

## 5.2. River Exe

### 1. Location

The river Exe rises close to the north Somerset coast and flows almost due south for 96 kilometres, before expanding into its wide estuary south of Exeter on the south coast of Devon.



### 2. Why was the Case Study Site selected?

The case study was selected because the river Exe is a major West country river, which traverses a diverse geology and landscape, including high uplands, deep valleys, more open landscapes in central Devon, towns and cities including Tiverton and Exeter, to emerge as the important estuary on the south coast of Devon. The highly varied topography, together with substantial water volumes running from streams and rivers feeding the Exe, together with the fact that most of this region was visited and painted by artists since 1800, therefore, provides a good example illustrating the potential for art to inform us of river change and management over time.

### 3. Summary of the Geology, Fluvial Geomorphology and Processes

The River Exe rises at Exe Head near the village of Simonsbath on Exmoor in Somerset, 8 kilometres from the Bristol Channel coast, from which it flows more or less directly south across Devon. Extending for a length of 96 kilometres, the Exe reaches the sea as a substantial ria, the Exe Estuary, on the English Channel coast. The Exe flows through a varied landscape, which is composed largely of sandstones, mudstones and limestones of the Devonian, Carboniferous and Permian Periods. The source of the Exe lies within a heather covered upland plateau, flowing through deeply incised valleys on its route southwards, before following a deep wooded valley past the small town of Bampton, and through richly wooded and fertile valleys to the ancient town of Tiverton, where its flows are swelled by the waters of the river Loman.

Six kilometres south of Tiverton it reaches Bickleigh Bridge, beyond which the Exe is enlarged by the flows from the river Culm, the largest of all its tributaries. At Cowley Bridge 3 kilometres to the north of Exeter, the river is joined by the river Creedy, which flows from the north-west. From this point the relatively clear waters of the river are tinged with the reddish colour from the Devon soil through which the river flows along this section.

The Exe then passes through the city of Exeter, which has enjoyed a long history as a flourishing port, and, where, over time, the route of the river has been significantly altered and channelled as a result of historical trading disputes; this included the cutting of a canal to Topsham as early as 1564. The historical obstruction of the natural waterway near Topsham by the Countess of Devon prevented any shipping traffic proceeding beyond Countess Weir at Topsham, 7 kilometres below Exeter.

Near Topsham the Exe is joined by the river Clyst, and just below the confluence the Exe expands until it is more than 1.5 kilometres in width. Close to the mouth of the estuary the important seaside town of Exmouth is located. Tides on the river are limited at Exeter, 2 kilometres upstream of Countess Weir. At low tide, extensive mudflats are exposed in the estuary and these are an important habitat for wading birds.

#### 4. How can the Art Imagery inform us of river change?

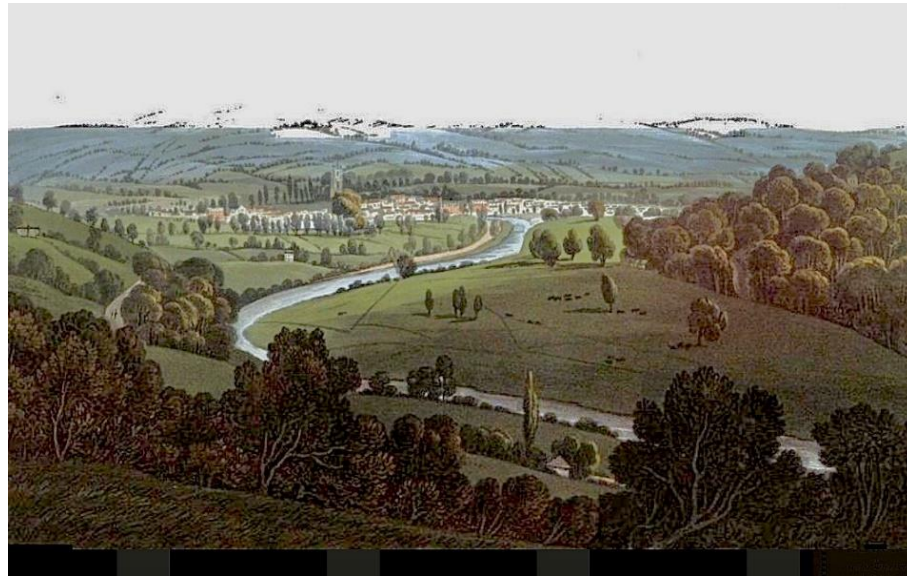
On account of the importance of the river Exe flowing through historic upland and valley-located villages and towns, as well as through the capital, Exeter, this scenic river with its many historic bridges and dramatic fast-flowing tributaries, has provided material for topographical artists since the 1800s. Many of these artworks appeared in topographical books written about the County, including *Picturesque Views of the River Exe* (Havell, 1819<sup>1</sup>). A detailed illustrated account of the river is also included in *Devonshire and Cornwall Illustrated* by Thomas Allom and William Bartlett in 1832 (Allom & Bartlett, 1832<sup>2</sup>).

Later, more topographical books on Devon, published in the early twentieth century, include colour plate illustrations reproduced from original watercolours, and these provide a chronology of river change through into the twentieth century, which can be readily compared with present-day views (Northcote & Widgery, 1923<sup>3</sup>). The extent of change, or lack of it, is illustrated in the examples on the following pages.



Figure 2.1: View on the River Exe near the Quay, Exeter by T. Allom. Steel engraving. 1831.





**Figure 2.2:** The River Exe winds its way southwards towards Tiverton in this aquatint engraving by Havell and Lewis (1819) from their *Picturesque Views of the River Exe*.



**Figure 2.3 (middle):** A further aquatint by Havell and Lewis (1819) showing the Exe at Bickleigh Bridge within its pastoral landscape. The volume of water running off the high ground to the north can result in flooding here, for example, in October 2021 – see **Figure 2.4 (below)**.

**Courtesy:** Geograph Images.







**Figures 2.5 and 2.6** show the River Exe at Tiverton in 1819 and in 1831 respectively. In the view above by Havell (above), the river follows its natural course through the vale adjacent to the church; the location has started to become more developed below, with properties on both sides of the river and the provision of a footbridge.







**Figures 2.7 and 2.8** show the same location at Tiverton in 1923 painted by Frederick J. Wiggery and the present-day view. Walls now border the river on the right, with undefended parkland on the left. In the present-day view, the far bank now has concrete flood defences and a road bridge has been installed. Flooding on the Exe, particularly upstream, continues to pose a threat to some of the villages abutting the river.

Photograph: © Lewis Clarke, Creative Commons Licence







**Figure 2.9 (above):** *Exeter from Exwick showing the river with the city beyond* by Frederick Widgery (1923).

**Figure 2.10 (below)** shows an extensive view of Exeter from across the Exe, painted by Peter de Wint in 1848.

Courtesy: Guy Peppiatt Fine Art.



The present-day view, **Figure 2.11**, also shows the Exeter Canal, which was constructed in 1566 leading south from the city's historic quayside, down towards Topsham and the mouth of the Exe.

Image Courtesy: Lewis Clarke, Creative Commons Licence.



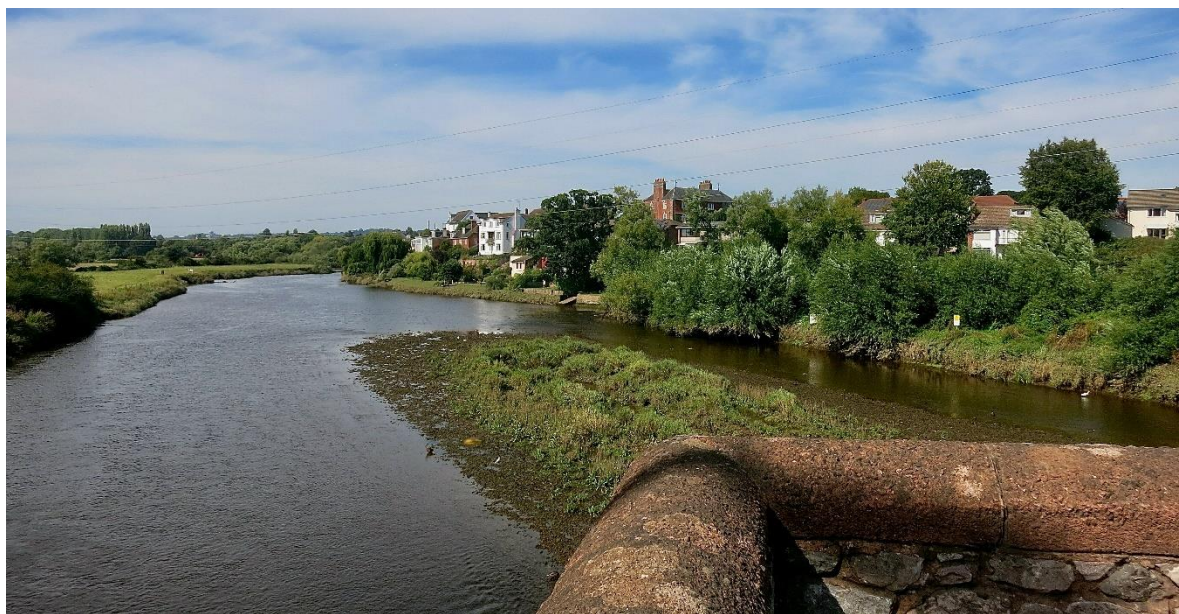




**Figure 2.12 (above)** shows the hamlet of Countess Weir to the south of Exeter painted in watercolour by Ernest W. Haslehurst in c.1920. The banks are natural and lack any flood defences.

The present-day view, **Figure 2.13 (below)**, shows the expanding village from the bridge with the banks still in a natural state.

Courtesy: D. Blenkinsop, Creative Commons.







**Figure 2.14 (above)** shows the small port of Topsham, a trading and ship-building centre at the head of the Exe Estuary in c.1920. From Topsham the estuary widens out towards Exmouth and the English Channel.

**Figure 2.15 (middle):** *A View of the Exe from Exwell Looking Towards Topsham* by Francis Towne, 1779. Watercolour.

The writer, Richard Walker, 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, 1800).

Courtesy: John Spink.



**Figure 2.16 (below)** shows the present-day view looking across the Exe Estuary, which has retained much of the natural appearance of Francis Towne’s watercolour painted over 220 years earlier. This environment is managed by the Exe Estuary Partnership.

Courtesy: David Smith, Geograph Images.



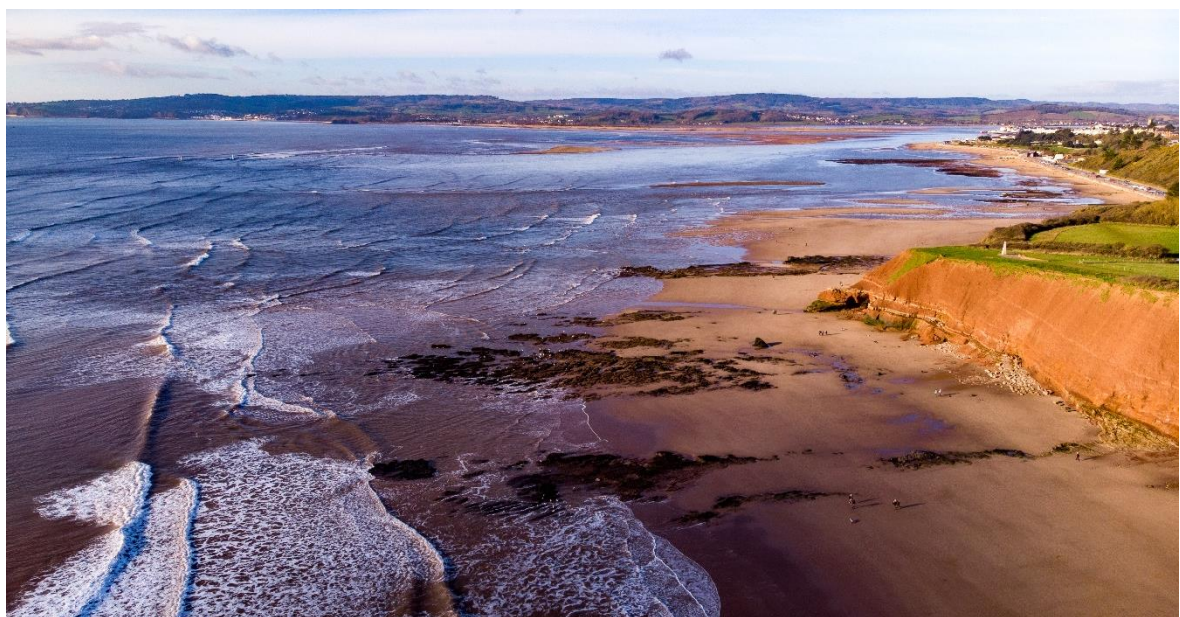




**Figure 2.17:** This view of the coast near Exmouth was produced as an aquatint engraving by William Daniell RA in 1823 and looks north-westwards across the estuary mouth. The developing town can be seen on the right.

The natural state of the estuary appears to show little change in the present-day photograph, **Figure 2.18 (below)**, and points to careful management of the natural environment. Although the coastline is now defended towards Exmouth, the striking sandstone shown in Daniell's view remain undefended.

Courtesy: Shutterstock Images.



**Figure 2.19 (overleaf)** illustrates the application of art to inform estuary management through the EU Interreg IVA *Licco* (Living with Coastal Change) Project. The assistance of the Exe Estuary Partnership is gratefully acknowledged ([www.exe-estuary.org](http://www.exe-estuary.org)).



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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 entranced by the broad estuarine 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, whilst 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 mildness of the climate and the health-giving properties of the air and seawater. For artists who wanted to work outside in the open landscape this fine weather was a very particular advantage.

In 1791 Dr Jebb, 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 beneficial effects of seawater) were installed on Exmouth beach as early as 1759. Exmouth was the earliest seaside resort to develop in Devon and the fact that it was becoming the "handsomest 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 artist whom many people associate with the town is Francis Danby who lived in Exmouth from about 1842 until his death in 1861. Danby lived first at Rill Cottage overlooking the river Exe and later at Shell House on the Moar, where he devoted time to boatbuilding.

Another notable inhabitant was Conrad Martens (1801-78), the official artist with Charles Darwin on HMS Beagle in 1833, who painted in Exmouth from 1822 until 1832.

Other local artists include Henry Bliffeld (1802-1892), James Bridger Goodrich (1826-1905), Richard Thomas Pennefather (1806-1885), William Henry Hallett (1810-1835), Richard Bevis (1824-1896) and Charles Edward Strong (1815-1899).

#### Artists portraying Exmouth before 1910

The landscape and marine painter William Daniell RA (1769-1837) was one of the artists who put Exmouth on the map when he travelled around the coastline of Britain

**280 million years ago (Permian period)**  
**Exe Estuary**  
Devon was part of a land mass just north of the Equator, with a dry, hot climate similar to that of the southern Sahara Desert today. The red sandstone rocks we can still see at Dawlish were eroded by storms and flash floods.

**240 million years ago (Triassic period)**  
**Exe Estuary**  
The coastline began to move northwards over the Atlantic Ocean as it formed, making Devon's climate more humid. Sea levels rose and the Exe Estuary was periodically submerged.

**7000 years ago**  
**Dawlish Warren**  
As sea levels continued to rise, longshore drift from the west transported sediment along the coast to form Dawlish Warren. This originally consisted of two sand spits (the Outer Warren and the Inner Warren) separated by a lake (Greenland Lake).

**1100-1300**  
**Powderham**  
"Much of the land in the Exe Estuary was reclaimed from the sea in the 12th and 13th centuries. Before this, the land would have been a marshy ground on which Powderham Castle now stands. The red sandstone cliffs through which the main road is now cut were part of the coastline. In this day, the river was seen as the outer walls of Powderham Castle where, as late as the 18th, fishermen used to tie up their boats."

**1300s**  
**Dawlish Warren**  
Dawlish Warren was used as a training ground for small games.

**1600s**  
**Exmouth/Dawlish Warren**  
Leif Courtney contrasted Topsham Quay in 1613. During the English Civil War (1642-1646) it was the site of an earlier battle, but.

**1715-1805**  
**Dawlish Warren**  
Anne Lytton (or Little), told of walking across stepping stones from Exmouth to the Warren to "milk the cows grazing". She claimed the main channel of the estuary flowed more to Lynton than to the Warren and that Dawlish Warren rather than the Warren and it is today.

**1811**  
**Exmouth**  
Boats used to sail from Exmouth Island in Exmouth, just around the corner from Exeter Road. An embankment built here in 1811 allowed the reclamation of 40 acres of marshland and foreshore. On 18th October, the tide on the Devonshire coast rose higher than has been witnessed in the memory of any person living; the wind was furiously very moderate.

**1924 22nd November**  
**Dawlish Warren**  
The Great Gale: At Dawlish Warren the sea burst through the embankment, and flooded some seven acres. Considerable damage to property was reported. As Sturges, "The water has made several breaches in the wall which protects the village, and had run in the streets to the height of many feet several houses are much damaged."

**1838 February**  
**Dawlish Warren**  
A storm washed away up to one quarter of the Warren with exceptionally high tides.

**1861**  
**Exmouth**  
Work started on constructing the sea wall along the Esplanade. This allowed the reclamation of a large strip of coastal land and the construction of docks in 1862-9 which boosted Exmouth's success as a port. Before this, lighters transferred cargoes from ships to wharves offshore.

**1861**  
**Exmouth**  
The railway line was built to Exmouth in 1861, bringing with it mass tourism.

**1862**  
**Dawlish Warren**  
The Earl of Devon built an embankment from the south-west corner of the Exe Estuary to Warren Point in order to reclaim an area from the sea to build a quay. Some 30,000 quays were harvested from the bank in Greenland Lake in one year.

**1863**  
**Exe Estuary**  
The Pilot's Handbook of 1863 advised of the nature of the Exe: "As the entrance is not lighted it cannot be run for with safety at night. It is at all times difficult to access, unapproachable in heavy sea, and must on no account be depended on for refuge. From the entrance, which has a long, shallow bar to channel is narrow and winding and ought not to be attempted without a pilot."

**1817**  
**Dawlish Warren**  
Soldiers excavated where Shuckton (Bosch) lived the Warren, where Warren, and they were demolished in 1900. A violent storm washed 5 acres of the Warren away in one day, killing many rabbits.

**1836**  
**Dawlish**  
"In 1836 a sea wall was built for the protection of the Warren. The sea wall was quite a small affair, and was superseded by the Railway wall ten years later."

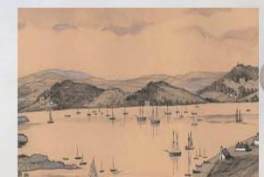
**1840s**  
**Clyst St George, Topsham (west)**  
Six hectares of agricultural land at Goscombe, at the mouth of the River Clyst were drained and reclaimed to be used as pasture land.

**1859**  
**Exe Estuary**  
A severe hurricane hit the River Exe in 1859, changing the appearance of Dawlish Warren, which previously entered in a steep bluff of sand on its seaward side. The bluff at least 250 ft high was washed away by a great storm. The tide level was at the top of the railway embankment and breaking over the parapet on to the line also running through the underways of the sea wall into the village, leaving the ground floor and cellars of most houses underwater. Part of the embankment of the South Devon Railway line near Exmouth was to a considerable extent washed away, the water having inundated the meadows.

**1869 31 January & 1 February**  
**Exmouth, Dawlish, Dawlish Warren**  
Gales and high tides continued to devastate the coast. On the South Devon line a quarter of a mile east of Dawlish, 300 yards of rail track were washed away, and a part of the Exmouth docks suffered similarly. More disastrously the Warren was seriously breached. Sand filled the quays and choked the breaching stock, leading to their abandonment.



Sale of Wreckage on Exmouth Beach, George Townsend (1813-1894), watercolour, c.1850-60. © Royal Albert Memorial Museum and Art Gallery, Exeter



Francis Danby ARA (1793-1861) Exmouth 1826 © courtesy Exmouth Library



Exmouth, James Fidler (1790-1864), watercolour, c.1820-25. © Royal Albert Memorial Museum and Art Gallery, Exeter



View of Exmouth from the Beacon Walls, William H. Hallett (1810-1835), oil on canvas, c.1830. © Royal Albert Memorial Museum and Art Gallery, Exeter



[www.licco.eu/exe-estuary/](http://www.licco.eu/exe-estuary/)



## ...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 Ridgway (1836-1893) who is best known for his Dartmoor scenes but also painted the Exe Estuary coastline and James Bruce Birkenmyer (1834-1899) who was head of both the Exeter School of Art and Exmouth art school. He was involved with the preliminary discussions, in 1862, 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 20th century progressed artists were drawn to Exmouth just as they had been previously; they were part of a continuum. The exceptional advantages which Exmouth had to offer still held (and hold 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 Haldon 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 bouncing off both the sea and the estuary and the mildness 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 lustre" – are elements which continue to enthrall both visitors and residents.

With special thanks to April Marjoram and Howard Jones of the Exmouth Historical and Archeological Society for their time, expertise and painstaking research.

The Living with a Changing Coast (LiCCo) project ran in the Exe Estuary between 2011 and 2014 to raise awareness of coastal change amongst coastal communities.

For more information on the Living with a Changing Coast project and the artists covered by this research see [www.licco.eu/exe-estuary/](http://www.licco.eu/exe-estuary/)



James Bridger Goodrich (1826-1905)  
View of the Estuary and Beacon from a field  
courtesy Exmouth Library



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



Richard Beavis (1824-1896)  
The story of the wreck  
1872  
© courtesy Sunderland Museum & Winter Gardens



John White Abbott (1763-1831)  
View of the port of Exmouth  
1811  
© Plymouth City Council (Arts & Heritage)



Living with a Changing Coast  
LiCCo Littoraux et Changements Côtières



## A Changing Coast through time in the Exe Estuary



1854 - November  
Lymington  
"At Lymington and Exeter whole traces were underwater"



1900  
Dawlish Warren  
Storms caused Dawlish Warren to breach once again. The seawalls were demolished, leaving them out of operation for some time.



1914, 1915  
Exmouth  
The Moor at Exmouth was reclaimed through construction of the riverbank and seawall behind Moor Road.



1920s  
Dawlish Warren  
"In the 1920s The Warren was connected by a footbridge to the Exmouth Warren, an island of high sand-dunes on which eccentric people built their unusual homes. ... Then, suddenly, with little warning the sea demolished in two days that which had taken decades to build and the little bridge, the Bridge of Sighs, lay only in the empty sea." Basil Moore-Wright



1937-39  
Dawlish Warren  
A series of storms and high tides removed the sand dunes on Dawlish Warren. "The whole of the Warren was in danger."



1949-1959  
Dawlish Warren  
The end of Dawlish Warren spit reached back after 7 months, but the storms showed that Dawlish Warren was prone to changing shape. British Rail nationalised forces and railway steeper barriers on the foot of the dunes and planted trees to help stabilise them, but the dunes continued to erode inland. The first wooden groynes were installed on the beach in 1959.



1960  
Lymington  
Longer-term floods in September and October 1960 caused problems in Lymington, so severe that people had to use boats to move around the village. A local boat which had floated up the Malwood chapel from the Gooch Inn was returned."



27th 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 dunes and a number of breaches occurred. It was clear that more sea defences were needed to protect the Warren's habitat, its tourism industry and its function as a breakwater for the rest of the salinity New coast. Defences were installed – a 300 metre long concrete sea wall was to the existing rock armour meeting a promenade on the top of the wall along with a backbone of 300 metres of rock filled wire baskets (gabions) beneath the sand dunes and 18 groynes along the spit to try to stabilise beach levels.



2000 8th December  
Dawlish Warren  
Torrential rain across Britain has originated further flooding and near 100 new flood warnings. A conveyor belt at Dawlish Warren had to be evacuated.



2000  
Dawlish Warren  
Dawlish Warren was designated a National Nature Reserve. Along with the rest of the Exe Estuary, the site is internationally important for wetland birds and willow. It is also home to at least 600 species of flowering plants, including the Sand Grouse (Rhinoceros).



2008 10th March  
Exmouth  
In Exmouth, the heavy winds and powerful waves meant water spilled on to some roads, making driving difficult.



2012  
Dawlish Warren  
In October high spring tides and stormy seas washed away several metres of sand from the central part of the spit, exposing the gullies that hold dunes in place.



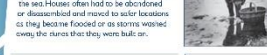
2015-2016  
Dawlish Warren  
As part of the Exe Estuary Strategy the sea wall and groynes at Dawlish Warren will be maintained and the ground level raised in places to reduce the risk of tidal flooding to property. Gullies will be removed gradually and from sand brought in to recharge the beach. This will help the dunes to recover and improve the quality of the beach for visitors. It should also lengthen the life of the sand spits as shelter for the rest of the estuary.



1880  
Dawlish Warren  
Thousands of tons of gravel were removed from a bank off the village of Serris for the building of Princess Theatre in Torquay.



1899  
Dawlish Warren  
The first sand dunes were built on the eastern end of Dawlish Warren. The community of 70 dwellings was continuously threatened by the sea. Houses often had to be abandoned or dismantled and moved to safer locations as they became flooded or as storms washed away the dunes they were built on.



1911  
Dawlish Warren  
"The Gull" washed away several homes at Dawlish Warren. The heavy rain and high tide resulted in a portion of the lower part of Lymington being flooded.



1917  
Dawlish Warren  
The first sea defence (granite boulders) was built on the western end of Dawlish Warren to protect the railway line.



1992  
Dawlish Warren  
By this time the inward movement of the Outer Warren had caused it to join with the Inner Warren, enclosing Greenwell cove and creating a single spit.



1944-1946  
Dawlish Warren  
A series of storms between 1944-1946 washed away the central bank and of Dawlish Warren. "The 21st December 1945 was the worst storm for 30 years", with waves washed up on the beach.



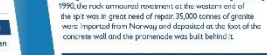
1962 11th March  
Dawlish Warren  
Significant seaward Dawlish Warren to see the extensive damage to dunes and beach huts. The lower Exe was overwhelmed with heavy sleepers.



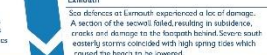
1978  
Dawlish Warren  
The Warren was redesignated as a Local Nature Reserve.



1992  
Dawlish Warren  
After yet more storms in December 1989 and January/February 1990, the rock armoured seawall on the western end of the spit was in great need of repair. 35,000 tonnes of granite were imported from Norway and deposited at the foot of the concrete wall and the promenade was built behind it.



2004 October 26th and 27th  
Exmouth  
Sea defences at Exmouth experienced a lot of damage. A section of the seawall failed, resulting in subsidence, cracks and damage to the beach behind. Severe southerly storms coincided with high spring tides which caused the beach to be lowered.



2004 17th December  
Topshean (West)  
Geosensor officially opened on an RSPB reserve after allowing the time back in and returning the pasture land to its original natural state.



2005  
Lymington  
In 2005 the Environment Agency spent £900,000 raising Lymington's sea defences. This scheme involved raising and strengthening walls along the estuary, raising sea defences and installing 7 manually operated electrohydraulically monitored flood gates in passageways down to the town.



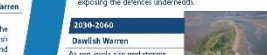
2012 - mid February 2014  
Dawlish Warren & Exmouth  
From October 2013 to February 2014 a series of ferocious winter storms battered the Exe Estuary, damaging beaches and coastal defences. Waves overtopped the sea wall at Exmouth, flooding many roads and destroying the sand dunes here. At Dawlish Warren groynes were knocked over and as much as 5m of sand was lost from the eastern face of the sand dunes, exposing the defences underneath.



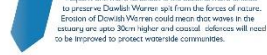
2013-2014  
Dawlish Warren  
As sea levels rise and storms are predicted to become more frequent and more ferocious it will become more difficult to preserve Dawlish Warren spit from the forces of nature. Erosion of Dawlish Warren could mean that waves in the estuary are 30m higher and coastal defences will need to be improved to protect water-side communities.



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### 5. What are the key issues that can be learnt from this Study Area?

Much of the course of the Exe through its upper and middle reaches lie within the Exmoor National Park, or other areas designated for the quality of their landscapes and natural environments and, therefore, there has been relatively little change over time, except as a result of the impacts of development within the riverside villages and towns. The course of the river has been altered significantly through Exeter, with measures put in place there and further upstream to reduce the potential impact of flooding. The increasing protection of river banks is evident in some of the illustrations.

Like the River Dart (Case Study 1), much of the course of this river flows through a relatively hard rock geology and, therefore, limited change in the upper and middle reaches can be expected over time. However, like the Dart, the flows are rapid, particularly after rainfall events, and, therefore, flood defence measures have been steadily improved over time, although risks still remain in some locations.

### 6. References

1. Havell, D. 1819. *Picturesque Views of the River Exe*. Frederick Lewis. London.
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Figure 2.20: William H. Bartlett

*The Exe and Exeter from Exwick Hill*

1832