

# **Kelling to Lowestoft Ness Shoreline Management Plan**

## **Appendix I: Sources of Data**



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This Appendix includes a list of the key reference materials used in the development of the Shoreline Management Plan.

# H1 Bibliographic database

## H1.1 MAIN SMP DOCUMENT

Defra 2000. *A Review of Shoreline Management Plans, 1996 to 1999 Final Report* Defra Flood and Coastal Defence, March 2000.

Defra (2005) Shoreline management plan guidance: volumes 1 and 2 and appendices. June 2005.

Posford Haskoning (2003a). Winterton Dunes. Coastal Habitat Management Plan (CHaMP). Final Report.

Posford Haskoning (2003b) Identifying biodiversity opportunities in Sheringham to Lowestoft Natural Area 104.

Halcrow (1995) Sheringham to Lowestoft Shoreline Management Plan. Sediment Sub-cell 3B. Phase 1. Volume 2: Studies and Reports.

Halcrow (1996) Sheringham to Lowestoft Shoreline Management Plan. Sediment Sub-cell 3B. Phase 1. Volume 1: Strategy Document.

Weston C & Weston S (1994). *Claimed By the Sea* (Norfolk). Wood Green Publications

Defra (2009). Consultation on Coastal Change Policy

## H1.2 APPENDIX C - BASELINE PROCESS UNDERSTANDING

The Baseline Process Understanding has developed from a number of key references, i.e. the previous SMP, strategy studies, the Southern North Sea Sediment Transport Study (SNSSTS) the Coastal Habitat Management Plan (CHaMP) and relevant extracts from Futurecoast. Other reports have also been reviewed, some of which were cited in the aforementioned studies.

### (a) Key references

Futurecoast (2002). Halcrow.

Winterton Dunes Coastal Habitat Management Plan (2003). Final Report. Posford Haskoning.

Southern North Sea Sediment Transport Study (SNSSTS) (2002). Phase 2, Sediment Transport Report. Report EX4526. <http://www.sns2.org> HR Wallingford.

Sheringham to Lowestoft Shoreline Management Plan (1995). Sediment Sub-cell 3B. Phase 1. Volume 2: Studies and Reports. Halcrow.

North Norfolk Shoreline Management Plan (1996) Sheringham to Snettisham Scalp. Volumes 1 and 2. L.G. Mouchel & Partners Ltd

Cromer Coastal Strategy Study (2001). HR Wallingford Report EX4363. HR Wallingford.

Overstrand to Walcott Coastal Strategy Study (draft). HR Wallingford.

Ostend to Cart Gap Coastal Strategy Study (2001) HR Wallingford Report EX4342. HR Wallingford.

Happisburgh to Winterton Sea Defences: Stage Three Strategy Review (2002). Halcrow.

Gorleston to Lowestoft Coastal Strategy Study (1999). Part One Appendices A - C. Consultation Draft. Halcrow.

**(b) Other references**

ABP (1996). Southern North Sea Sediment Transport Study. Literature Review and Conceptual Sediment Transport Model. Report No. R.546, May 1996.

Andrews, J. E. et al. (2000). Sedimentary evolution of the north Norfolk barrier coastline in the context of Holocene sea level change. In: Holocene Land-Ocean interaction and environmental change around the North Sea. Geological Society Special Publication 166, 219-251.

Balson, P.S. (1999). The Holocene Evolution of Eastern England. Evidence from the Offshore Southern North Sea. Proceedings of the 4<sup>th</sup> International Symposium of Coastal Engineering. Sci. of Coastal Sedim. Proc.

British Geological Survey (BGS) (1996). Sediment Input from Coastal Cliff Erosion. Operational Investigation 577. Technical Report 577/4/A.

Cambers, G. (1976). Temporal Scales in Coastal Erosion Systems. Transactions of the Institute of British Geographers 1, 246-256.

Clayton, KM (1989). Sediment Input from the Norfolk Cliffs, Eastern England – A Century of Coast protection and its Effect. Journal for Coastal Research, 5(3) 433-442.

Delft (1986) Great Yarmouth Outer Harbour: Littoral drift study. Delft Hydraulics Laboratory.

Halcrow (1998). Caister Beach Coast Protection: Engineer's Report. March 1998.

Halcrow (2002a) Gorleston Coast Protection Scheme: Draft PAR. Great Yarmouth Borough Council.

Halcrow (2003) Gorleston Coast Protection Scheme: Sediment Budget. Great Yarmouth Borough Council.

Halcrow (2004) Gorleston Coast Protection Scheme: Revised PAR. Great Yarmouth Borough Council.

HR Wallingford (1998) – Great Yarmouth Outer Harbour: Impact of the Outer Harbour Development. Report EX3726.

HR Wallingford (1998). Research on the Behaviour and Engineering Significance of Coastal and Offshore Banks. Report SR512.

HR Wallingford (1999). Simulation of the sediment budget for the Happisburgh to Winterton Reefs. PICES application study.

Hulme, M., Jenkins, G.J., Lu, X., Turnpenny, J.R., Mitchell, T.D., Jones, R.G., Lowe, J., Murphy, J.M., Hassell, D., Boorman, P., McDonald, R. and Hill, S. (2002) Climate Change Scenarios for the United Kingdom: The UKCIP02 Scientific Report, Tyndall Centre for Climate Change Research, School of Environmental Sciences, University of East Anglia, Norwich, UK. 120pp

Leggett, D.J., Lowe, J.P. & Cooper, N.J. (1998). Beach evolution on the Southern North Sea coast. In: Edge, B.L. Proceedings of the International Conference on Coastal Engineering, Copenhagen, 2759 – 2772. ASCE.

McCave, I.N. (1978). Grain size trends and transport along beaches: example from Eastern England. Marine Geology 28, 43-51.

Motyka J M and Willis D H (1974). The effect of wave refraction over dredged holes. Proceedings ASCE 14th Coastal Engineering Conference, Copenhagen, June 1974, pp.615-625.

NADNAC (National Appraisal of Defence Needs and Costs). (2004) Halcrow in association with HR Wallingford Limited & John Chatterton & Associates. Defra.

Posford Duvivier, 1997 – Sandbanks: Basic processes and effects on long-term coastal morphodynamics. Report on sandbank behaviour on nearshore wave conditions.

Shennan, I. (1989) Holocene crustal movements and sea-level changes in Great Britain. Journal of Quaternary Science, 4, 77-89

Townend, I.H.T. & McLaren, P. (1990). The relationship between bank development and coastal response, East Anglia UK. Unpublished manuscript.

University of East Anglia (UEA) (1971). East Anglian Coastal Study Reports 2 and 3.

Vincent, C.E. (1979). Alongshore sand transport rates – a simple model for the East Anglian coastline. Coastal Engineering 3: 113-136.

### **(c) Websites**

[www.eastport-gy.co.uk](http://www.eastport-gy.co.uk) – provides further information on the proposed Outer Harbour.

[www.ukcip.org.uk](http://www.ukcip.org.uk) – provides further information on climate change including the UKCIP02 Scientific Report.

### **H1.3 APPENDIX D - THEMATIC STUDIES**

A number of reports and other information sources were reviewed in the development of the thematic studies. The maps produced also used information layers from websites such as English Nature and MAGIC.

#### **(a) Reports**

North Norfolk Local Plan. North Norfolk District Council, 1998.

North Norfolk Natural Area Profile. English Nature, 1997.

Shoreline Management Plan for Sediment Subcell 3A Snettisham to Sheringham. Volume 1. Posford Duvivier, 1997.

Shoreline Management Plan for Sediment Subcell 3A Snettisham to Sheringham. Volume 2. Posford Duvivier, 1997.

Shoreline Management Plan for Sediment Subcell 3B Sheringham to Lowestoft. Strategy Document. Halcrow, 1996.

Shoreline Management Plan for Sediment Subcell 3B Sheringham to Lowestoft. Volume 2: Studies and Reports. Halcrow, 1995b.

Winterton Dunes. Coastal Habitat Management Plan (CHaMP). Final Report. Posford Haskoning, 2003a.

Identifying biodiversity opportunities in Sheringham to Lowestoft Natural Area 104. Posford Haskoning, 2003b.

Coastal Defence and the Historic Environment: English Heritage Guidance. 2003.

LEAP Consultation Draft for North Norfolk. Environment Agency, 1996.

Cromer Coastal Strategy Study, interim report. HR Wallingford Report EX4363. HR Wallingford, 2001a.

North Norfolk Strategy Studies. Overstrand to Mundesley. Completed Interim Report. HR Wallingford, 2003.

Ostend to Cart Gap Coastal Strategy Study. HR Wallingford Report EX4342. 2001.

Happisburgh to Winterton Sea Defences: Stage Three Strategy Review. Appendix G. Halcrow, 2002.

Caister Beach Coast Protection. Environmental Appraisal. Halcrow, 1997.

Gorleston to Lowestoft Coastal Strategy Study (Halcrow). Part 1, Appendices A to C.



Annual Eastern Sea Fisheries Joint Committee Reports; 2001, 2002, 1998 and 1999.

**(b) Web sites and additional information sources**

North Norfolk District Council Local Plan ([www.north-norfolk.gov.uk/planning](http://www.north-norfolk.gov.uk/planning))

Waveney District Council Draft Local Plan ([www.waveney.gov.uk/services/planning/local\\_plan](http://www.waveney.gov.uk/services/planning/local_plan))

Great Yarmouth Borough-Wide Local Plan ([www.great-yarmouth.gov.uk](http://www.great-yarmouth.gov.uk))

Broads Local Plan ([www.great-yarmouth.gov.uk](http://www.great-yarmouth.gov.uk))

Norfolk County Council Structure Plan ([www.norfolk.gov.uk/environment/planning/landuse](http://www.norfolk.gov.uk/environment/planning/landuse))

Suffolk County Council Structure Plan ([www.suffolkcc.gov.uk/e-and-t/structure\\_changes/adopted\\_structure\\_plan](http://www.suffolkcc.gov.uk/e-and-t/structure_changes/adopted_structure_plan))

Norfolk County Council population estimates ([www.norfolk.gov.uk/council/statistics/demography](http://www.norfolk.gov.uk/council/statistics/demography))

Suffolk County Council population estimates ([www.suffolkcc.gov.uk/cgi-bin](http://www.suffolkcc.gov.uk/cgi-bin))

English Nature ([www.english-nature.org.uk](http://www.english-nature.org.uk))

Norfolk Wildlife Trust ([www.wildlifetrust.org.uk/norfolk](http://www.wildlifetrust.org.uk/norfolk))

Suffolk Wildlife Trust ([www.wildlifetrust.org.uk/suffolk](http://www.wildlifetrust.org.uk/suffolk))

Biodiversity Habitat and Species Action Plans ([www.norfolkbiodiversity.org](http://www.norfolkbiodiversity.org))

Norfolk Coast AONB ([www.norfolkcoastaonb.org.uk](http://www.norfolkcoastaonb.org.uk))

CHaMPs ([www.english-nature.org.uk/livingwiththesea/champs/pilots.asp](http://www.english-nature.org.uk/livingwiththesea/champs/pilots.asp))

Economic Strategies for Norfolk and Waveney ([www.shaping-the-future.org](http://www.shaping-the-future.org))

Great Yarmouth Port Authority ([www.gypa.co.uk](http://www.gypa.co.uk))

Broads Authority ([www.broads-authority.gov.uk](http://www.broads-authority.gov.uk))

MAGIC (Multi-Agency Geographic Information for the countryside) ([www.magic.gov.uk](http://www.magic.gov.uk))

<http://www.happisburgh.org.uk/>

**H1.4 APPENDIX H – ECONOMIC APPRAISAL**

Information on assets, benefits, and management costs was extracted from available strategy plans and scheme assessments.

**(a) Reports**

Cromer Coastal Strategy Study (2001). Interim report. HR Wallingford Report EX4363. HR Wallingford.

Overstrand to Walcott Strategy Study (2004). Part II – Technical Support Information (Draft). HR Wallingford Report EX4692. HR Wallingford.

Ostend to Cart Gap Strategy Study HR Wallingford Report EX4342 (2001). HR Wallingford.

Ostend to Cart Gap Strategy Implementation Review. (2002) Halcrow.

Caister Seawall Repair. Final Appraisal Report (2000). Halcrow.

Great Yarmouth Shoreline Management Strategy. Final Report. (1994). Halcrow.

Gorleston Coast Protection Scheme. Project Appraisal Report. (2003) Halcrow.

Gorleston to Lowestoft Coastal Strategy Study (1999). Halcrow.

Corton Village Project Appraisal (2002). Halcrow.

**(b) Other data**

Other data used in the economic appraisal includes:

- Address Point dataset
- Average residential property prices for 2004, as obtained from the website [www.upmystreet.co.uk](http://www.upmystreet.co.uk).
- Commercial values obtained from the Focus database (from the Valuation Office).
- Replacement costs for general defence types have been taken from the recently developed Environment Agency database.
- Maintenance costs have been taken from *NADNAC (National Appraisal of Defence Needs and Costs)*. (2004) Halcrow in association with HR Wallingford Limited & John Chatterton & Associates. Defra.

## H2 Mapped data

### H2.1 Main SMP document - policy maps

#### (a) Basemapping (Communication, Topography and Coastline)

Simple map information based upon the Ordnance Survey, Meridian data (provided under licence, © Crown Copyright) to form the backdrop to the mapped information. Mapping at scales 250,000 and 10,000 was used. North Norfolk District Council Licence number: LA078816.2004.

#### (b) Present coastline

This was defined from Ordnance Survey mapping and minor changes were made, e.g. at Winterton, where major variations in this position have occurred since the coastline was last mapped.

#### (c) Indicative Erosion Zones

These were defined as part of the assessment of shoreline response for the final policy (see Appendices C and G for details of this assessment) for years 2025, 2055 and 2105.

#### (d) EA Indicative Tidal Flood Plain Mapping

Environment Agency 2003 indicative flood plain mapping (coastal flood areas only) was provided under licence © Environment Agency / CEH Wallingford). This mapping provides a general overview of areas of land in natural floodplains and indicates where coastal flooding is possible. It should be noted that the EA is continually updating its maps and these should be used in preference to those presented in this SMP.

#### (e) National Nature Conservation Designation

For clarity of presentation, this combined datasets for: National Nature Reserves and SSSI sites (see below).

#### (f) International and National Nature Conservation Designation

For clarity of presentation, this combined datasets for: SPA, Ramsar, SAC, National Nature Reserves and SSSI sites (see below).

#### (g) Important Heritage Sites

For clarity of presentation, this included only Scheduled Ancient Monuments and Grade 2 buildings and above and those monuments identified as high importance by Norfolk and Suffolk County Archaeologists.

#### (h) Policy unit boundaries

These were defined as part of the SMP and mapped accordingly.

## **H2.2 APPENDIX C**

### **(a) Basemapping (Communication, Topography and Coastline)**

As above.

### **(b) Present coastline**

As above.

### **(c) Indicative Erosion zones**

These were defined as part of the assessment of shoreline response for the 'no active intervention' scenario (see Appendix C for details of this assessment) for years 2025, 2055 and 2105.

### **(d) EA Indicative Tidal Flood Plain Mapping**

As above.

### **(e) National Nature Conservation Designation**

As above.

### **(f) International and National Nature Conservation Designation**

As above.

### **(g) Important Heritage Sites**

As above.

## **H2.3 APPENDIX D**

### **(a) Data obtained from MAGIC website**

A number of data sets were obtained from the government website MAGIC (Multi-Agency Geographic Information for the Countryside). These datasets were obtained in 2004. Copyright information is available on the website: [www.magic.gov.uk](http://www.magic.gov.uk).

- Agricultural Land Classification
- Areas of Outstanding Natural Beauty
- Common Land
- Heritage Coast
- Environmentally Sensitive Areas

### **(b) Data obtained from English Nature**

A number of data sets were obtained from English Nature ([www.English-nature.gov.uk](http://www.English-nature.gov.uk)). These datasets were obtained in 2004:

- Ramsar sites
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)

- Sites of Special Scientific Interest (SSSI)
- National Nature Reserves

**(c) Data Obtained from English Heritage**

Sites and Monuments Records (SMRs) are a primary source of information on the local historic environment. Data from these were provided by Norfolk and Suffolk County Archaeologists. The data was filtered to extract only those sites recorded as monuments or listed buildings, although it is recognised that the implementation of a policy (at either strategy or scheme stage) would also need to consider 'find' sites. The following classes were mapped:

- SMR listed building
- SMR listed monument
- Grade 1 listed
- Grade 2 listed
- Grade 2\* listed
- Scheduled Ancient Monument
- SMR region

**(d) County Wildlife Sites**

Datasets relating to coastal County Wildlife Sites were provided by Norfolk Wildlife Trust and Suffolk Wildlife Trust.

## **H2.4 APPENDICES F, G AND H**

**(a) National Property Database**

Environment Agency licenced data comprising of Ordnance Survey AddressPoint and Valuation Office data. This has not been reproduced on the final maps presented, but was used in the analysis of property loss.