

References – Main Report Section

1

UKCIP02 Report – html pages edited by DEFRA – Main report downloaded as separately sectioned by topic files (pdf)

http://www.ukcip.org.uk/scenarios/sci_report/sci_report.html

UKCIPP02 - shorter versions intended as research tools

http://www.ukcip.org.uk/research_tools/research_tools.html

[accessed April 22nd 2003]

The UKCIP02 report built on the earlier UKCIP98 report that was the first 'stakeholder approach' review of climate in the UK. The newer report increased its sensitivity and was based on much smaller 'cells' of study – the new cells being km and the older ones 300 km. The earlier report looked at 3 scenarios whilst the new report considered four emission levels.

Report of the East Anglia Climatic research unit.

http://www.datum-line.co.uk/gen_file/front_line_all.htm

2

Downing, Thomas E. Olsthorpe, Alexander J., Tol, Richard, S.J. Editors (1999)

"Climate, Change and Risk" Routledge, London & NY ISBN 041-5170311

3

Pilkey, Orrin H. **"Engineered Barrier islands: Lifeless Piles of Sand"** (October 2002)

Paper 195-10 Lecture to the American Advancemnet of Science

Division of Earth & Ocean Sciences, Duke University, Durham, North Carolina 27708

http://gsa.confex.com/gsa/2002AM/finalprogram/abstract_40202.htm

4

Cunningham, Robert (November 1999)

Datum-On-Line – Coastal management issues – comment site

"Voices on the Wind of change" p2 para 1,3

"With an estimated 22 million seaside holidays taken in England and Wales each year, tourism is not just the life blood of the coastal resorts, but of the coastal counties as a whole."

"Half the UK manufacturing industry is sited on or near the coast. The whole of the UK will be severely affected as all petroleum refineries and half of our electricity generating plants are in or near coastal locations."

http://www.datum-line.co.uk/gen_file/front_line_all.htm

5

Thomalla, Frank **"Managaing flood risk in the UK"** (April 2001)

Department of Global Change and Social Systems

Potsdam Institute for Climate Impact Research (PIK)

Town & Country Planning – (Special feature)

"Today around 1.7 million residences, 130,000 commercial properties and 1.3 million hectares of agricultural land in England are located in areas vumnerable to fluvial, tidal and coastal flooding, as well as coastal erosion. Assets located near the coast and estuaries are increasingly at risk owing to a rise in global sea level." Page 112 column 3, 'The Way Forward' para 2

http://www.pik-potsdam.de/~thomalla/town&country_fthomalla.pdf

accessed July 10th 2003 & September 2003

5 continued...

Cambridge Coastal Research Unit

<http://ccru.geog.cam.ac.uk/research/projects/#risk>
accessed August 21 2003

and

Ecological Viewpoint – Coasting towards disaster - (web review document) (Feb 2000)

“..today, nearly 75% of the population live within 30miles of the coast and more than fifteen percent live within 1 km of an estuary.”

www.themoviechannel.com/sitefeatures/viwpoints/ecological3.asp
accessed September 2nd 2003

6

Environmental agency – Flood risk maps

“Antiflood – Now do you have a choice” Postcode database of maps of the UK
accessed July, August, September 2003

<http://www.antiflood.com/warnings/index.asp>

7

Document 1 - An Introduction to the North Norfolk Coastal Environment)

“Valuation of Coastal Land” – un-numbered table in section covering usage of land on the Norfolk coastline. (see Figure 4 Report Appendix - adapted from ‘Document 1’)

<http://www.northnorfolk.org/coastal/doc1.html>

8

Brunsdon, Denys and Ibsen, M-L (1993)

“The spatial and temporal distribution causes of landslides on the South Coast of Great Britain”
cited in “*Engineering Geomorphology on the coast : Lessons from west Dorset.*” 1999
Geomorphology Vol 31 Issue 1-4 page 396 Table 1 “Costal erosion rate data for the Dorset coast”

9

Document 1 - An Introduction to the North Norfolk Coastal Environment)

(Table 2) Reproduced in document as: **Figure 4. Coastal Erosion rates in North Norfolk.**

Based on data from: Clayton, K.M. and Coventry, F. (1986) The conservation effectiveness of the modified coast protection work at West Runton SSSI. Nature Conservancy Council

<http://www.northnorfolk.org/coastal/doc1.html>

10

Toghill, Peter. “The Geology of Britain – An Introduction (2002)

ISBN 1 85310 890 1 Airlife Publishing

Figure 156 p 171 (See Figs 5 and 6 – Report Appendix)

11

Picture courtesy of Martin Warren -

Norwich Museum and archaeological services

Cliffs of West Runton comprised primarily of glacial deposit and showing their characteristic tendency to slumps and loose slurry or debris flows.

<http://www.chesterfieldlodge.fsnet.co.uk/field.htm>

12

Bell, F.G. (April 2001)

The Geotechnical properties of some till deposits occurring along the coastal areas of eastern England" Engineering geology 63 (2002) p 62 column 2 para 3

" The behaviour of the soils of low plasticity can be sensitive to small changes in moisture content. This is well demonstrated in the Hunstanton Till and the Cromer Drift. Samples were compacted and specimens taken dry and wet of optimum moisture content and subject to undrained tri-axial testing. The addition of the first 2% of water caused a reduction of just over 70% in strength. In the Contorted drift, the decline in strength with increasing water content also is dramatic, an increase of about 2.5% reducing the strength by almost 70%."

13

Source NERC Proudman Oceanographic Laboratory (cited source of diagrams)

Managing the Environment and Resources

Sealvel rise maps – accessed (August 2003) at:

<http://www.sustainable-development.gov.uk/sustainable/quality99/pdf/ch4n.pdf>

accessed through :

(<http://www.sustainable-development.gov.uk>)

14

Bell, F.G. (April 2001)

The Geotechnical properties of some till deposits occurring along the coastal areas of eastern England" Engineering geology 63 (2002) p 49-68

Table 3 p 58 (Data covering Natural moisture content, plastic limit and liquid limit of tills from Norfolk)

and

Hart, J. K. and Boulton, G. S. (1991). The Glacial Geology of north east Norfolk. In: Rose, J., Gibbard, P. L. and Elhers, J. (eds.)

The Glacial Deposits of Britain. Balkema, Rotterdam, 233-244

15

Baars, Martien (May 2003) Dep. Biological Oceanography, NIOZ, Texel, Netherlands

A Plume across the North sea

Abstract

www.abdn.ac.uk/~geo027/gg3520/cedge.htm (accessed August 2002)

16

Baars, Mertien. Cefas - Eutwork Abstract 14 (May 2003)

"Satelliet images show a marked plume of suspended matter from Norfolk stretched northward in the direction of the residual currents into the open Southern Bight" "Inbetween the Central North Sea Water in the North and the tongue of Channel water in the south there was a marked 'river' of English Coastal Water."

www.cefas.co.uk/eutwork/abstract4.htm

17

McCave, I.N. (1987)

Fine sediments sources and sinks around the east anglain Coast (UK)

Depratment of earth sciences, University of Cambridge.

Journal of the geological society London. Vol 144 p149-152

Table 1 p.150 (see Report appendix Fig: 9)and Fig 2 p 150 (Report appendix Fig: 10)

www.geog.ucl.ac.uk/ceru/download/Wash_biblio.pdf

17a**OSPAR Convention for the protection of the marine Environment of the North-East Atlantic**

Paper (Draft version) submitted by World Wildlife Fund for nature

'Conclusion' "In 1998 consultants Rendel Geotechnics estimated that the amount of sediment entering the sea from Britain's fortified coastline had fallen by as much as half in the past century. One prime reason for this was the sea walls shutting off sediment supplies. Of more than 1000km of soft cliffs being actively eroded by the sea in 1900, it found that only 200 km were 'untouched' by coastal protection measures. This is a potentially catastrophic situation as sea level rise accelerates. Sediment and natural coastal processes are the key to all forms of coastal defence."

18**Geographic Area and Physical context - Eastern Chapter**

"Topography, Geology and main features"

Defra paper on East Anglian topography Section 1.1.1 para 3

<http://www.defra.gov.uk/erdp/docs/eastchapter/east11/geographic.htm#111>

accessed August 2003

19

Safeguarding our Coasts. LOIS study (2001) (Land Ocean interaction Survey)

www.nerc.ac.uk/loiscoast

Page 10 Diagram illustrating the relationship between sediment transport and shore morphology. (See appendix Figure 8)

20

Dean, Cornelia, Against the Tide (1999)

Comubia University Press ISBN 0-231-08419-6

P54 – 55

(see appendix Fig 13)

And

Pilkey, Orrin, Dixon, Katherine L. (1996) "The Corps and The Shore" Island Press

ISBN: 1-55963-438-3

21

1953 storm surge data (see Figure

<http://oceanografia.cicese.mx/cursos/sco/figures/fig4a1.html>

"A storm surge in the North Sea. The curves are predictions from the storm surge warning system, the squares are observations. The tide is subtracted from the data, so only the effect of the wind surge is shown; this has to be added to the tide to obtain final sea level. Blue squares indicate local high water

The storm surge enters from the North Atlantic Ocean and builds up as the [water is pushed](#) into the North Sea and towards the narrow Channel between England and France. Notice the increase in surge height from 1.5 m at Immingham (I) to 1.7 m at Lowestoft (L) and 2m at Walton (W) and Southend (S). The green line indicates that it takes the surge about 11 hours to travel from Immingham to Southend."

Caption from site (accessed 01-07-03)

21a

OSPAR Convention for the protection of the marine Environment of the North-East Atlantic

Paper (Draft version) submitted by World Wildlife Fund for nature

'Chapter Two : UK threats overview'

Para 2 ' lines 2-4

"Most of the defences were built or raised in the aftermath of catastrophic east coast floods of 1953. Now those walls are crumbling. The Ministry of Agriculture Fisheries and Food [MAFF-now replaced by DEFRA] says that 60% of all coastal protection schemes are classified as 'emergency'.

22

Safeguarding our Coasts. Lois study (2001)
Appendix F 'Coastal defence charts'
(see appendix – Figure 13 a and 13 b page 14,15)
www.nerc.ac.uk/loiscoast

23

Pilkey, Orrin, Dixon, Katherine L. (1996) "The Corps and The Shore" Island Press
ISBN: 1-55963-438-3
Chapter 5: 'Folly Beach: Reclaimed Heyday'
Chapter 6: 'Sargeant Beach : Texas'
Chapter 7 : 'Presque isle : the End of a Beach'
Chapter 8 : 'Camp Ellis: Maine'
Chapter 10 : 'Politics, Science and Engineering'

24

Pilkey, Orrin, Dixon, Katherine L. (1996) "The Corps and The Shore" Island Press
ISBN: 1-55963-438-3
Page 139 'Sargent Beach, Texas' 'The costs': Social para 1
"If the social costs of the Sargent Beach seawall are similar to seawalls on other American Beaches – and we know of no reason to think otherwise – we anticipate the following scenario of false hopes. Once, and perhaps even before, the seawall is in place, an illusion of safety will be created. The value of the property behind the seawall will shoot up, and the house building will begin. Public access to the beach, already made somewhat inaccessible by the seawall will be increasingly restricted...a new coastal road is constructed..."

25

McGlashan, Derek J., (August 2002)
"*Managed relocation : an assessment of its feasibility as a coastal management option*"
The Geographical Journal Volume 169 Number 1 Pub: March 2003 p 6-20
Case Study 4 – 'Building relocation in N. Carolina' - page 14-15 and 'Disucussion'

26

Dean, Cornelia, Against the Tide (1999)
Comubia University Press ISBN 0-231-08419-6
P 188-193 'National Flood Insurance program'

27

Geographic Area and Physical context - Eastern Chapter
"Topography, Geology and main features"
Defra paper on East Anglian topography
<http://www.defra.gov.uk/erdp/docs/eastchapter/east11/geographic.htm#111>
accessed August 2003

28

"Crumbling Away – Is dredging the villain in the drama of Britain's eroding coasts?"
New Scientist archive Vol 152 Issue 2061 21st December 1996 page 14

Para 'Inexact science' – para 5 lines 7-11
"My worry is that the reefs will break the back of the Norfolk Coast. They trap sediment washing down from the North, so beyond them erosion will increase. Here could be a huge catastrophe one day, with the sea invading the Norfolk Broads." – Professor John Pethick (Cambridge Coastal Research Unit.)

29

Photograph: Sea Palling Norfolk.

'Quarrying Today' – (Quarry Products Association) - Spring 2001 Issue 9 p.6

30

Pilkey, Orrin, Dixon, Katherine L. (1996) "The Corps and The Shore" Island Press
ISBN: 1-55963-438-3

Page 169 'The Future' para 1 (regarding the Presque Isle Breakwaters)

"In 1994, Corps publicist John Derbyshire noted that some changes (to the breakwater) had been made but said more time was needed to see how the shoreline finally adjusts. Derbyshire also explained away tombolo formation – a geological process that breakwaters were designed to prevent – by describing those breakwaters that formed tombolos as "too successful" "

31

King, Susannah, E. Lester, John N. (2000 February)

The Value of salt marsh as a sea defence

Marine Pollution Bulletin Pollution Economics Vol 30 Issue 3 pp 180-189

Abstract para 1

32

Chang, Y-H, Scrimshaw, M.D. McCleod, C.L. Lester, J.N. (2001)

"Flood defence in the Blackwater estuary, Essex, UK: The Impact of Sedimentological and geochemical Changes on Salt marsh Development in the Tollesbury Manged Realignment Site"

'Materials and Methods – study area' Para 1 lines 5-8

33

OSPAR Convention for the protection of the marine Environment of the North-East Atlantic

Paper (Draft version) submitted by World Wildlife Fund for nature (1999)

Chapter 3, para 2 line 4-6

In a typical case on the Blackwater estuary, local authorities in 1992 spent £4 million on strengthening a sea wall to defend 170 hectares of arable land part of which was uncultivated. Local people put the market price of the land at £400,000"

34

Chang, Y-H, Scrimshaw, M.D. McCleod, C.L. Lester, J.N. (2001)

"Flood defence in the Blackwater estuary, Essex, UK: The Impact of Sedimentological and geochemical Changes on Salt marsh Development in the Tollesbury Manged Realignment Site"
Fig 1 page 472

34a

French, P.W. (1999)

"Managed Retreat: a natural analogue from the Medway estuary, UK"

Ocean Coastal Mangement Vol 42 p 49-62

'Along the coast of the UK, there are many examples of natural storm breaches in defences which have resulted in the hinterland reverting to salt marsh' section 2 para 1

35

Chang, Y-H, Scrimshaw, M.D. McCleod, C.L. Lester, J.N. (2001)

"Flood defence in the Blackwater estuary, Essex, UK: The Impact of Sedimentological and geochemical Changes on Salt marsh Development in the Tollesbury Managed Realignment Site"

'Salt Marsh within the MR site started to develop during the Summer of 1997, extending from the new sea wall to about 50 metres north of the sea wall in October 1997".
Final paragraph and conclusions.

36

Pethick, J (2002) (Report to English Nature)

"The mean retreat rate at the middle of the barrier beach at Middle car park was shown by Job (2000) to be 1.2 metres per year." Page 4 2.4 para 2

"The potential for breaching has not been seen as a major issue at Slapton but this must be questioned in the light of the discussion given here." Page 5 para 3

"The Slapton barrier beach system as described above is in the ultimate breakdown stage of its development...it is clear that it is extremely sensitive to interference"
Section Impacts of Proposed Works para 1 1-2

http://www.english-nature.org.uk/livingwiththesea/project_details/good_practice_guide/shingleCRR/shingleguide/Annexes/Annex02Slapton/Index.htm
(Accessed September 2003)

Storms have seriously erode the shingle reducing the height of the beach and the road between Dratmouth and Torcross has been realigned and will need to be realigned again as the coastal squeeze allows no natural movement of the beach in a landward direction.

(For photographs see appendix Figs 14 and 15)

37

Chang, Y.M. Scrimshaw, M.D., Macleod, C.L., Lester, J.N. (2001)

Marine Pollutionbulletin Vol 42 Number 6 p 470-481

"Flood defence in the Blackwater estuary, Essex, UK: The Impact of Sedimentological and geochemical Changes on Salt marsh Development in the Tollesbury Manged Realignment Site"

38

Maddrell, Roger (1996)

"Managed coastal retreat, reducing flood risks and protection costs, Dengerness Nuclear Power Station, UK" Coastal Engineering Volume 28 Issues 1-4 p 1-15

39

Maddrell, Roger (1996)

"Managed coastal retreat, reducing flood risks and protection costs, Dengerness Nuclear Power Station, UK" Coastal Engineering Volume 28 Issues 1-4 p 1-15

40

Halcrow – Cival (Coastal) Engineering Consultants – working with SCOPAC and other Shoreline mangement organisations.

http://www.halcrow.com/halcrow_coastal.asp

Hosking, Adam (Halcrow group) and McInnes, Robin (SCOPAC)

“Preparing for the Impacts of Climate Change on the Central South Coast of England: A Framework for Future Risk” 2002

Journal of Coastal Research Special issue 36

(<http://www.science.ulst.ac.uk/ics2002/hosking%20and%20mcinnes.pdf>)

(last accessed 15-07-03)

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Maddrell, Roger (1996)

“Managed coastal retreat, reducing flood risks and protection costs, Dengerness Nuclear Power Station, UK” Coastal Engineering Volume 28 Issues 1-4 p 1-15

42

Maddrell, Roger (1996)

“Managed coastal retreat, reducing flood risks and protection costs, Dengerness Nuclear Power Station, UK” Coastal Engineering Volume 28 Issues 1-4 p 1-15

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Hosking, Adam (Halcrow group) and McInnes, Robin (SCOPAC)

“Preparing for the Impacts of Climate Change on the Central South Coast of England: A Framework for Future Risk” 2002

Journal of Coastal Research Special issue 36 (p. 383 para 1).

(<http://www.science.ulst.ac.uk/ics2002/hosking%20and%20mcinnes.pdf>)

(last accessed 15-07-03)

44

Pilkey, Orrin, Dixon, Katherine L. (1996) “The Corps and The Shore” Island Press ISBN: 1-55963-438-3

Acknowledgments p xii para 2 lines 4-6

“A generalise difference between scientists and engineers, at least in coastal studies, is that scientists are trained to observe natural systems and engineers are trained to manipulate them.”

45

Safeguarding our Coasts. Lois study (2001)

P 6 para4 ‘Introduction’ “These costs can become prohibitive, with defences constructed and repaired on a piecemeal basis. Present costs estimates range between £1 - 5 million per kilometre for defences expected to last about 50 years. This situation has been further complicated by a rise in sea level”

www.nerc.ac.uk/loiscoast

46

White, Gilbert F., Kates, Robert W., Burton, Ian. (2001)

“Knowing better and losing evn more: the use of knowledge in hazards management”

Global Environment Change Part B : Environmental Hazards.

Volume 3 Issues 3-4 September-December 2001 p 84 para 2 lines 2--7

47

White, Gilbert F., Kates, Robert W., Burton, Ian. (2001)

“Knowing better and losing evn more: the use of knowledge in hazards management”

Global Environment Change Part B : Environmental Hazards.

Volume 3 Issues 3-4 September-December 2001 p 90 column 2 para 2 lines 2-22

48

Holbeck Hall Hotel v Scarborough Borough Council (1996)
(High Court of Justice 1995 ORB 561 Queens Bench Division)
<http://web.act.ac.za/depts/pbi/jgibson/iczm/cases/holbeck1.htm>

49

News Release 189/01

“Elliot Morley Announces £31 million strategy for sea defences in Norfolk”

www.defra.gov.uk/news/2001/011025a.htm

(accessed 20-07-03)

Elliott Morely quoted news release para 2

£31.4 m additional funding announced in Autumn 2001 for an upgrading of 8.5 km of coastline. This followed a £51 m response in November to the experienced flooding events.

“The government is committed to sustaining flood and coastal defences and has increased spending plans in both of its spending reviews. In November we announced a further £51 million as a part of the response to the severe flooding events. In all DEFRA funding is set to increase from £66 m in 2002 to £114 m in 2003-04”

50

Hansard June 2003

“Thamesmead is built on land 3.5 metres below the level of high water.”⁴⁴)

51

McGlashan, Derek J., (August 2002)

“Managed relocation : an assessment of its feasibility as a coastal management option”

The Geographical Journal Volume 169 Number 1 Pub: March 2003 p 6-20

Case Study 3 – page 11-12

52

“About LIDAR” - includes other detail of technology and equipment associated with LIDAR

www.csc.noaa.gov/beachmap/html/intlidar.html

(accessed 21-06-03)

and

“Remote Sensing for Coastal Management” -

Sensor summaries

(accessed 21-06-03)

IKONOS, 1-4 metre resolution 3-5 days

Landsat, 15 metre spatial resolution 14 day temporal

LIDAR 0.75 metre spatial resolution limited only by operation schedule

SeaWiFS 1 km spatial 1 day

http://www.csc.noaa.gov/crs/rs_apps/sensors/sensor_all.htm

53

Pike, Richard J. (1999)

“A Bibliography of Terrain Modelling (Geomorphometry), the Quantitative Representation of Topography – Supplement 4.0”

Open-file report USGS

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Orrin Pilkey Prof. Duke University USA (1998)

Personal communication September 2003 regarding Legal cases in Florida and Carolina

www.sfu.ca/~ianh/geog312/lectures/shoreline%20limg033.gif

55

(OCRM) Ocean and Coastal Resource Management Beach Nourishment Report

(March 2000)

1.3 ‘Costs and Benefits’ and ‘Project Longevity’