

Case Study 2 - East Anglia

2.1. Introduction

The coastline of East Anglia exhibits a long history of change, which is recorded through historical documents, paintings and, later, photographs. The coastline for most of this region has been retreating and this has been the case for thousands of years. The soft rock geology has proved particularly susceptible to marine erosion, whilst on the low-lying parts of the coastline there has been a history of flooding that has been recorded since at least the fifteenth century.

For this case study, two sites have been selected. First, the coastline in the vicinity of the town of Cromer on the North Norfolk coast and, second, the extensive coastal frontage from Lowestoft in Suffolk southwards past Southwold and Aldeburgh to Orford Ness. Both these parts of the East Anglian coast face significant challenges arising from long-term coastal change but also are celebrated for their coastal scenery and architectural heritage. Much of the Suffolk coast case study site forms part of the Suffolk Heritage Coast with many environmental designations. The East Anglian coast has a very rich art heritage and there are numerous illustrations depicting the town of Cromer and the Suffolk coast since the end of the eighteenth century. This case study builds on previous research undertaken for The Crown Estate in 2010 (McInnes & Stubbings, 2010¹) and for the European Commission in 2011-2012 (Momber *et al.*, 2013²), which the author gratefully acknowledges.

2.1.1. Geology and Geomorphology

The geology of Norfolk and Suffolk dates back to the Cretaceous Period and, although masked by more recent glacial deposits, the earliest rocks are approximately 140 million years old. In Norfolk, sands and clays were deposited in a shallow tropical sea during the Cretaceous Period, particularly in north-west Norfolk, whilst elsewhere expansive spreads of sediments deposited during the Ice Age covered the chalk bedrock, which underlies much of the County. The relatively flat surface created by these deposits, together with the immense physical power of the ice sheets, resulted in the wide coastal plain of North Norfolk, which meets the sea as a series of spectacular coastal cliffs in the north-east of the county. The array of surface sediments has given rise to varying soil conditions, land cover and habitats in the coastal zone, a number of which are designated for their environmental significance.

During the Tertiary Period, from 65 million years ago, there was a significant fall in sea level, and the area now occupied by the county of Norfolk became land. The incoming of a shallow sea later in the Tertiary and the earliest Quaternary (approximately two million years ago) resulted in the deposition of shelly sands, known as the Norwich Crag. Around 450,000 years ago a severe cold phase, known as the Anglian Glaciation, caused an ice sheet to spread across East Anglia, occupying the whole of Norfolk. As the ice advanced, it eroded the ground over which it passed, the eroded material then being deposited at the base of the ice to form sheets of till (Boulder Clay). By contrast, the geology and geomorphology of Suffolk is relatively simple. Extensive spreads of till, or Boulder Clay, deposited over the last one million years cover the gently undulating plateau (underlain by chalk) that forms much of the County. The late Tertiary to Quaternary Crag Deposits are marine sandstones formed when much of Suffolk was below sea level. The variable nature of these sediments gives rise to mixed habitats and landscape types.

Over the last 100,000 years the sea has risen by 30m and is currently rising at an estimated 2mm per year. The relative levels of land and sea during this period have dominated the physical development of the Suffolk coast. Accumulations of shingle, known locally as 'Nesses', have developed at Benacre and Thorpeness, while, at Aldeburgh, the second largest spit in Europe, Orford Ness commences. Orford Ness

has diverted the mouth of the River Alde for a distance of about 20km south from its original outlet of Aldeburgh. Behind Orford Ness are saltmarshes, which have developed in the calmer conditions provided by the spit. Along the cliffed part of the coast erosion has been very active. Dunwich is one of the best-known sites in East Anglia to be affected by erosion. It was an important city in the time of King Henry II and has now almost completely disappeared.

2.1.2. Coastal Processes

In North Norfolk at Cromer coastal defences protect the weak cliffs composed of glacial tills, sands and clays. To the east is the village of Overstrand, where the cliffs rise to approximately 35m and have been affected significantly by rotational landsliding and mudslides. Processes of slope instability are particularly active along this part of the North Norfolk coastline producing failures of the over-steep glacial sea cliffs.

In some locations, efforts have been made to stabilise sand dunes through the planting of Marram Grass, whilst elsewhere, such as at Sea Palling, substantial sea defences were undertaken, particularly between Happisburgh and Winterton, following the breach of the sand dunes during the tidal surges of January 1953. The villages along this coastline, particularly Happisburgh, demonstrate the force of the sea and the challenges of coastal risk management. The impracticality of continuing to defend some coastal communities has necessitated new solutions and the Council has been developing innovative approaches, with support from the Department for Environment, Food and Rural Affairs, towards adaptation to help sustain affected residents and businesses (North Norfolk District Council, 2011³).

South of Lowestoft, towards Southwold in Suffolk, the beaches are wide and composed of shingle, broken only by hamlets such as Covehithe where the ruined church of St Andrew is dramatically situated. South of Covehithe, a sand and shingle beach stretches down towards the historic town of Southwold, and a reedy lagoon amongst the sand dunes behind the beach is an important wildlife habitat. The coast between Covehithe and Southwold is backed by an undulating cliffline, and is intersected by a number of stretches of low-lying land backed by saltmarsh (for example, Easton Broad and Easton Marshes). Cliff recession here is very rapid, providing a supply of sand to the beaches at Southwold. Continued coastal retreat threatens the stability of the shingle ridges in the area, which protect the low-lying marshland from inundation by the sea.

The town of Southwold is situated on high ground and is fronted by a relatively narrow, well-defended sand and shingle beach. To the south of the town, a wide sand and shingle beach has built up against the north pier of Southwold harbour. Some of this sandy material is transported in suspension by the sea across the mouth of the harbour to the community of Walberswick on the south side, where the beach remains relatively stable. Shingle ridges exist between Walberswick and Dunwich, which are occasionally overtopped by the sea. To the south the higher cliffs of Dunwich and Minsmere are eroding, and also provide a significant source of sediment for the beach. To the south of Minsmere cliffs is the low-lying land of the Minsmere valley, fronted by a shingle ridge. The land then rises at Sizewell, running into the Thorpeness Cliffs, down to Thorpe Ness (Royal Haskoning, 2009⁴).

Records from the later medieval period of Suffolk are dominated by the town of Dunwich now largely lost to the sea; other examples include Easton Bavents and Sizewell church, all of which were lost by the nineteenth century. Dunwich was a thriving port from the eleventh century, mainly due to its fishing industry. However, a storm in 1328 shifted coastal shingle banks, blocking the harbour mouth and consequently shifting trade to nearby Walberswick. The reduced economy meant that the town could no longer invest in sea defences and was quickly affected by coastal erosion, with several kilometres of coastal hinterland being lost to the sea (Hegarty & Newsome, 2005⁵).

Eight churches and two priories were constructed in the medieval town of Dunwich; of the two priories, Blackfriars and Greyfriars, only the remains of Greyfriars can still be seen on the cliff edge today, while Blackfriars was lost to the sea in the sixteenth century. Prior to the growth of the town in the medieval period it is believed that Dunwich was originally the site of a Roman coastal fort and later Saxon settlement, based on finds of Roman tiles at several religious sites (Sear *et al.*, 2013⁶).

To the south of Thorpeness is the seaside town of Aldeburgh that is located on the promontory of Thorpeness. A Martello Tower marks the start of Orford beach and the massive shingle bank that extends south as far as Orford Haven to form Orfordness. This spit deflects the mouth of the river Alde from an approximate west to east alignment, to a roughly north/south alignment. The change in alignment occurs at Slaughden, south of the town of Aldeburgh. Orford Ness is a shingle foreland that shows changes in elevation attributable to changes in sea level rise over the time of its formation. The Ness has been formed over the last 6,000 years and has received sediment supply by longshore drift from the north. The location marks the southern end of the East Anglian study site.

Coastal Protection Authorities in East Anglia have been particularly active in seeking solutions to the ongoing problems of coastal erosion and flooding and have sought ways of managing risk in order to sustain local communities alongside maintaining natural coastal processes.

2.1.3. The Coastal Environment

The quality of the landscape of the North Norfolk coast is recognised through a number of designations, with much of the coastline forming part of the Norfolk Coast Area of Outstanding Natural Beauty, whilst to the west of Cromer the low-lying coastline forms the North Norfolk Heritage Coast. The cliffs to the east of Cromer at Overstrand are designated as a Special Area of Conservation (SAC) for their maritime cliff habitats and slopes.

Whilst the town of Cromer is protected by a range of coastal defences, most of the adjacent coastlines are unprotected. These eroding cliffs are not only of international importance for their geodiversity and fossil remains, but are also important contributors to sedimentary processes providing a source of beach materials to supply the coastline extending south-eastwards. The environmental challenges centre around ensuring the sustainable development of this coastline and of its town and villages, whilst at the same time seeking to protect and enhance its important geodiversity, encouraging natural coastal processes where possible and conserving those sites with high biodiversity value such as maritime cliff habitats (Natural England, 2015⁷). The natural erosion of these soft clifflines helps to maintain the important maritime cliff habitats and slopes, encouraging the natural succession of plant communities that exist there and which benefit from emergent ground water, a characteristic of these cliff and slope faces.

In Suffolk, the case study area extending from south of Lowestoft to Orford Ness lies almost entirely within the Suffolk coast and heaths Natural Character Area (Natural England, 2015⁸). This coastline is generally low-lying and composed of soft eroding cliffs broken by eastward flowing rivers, which often follow a winding course out to the sea. South of Lowestoft much of the coast is undeveloped, with the exception of the towns of Southwold and Aldeburgh, and the villages of Kessingland, Cove Hithe, Walberswick, Dunwich and Thorpeness. There is a close interaction between land and sea along this coastline, with a series of eroding long shallow bays broken by wide estuaries and inlets, which form habitats for wildlife of international importance.

The quality of the natural environment is reflected in the designation of coastal habitats as RAMSAR Sites, Special Protection Areas and Special Areas of Conservation, whilst there are three National Nature Reserves and numerous sites of Special Scientific Interest (Natural England 2015⁸).

2.1.4. Coastal Heritage

Developed from the late eighteenth century, Cromer is an important and historic centre for commerce and tourism on the North Norfolk coast. The magnificent fourteenth century church of St Peter and St Paul, with its towers reaching to 48m (160 feet), is particularly grand. This old part of the town comprises flint cottages and winding streets leading down to a fine beach and the pier. On account of its picturesque location, numerous artists painted at Cromer and depict the story of the changing coast and its impact on coastal heritage. For example, the ongoing problems of erosion there were illustrated by the artist Ladbroke in his engraving of 1833, which showed the relative positions and the old and new lighthouses. The old lighthouse and the headland on which it stood have long since disappeared as a result of marine erosion.

The coastline of the second East Anglia case study area, from Lowestoft to Orford Ness, has revealed a rich archaeological heritage describing past wealth and importance, as well as a particularly rich military heritage. These sites include, for example, the twelfth century Orford Castle, the Napoleonic Martello Towers, as well as twentieth century military establishments (Natural England, 2015⁸). The whole of the coastline of this study area was designated as Heritage Coast in 1973.

Coastal erosion and flooding have had a significant impact on Sites of Heritage Importance over the centuries and an insight into change was provided by William Daniell in his 'A Voyage Round Great Britain' (Daniell & Ayton, 1814-25⁹). Here Daniell describes the appearance of this part of the coastline two centuries ago: *"the parish Church is situated about half a mile west of the town, that spot having been chosen, according to some accounts, for the sake of greatest security from the ravages of the ocean"*. Daniell continued from Norfolk into Suffolk and he describes how *"near Southwold, on the very summit of the cliffs that bound the German Ocean stands Pakefield. The action of the waves has repeatedly carried away large portions of these cliffs, together with the buildings which they supported; and as the same tremendous element is continually operating, the village itself seems on the very brink of destruction. A memorable and mournful instance of these encroachments of the sea exists about four miles from Southwold at Dunwich, which was once an opulent commercial city, containing eight parish churches, several monasteries and a hospital house belonging to the Knights Templars together with various other establishments of high importance . . . is now reduced to a miserable village. That it (Dunwich) should have suffered so greatly from the ravages of the ocean is not surprising, since its site was principally on a hill, consisting of loam and sand, on a coast destitute of rocks to resist the impetuosity of the waves. The only one of its churches of which any remains are now existing is that of All Saints."*

"Aldborough (sic), the next coastal town is pleasantly situated in the valley of Slaughden, under the shelter of a steep hill, which runs north and south the whole length of a principal street, about three quarters of a mile. About two centuries ago it was a place of considerable importance, but it was reduced to comparative insignificance by repeated encroachments of the sea. A plan of the town in 1559 shows it had been of much greater extent than it now is, and represents the churches being more than ten times further from the sea than at this day. There are many persons now living who can remember inundations which destroyed many houses together with the market place and cross. Thus depopulated and impoverished, Aldborough, until within the last five and twenty years, was in a state of rapid decay; but it gradually attracted the notice of several families of distinction, who wished for a summer residence of greater privacy and retirement than could be enjoyed at a fashionable watering place" (Daniell & Ayton, 1814-1825⁹).

2.1.5. Coastal Art History

Like the coastline of north-east England, the East Anglian coast has seen dramatic changes over the centuries as a result of coastal erosion, landsliding and inundation by the sea. This has led to the loss of the important sea port of Dunwich in Suffolk as well as villages and historic structures including churches and lighthouses; along much of the coast these physical processes are visibly continuing today.

The art history of East Anglia has been recorded comprehensively by a number of eminent authors and researchers who have studied the Norwich School as well as other art communities that have flourished in the two counties over the last 250 years (Rajnai, 1976¹⁰; Hemingway, 1979¹¹; Walpole, 1997¹²; Scott, 2002¹³; Collins, 2005¹⁴; Newton (Ed.), 2005¹⁵; Ellis (Ed.), 2005¹⁶; Ellis (Ed.), 2006¹⁷; Ellis (Ed.) 2006¹⁸; Munn, 2006¹⁹; Walpole, 2009²⁰). During the late eighteenth century and early-to-mid nineteenth century East Anglia was described extensively by authors in fine topographical books often illustrated with engravings or aquatints (Beatniffe, 1772-1802²¹; Parkin, 1788²²; Armstrong, 1791²³; Bell, 1807²⁴; Dickson, 1811²⁵; Britton & Brayley, 1812²⁶; Stark, 1828-34²⁷; Lound & Ninham, 1831²⁸; Turner, 1838²⁹; Ewing, 1842³⁰).

In addition to topographical books relating specifically to East Anglia other important coastal tours of the British Isles include illustrations of the Norfolk, Suffolk and Essex coastlines. One of the most important publications was '*A Voyage Round Great Britain*' by William Daniell and Richard Ayton (Daniell & Ayton, 1814⁹). The voyage commenced in 1814 and took eleven years to complete and the eastern seaboard of England was completed on the return journey; his aquatint plates include views of Yarmouth, Lowestoft, Southwold Harbour, Orfordness Lighthouse, Harwich and Southend. Daniell's delicate aquatints are accompanied by an informative text and together they provide an interesting account of the coast.

East Anglia is regarded by some as the cradle of English landscape painting with celebrated artists from the Norwich School, together with Suffolk artists such as John Constable RA (1776-1837) and Thomas Gainsborough RA (1727-1788), exemplifying the art of landscape painting in this country. Although these two great artists painted the coastline of Suffolk infrequently there are, fortunately, many of other painters who chose to illustrate the coastal scenery, often in remarkable detail. In Norfolk the cultural centre for the arts was the City of Norwich, which benefited from the foundation, in 1803, of the Norwich Society of Artists, which held its first annual exhibition two years later in 1805 and continuing almost without interruption until 1833. The society of artists was led by a number of outstanding artistic families and individuals including the Crome family, the family of John Stark, the Cotmans, John Thirtle, George Vincent and Robert Ladbroke.

John Crome (1768-1821) was the most prominent figure in the Norwich School and met a fellow artist, Robert Ladbroke (1769-1842), during the course of his artistic apprenticeship. With patronage from wealthy families from within the county Crome flourished as an artist and, whilst most of his views are of the city of Norwich and surrounding countryside, he also, like many Norfolk artists, painted the coastline, especially the activities of fishermen on the shore at Yarmouth beach and elsewhere. Although recognised as the co-founder of the Norwich Society Robert Ladbroke (1769-1842) is less well known than Crome. Like Crome, he also painted views on the coastline, particularly at Yarmouth. Other members of the Crome family were also significant artists in their own right. These included John Crome's eldest son, John Burney Crome (1794-1842), whose dramatic picture '*Great Gale at Yarmouth on Ash Wednesday, 1836*' illustrates the devastating effects of a storm on seafront properties in that year. John Crome's third son, William Henry Crome (1806-1867), was also a fine landscape painter in oils.

Further important artists of the Norwich school included James Stark (1794-1859) who, together with George Vincent, continued as the mainstays of the School after John Crome died. Stark continued to support the Norwich Society throughout his lifetime, eventually becoming President in 1829. Like John Crome, he also painted the '*Great Storm at Yarmouth*' (1836) as well as producing a magnificent oil painting of '*Cromer*', which provides an accurate account of the coastal scenery at that time. His son, Arthur James Stark (1831-1902), was also a talented artist who exhibited his first work at the Royal Academy at the age of seventeen. George Vincent (1796-c.1835) was, alongside Stark, one of the most important second-tier artists of the Norwich School. He first exhibited at the Norwich Society in 1811, again favouring views of the coast such as '*The Fish Auction, Yarmouth*' (1827), which, along with his other works, provides not only an interesting social account but also information on beach levels and coastal conditions of the time.

Two other families of artists made outstanding contributions to the Norwich School, namely the Stannard family and the Cotmans. Alongside Crome and John Sell Cotman, Joseph Stannard (1797-1830) was one of the most significant artists contributing to the Norwich School, although he died at the early age of thirty-three. Alongside John Crome (1782-1842), John Sell Cotman is acknowledged by most as the leading proponent of the Norwich School (1782-1842). Although painting widely in England, Cotman's East Anglian work tends to focus on the architecture and landscapes of the interior of the county rather than coastal scenes. His sons, Miles Edmund Cotman (1810-1858) and John Joseph Cotman (1814-1878), were also prolific painters of the Norfolk landscape and the Broads.

Henry Bright (1810-1873) was born in Saxmundham in Suffolk; he received his inspiration from John Berney Crome and John Sell Cotman. Many of the artists described above produced fine views of the Norfolk coastline but the East Anglian coastline was also visited by other eminent artists of the period, including John Varley (1778-1842) who painted '*Cromer Beach*', Anthony Vandyke Copley Fielding POWS (1787-1855), Thomas Hearne FSA (1744-1817) and Thomas Churchyard (1798-1865). Henry Bright (1810-1873), although born in Suffolk, was a member of the Norwich School of painters, and did in fact produce a number of views of coastal and river scenes in oils whilst other artists such as John Moore of Ipswich (1820-1902) painted coastal and shipping scenes as well as accurate views of coastal towns such as '*Cromer – Sunrise*' which clearly indicates the proximity of the town to the cliffs and the shoreline.

J. M. W. Turner RA produced a number of fine watercolour drawings of the East Anglian coastline in about 1827. These included views of '*Orford Haven*', '*Orfordness*', '*Aldborough*', '*Dunwich*', '*Lowestoffe*' and '*Lowestoffe Lighthouse*', '*Yarmouth Sands*', '*Great Yarmouth Fishing Boats*' and '*Hasboro Sands*' (now called Happisburgh). His views often depict fishermen struggling with their craft in rough seas off the coast or coming to the aid of ships in distress.

A succession of artists continued to paint the popular subjects of Dunwich, Southwold and Walberswick right through the nineteenth century and into the twentieth century. For example, Henry Davy (1793-1865) was a topographical artist and pupil to the eminent John Sell Cotman. As well as producing numerous accurate coastal scenes including views of Southwold showing the cliffline and the coast protection structures. Thomas Smythe (1825-1906) also painted finely detailed views, for example of Southwold beach. Later in the nineteenth century Helen Clarke (fl.1890s) also painted a detailed watercolour of the cliffs and beach at Southwold showing the seaside villas and the vestiges of rudimentary coast protection structures at the top of the beach, in 1899.

During the mid-to-late nineteenth century topographical artists continued to paint the Suffolk and Norfolk coasts - cliffed coastlines, the ports, harbours and estuaries as well as the resorts. Henry Moore (1831-1895) painted '*Crossing the bar, Walberswick Sands*' in 1857, whilst Walter Crane (1845-1915) produced a detailed watercolour of '*Eastcliff, Southwold*' in 1886. "*This illustrates the row of fisherman's huts that used to line the base of the cliffs before they were washed away in the storms of 1905*" (Munn, 2006¹⁹).

Walter Langley (1852-1922), who is more associated with the Newlyn School of Cornwall, visited Walberswick in 1891 and produced views of the village as well as of nearby Southwold. Edwin Edwards (1823-1879) was born in Framlingham, Suffolk. He was an etcher and engraver who also worked in oils and exhibited views of Southwold and Walberswick at the Royal Academy in 1868 and 1878 respectively. In fact, numerous artists found their way to Southwold and Walberswick, where they met other artists in the summer season.

The watercolourist, Myles Birket Foster RWS (1825-1899), painted several of his highly detailed landscapes at Walberswick in the 1890s, whilst Charles Robertson (1844-1891), a follower of the Pre-Raphaelite School of Artists, painted a view of Southwold harbour with Walberswick and its windmill in the distance with the title of '*On the East Coast*' in about 1883. The town of Cromer was a haven for artists who painted the crumbling cliffs there and at nearby Trimingham as well as fishermen on the shore. As well as Varley, who painted the town from beach level in 1810, returning to the same spot in

1830; the locality was painted by James Stark, Catherine Madox Brown (fl.1870s) in 1874 and Alfred Richardson Barber (fl.1870s-1890s).

Artists from the east coast of England who painted regularly included Alfred Kinsley (1852-1945) who was born in Hull, Charles Samuel Keene (1823-1891) an Ipswich etcher and illustrator, William Eden (1884-1913) who painted views of Walberswick, the London born artist Arthur Evershed (1836-1919) and C. W. Roxby who visited the Suffolk coast in the 1880s. In the early twentieth century Marion Seward (1861-1924) from Cambridge painted views of Walberswick as well as recording the loss of All Saint's Church Dunwich as a result of coastal erosion, whilst Charlotte Spiers, a London watercolourist and member of the Society of Women Artists, exhibited views of Walberswick and Blythburgh regularly at the London exhibitions.

The late nineteenth and early twentieth centuries saw increasing numbers of colour plate book illustrations to cater for the growing numbers of coastal visitors as well as the introduction of colour picture postcards by famous companies such as Raphael Tuck, and J. & F. Salmon of Sevenoaks in Kent. Book publishers such as A. & C. Black and Salmon's commissioned a range of artists including Alfred Robert Quinton (fl.1853-1934), Ernest William Haslehurst (1866-1949) and others to produce attractive views that could be illustrated as postcards or in book illustrations. In 1921 A. & C. Black published their '*Norfolk and Suffolk*' volume (Clarke, 1929³¹), which was illustrated with forty colour plates after the prolific watercolourist, Alfred Heaton Cooper (1864-1929).

The keen interest in paintings of coastal scenery continued through the early twentieth century until the Second World War and beyond, with artists such as Sir J. Arnesby Brown (1866-1955) exhibiting views of the Suffolk coast particularly from 1933 and Edith Cubitt (later Edith Andrews) painting landscapes in the vicinity of Walberswick. Bertram Priestman (1868-1951) had a studio in Walberswick from 1914-1927 where he tutored pupils including Edward Seago. Seago painted numerous fine oils of the East Anglian coastal towns and villages, rivers and estuaries such as '*Beach Scene at Kessingland*' (near Lowestoft) and '*The River Orwell near Shotley Point, Suffolk*'. Campbell Mellon (1876-1955) painted oils of cliff, beach and recreational scenes at Gorleston, Yarmouth and elsewhere on the east coast.

2.1.6. East Anglian Case Study Sites

For the purposes of this study, two frontages along the East Anglian coast have been selected for more detailed consideration of those changes that can be observed through a review of historical artworks over time. The study sites were selected in order to provide a representative selection of Britain's coastal scenery, environments and heritage, but also taking account of the available resource of images to illustrate the overall study concept. For the East Anglian coast, the study sites are:

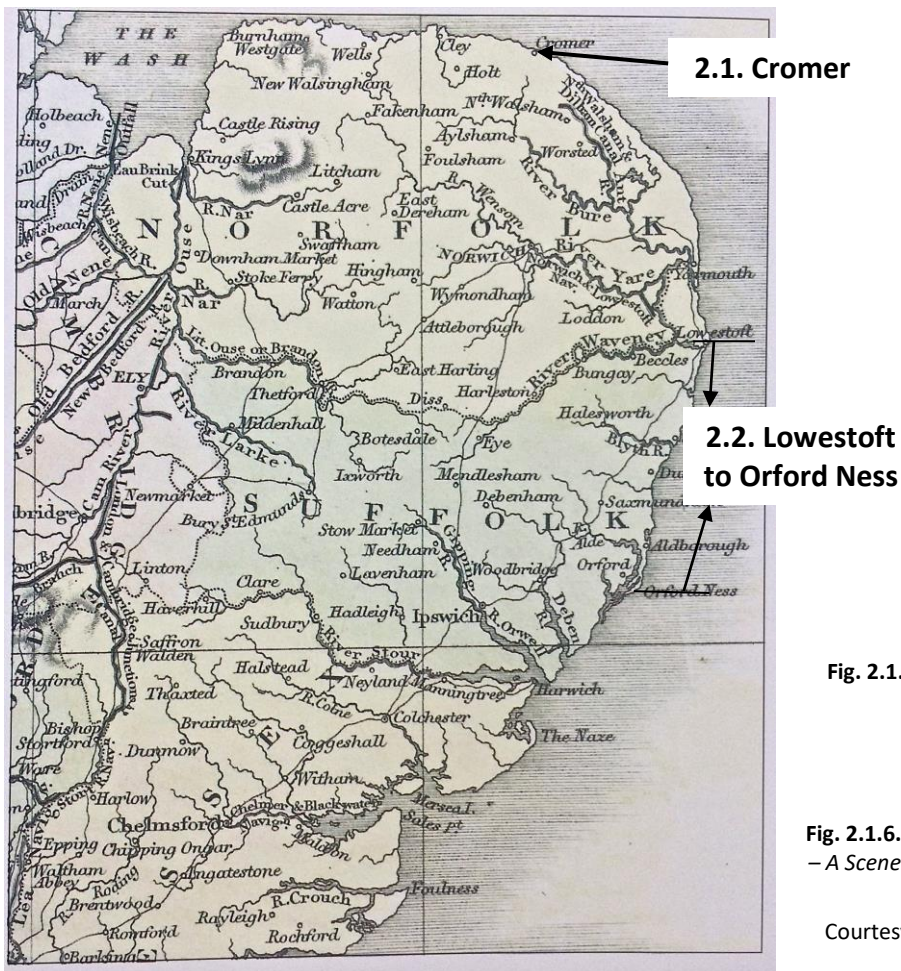
- Cromer, North-East Norfolk coast;
- Pakefield, near Lowestoft to Orford Ness.

The case studies illustrated by the artworks dating back as far as the late eighteenth century are illustrated in the following pages.

2.1.7. References

1. McInnes, R. G. & Stubbings, H., 2010. '*Art in Support of Understanding of Coastal Change in East Anglia*'. Report for The Crown Estate. 91pps.
2. Momber, G.; Satchell, J.; Tidbury, L. & McInnes, R. G., 2013. '*Arch-Manche: Archaeology, Art and Coastal Heritage*'. Report of the Interreg IVA Project.
3. North Norfolk District Council, 2011. '*Coastal Pathfinder Project*'. Supported by Defra.

4. Royal Haskoning, 2009. '*Lowestoft to Felixstowe SMP2*'. Lead Authority: Suffolk Coastal District Council.
5. Hegarty, C. & Newsome, S., 2005. '*The Archaeology of the Suffolk Coast and Inter-Tidal Zone*'. Report for the National Mapping Programme.
6. Sear, D., Murdock, A., LeBas, T., Baggaley, P. & Gubbins, G. '*5883 Dunwich, Suffolk: Mapping and Assessing the Inundated Medieval Town*'.
7. Natural England, 2015. '*Central North Norfolk National Character Area Profile*'. www.gov.uk/natural-england.
8. Natural England, 2015. '*Suffolk Coasts and Heaths Natural Character Area Profile*'. www.gov.uk/natural-england.
9. Daniell, W. & Ayton, R., 1814. '*A Voyage Round Great Britain*'. Private Press. London.
10. Rajnai, M., 1976. '*The Norwich Society of Artists*'. Norwich Museums Service for the Paul Mellon Centre.
11. Hemingway, A., 1979. '*The Norwich School of Painters*'. Phaidon Press. Oxford.
12. Walpole, J., 1997. '*Art and Artists of the Norwich School*'. Antique Collector's Club. Woodbridge.
13. Scott, R., 2002. '*Artists at Walberswick*'. Art Dictionaries Ltd. Bristol.
14. Collins, I., 2005. '*Making Waves – Artists in Southwold*'. Black Dog Books, Norwich.
15. Newton, I., 2005. '*Painting on the Edge – British Coastal Art Colonies 1880-1930*'. Sansom & Co. Bristol.
16. Ellis, A. (Ed.), 2005. '*Oil Paintings in Public Ownership in Suffolk*'. The Public Catalogue Foundation.
17. Ellis, A. (Ed.), 2006. '*Oil Paintings in Public Ownership in Norfolk*'. The Public Catalogue Foundation.
18. Ellis, A. (Ed.), 2006. '*Oil Paintings in Public Collections in Public Ownership In Essex*'. The Public Catalogue Foundation.
19. Munn, G., 2006. '*Southwold – An Earthly Paradise*'. Antique Collector's Club. Woodbridge.
20. Walpole, J., 2009. '*Suffolk Artists of the Eighteenth and Nineteenth Centuries*'. Antique Collector's Club. Woodbridge.
21. Beatniffe, R., 1808. '*The Norfolk Tour, or Travellers Pocket Companion*'. Private Press.
22. Parkin, Rev. C., 1788. '*A New and Complete History of Norfolk*'. Norwich.
23. Armstrong, M. J., 1791. '*An Essay on the Contour of the Coast of Norfolk but more Particularly of the Marum-Banks and Sea-Breaches so Loudly and Justly Complained of*'. Norwich.
24. Bell, E., 1807. '*Antiquities of Norfolk*'. Private Press.
25. Dixon, R., 1811. '*Sketches Illustrative of Picturesque Scenery in Norfolk*'. Norwich.
26. Britton & Brayley, 1812. '*A topographical and historical description of the County of Norfolk*'. London.
27. Stark, J., 1828/34. '*Scenery of the Rivers of Norfolk*'. Norwich.
28. Lound, T. & Ninham, H., 1831. '*Etchings of Views in Norfolk*'.
29. Turner, D., 1838. '*Etchings of Views in Norfolk*' by the late J. Crome. Norwich.
30. Ewing, W., 1842. '*The Norfolk Topographer's Manual*'. Revised from the original by Samuel Woodward.
31. Clarke, W. G., 1921. '*Norfolk and Suffolk*'. A. & C. Black Ltd. London.



Case Study 2.1 – Cromer, North Norfolk Coast

1. Location

The case study describes the immediate vicinity of the town of Cromer on the north Norfolk coast.

2. Why was the Case Study Site selected?

The Cromer site was selected because this important coastal resort and commercial centre for North Norfolk has a long history of coastal erosion risk management. In coast protection terms it represents a hard point along a generally eroding coastline. The frontage in the vicinity is of particular interest on account of its geodiversity, whilst the town itself contains a magnificent fourteenth century church and numerous old flint cottages picturesquely arranged above the shoreline. Many artists painted views of Cromer, often returning to repaint the view some decades later.

3. Summary of the Geology, Geomorphology & Coastal Processes

The geology comprises rocks of the Cretaceous Period, which are overlain by more recent glacial deposits. Whilst at Cromer, and at Sheringham to the west, the coastline is defended, most of this coast is subject to significant marine erosion. Considerable efforts have been made in recent years to ensure sustainable management of this part of the Norfolk coast, protecting property where possible in harmony with natural coastal processes and preservation of the sites of high biodiversity value such as maritime cliff habitats and geodiversity (Natural England, 2015¹).

4. How can the art imagery resources inform us of changes that have affected this coastal zone?

The wide range of images of Cromer illustrated in this case study depict this changing soft rock coastline since the early nineteenth century. The images illustrate the nature of cliff and beach conditions in their natural, unconstrained form before the provision of coastal defence measures such as seawalls and groynes. Images such as **Fig. CS2.1.12, CS2.1.14. & CS2.1.16.** suggest how the coastline might be affected if defences were not maintained in the future. Clearly this would be likely to result in significant reactivation of instability processes along the whole of this coast.

The watercolours and paintings also show the nature of past beach conditions, and these are described in some detail in the watercolours painted by John Varley in 1802 (**Fig. CS2.1.9.**) and in c.1830 (**Fig. CS2.1.10.**). Beach conditions today compare favourably with the extensive beaches that existed in the early nineteenth century.

5. Key issues that can be learnt from this site.

The range of artworks show the natural coastal processes that existed before more formal coastal defence measures were put in place later in the nineteenth century, and suggest how the coastline might respond in the event of a reduction in the standard of coast protection. The images also provide an interesting illustrated chronology of the development of the historic town of Cromer, the architectural character of which is a notable feature. Artworks such as those coastal views by Alfred Robert Quinton (see **Fig. CS2.1.18.**) show the historic buildings lining the waterfront, many of which still exist today. Such detailed images can be used by those involved in heritage management and planning to identify changes that have affected town and village layouts and can inform, for example, conservation area plans and Listed Building designations.

1. CROMER, NORTH NORFOLK



Fig. CS2.1.7. (above) The North Norfolk coastline between Sheringham in the west and Overstrand to the east, and centred on the important resort of Cromer, is characterised by high eroding cliffs of weak sands and clays. Whilst the town frontages are protected by a range of coastal defence structures the less developed cliffs continue to erode naturally. The eroded sediments are transported south-eastwards down the coast and contribute to the maintenance of beaches downdrift. This watercolour (c.1920) by Alfred Robert Quinton shows the undefended and unstable cliffs at West Cliff, Sheringham at that time.

Image courtesy of Salmon's.

Fig. CS2.1.8. (below) is a photograph of the coastline looking towards Cromer from Overstrand. It shows the extensive timber defences, which aim to reduce the rate of cliff retreat.

Image courtesy of Christine Matthews – [Geograph.org.uk/p/668413](https://www.geograph.org.uk/p/668413).



1. CROMER, NORTH NORFOLK



Fig. CS2.1.9. (top) 'Cromer' by John Varley. 1802.

Image courtesy of Norwich Castle Museum.

Fig. CS2.1.10. (middle) 'Cromer' by John Varley. C.1830. A finely executed watercolour.

Courtesy of V. & A. Images. 2018.

Fig. CS2.1.11. (bottom) 'Cromer from the Beach'.

Courtesy: © Peter Facey/Creative Commons Licence.



These watercolours by Varley are of interest because they provide details of the condition of the beach at the beginning of the nineteenth century, as well as the state of the cliffline. The beach is composed of sand and appears to be in a healthy state with a slight crest towards the centre of the beach, witnessed by the pool of water trapped at the back of the beach in the left foreground of the watercolour.

The cliffs can be seen in their natural state before coastal defences were constructed and the proximity of the development to the cliff top is clearly visible. The level of the beach against the piles of Cromer pier can be seen to the right.



Later a seawall was provided along the foot of the cliffs to prevent erosion at their toe and groynes were constructed to control beach levels. It is interesting to note that the artist Varley returned to Cromer and painted a view from the similar spot in 1830, which shows little apparent change to the cliffline or the beach. The weak cliffs along this part of the North Norfolk coast reach heights of up to 70m but the seawall prevents

coastal erosion. Where the cliffs are undefended the rate of retreat experienced can be of the order of 2-2.5m a year. The construction of the seawall during the Victorian Period would have had the effect of reducing the sediment supply to the beach as erosion could no longer take place. This would reduce sediment inputs with implications for Cromer beach and beaches to the south. Despite this, the beach at Cromer appears in a healthy condition.

The watercolours by Varley shows us what conditions might be expected to look like along the Cromer town frontage if the seawall and groynes were not maintained in the future. There would be significant erosion and reactivation of the instability problems in the cliffs with consequent risks to people, property and assets.

1. CROMER, NORTH NORFOLK



Fig. CS2.1.12. (left) and CS2.1.14. (below) were painted in oils by John Moore of Ipswich in 1850.

Images courtesy of Mandell's Gallery, Norwich.

Figs. CS2.1.13. and CS2.1.15. show present day views.



For this case study there are two paintings viewing the town of Cromer from the west and from the east. In the case of the cliffs, the natural processes of cliff erosion and weathering can be clearly seen. Large sections of the 30-35m high cliff can be seen spalling away by a process known as mass wasting, particularly in the painting from the west (left). The indentations in the face of the cliff shown in the two paintings suggest that the cliff conditions are influenced strongly by the local geology and groundwater conditions. The back scars of small slides and slips can be seen at the top of the cliff adjacent to the grassy land in front of the church. These processes will have been speeded up

through a lack of toe support, which is resulting in removal of support for the cliffline above by marine erosion. The artworks also illustrate how the steep clay cliffs are attempting to re-grade naturally to a more stable angle of repose by the processes of slope failure. The accumulation of slope debris at the foot of the sea cliffs is, however, being quickly removed by coastal erosion and, as a result, the cliff face is unable to achieve equilibrium and, therefore, remains actively unstable.

Historical evidence suggests that the rate of cliff retreat at this time could have been of the order of 1.5-2m a year based on erosion rates of undefended frontages to the east. This gives an indication of the potential risks if the coastal defence policy of 'Hold the Line' was to be discontinued.

Also of interest is the depiction of the beach, which shows the extent of the sand and shingle ridges running along the beach parallel with the cliffline. The careful painting of the groynes and the pier also give an indication as the extent of the beach and the way the sediment is being retained by the groyne, particularly in the view from the east, at that particular time (top). This pair of paintings can, therefore, provide useful indications of conditions prior to coastal defences being constructed. The present day views (**Fig. CS2.1.13. & CS2.1.15.**) illustrate how the cliff face has become almost completely vegetated over the intervening period, largely as a result of protection at the toe by nineteenth century seawall construction. Along part of the town coastal frontage a large car park has been constructed, which has had the effect of advancing the coastal defence line seawards, and this provides additional support for the previously unstable cliffline.

The artwork describes very clearly the conditions that were being experienced before parts of the frontage was defended. It suggests what conditions might be experienced in terms of the re-activation of cliff instability problems if coastal defences are not maintained or are removed at some time in the future. This would lead to significant toe erosion of the cliffline and instability problems, which would impact upon people, property and assets in town.

1. CROMER, NORTH NORFOLK



Fig. CS2.1.16. (left) shows the Eastern Cliffs and beach at Cromer c.1920 and was painted in watercolour by A. R. Quinton. Image courtesy of Salmon's.

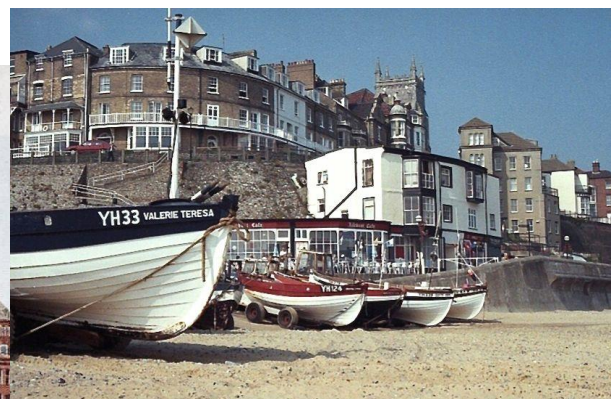


The present day view, **Fig. CS2.1.17.** (middle), shows a healthy beach retained by timber groynes and a more stable, vegetated cliffline. No doubt a result of the seawall constructed along the foot of the cliff.

Image courtesy of © Lewis Potter/Creative Commons Licence.

Fig. CS2.1.18. (bottom left) and **CS2.1.19. (bottom right)** show the seawall and seafront properties with the church above and behind. A. R. Quinton's watercolour accurately describes the architecture of the resort and much of its character has been carefully retained.

Images courtesy of Salmon's (left) and © Jeff Buck/Geograph (right).



Case Study 2.2 – Lowestoft to Orford Ness

1. Location

This coastal frontage extends from just to the south of Lowestoft in the north to the shingle spit of Orford Ness in the south, a distance of approximately 55km. Fronting the North Sea this coastal zone is comprised of low weak cliffs of sands and clays with the towns of Lowestoft, Southwold and Aldeburgh the main centres of population.

2. Why was the Case Study Site selected?

The case study site comprises a low-lying eroding coastline that has experienced a long history of change, which is illustrated through a wide range of artworks. The town of Southwold and the village of Walberswick to the south were a particular focus for artists from the mid-nineteenth century until the middle of the twentieth century in particular.

The rich resource of images not only provides depictions of the changing coast, but also illustrates the rich architectural heritage to be found along this North Sea frontage.

3. Summary of the Geology, Geomorphology & Coastal Processes

The geology of the case study site is relatively simple comprising extensive spreads of till or Boulder Clay, deposited over the last one million years, which cover the gently undulating underlying chalk. Later deposits of Tertiary to Quaternary Crag Deposits are marine sandstones formed when much of Suffolk was below sea level. The varied nature of these sediments gives rise to mixed habitats and landscape types along this North Sea frontage (Natural England, 2015²).

The relative levels of land and sea over the last 10,000 years have dictated the physical development of the Suffolk coast. Accumulations of shingle, for example, known locally as ‘Nesses’ have developed at Benacre and Thorpeness, whilst, at Aldeburgh, the second largest spit in Europe, Orford Ness, commences. Here the spit has diverted the mouth of the River Alde for a distance of about 20km south from its original outlet at Aldeburgh. Behind Orford Ness are saltmarshes, which have developed in the calmer conditions provided by the spit. Dunwich, which is one of the best-known heritage sites in East Anglia, has been dramatically affected by erosion; it was once an important city in the reign of King Henry II but has now almost completely disappeared (McInnes & Stubbings, 2010³; Momber *et al.*, 2012⁴).

The coastline comprises generally wide sandy beaches in the north, backed by low cliff lines, whilst, from Gorleston southwards the coast is characterised by low-lying crumbling cliffs with sandy beaches and the ruins of ancient churches. South of Lowestoft towards Southwold the beaches are wider, composed of shingle, broken only by small hamlets such as Covehithe, and then a long, shingle beach stretches southwards towards the historic town of Southwold. The town is flanked by a reedy lagoon amongst the sand dunes and is an important wildlife habitat.

4. How can the art imagery resources inform us of changes that have affected this coastal zone?

The coastal frontage from Lowestoft south to Orford Ness has a rich art heritage with scenes being painted both by early artists of the Norwich School, as well as travelling topographical artists such as William Daniell RA (e.g. **Fig. CS2.2.4.**) and nineteenth century watercolourists (e.g. **Fig. CS2.2.6.**). Later, the prolific watercolourist, Alfred Robert Quinton, painted numerous views of this coastline and these provide a wealth of information, not just on beach and cliff conditions but also on the seaside architecture and its development through the early part of the twentieth century.

The art resources which are described in this case study seek to illustrate the potential of the mediums to support understanding of long-term coastal change, as well as coastal development patterns over the last 150 years in particular.

5. Key issues that can be learnt from this site.

A range of artworks illustrate the nature of the changing coast since the early nineteenth century and show the gradual introduction of coastal protection and flood defence measures to reduce the risks from

erosion and flooding by the sea. The early imagery provides an insight into the natural coast and how it has evolved over time, showing, for example, the geomorphological processes, as well as habitats adjacent to and behind the shoreline, over an extended time period. The condition of the beaches can be compared over the last two centuries and an understanding gained of any potential changes in coastal defence policy for example, and the implications that might arise from this.

The present day images can be compared with the historical paintings and watercolours, and show that much of this beautiful coastline has changed very little over time, with extensive natural areas that are heavily protected for environmental reasons, as well as on account of their landscape quality.

6. References

1. Natural England, 2015. '*Natural Character Area Profile: 78 Central North Norfolk*'.
2. Natural England, 2015. '*Natural Character Area Profile: 82 Suffolk Coast and Heaths*'.
3. McInnes, R. G. & Stubbings, H., 2010. '*Art as a Tool in Support of the Understanding of Coastal Change in East Anglia*'. Report for the Crown Estate. Crown copyright. ISBN: 978-1-906410-10-0.
4. Momber, G.; Satchell, J.; Tidbury, L. & McInnes, R. G., 2012. '*Arch-Manche Archaeology, Art and Coastal Heritage. Coastal Management: A Guide to Using Archaeological, Palaeo-environmental, Historic and Artistic Resources*'. Report for the European Commission Interreg IVA 2Seas Programme. www.archmanche-geoportal.eu.



Fig. CS2.2.1. '*Yarmouth Jetty*' by Henry Moore RA RWS. 1877.

Image courtesy of Chris Beetles Limited, London.

1. LOWESTOFT TO ORFORD NESS



Fig. CS2.2.2. (left) shows a fish sale at 'Pakefield Beach, Suffolk' to the south of Lowestoft and was painted in 1882.

Image courtesy of Mandell's Gallery, Norwich.

Pakefield is, in effect, a southern extension of the town of Lowestoft located to the north. The town is famous for St Margaret's and All Saints Church, which is located immediately adjacent to the beach at the top of a low cliff.

The site was selected on account of the coastal geomorphology, which comprises a low cliffline, backing a wide shingle and sand beach. It is a location, which has, in the past, been affected by significant erosion and cliff instability problems leading to the loss of cliff top properties.

Pakefield is characterised by a sandy beach with scattered shingle deposits located below low grassy banks and cliffs. Over the last century the cliffs and slopes have become increasingly vegetated in marked contrast to the situation in the late nineteenth century.

It is necessary to continue to maintain the stable backshore and cliffline in order to protect the historic church and cliff top assets existing along the frontage. In the past the cliffs at Pakefield have been the subject of severe coastal erosion, with a number of properties being destroyed as a result of the retreat and rotational landsliding. This painting by Alfred Stannard shows a busy scene with a fish market on the beach below the church. The beach appears wide and sandy, which lacks the vegetation cover that exists today. Although the painting by Alfred Stannard is not particularly detailed, it does suggest that since then the beach has been accreting and, therefore, makes an interesting comparison with the present day coastal environment.

This painting informs us of the changing beach conditions at Pakefield since the 1880s. In particular, the beach appears more extensive today and the backshore and coastal cliffs appear to be extensively vegetated. This appears to be supported by evidence from coastal surveys since the 1990s, which show significant rates of accretion at the northern (Lowestoft) end, although there has been some erosion at the southern end.

Fig. CS2.2.3. The present day photograph below shows the church adjacent to the low cliffline.

Image courtesy of © mapio.net.



2. SOUTHWOLD, SUFFOLK

The next nine views show images of the coastline at Southwold.



Southwold is situated on the open Suffolk coast. The town is almost an island as, on its north side, it is cut off from the hinterland by Buss creek, and on the south by the river Blyth. Southwold is an important historic coastal town containing many listed buildings, as well as being a popular seaside resort.

To the north of Southwold a small community at Easton Bavents is located along an undefended cliff frontage, whilst the town of Southwold itself is defended by a concrete sea wall with an extensive natural beach to the south. The boundary is the mouth of the Blyth Estuary with its estuary mouth being channelized with hard defences.

Fig. CS2.2.4. (top) shows Southwold Harbour engraved by William Daniell RA in 1822.



Southwold harbour lies at the mouth of the River Blyth to the south of the town of Southwold, and separates Southwold from the village of Walberswick to the south. The site was chosen because it allows comparison with the present day (**Fig. CS2.2.5. (middle)**) with an early nineteenth century image of the harbour infrastructure. The key coastal risk management issue for the location is the maintenance and management of the harbour and harbour mouth for the future, and to ensure that properties in the vicinity of Southwold and Walberswick receive a sufficient standard of protection from the risk of flooding.



Fig. CS2.2.6. (bottom) shows 'Southwold Beach' painted by Helen Clarke in 1899.

Image courtesy of Derek Newman Fine Art.

This view provides a detailed illustration of the conditions on the cliffline and the beach at that time. Rudimentary coastal defences line the foot of the cliff and the beach appears to be of shingle; although the more vegetated cliffs appear relatively stable in the foreground they are more susceptible to active erosion beyond. Some further coastal defences and a groyne can be seen

projecting into the sea in the middle distance. The situation in 1899 can be compared with the present day view (see **Fig. CS2.2.10. overleaf**) which shows a new concrete sea wall and re-grading and stabilisation of the coastal slope. The beach appears lower in the present day view, which may perhaps be a result of wave reflection from the hard structure causing some scour, or other factors including a reduction in the supply of sediment feeding from the north, as well as rising sea levels.

The watercolour by Helen Clarke suggests that the defences would provide little protection against the force of the North Sea and the fact that the defences in the middle distance and beyond appear some way seaward of the cliff would suggest that waves have been breaking through the timber breastwork and eroding the cliff behind.

The watercolour shows the form of the beach, which appears more stable and steeper than in the present day photograph. The vegetation on the cliff in the foreground suggests that waves are not undermining the cliff at this location compared with further along the coast. The picture illustrates how the coast might look if defences were not maintained.

2. SOUTHWOLD, SUFFOLK



Fig. CS.2.2.7. (above) shows the beach immediately south of Southwold painted by Thomas Smythe c.1860.
Private Collection.

This oil painting illustrates conditions on an extensive open beach facing the North Sea. It contrasts with the narrower beach to be found abutting the town to the north.

The site comprises a very extensive sand and fine shingle beach to the south of the town of Southwold, and to the north of the harbour. At the back of the beach the cliffs rise gently towards the grassy slopes of Gun Hill. **Fig. CS2.2.8. (below)** shows the beach today.

Image courtesy of © Christine Matthews/Creative Commons Licence.

The key coastal risk management issue for the location is to maintain the quality of the beach and the existing coastal defences to protect the town, looking ahead for the next 100 years.



2. SOUTHWOLD, SUFFOLK



Fig. CS2.2.9. (left) and Fig. CS2.2.11. (bottom) show views of Southwold by Alfred Robert Quinton painted in watercolour c.1920.

Images courtesy of Salmon's.

Watercolours by Quinton painted between 1900-1934 show the patterns of development of coastal towns such as Southwold alongside architectural detail and information on coastal defences and beach conditions.

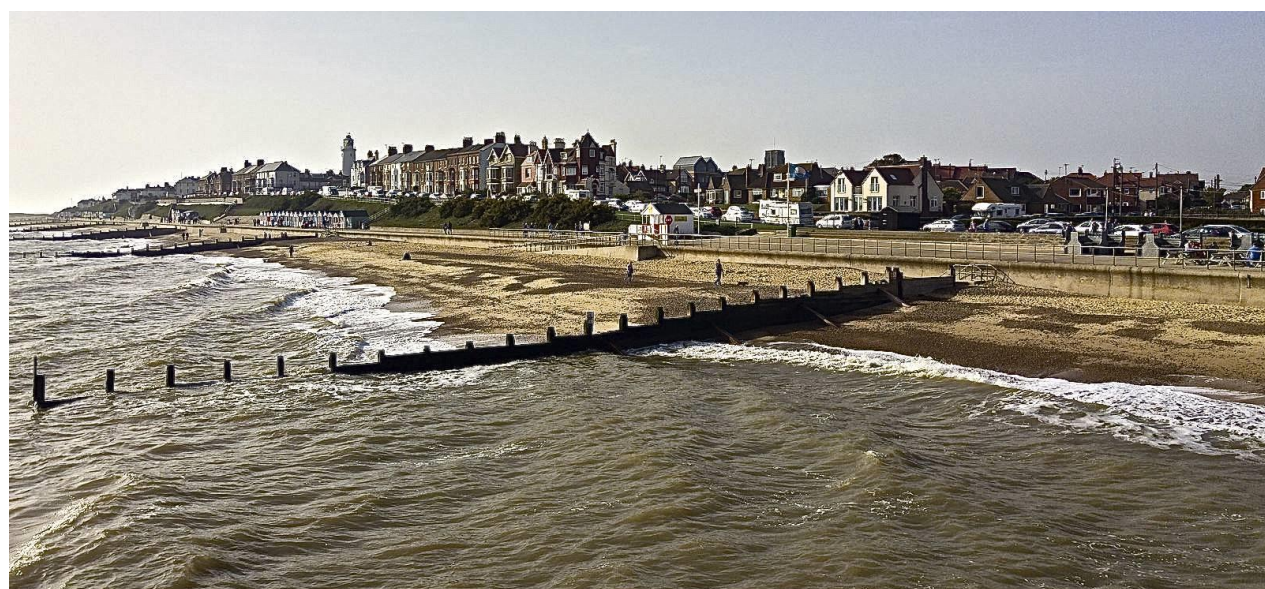


Fig. CS2.2.10. (middle) Coastal protection measures have been upgraded with an increased standard of protection provided by the concrete seawall.

Image courtesy of © Phil Champion/Creative Commons Licence.



3. WALBERSWICK, SUFFOLK



Fig. CS2.2.12. is a painting by Thomas Benham at Walberswick to the south of Southwold in 1878 (Private Collection).

Essentially a genre painting, the artwork also provides good topographical detail in terms of the conditions of the low-lying land behind the shallow embankment with the village beyond.



On account of its heritage and natural beauty, the village was an artistic hub from Victorian times and through the twentieth century.

Fig. CS2.2.13. (middle) by A. R. Quinton shows the ferry at Walberswick in about 1920, which crosses the River Blyth. The old black timber houses still exist today.

Image courtesy of Salmon's.



Fig. CS2.2.14. shows the present day view of the waterfront at Walberswick.

Courtesy of © John Winfield/Creative Commons Licence.

4. DUNWICH, SUFFOLK

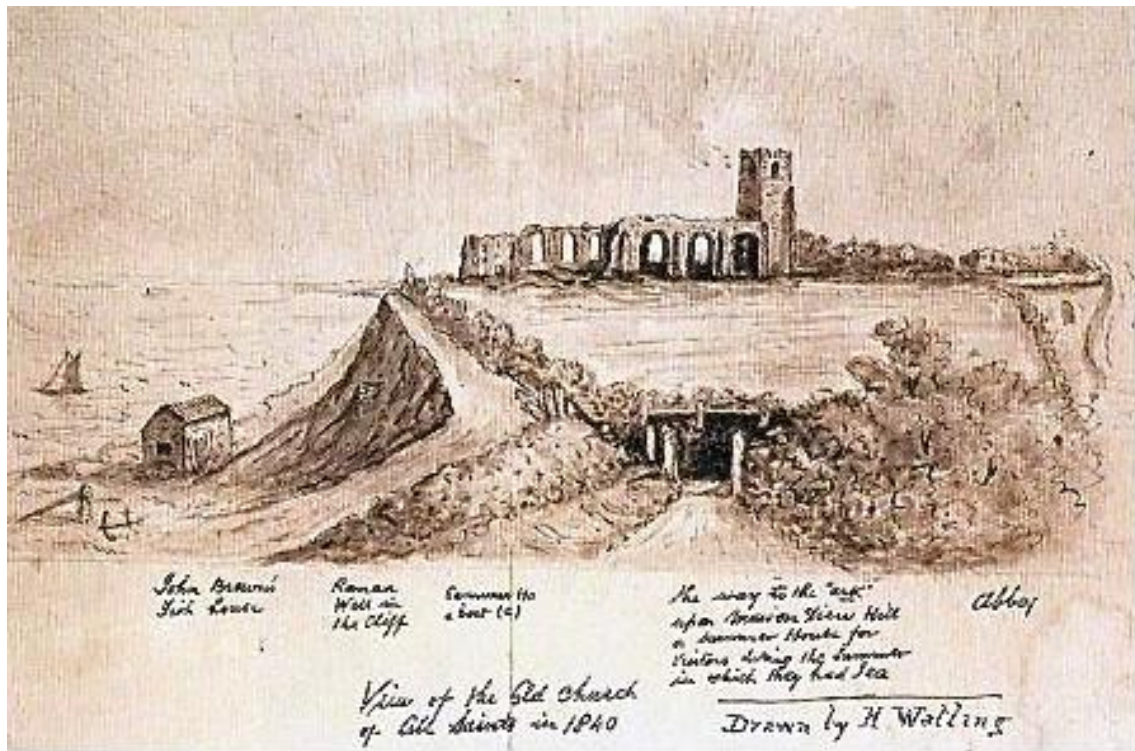


Fig. CS2.2.15. (above) shows All Saint's Church at Dunwich drawn in 1840 by Hamlet Watling. It is typical of the meticulous recording of ancient buildings by nineteenth century antiquarians and artists. The former capital of the East Angles, the town has been largely lost as a result of coastal erosion since the thirteenth century.

Image courtesy of The Swan Hotel, Southwold.

Fig. CS2.2.16. (below) by Alfred Heaton Cooper (1921) shows the relic of the church on the cliff edge.



5. ORFORD NESS, SUFFOLK



Fig. CS2.2.17. (top) of *'Slaughden Quay'* near Aldeburgh, Suffolk, was painted by John Moore of Ipswich in 1883.

Slaughden is a small community located on the Suffolk coast to the south of the seaside town of Aldeburgh on the River Alde.

The site is typical of the low-lying saltmarshes and mudflats to be found on the southern part of the Suffolk coastline.

This work by John Moore of Ipswich illustrates the coastal geomorphology and environment of the area. Such artworks provide the opportunity to consider not just the physical changes that have taken place over time but also environmental changes

Slaughden Quay is located on the River Alde and is situated on a massive shingle spit, which extends for some 16km south of Aldeburgh to Orfordness and Orford Beach. The shingle spit is separated from the hinterland by the River Alde, which flows eastwards, through Snape, before broadening into a wider estuary and narrowing again and turning sharply south as a result of longshore drift.

Image courtesy of Colchester & Ipswich Museums.



Fig. CS2.2.18. (middle) *'Orford Ness'* by William Daniell RA. 1822.



Fig. CS2.2.19. (bottom) *'Orford Ness and Lighthouse'*.

Image courtesy of © Stuart Warrington/Creative Commons Licence.

Orford Ness is a very extensive foreland shingle spit located in southern Suffolk, extending south from the seaside resort of Aldeburgh for a distance of 16km. It is separated from the hinterland by the River Alde, which has been forced to flow southwards parallel with the coast.

This is one of the most important geomorphological features of its kind in Great Britain and is a location where there is a coastal policy of *'No active intervention'*. Orford Ness is Europe's largest vegetated shingle spit covering an area of 900ha and includes a range of internationally designated habitats.

The site has the potential to breach between the shore and the estuary as a result of its exposed location, and particularly in the face of rising sea levels and a potential increase in the frequency of storm events. The Alde/Ore estuary runs behind this massive shingle ridge to emerge at the coast at North Weir Point to the south. The spit was formed almost entirely by waves through the process of longshore drift. The main influence has been storm waves throwing shingle over the top of the beach crest, where it is protected from the more usual wave action. Over the last two hundred years historical evidence suggests that the spit has extended southwards at between 64-183m pa. Over the years this leads to the formation of stable shingle ridges of finer material and swathes of coarse shingle, which may then be colonised by vegetation.