part of the South Devon coast. Some of these ancient landslides are susceptible to reactivation following increased toe erosion or changes in groundwater; these might be anticipated to a greater extent as a result of climate change and sea level rise.

4. Risks to Heritage Assets along the Case Study Frontage

Because of the resilient nature of the coastal cliffs around Torquay, risks to heritage assets are relatively low. In some of the adjacent bays historical properties have been affected over time by cliff instability, and this has led to the redevelopment of some sites. For this particular case study, therefore, the attention is focused on historical and primarily anthropogenic change, which is illustrated in detail through the following case study examples.

5. How can historical Imagery inform heritage risk management?

The town of Torquay is almost entirely of the nineteenth century, the original hamlet having expanded rapidly at the time of the Napoleonic Wars and soon after. Calling itself '*the Queen of Watering Places*', Torquay expanded rapidly with grand terraces and ornate villas extending along the coastal frontage of the Bay. The coming of the railway in 1848 led to even more rapid development and the establishment of the town as a grand Victorian seaside resort. At Babbacombe to the north, cottages ornés were built above the bay and on the coastal slopes, and many of these cottages feature in early engravings (e.g. Figures 12.12 and 12.14). A large number of images provide a chronology of the development of locations such as Babbacombe, and show how historic buildings have been adapted or lost over time. The case study is intended to provide assistance on how historical artworks, such as watercolours and

engravings, can be utilised to provide a more complete historical environment record.

6. Key Issues – What can be learnt from this site?

Torquay is the largest seaside resort to be considered within a case study for the CHeRISH project. Because of its significance and popularity, together with the adjacent villages and bays, there is a rich art record which can be interrogated to describe patterns of development over the last 200 years. The best images could be usefully added to the Historical Environment Records in order to provide illustrations of heritage sites extending back long before the days of photography.

7. References

1. Cockrem, E., 1851. *'Plan of the Town of Torquay, from the Ordnance Survey, Being a Companion to the Torquay Directory'*.

Interpreting Historical Artworks



Figure 12.1: *'Torquay'* by William Daniell RA. Aquatint. Engraving. 1825.

This attractive house was Marine Villa, which is present on John Wood's Plan of *'Torquay and Environs'* of 1841, and was then occupied by a Dr Parkin. In 1853 it appears on the *'Plan of the Town of Torquay, from the Ordnance Survey, Being a Companion to the Torquay Directory'*. Edward Cockrem's directory records the house was occupied by Sir Henry Bold Hoghton, Bart (Cockrem, 1851¹).

On the First Edition Ordnance Survey Country Series, surveyed in 1861, (see Figure 12.2) it appears as Marina, which survived with extensions independently for a time, for it appears on the Second Edition County Series surveyed in 1904. It was finally subsumed into the ever-growing Imperial Hotel (which had opened in 1866 after the Marine Villa's neighbour *'The Cove'* was demolished in 1863 to make way for it) and as shown on the Third Edition County Series surveyed 1933. Elements of the ornate façade survived at least until the Second World War.

This view demonstrates Daniell's skill and accuracy as both a topographical and architectural artist and shows a scene that has changed dramatically over the last 200 years.



Figure 12.2 (above): The Ordnance Survey Map (1860-61) shows the expansion of the Imperial Hotel adjacent to 'The Marine Villa' or 'Marina' which is shown in Daniell's view (Figure 12.1).

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Figure 12.3 (below): An aerial photograph showing how development has changed the environment today.

Image Courtesy of Torbay Council.

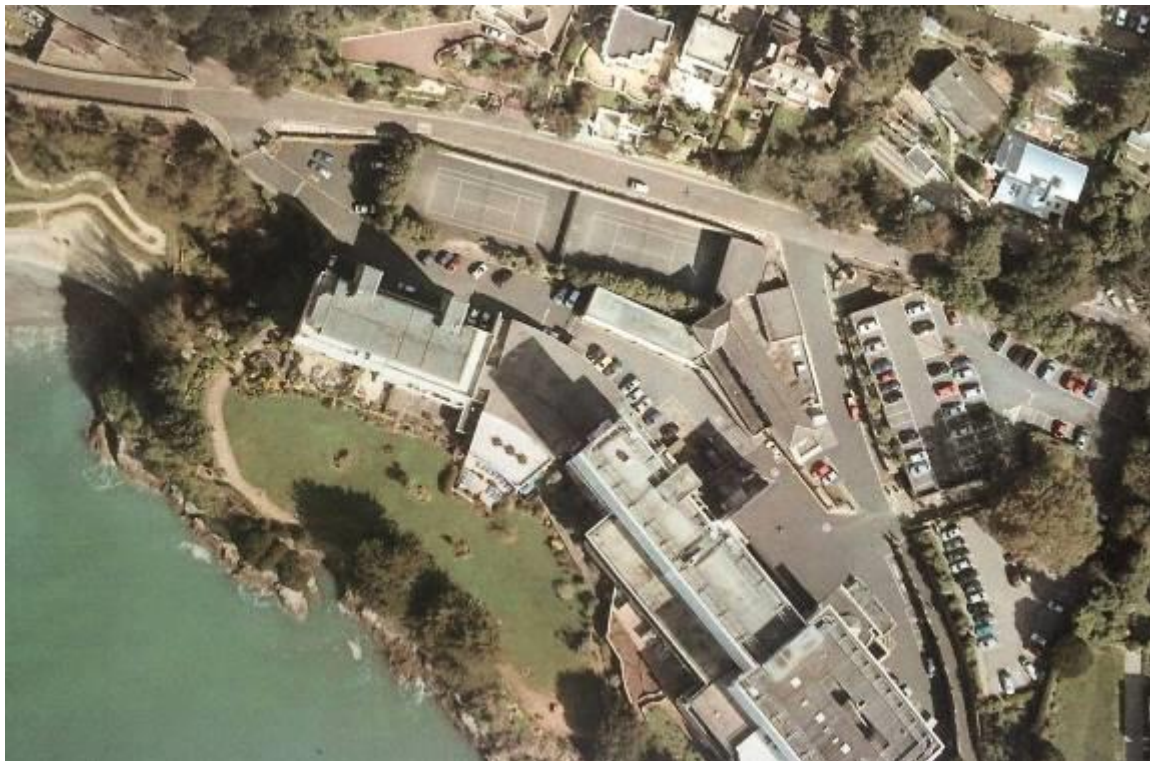




Figure 12.4 (above): A view of '*Vane Hill Torquay*' by Alfred Robert Quinton in watercolour (c.1920). In the foreground is the Pavilion, which was first designed by E. Richards in 1897, adapted by the Borough Surveyor, H. A. Garrett, and opened in 1912. Quinton produced numerous detailed views for the postcard publishers, J. & F. Salmon, in the early twentieth century.

Image Courtesy of J. Salmon Limited of Sevenoaks.

Figure 12.5 (below): '*Waldon Hill, Torquay*' also by A. R. Quinton. The line of Rock Walk can be seen on the hillside; all the villas on the hill pre-date the Pavilion. Alongside the North Quay are the Coal Bunkers.

Image Courtesy of J. Salmon Limited of Sevenoaks.



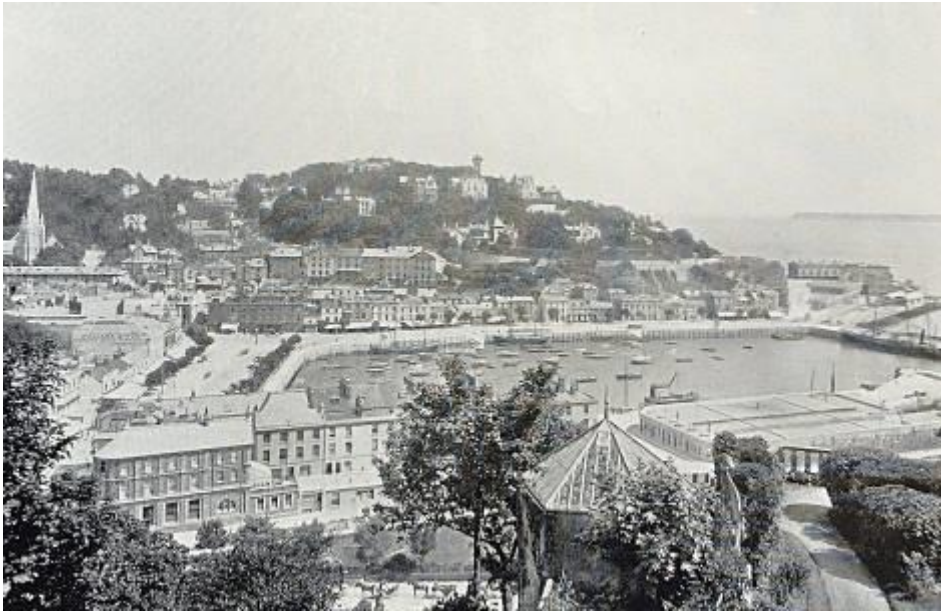


Figure 12.6: This photograph of 'Vane Hill', c.1910 is a similar view to that painted by Quinton in Figure 12.4 and illustrates his eye for detail.

Private Collection.



Figure 12.7: In this hand-tinted colour postcard, c.1920, many of the details shown of the buildings in Quinton's postcard (Figure 12.4) are visible here but in this view are in colour. (It should be noted that hand-tinted cards such as this do not have the reliability of original colour photographs)

Private Collection.



Figure 12.8: A present day view of the harbour and Vane Hill showing the developments that have replaced the Victorian villas.



Figure 12.9 (above): 'Torre Abbey, Devon' by William Daniell, 1825. This aquatint engraving shows Torre Abbey, which is the Georgian-looking building to the left of the picture, showing the two side wings built 1741-42; trees obscure the medieval gatehouse, and the large medieval 'Spanish Barn', which should lie to the left (west) has been omitted. The New Inner Harbour in the foreground, built to Rennie's design, was completed c.1815, but Torbay Road was not cut at the bottom of the cliff face until 1840. The pedestrian Rock Walk rising from the harbour to cut across Waldron Hill is the diagonal visible up the cliff. The 'watchtower' lies to the south above Cary Parade. This appears on the OS 1:500 Town map and the 1:1250 County Series surveyed 1860-61. Remnants may have survived in the wooded area behind the Torbay Hotel.



Figure 12.10 (above) shows David Addey's watercolour of Daniell's view painted in 1990. Torre Abbey appears to be obscured by foliage. A multi-storey car park now partially obscures the Pavilion. The present day view is shown in **Figure 12.11 (right)**.

Image Courtesy: Alamy Stock Photo





Figure 12.12 (above): *'Babbacombe'* by George Rowe, c.1826. Sadly, most houses have gone, certainly along the beach. The high flagstaff, up on the downs, is certainly on the 1887 OS Map, though the lower one (on Half-Tide Rock) is not. Of the up-slope houses the lower one is probably 'The Vine', present in some form as 'Glen Sannox/Babbacombe Court' until late twentieth century demolition. The upper one could, therefore, be 'The Babbacombe Cliff House Hotel' (Babbacombe Cliff on the 1933 OS) which may have been built by William Nesfield in 1878.

Figure 12.13 (below): *'Babbacombe'* by T. Fidler, c.1830s. The leftmost building on the shore was a public house in 1887 and has been subsumed into the Cary Arms Hotel; the building above it is 'Beach Cottage'. The middle building on the shore present in 1887, had gone by 1904. The one above with a smoking chimney is recognisably the listed Rose Cottage; it now has a slate verandah but it has been artistically 'moved' down slope. The cottages orné cannot be identified in this location. The flagstaff on Half-Tide Rock may have been a fishing aid at this location, having none of the visibility of the one on the downs, signalling shoals and tides by hoisting various buoys – it only appears to have stays, and no halyards/running rigging to the mast top.





Figures 12.14-12.17: This series of views plot the changes at Babbacombe in the nineteenth century. The two engravings (top and middle) show the gradual alteration or replacement of the marine villas on the shore. The tranquil view of 'Fisherman's Bay and Babbacombe Rocks' by Edward William Cooke RA, painted in 1875 portrays this coastline in Pre-Raphaelite geological detail.

Image Courtesy of Martyn Gregory Gallery, London.



Full details of the 'Babbacombe Downs Conservation Area – Character Appraisal' (2005) can be found at:
http://www.torbay.gov.uk/index/yourservices/planning/archaeologyandconservation/babbacombe_downs_conservation_area_appraisal.pdf

The Changing Torbay Coast



Figure 12.18: This detailed watercolour of 'Oddicombe Beach' by Samuel Edward Kelly, c.1910, shows development beneath the precarious red sandstone cliffs. Debris from previous cliff falls litters the shore in the foreground.

Image Courtesy: Private Collection.



Figure 12.19: This postcard shows the beach and the cliff in about 1970. The jointing in the sandstone cliffs is clearly visible and suggests the potential for further cliff falls.

Image Courtesy: Private Collection.



Figure 12.20: The watercolour by artist David Addey (1990) shows development on the cliff top and coastal defences in the bay below.

Image Courtesy of David Addey.



Figure 12.21: A photograph of Oddicombe Beach c.1900 looking eastwards. A cliff fall has occurred from the face of the bluff in the centre of the view.

Image Courtesy of Torquay Library.



Figure 12.22: The massive cliff fall onto Oddicombe Beach on 3rd April 2013 at Ridgemont House.

Image © Dr N. Csorvasi 2013.



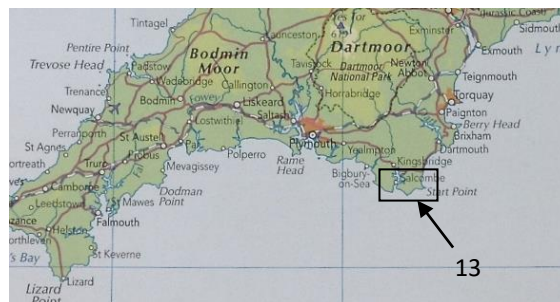
Figure 12.23: Another massive rockfall at nearby Anstey's Cove is recorded in this photograph c.1900.

The assistance of Hal Bishop and John Tucker of Torbay Council in the preparation of this case study is gratefully acknowledged.

Case Study Site 13 – Start Point to Salcombe, South Devon

1. Location

The case study site extends from Hallsands to the north of Start Point and continues westwards, past Prawle Point, to Salcombe at the entrance to the Kingsbridge Estuary; the coastal frontage is a distance of approximately 13km.



2. Why was the Case Study Site selected?

This part of the South Devon coast includes the abandoned community of Hallsands to the north of Start Point, field systems and associated later remains at Deckler's Cliff to Gammon Head, between Prawle Point and Salcombe, together with Salcombe Castle and marine villas along the estuary.

3. Summary of the Geology, Geomorphology & Coastal Processes

This section of the coastline is composed of metamorphic schists of the Devonian Period. These rocks create the rugged headlands of Start Point, Prawle Point and Bolt Head to the west. This coastline is comprised of long sections of cliffed shorelines that are indented with numerous small coves and pocket beaches, together with estuaries that intersect the cliffs, which were formed as a result of rising sea levels c.10,000 years ago. The rates of erosion of the cliff lines are very slow and there is minimal sediment contributed to the overall system. Most of the beach deposits are contained within their own bays and sheltered by adjacent headlands (Halcrow, 2011¹).

4. Risks to Heritage Assets along the Case Study Frontage

The village of Hallsands to the north of Start Point comprised a small fishing community, which was protected by a sand and shingle beach. In 1897 a major dredging operation took place offshore, leading to a significant reduction in beach levels which allowed the exposed village to be impacted upon directly by high tides and easterly winds. This led to the loss of some properties and, despite the construction of a seawall later, a major storm in 1917 caused further serious damage and the village was abandoned (MDV45491). The coastline to the west near East Prawle is rich in prehistoric archaeological sites and finds, particularly from the Bronze Age. Further evidence of occupation extends through the Roman, Medieval and post-Medieval periods. A signalling station (HER7053), one of a chain along the south coast, was built at Signal House Point in the late eighteenth century and a civilian signal station (HER43349) was established at Prawle Point later. The location had a strategic importance in both World Wars and on into the Cold War period when an RAF airfield and a radar station were established, together with gun emplacements.

At Deckler's Cliff to the north-west of Prawle Point, there is a coaxial field system and associated remains that form a Scheduled Ancient Monument (List Entry Number 1021253). There is also evidence of nineteenth century iron mines at this location. The Deckler's Cliff site is affected slowly by coastal erosion.

Salcombe is situated at the mouth of the Kingsbridge estuary. On its west side the entrance was guarded by Salcombe Castle (MDV7025), which is also known as Fort Charles. This ruin attracted the attention of some early engravers looking for picturesque views along the south Devon coast, but many artists passed it by. Within this estuary and, indeed, in others along the south Devon coast, attractive marine residences and cottages ornés were built in beautiful locations on terraces bordering the waterway. William Daniell, who travelled along the south-west coast in 1825, captured some of these in his fine aquatint engravings. Between 1910 and 1930 the prolific watercolourist, Alfred Robert Quinton, who worked for the colour picture postcard manufacturers, J. & F. Salmon of Sevenoaks, painted numerous views including several of Salcombe from Portlsmouth, which show the gradual development of Salcombe and the villas in the vicinity.

5. How can historical Imagery inform heritage risk management?

It has been explained that this part of the coastline is predominantly one of hard rock and, therefore, there is very limited coastal erosion or cliff instability. This case study highlights the effects of intervention at Hallsands for the extraction of material for expansion of the Naval Dockyard at Keyham near Plymouth. It illustrates the impact of such nearshore activity on development. Only one art image was found of Hallsands, which was subsequently engraved and is illustrated as figure 13.1. A number of photographs exist of the Hallsands community and a picture of life there can be gained from the photograph shown as figure 13.2.

With regard to Deckler's Cliff, despite extensive searches, no paintings, watercolours or prints were found of this specific coastline, and certainly none which showed the field systems. A photograph by Francis Frith (see figure 13.3) does show the field system, which is better illustrated in the recent photograph shown as figure 13.4.

No accurate artworks could be found of Salcombe Castle, perhaps because of its ruinous state. Its present day condition is illustrated in figure 13.5.

William Daniell's view of Salcombe (figure 13.6) shows a marine villa '*Woodville*' perched on the side of the estuary. In David Addey's watercolour taken from the same spot in 1988, the castellated steps on the left hand side form part of those shown in Daniell's view, but the present house called '*Woodcot of Woodville*' bears no resemblance to the property depicted by Daniell. The view by Alfred Robert Quinton (figure 14.8) shows Salcombe from Sunny Cove in about 1915. The scattered villa development bordering the estuary is now more intensive.

6. Key Issues – What can be learnt from this site?

This site indicates the variable quantity and quality of images available for different heritage subjects. At some of the smaller villages, such as Hallsands, artists did not tend to stop to paint, particularly if conditions at the time such as accommodation were not suitable for them. As a result, it is necessary to rely on photographic evidence. Similarly, the field systems at Deckler's Cliff were not a subject for artists and, again, the photographic record provides the best evidence. Salcombe Castle was engraved but in a picturesque and exaggerated manner and, therefore, cannot offer a worthwhile comparison in terms of the nature of the building and changes that may have taken place over time. By contrast, William Daniell's views, which were executed finely both from archaeological and topographical perspectives, do illustrate examples of marine villas and settlements along the South Devon estuaries and coasts. Similarly, works by the prolific Alfred Robert Quinton also help us to understand patterns of development into the twentieth century.

7. References

1. Halcrow, 2011. '*Durlston Head to Rame Head SMP2*'.



Figure 13.1: Lying just to the north of Start Point the fishing community of Hallsands occupied an exposed coastal location. Following dredging for aggregates too close to shore the beach lowered significantly. After a severe storm in 1917 the village was abandoned. This engraving of Hallsands is from an oil painting by William Collins (1846). No other paintings of the village have been found although there are a number of old photographs such as **Figure 13.2 (middle left)**. Where no artworks exist early photographs describe the nature of such relatively unvisited locations although the views are not in colour.

Image – Private Collection.



Figure 13.3: A view of the coast near East Portsmouth looking towards the Deckler's Cliff heritage site taken in 1924; no paintings were found for this section of the South Devon coast.

Image © 2005 Heritage Photographic Resources Ltd/Francis Frith Collection.



Figure 13.4: This recent photograph shows Deckler's Cliff with the ancient field system clearly visible. Although undefended the coastline has changed only slightly since the earlier Frith photograph.

Image courtesy of © Derek Harper/Creative Commons License.



Figure 13.5: A few romantic style engravings exist of the ruins of Salcombe Castle (Fort Charles) but they are of insufficient detail and clarity to inform this study.

Image courtesy of © Anthony Parkes/Creative Commons License.



Figure 13.6: This view of 'Salcombe' by William Daniell RA (1825) shows one of the many decorative marine villas that are situated overlooking the estuary. As well as being a fine topographical artist, Daniell was an accurate architectural draughtsman, therefore the buildings in his engravings offer true images of their state at that time.



Figure 13.7: The architect and watercolour artist, David Addey, retraced Daniell's journey around the British coast in the late 1980s; he reached Salcombe in 1988. Whilst the villa depicted by Daniell had gone, part of the crenelated steps up to it still existed.

Image courtesy of David Addey.



Figure 13.8: This view of Salcombe from Sunny Cove by A.R. Quinton shows the typical villa development found on many South Devon estuaries in the early 20th century.

Image courtesy of J. Salmon Limited of Sevenoaks.

Figure 13.9 (Right): shows the location today. Image courtesy of © Chris Hart/Creative Commons License.



Case Study Site 14 – Plymouth

1. Location

The case study extends from the eastern side of Plymouth Sound to include City frontage, Devonport, Mount Edgumbe and west to Rame Head. The total coastal frontage is approximately 15km.

2. Why was the Case Study Site selected?

Plymouth was selected on account of its rich maritime heritage, which dates back to the reign of King Henry VIIIth when the earliest fortifications were constructed as defences against French attack. Concerns about invasion after the Spanish Armada led to further improvements with the Royal Citadel being constructed for King Charles II in 1665, incorporating the remains of the sixteenth century fort. Further improvements to the fortifications continued through into the late eighteenth century. On account of Plymouth's rich maritime heritage, there are numerous illustrations of the Citadel, as well as views of shipping and Naval activity within Plymouth Sand, Cattewater and Hamoaze. A further attraction for artists was Mount Edgumbe, located on a headland to the south-west of the city. Plymouth experienced perhaps the most intensive bombing of any English cities in the Second World War, and many historic buildings were lost, leading to a major programme of reconstruction. However, the Citadel and a number of other historic locations around the waterfront remain today. On account of the numerous images of the Plymouth area, and the importance of the Royal Citadel and Mount Edgumbe, the rich resource of images available allow us to understand more about changes to historic sites since the 1770s.

3. Summary of the Geology, Geomorphology & Coastal Processes

The coastal frontage at Plymouth is composed of rocks of the lower old red sandstone group of early Devonian age. North of the coastline there are outcrops of limestones, mudstones and slates of the Torbay and Tamar Groups. These occupy most of the area of the inner harbour.

Plymouth developed on an estuary, the largest along the south Devon coast, and is located at the point of discharge of three major rivers, the Tamar, the Tavy, and the Plym. Several smaller streams and creeks also discharge into the estuary. These waters combine to form Plymouth Sound, which is flanked by steep rocky cliffs, and is partially protected by the Plymouth Sand breakwater, which limits the wave exposure of the shoreline on its landward side. The presence of Drake's Island within the sand also provides an element of shelter for the shoreline.

The adjacent cliff lines and rocky coasts are resistant to erosion, with very slow rates of retreat.

4. Risks to Heritage Assets along the Case Study Frontage

On account of the nature of the solid geology and the relatively sheltered position of Plymouth within its Sound, the impacts on heritage assets can be expected to be slight. However, severe storm events, such as those experienced in the winter of 2013/14, demonstrate that, even in such locations, damage to exposed historical structures, such as at the Citadel, can be experienced. This may be expected to increase as a result of an increased frequency of storm events and rising sea levels.

5. How can historical Imagery inform heritage risk management?

On account of the wealth of images produced of Plymouth, often relating to its maritime and Naval heritage, it is possible to illustrate the chronology of development and change in the case study site. A series of annotated images have been provided as part of this case study to show how they may be interpreted to better inform us of development patterns within the city and its environs over time.

6. Key Issues – What can be learnt from this site?

Like the case study for Torquay (Case Study 12) this review of Plymouth focuses on changes resulting from human activity rather than natural change. Interpreting historical images in this way provide more information on the addition, alteration or loss of heritage sites over the decades and centuries, thereby providing a more complete record of the city's heritage.

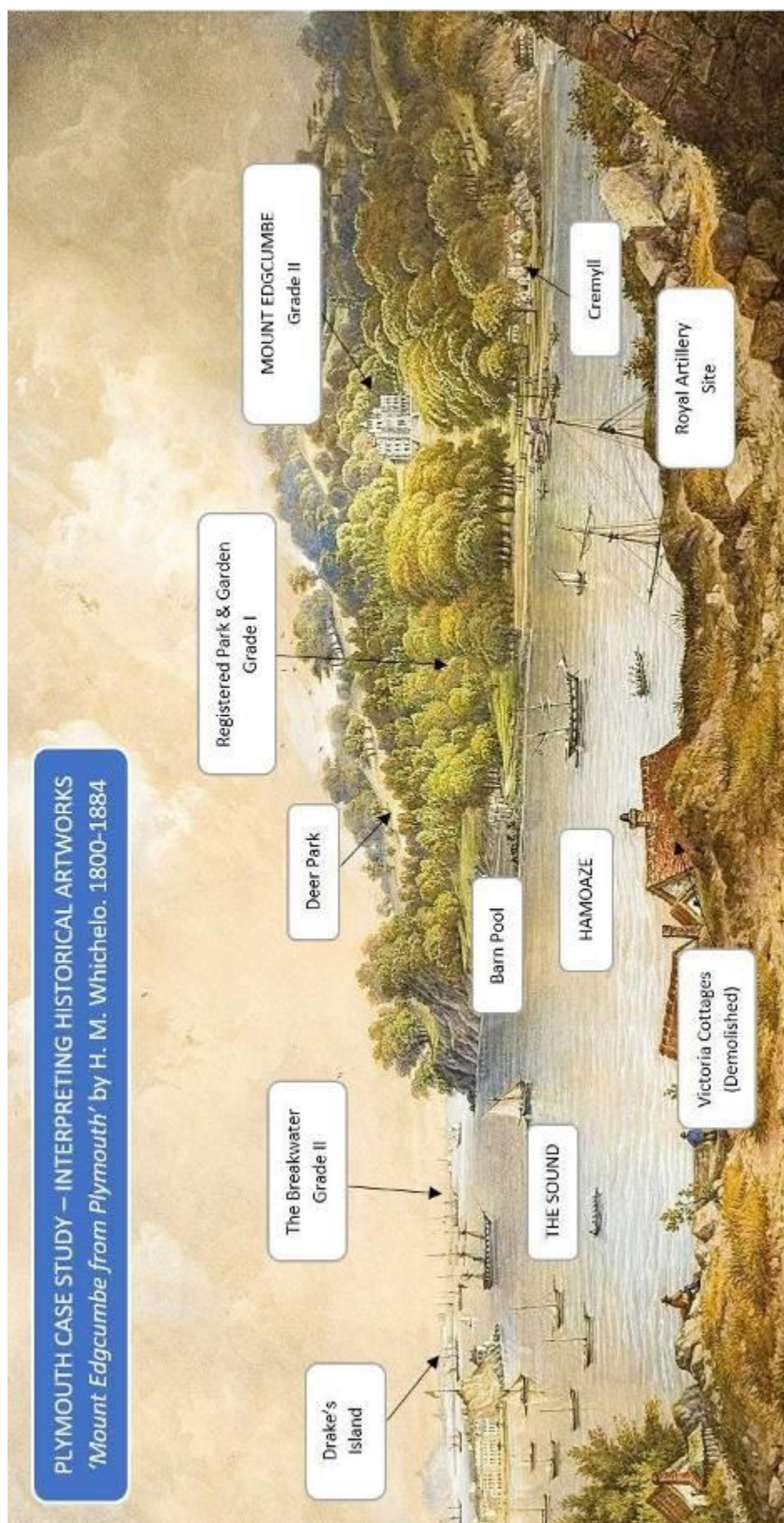


Figure 14.1

PLYMOUTH CASE STUDY – INTERPRETING HISTORICAL ARTWORKS

'The Citadel, Plymouth' by William Daniell RA. 1825

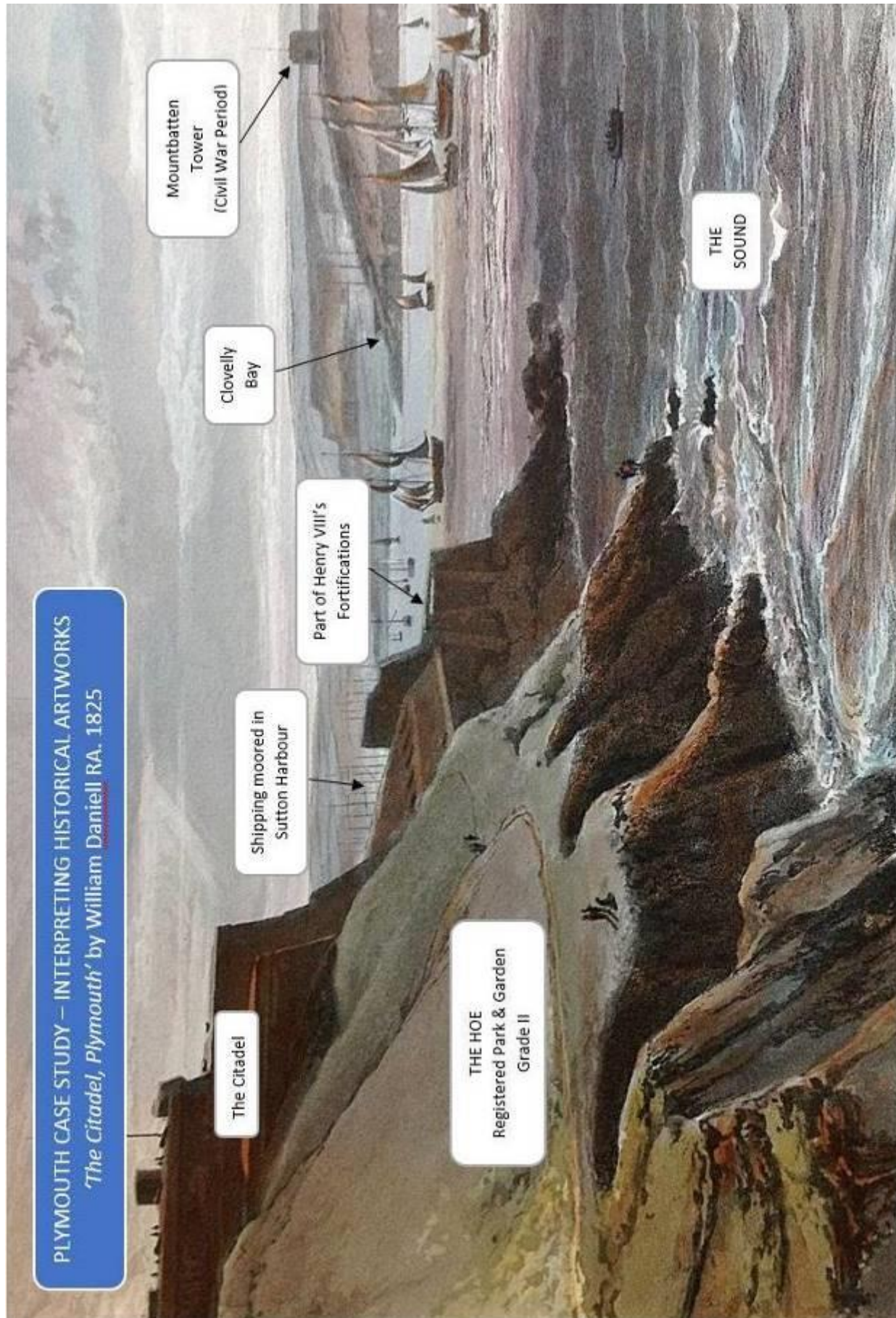


Figure 14.2

PLYMOUTH CASE STUDY – INTERPRETING HISTORICAL ARTWORKS
 'Government House to Devonport' by William Payne. c.1760-c.1830



Figure 14.3

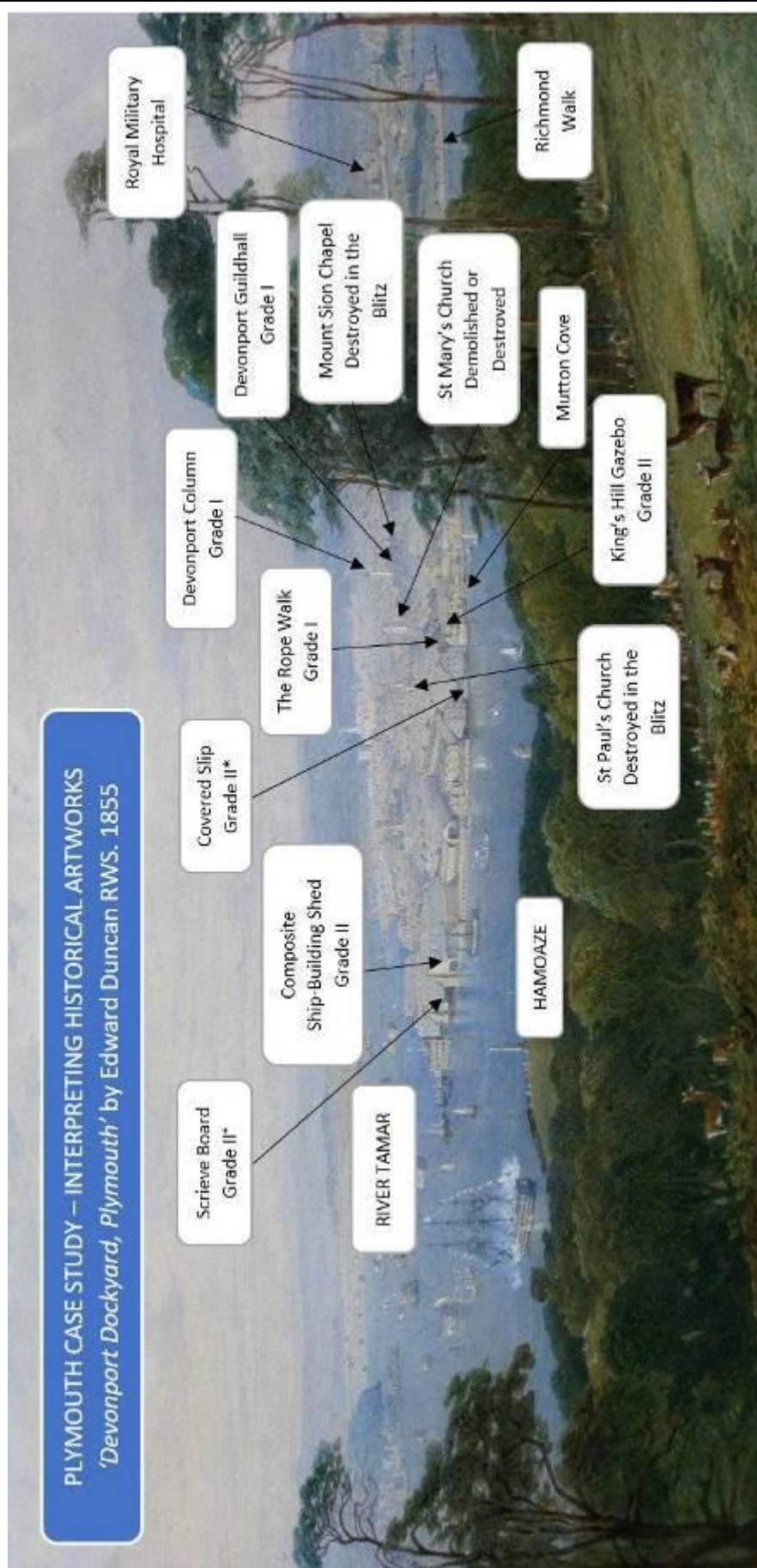


Figure 14.4

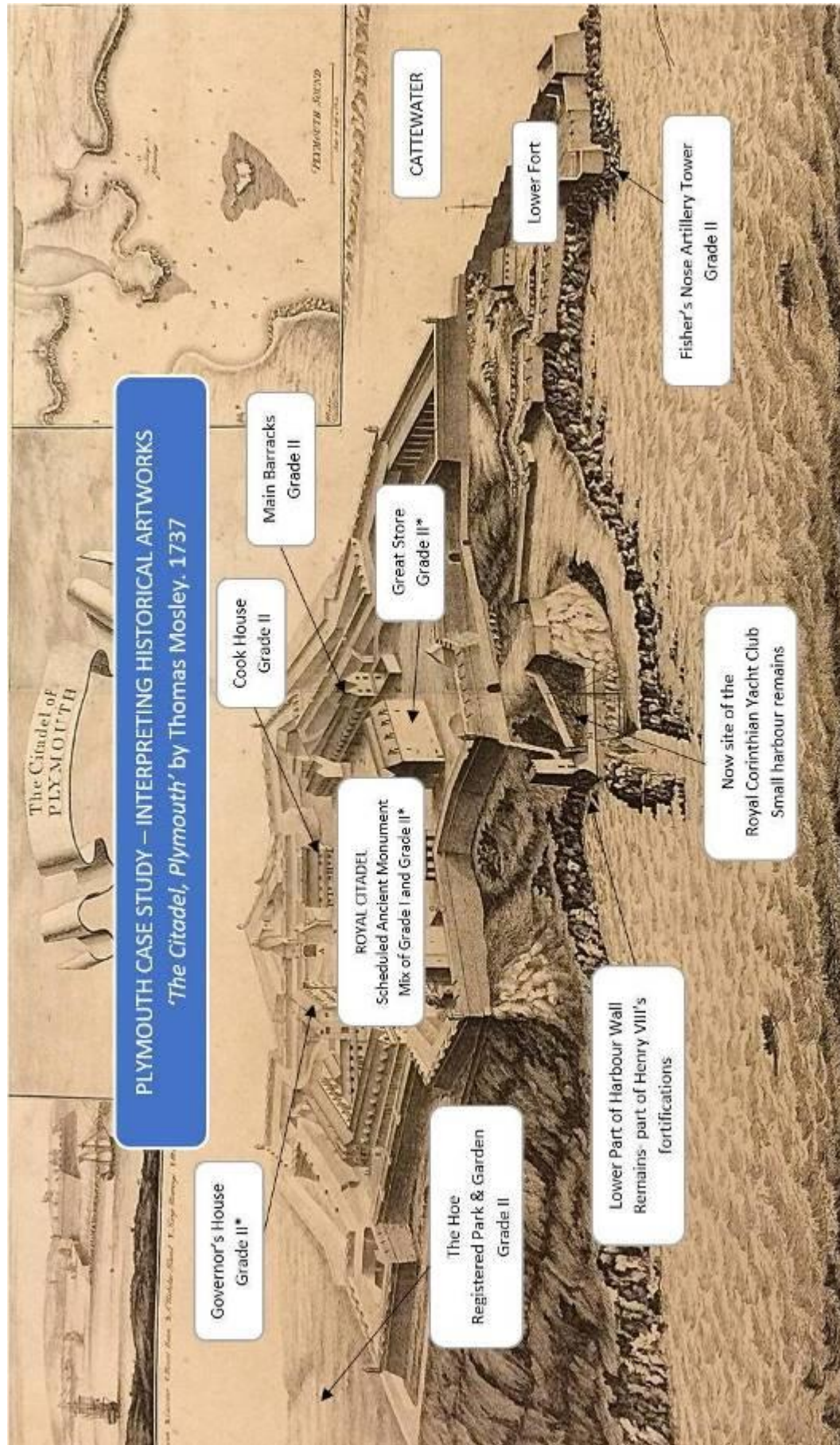


Figure 14.5

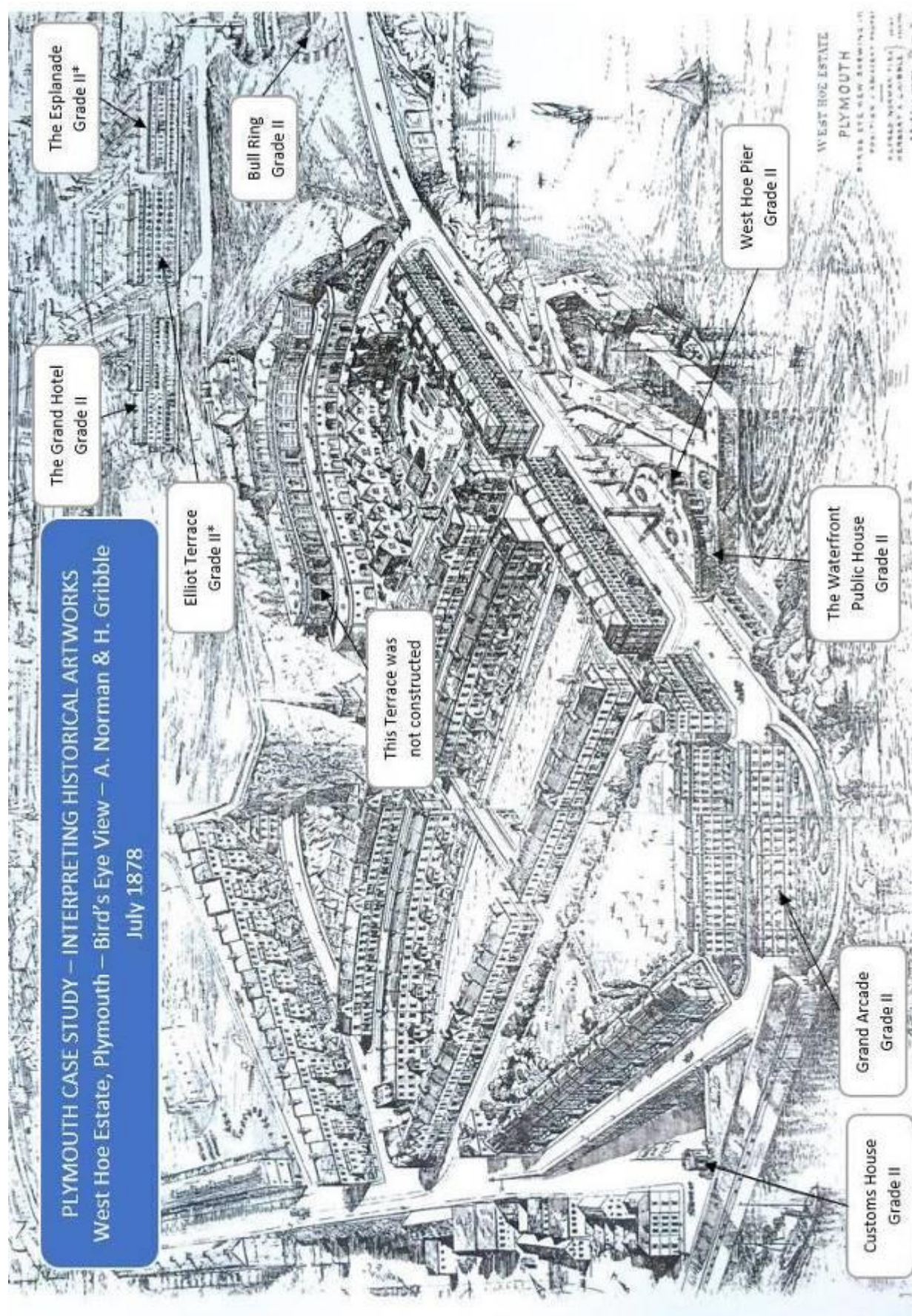


Figure 14.6

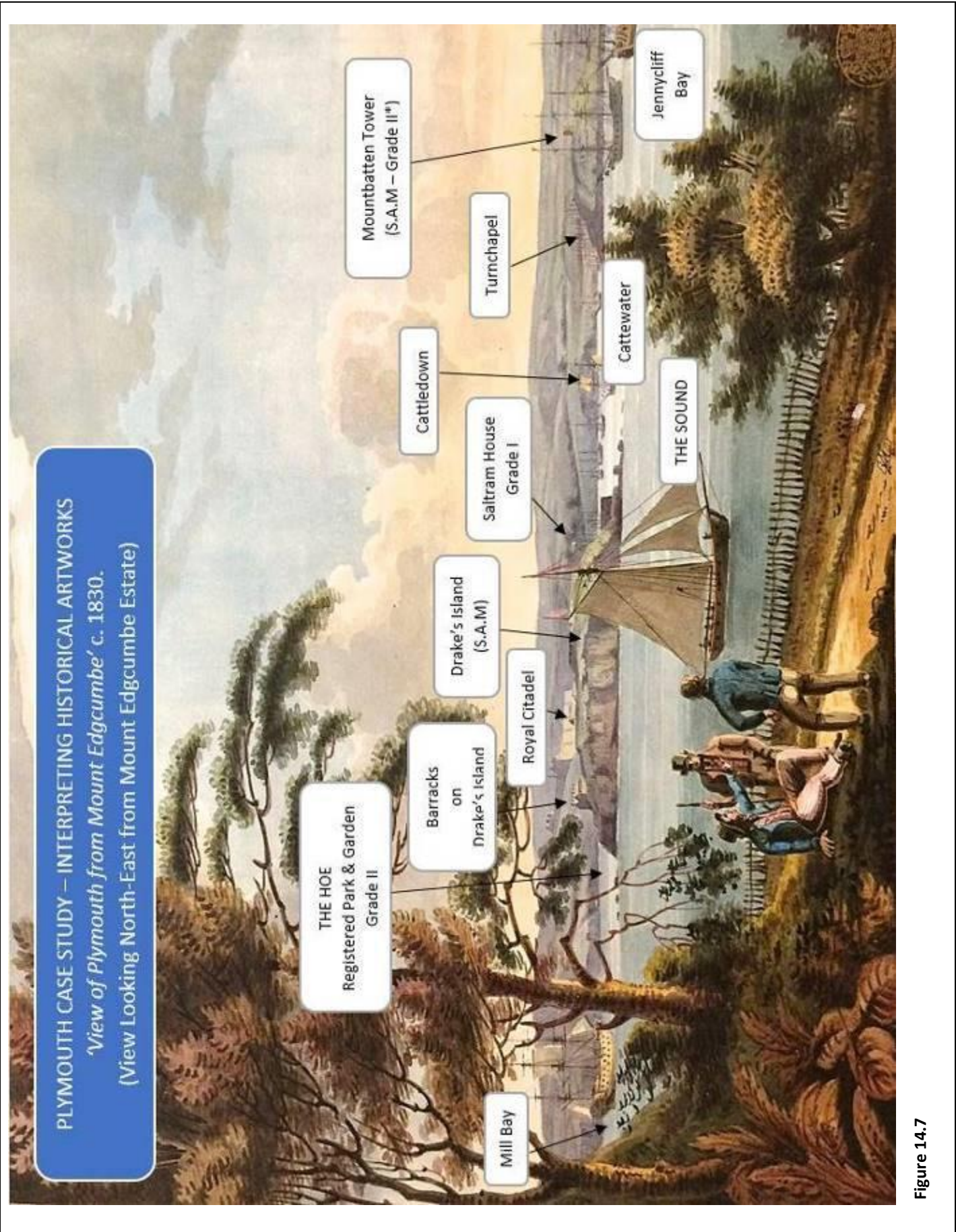


Figure 14.7