

North East Rapid Coastal Zone Assessment (NERCZA)



Skinningrove Harbour

ARS Ltd Report 2008/81 December 2008

Compiled by:

Dr Chris Tolan-Smith FSA Archaeological Research Services Ltd Baltic Business Centre Saltmeadows Road Gateshead NE8 3DA

> Tel: 0191 477 5111 Fax: 0191 477 7687

admin@archaeologicalresearchservices.com www.archaeologicalresearchservices.com

North East Rapid Coastal Zone Assessment (NERCZA)

Archaeological Research Services Ltd Report 2008/81

December 2008

© Archaeological Research Services Ltd Mmviii

Acknowledgements

The production of this report has involved the input of a large number of people. I should like to express my special thanks to my colleagues at **Archaeological Research Services Ltd.**, namely Clive Waddington, Cinzia Bacilieri, Sally Radford, Gemma Pallant, David Knight and Ben Johnson. Richard Hewitt, part of the ARS team until the summer of 2008, developed the GIS data base and tutored me in its use. Being a complete novice in such matters, I found his help invaluable. I could not have completed this project without his patient support and good humour.

I am also most grateful to Prof Ian Shennan and Ms Natasha Barlow of the Sea Level Research Unit in the Department of Geography at the University of Durham. Their seminal synthesis of the data on sea level change in the NE was far beyond my competence and they also saved me the trouble of trying to synthesise the geology of the region.

Colleagues in central and local government have also provided data and support throughout:

English Heritage: Peter Murphy, Jonathan Last, Dave McCleod, Yvonne Boutwood, Jacqui Huntley, Kate Wilson, Robert Young, Roger J.C.Thomas, Dave Hooley and Alice Frogatt (formerly EH GIS Management)

Environment Agency: Phil Catherall (for LiDaR data)

National Soils Research Institute, Cranfield University: Tim Farewell

British Geological Survey: Roger Parnaby and Rosie Pharoah

Seazone Solutions: Mike Glassborow (for Hydrographic Office data)

Natural England: Tom Gledhill and Steve Preston

North Yorkshire County Council: Gail Falkingham and Nick Bodrini

North York Moors National Park: Graham Lee and Sandra Kennish

Tees Archaeology: Robin Daniels, Peter Rowe, Gary Green and Rachel Grahame

Durham County Council: Lee White and David Mason

Durham Heritage Coast: Niall Benson

Tyne and Wear Specialist Conservation Team: Jenny Morrison and David Heslop

Northumberland County Council Conservation Team: Sara Rushton, Chris Burgess,

Keith Elliott and Liz Williams

Northumberland Coast AONB: Tom Cadwallader

Scarborough Borough Council: Chris Matthews (for SMP2)

Berwick Borough Council: Chris Budzinski (for SMP1)

David Cranstone made available details, in advance of publication, of his study of the salt making industry in the North of England and Myra Tolan-Smith provided discussion on numerous points, companionship on field visits and looked after Ruby the spaniel while I took the photographs. I thank all three of them.

Dr Chris Tolan-Smith FSA

Project Officer

NERCZA

ARS Ltd

Contents

Acknowledgements	i
Contents	ii
List of figures	V111
List of tables	X11
Executive summary	xv
1 The North East Rapid Coastal Zone Assessment	
1.1 Introduction	1
1.2 Reasons for and Circumstances of the Project	2
1.2 Previous Work and Archaeological Resource	3
1.4 Aims and Objectives	5
1.5 Report Structure	7
2 Methodologies employed in the NERCZA Study	
2.1 Introduction	9
2.2 The GIS data base	9
2.3 Aerial Photograph Mapping to NMP Standards	10
2.3.1 Introduction	10
2.3.2 Sources of Aerial Photographs	13
2.3.3 Sources of monument data	14
2.3.4 Mapping Methods	14
2.3.5 Recording Practice	15
2.3.6 Copyright	15
2.3.7 Project Archive	15
2.3.8 Project Dissemination	15
2.4 Archaeological Analysis	15
2.4.1 Analytical procedures	15
2.4.2 Assessment of the threat	16

3.1 Introduction	19
3.2 Holocene Relative Sea Level Changes	20
3.3 Geology of the NE Coast	22
3.3.1 Solid Geology	22
3.3.2 Drift Geology	22
3.3.3 Coastal Geomorphological Processes	23
3.4 NE England Coastal and RSL Change	24
3.4.1 Berwick-upon-Tweed – River Tyne (SMP Cell 1a)	24
3.4.2 River Tyne Seaham (SMP Cell 1b)	29
3.4.3 Seaham – Saltburn (SMP Cell 1c)	33
3.4.4 Saltburn – Whitby (SMP Cell 1d)	34
3.5 Holocene palaeogeography of the North Sea	36
3.5.1 9572 yr BC palaeogeography	36
3.5.2 8162 yr BC palaeogeography	37
3.5.3 6905 yr BC palaeogeography	37
3.5.4 6354 yr BC palaeogeography	37
3.5.5 5879 yr BC palaeogeography	39
3.5.6 4601 yr BC palaeogeography	39
3.5.7 3799, 3193 and 1228 yr BC palaeogeography	39
3.5.8 Tidal changes during the Holocene	39
3.6 Potential for further work	40
3.7 Conclusions	40
wider context of the coastal archaeology of NE England	
4.1 The Prehistoric Period	42
4.1.1 Early Prehistory	42
4.1.2 The Mesolithic Period	43
4.1.3 The Neolithic and the Early Bronze Age	44

4.1.4 The Late Bronze Age and the Iron Age

49

4.2 The Roman Period	52
4.3 The Medieval Period	56
4.4 The Early Post Medieval Period	58
4.5 The Industrial Period	59
4.6 Military Archaeology of the C20	61
5 The archaeology of the NE Coastal Zone	
5.1 Introduction	63
5.2 Early Prehistory – the Palaeolithic and Mesolithic Periods	63
5.2.1 Terrestrial landscapes	63
5.2.2 Coastal/Maritime landscapes	64
5.3 The Neolithic Period	64
5.3.1 Terrestrial landscapes	64
5.3.2 Coastal/Maritime landscapes	65
5.4 The Bronze Age	65
5.4.1 Terrestrial landscapes	65
5.5 The Iron Age and Romano-British Periods	66
5.5.1 Terrestrial landscapes	66
5.6 The Roman Period	67
5.6.1 Terrestrial landscapes	67
5.6.2 Coastal/Maritime landscapes	67
5.7 The Early Medieval Period	68
5.7.1 Terrestrial landscapes	68
5.8 The Medieval Period	68
5.8.1 Terrestrial landscapes	68
5.8.2 Coastal/Maritime landscapes	69
5.9 The early Post-Medieval Period	69
5.9.1 Terrestrial landscapes	69
5.9.2 Coastal/Maritime landscapes	70
5.10 The Industrial Period	70
5.10.1 Terrestrial landscapes	70

5.10.2 Coastal/	Maritime landscapes	70
5.11 Military Coastal D	efences from the C16 to the C19	72
5.12 Military Coastal D	efences in the Modern Period	72
5.12.1 World V	Var I	72
5.12.2 World V	Var II	73
5.12.2.	1 Coastal Defence Batteries	73
5.12.2.	2 Heavy Anti-Aircraft Batteries	73
5.12.2.	3 Searchlight Emplacements	74
5.12.2.	4 Barrage Balloon Sites	74
5.12.2.	5 Bombing Decoys	74
5.12.2.	6 Radar Stations	74
5.12.2.	7 Air-raid Shelters	74
5.12.2.	8 Beach Defence Batteries	75
5.12.2.	9 Pillboxes and Section Posts	75
5.12.2.	10 Anti-tank Obstacles	75
5.12.2.	11 Anti-glider Obstacles	75
5.13 Conclusion		70
6 Whitby West Pier to Blackh	all Rocks (Block 1 NMP)	
6.1 Introduction	,	77
6.1.1 Soils and	landuse	77
6.1.2 Coastal e	rosion	78
6.2 Terrestrial landscap	es	81
6.2.1 Early Pre	history	81
6.2.2 The Meso	olithic Period	83
6.2.3 The Neol	ithic Period	84
6.2.4 The Bron	ze Age	85
6.2.5 The iron	Age and Romano-British Periods	88
6.2.6 The Early	Medieval Period	89
6.2.7 The Medi	ieval Period	90
6.2.8 The Indu	strial Period	92

6.3 Coastal/Maritime Landscapes	98
6.3.1 Prehistory	98
6.3.2 The Roman Period	100
6.3.3 The Medieval Period	101
6.3.4 The early Post-Medieval Period	103
6.3.5 The Industrial Period	103
6.3.5.1 The chemical industry	103
6.3.5.2 Shipbuilding	103
6.3.5.3 Harbour facilities	104
6.3.5.4 Aids to Naviagtion and Safety at Sea	106
6.3.5.5 Shipwrecks	107
6.4 Military Coastal Defence	109
6.4.1 C18 and C19	109
6.4.2 World War I	110
6.4.3 World War II	111
6.4.3.1 Coastal defence batteries	111
6.4.3.2 Anti-aircraft batteries	113
6.4.3.3 Searchlight emplacements	113
6.4.3.4 Bombing Decoys	114
6.4.3.5 Beach defence batteries	114
6.4.3.6 Anti-glider obstacles	116
6.4.3.7 Radar Stations	117
7 Blackhall Rocks to South Beach, Blyth (Block 3 NMP)	
7.1 Introduction	121
7.1.1 Soils and landuse	121
7.1.2 Coastal erosion	122
7.2 Terrestrial landscapes	126
7.2.1 Early Prehistory	126
7.2.2 The Mesolithic Period	126
7.2.3 The Neolithic Period	128

	7.2.4 The Bronze Age	129
	7.2.5 The Iron Age and Romano-British Period	129
	7.2.6 The Roman period	131
	7.2.7 The Early Medieval Period	131
	7.2.8 The Medieval Period	132
	7.2.9 The Industrial Period	133
7.	3 Coastal/Maritime Landscapes	135
	7.3.1 The Mesolithic Period	135
	7.3.2 The Roman Period	136
	7.3.3 The Early Medieval Period	137
	7.3.4 The Medieval Period	137
	7.3.5 The Industrial Period	138
	7.3.5.1 Salt making	138
	7.3.5.2 Harbours	138
	7.3.5.3 Shipbuilding	141
	7.3.5.4 Aids to Navigation and Safety at Sea	142
	7.3.5.5 Shipwrecks	149
	7.4 Military Coastal Defence	150
	7.4.1 C16 to the C19	150
	7.4.2 World War I	153
	7.4.3 World War II	156
	7.4.3.1 Coastal Defence Batteries	156
	7.4.3.2 Anti-aircraft defences	157
	7.4.3.3 Searchlight emplacements	160
	7.4.3.4 Bombing decoys	161
	7.4.3.5 Beach Defence Batteries	161
	7.4.3.6 Anti-glider obstacles	161
	7.4.3.7 Radar Stations	162

166

8.1.1 Soils and landuse	166
8.1.2 Coastal erosion	167
8.2 Terrestrial landscapes	170
8.2.1 Early Prehistory	170
8.2.2 The Mesolithic Period	170
8.2.3 The Neolithic period and the Bronze Age	171
8.2.4 The Iron Age and Romano-British Period	174
8.2.5 The Roman Period	176
8.2.6 The Early Medieval Period	176
8.2.7 The Medieval Period	177
8.2.8 The Industrial Period	181
8.3 Coastal/Maritime Landscapes	182
8.3.1 The Mesolithic Period	182
8.3.2 The Medieval and early Post-Medieval Periods	183
8.3.3 The Industrial Period	185
8.3.3.1 Salt making	185
8.3.3.2 Oyster cultivation	185
8.3.3.3 Harbours and Ports	186
8.3.3.4 Shipbuilding	188
8.3.3.5 Aids to Navigation and Safety at Sea	189
8.3.3.6 Shipwrecks	191
8.4 Military Coastal Defence	192
8.4.1 C19	192
8.4.2 World War II	192
8.4.2.1 Coastal Defence Batteries	193
8.4.2.2 Anti-aircraft defences	193
8.4.2.3 Bombing decoys	193
8.4.2.4 Anti-invasion defences	194
8.4.2.5 Anti-glider obstacles	196
8.4.2.6 Radar Stations	197

9 Low Newton-by-the-Sea to Marshall Meadows Point (Block 4 NMP)		
9.1 Introduction	202	
9.1.1 Soils and landuse	202	
9.1.2 Coastal erosion	203	
9.2 Terrestrial landscapes	205	
9.2.1 Early Prehistory	205	
9.2.2 The Neolithic period and the Bronze Age	205	
9.2.3 The Iron Age and Romano-British Period	208	
9.2.4 The Early Medieval Period	211	
9.2.5 The Medieval Period	213	
9.2.6 The early Post-Medieval Period	221	
9.2.7 The Industrial Period	221	
9.3 Coastal/Maritime Landscapes	223	
9.3.1 The Mesolithic Period	223	
9.3.2 The Iron Age and Romano-British Period	224	
9.3.3 The Industrial Period	225	
9.3.3.1 Lime burning	225	
9.3.3.2 Salt making	227	
9.3.3.3 Fishing and whaling	227	
9.3.3.4 Harbours	229	
9.3.3.5 Shipbuilding	230	
9.3.3.6 Aids to Navigation and Safety at Sea	230	
9.3.3. Shipwrecks	232	
9.4 Military Coastal Defence	233	
9.4.1 C16 to C19	233	
9.4.2 World War II	235	
10 Recommendations for further work an proposed research agenda		
10.1 Introduction	239	
10.2 SMP2	239	
10.3 Designation	239	

	10.4 Research Agenda Themes for informing NERCZA Phase 2	240
	10.4.1 Inter-tidal peats	240
	10.4.2 Deflation and blow-out of sand dunes	241
	10.4.3 Land reclamation	241
	10.4.4 Pre-Industrial shipbuilding	241
	10.4.5 The fishing and whaling industries	242
	10.4.6 The evolution of small harbours and docks	242
	10.4.7 Foreshore survey of all surviving shipwrecks	242
	10.4.8 WWII Anti-invasion features	243
	10.4.9 Recreation	243
	10.5 Site specific issues	243
	10.5.1 Crimdon Dene and Blackhall flint scatters	243
	10.5.2 Overdene Wyke enclosures	243
	10.5.3 Greatham Creek	243
	10.5.4 Hummersea alum works	244
	10.5.5 Trow Point Bronze Age barrow	244
	10.5.6 Alnmouth salterns	244
	10.5.7 Alnmouth oyster beds	244
	10.5.8 Amble hulks	244
	10.5.9 Fenham multivallate fort	244
	10.5.10 Scremerston multivallate fort	245
References		246
Appendix		262

List of figures

- 2.1 OS quarter sheet map showing the 1km squares mapped
- 3.1 Sea-level change and deglaciation
- 3.2 Solid geology of the North East coast with main locations discussed in text marked
- 3.3 Location of SLI points from raised peat deposits within SMP Cell 1a
- 3.4 Sea level index points for Northumberland (north) sites as calibrated age (yr BP) against change in sea-level relative to present
- 3.5 Sea level index points for Northumberland (central) sites as calibrated age (yr BP) against change in sea-level relative to present
- 3.6 Sea level index points for Northumberland (south) sites as calibrated age (yr BP) against change in sea-level relative to present
- 3.7 Location of SLI points from raised peat deposits within SMP Cell 1b
- 3.8 Sea level index points for Tees sites as calibrated age (yr BP) against change in sea-level relative to present
- 3.9 Diagrammatic representation of the fluctuations in RSL at Hartlepool Bay during the mid Holocene
- 3.10 Late Holocene relative land-/ sea-level changes (mm yr⁻¹) in Great Britain
- 3.11 Palaeogeographical reconstructions of North West Europe
- 6.1 The putative Lower Palaeolithic biface from Limekiln Gill, County Durham
- 6.2 The putative Lower Palaeolithic biface from South Gare Breakwater, Teesmouth
- 6.3 Kettleness alum works
- 6.4 Kettleness station
- 6.5 Skinningrove Harbour
- 6.6 The lifeboat house at Staithes

- 6.7 Wreck of an C18 colliery brig at Seaton Carew
- 6.8 The coastguard station at Whitby 16th December 1914
- 6.9 Ridge-and-furrow and pre-medieval sites in Block 1a
- 6.10 Pre-Medieval sites in Block 1 recorded from aerial photographs
- 6.11 Medieval and post-Medieval sites in Block 1 recorded from aerial photographs
- 6.12 Ridge-and-furrow in Block 1 recorded from aerial photographs
- 6.13 Teesmouth Defended Port in WWII recorded from aerial photographs
- 6.14 Pillboxes and anti-tank obstacles in Block 1 record from aerial photographs
- 7.1 Rock armour at the base of cliffs north of Seaham
- 7.2 Eroding colliery waste at Hawthorn Hive, County Durham
- 7.3 St Peter's Church, Monkwearmouth
- 7.4 The Whitburn barbed point, ventral view
- 7.5 The reconstructed gate at South Shields Roman Fort
- 7.6 Seaham Harbour, County Durham
- 7.7 Thomas Meik's 1849 illustration of North Dock, Sunderland
- 7.8 Seaton Sluice harbour
- 7.9 The rock-cut, artificial harbour at Seaton Sluice
- 7.10 The South Pier Lighthouse, Sunderland re-sited at Roker
- 7.11 The Lighthouse at Souter Point
- 7.12 The South Groyne Lighthouse, Tynemouth with the North Pier and Lighthouse in the distance
- 7.13 St Mary's Island and Lighthouse
- 7.14 The 'New' High and Low Lights at North Shields
- 7.15 The East Lawe Beacon, South Shields

- 7.16 The Seaton Sluice Brigade mustering with their rocket apparatus
- 7.17 The Seaton Sluice Volunteer Life Brigade Watch House
- 7.18 The water tower at Robert's Battery
- 7.19 Coulson Battery, Blyth; the southern gun emplacement
- 7.20 Coulson Battery, Blyth; WWI and WWI command posts
- 7.21a Lizard Farm Heavy Anti-Aircraft Battery
- 7.21b Transcription of Lizard Farm aerial photograph
- 7.22 Pre-Medieval sites in Block 3 recorded from aerial photographs
- 7.23 Medieval and post-Medieval sites in Block 3 recorded from aerial photographs
- 7.24 Ridge-and-furrow in Block 3 recorded from aerial photographs
- 7.25 Wearmouth Defended Port in WWII recorded from aerial photographs
- 7.26 Tynemouth Defended Port in WWII recorded from aerial photographs
- 7.27 Pillboxes and anti-tank obstacles in Block 3 recorded from aerial photographs
- 8.1 The site of St Waleric's Church, Alnmouth
- 8.2 Peat and fallen tree trunk overlying boulder clay at Low Hauxley
- 8.3 Bronze Age cist at Howick Burn
- 8.4 Cresswell Tower
- 8.5 Low Chibburn C14 Preceptory
- 8.6 Fragment of the Amble monastic grange
- 8.7 St Bartholomew's Church, Newbiggin
- 8.8 Site of the Mesolithic hut at Howick Burn
- 8.9 Oyster beds at Alnmouth
- 8.10 A vessel 'taking the ground' in Alnmouth Harbour

- 8.11 The memorial plaque at Craster Harbour
- 8.12 Craster Harbour
- 8.13 Coquet Island Lighthouse
- 8.14 The High Light at Blyth
- 8.15 Boulmer Volunteer Rescue Service building
- 8.16 Wooden hulks on the north shore at Amble Harbour
- 8.17 APTE record of the Long Houghton decoy airfield
- 8.18 Pillbox S0007011 Druridge Bay Defence Area
- 8.19 Anti-tank blocks in the Druridge Bay Defence Area
- 8.20 Pre-Medieval sites in Block 2 recorded from aerial photographs
- 8.21 Medieval and post-Medieval sites in Block 2 recorded from aerial photographs
- 8.22 Ridge-and-furrow in Block 2 recorded from aerial photographs
- 8.23 Druridge Bay Defence Area recorded from aerial photographs
- 8.24 Pillboxes and anti-tank obstacles in Block 2 recorded from aerial photographs
- 9.1 The partially eroded C18 Limekilns at Beadnell Harbour
- 9.2 Putative Late Bronze Age enclosure at North Sunderland recorded from aerial photographs
- 9.3 Multivallate Fort at NU105374 recorded from aerial photographs
- 9.4 Bamburgh Castle from the east
- 9.5 Lindisfarne Priory seen from The Heugh
- 9.6 The White Wall, Berwick-upon-Tweed
- 9.7 St Cuthbert's Isle
- 9.8 The C16 Cumberland Bastion and C17 earthworks, Berwick-upon-Tweed
- 9.9 Beadnell Limekilns

- 9.10 Castle Lime Works, Holy Island
- 9.11 Pier Maltings, Berwick-upon-Tweed
- 9.12 Keel boat sections at Holy Island Harbour
- 9.13 The Guile Point obelisks, Holy Island Harbour
- 9.14 Lindisfarne Castle
- 9.15 The Fort on the Heugh, Holy Island
- 9.16 WWII anti-tank obstacles at the Beal end of the Holy Island causeway
- 9.17 Searchlight Battery at Shoreston Hall, Seahouses
- 9.18 Pre-Medieval sites in Block 4 recorded from aerial photographs
- 9.19 Medieval and post-Medieval sites in Block 4 recorded from aerial photographs
- 9.20 Ridge-and-furrow in Block 4 recorded from aerial photographs
- 9.21 Pillboxes and anti-tank obstacles in Block 4 recorded from aerial photographs

List of tables

- 2.1 NERCZA GIS data layers
- 3.1 SMP Cells for the NERCZA study area
- 3.2 Summary of SLI points and limiting data from Northumberland
- 3.3 Summary of SLI points and limiting data from the Tees.
- 6.1 Soil and landuse in Block 1
- 6.2 Rates of coastal erosion in Block 1 recorded in the SMP
- 6.3 SMP proposed responses to predicted coastal change in Block 1
- 6.4 Mesolithic flint scatter sites identified in Block 1
- 6.5 Neolithic sites in Block 1
- 6.6 Flint scatter sites in Block 1
- 6.7 Round barrows and ring ditches in Block 1
- 6.8 Putative Neolithic or Bronze Age sites in Block 1
- .6.9 Iron Age and Roman-British enclosures in Block 1
- 6.10 Bee-hive querns from Block 1 6.11 Early Medieval sites in Block 1
- 6.11 Early Medieval sites in Block 1
- 6.12 Sites of the North Yorkshire alum industry in Block 1
- 6.13 Ironstone mines in Block 1
- 6.14 C19 iron working sites at Middlesborough, Redcar and Hartlepool
- 6.15 C19 Chemical works at Teesside
- 6.16 Pre-Roman coastal/maritime sites in Block 1

- 6.17 Roman coastal/maritime sites in Block 1
- 6.18 C17 gun batteries at Hartlepool Headland
- 6.19 C19 Saltworks on Teesside
- 6.20 'Docks' associated with the North Yorkshire alum and ironstone industries
- 6.21 Timber staithes associated with the alum and ironstone industries in Block 1
- 6.22 Small harbours in Block 1
- 6.23 Shipwrecks recorded above LAT in Block 1
- 6.24 Remains of shipwrecks recorded above LAT in Block 1
- 6.25 C18 and C19 gun batteries in Block 1
- 6.26 WWII coastal defence batteries in Block 1
- 6.27 Searchlight batteries in Block 1
- 6.28 WWII beach defence batteries in Block 1
- 6.29 Pill boxes in Block 1 identified on aerial photographs
- 6.30 Anti-tank obstacles in Block 1 identified on aerial photographs
- 6.32 Barrage balloon moorings in Block 1 identified on aerial photographs
- 6.33 Air raid shelters in Block 1 identified on aerial photographs
- 7.1 Soil and landuse in Block 3
- 7.2 Rates of coastal erosion in Block 3 recorded in the SMP
- 7.3a SMP2 proposed responses to predicted coastal change in Block 3 south of the Tyne
- 7.3b SMP1 proposed responses to predicted coastal change in Block 3 north of the Tyne
- 7.4 Mesolithic flint scatter sites in Block 3.
- 7.5 Bronze Age sites in Block 3.
- 7.6 Iron Age and Roman-British farmstead enclosures in Block 3

- 7.7 Collieries in Block 3
- 7.8 HER records of pits at Old Hartley Colliery
- 7.9 Shipyards in Block 3 recorded in the Tyne and Wear HER
- 7.10 Shipwrecks between MHWS and LAT in Block 3 recorded County Durham
- 7.11 Shipwrecks between MHWS and LAT in Block 3 recorded in Tyne and Wear
- 7.12 C18 gun batteries at Sunderland
- 7.13 WWII Searchlight batteries recorded in the Tyne and Wear in Block 3
- 7.14 Anti-glider obstacles in Block 3
- 7.15 Pill boxes in Block 3 identified on aerial photographs
- 7.16 Anti-tank obstacles in Block 3 identified on aerial photographs
- 7.17 Minefields in Block 3 identified on aerial photographs
- 7.18 Barrage balloon moorings in Block 3 identified on aerial photographs
- 7.19 Air raid shelters in Block 3 identified on aerial photographs
- 8.1 Soil and landuse in Block 2
- 8.2 SMP1 proposed responses to predicted coastal change in Block 2
- 8.3 Archaeological potential and risk from erosion in Block 2
- 8.4 Flint scatter sites identified in Block 2
- 8.5 Bronze Age sites identified in Block 2
- 8.6 Iron Age/Romano-British sites identified in Block 2
- 8.7 Deserted Medieval Villages identified in Block 2
- 8.8 Shipwrecks between MHWS and LAT in Block 2
- 8.9 Pillboxes recorded in the Druridge Bay Defence Area
- 8.10 Beach defence batteries recorded in the Druridge Bay Defence Area

- 8.11 Anti-glider obstacles in Block 2
- 8.12 Pillboxes identified from aerial photographs
- 8.13 Anti-tank blocks identified from aerial photographs
- 8.14 Minefields identified from aerial photographs
- 8.15 Barrage Balloon Sites identified from aerial photographs
- 8.16 Air-raid shelters identified from aerial photographs
- 9.1 Soil and landuse in Block 4
- 9.2 SMP1 proposed responses to predicted coastal change in Block 2
- 9.3 Archaeological potential and risk from erosion in Block 4
- 9.4 Bronze Age sites identified in Block 4
- 9.5 Iron Age and Romano-British sites identified in Block 4
- 9.6 Deserted Medieval Villages in Block 4
- 9.7 Flint scatter sites at Budle Bay
- 9.8 Shipwrecks between MHWS and LAT in Block 4
- 9.9 Pillboxes recorded from aerial photographs
- 9.10 Anti-tank blocks recorded from aerial photographs

Executive Summary

Between March 2007 and December 2008 Archaeological Research Services Ltd carried out, on behalf of English Heritage, a desk based rapid coastal zone assessment of the threat posed to heritage assets in the North East by rising sea level and consequential coastal erosion. The North East Rapid Coastal Zone Assessment, or NERCZA, is one of a series of projects initiated by English Heritage around the coasts of England. The brief specifically required that the assessment be undertaken with reference to Defra's Shoreline Management Plans (SMPs). The area assessed, which extends from Whitby in North Yorkshire to the border with Scotland north of Berwick-upon-Tweed falls within SMP Cell 1. The first phase of the SMPs was completed in the 1990s (SMP1) and a second phase study (SMP2) is currently underway, the SMP2 for the coast south of the Tyne having been completed by the time the NERCZA began, while work to the north is underway at the time of writing. This has led to the assessment of the threat in the two areas being undertaken in relation to slightly different criteria. However, both the SMP1 and SMP2 documents make essentially similar policy recommendations which in most cases amount to either Hold the Line or No Active Intervention. The former case involves various mitigation strategies such as the construction of sea defences while in the latter nature is allowed to take its course. Heritage assets may be considered to be under threat from both the above mitigation strategies and from coastal erosion where no action is to be taken.

The NERCZA study area consists of approximately 200km of coastline between the Lowest Astronomical Tide (LAT) and 1km inland from Mean High Water Springs (MHWS), and includes Coquet Island and the Farne Islands which lie offshore and Holy Island, joined to the mainland at low tide by a causeway. The review of the heritage assets has been based on a consideration of two data sets. The first consists of the Historic Environment Records (HERs) maintained by or for the Local Authorities with curatorial responsibilities for this section of the coast, namely North Yorkshire County Council, the North York Moors National Park Authority, Tees Archaeology (for Redcar and Cleveland, Middlesbrough, Stockton-on-Tees and Hartlepool), Durham County Council, Tyne and Wear Specialist Conservation Team (for South Tyneside and North Tyneside) and Northumberland County Council. The second data set consists of the aerial photograph coverage of the study area from which all archaeological features visible have been mapped to the standards of English Heritage's National Mapping Programme. Within the context of the NERCZA, this has been referred to as the Aerial Photograph Transcription Exercise (APTE). The aerial photograph coverage for 400km² has been examined and 968 new records have been added to the HERs while 270 exiting records have been enhanced. These two main data sets have been supplemented by reference to the National Monuments Record.

In assessing the threat to heritage assets posed by sea level rise, major sites and groups of sites are discussed individually and the threats they face evaluated. Categories of more numerous types of site are also discussed but the issue of threat is dealt with in a series of tables in which the SMP policy unit is noted, the importance of individual sites and the degree of threat are rated as high, medium or low. Nearly 75% of the sites recorded in the APTE date from the Second World War and consist of numerous categories of site such as pillboxes or anti-tank obstacles or ephemeral features such as minefields. These sites are listed in tables and the relevant SMP policy unit noted. Many are no longer extant.

The NERCZA study has established that many heritage assets in the coastal zone are under threat from rising sea level and/or the mitigation strategies proposed. The threat is particularly acute in the case of those sites currently situated between LAT and within 200m inland of MHWS. Many of these sites specifically relate to what has been defined in this document as the Coastal/Maritime Landscape such as port and harbour facilities, aids to navigation, shipwrecks and the military defence of the coast but also includes features of the Terrestrial Landscape which happen to be close to the coast such as the North Yorkshire alum works, two multivallate forts in Northumberland, Bronze Age

burials at Low Hauxley and Trow Point and early prehistoric flint scatter sites in County Durham. It is also the case that important inter-tidal peat deposits and old ground surfaces below coastal dunes are particularly vulnerable such as those at Creswell and Druridge Bay.

In carrying out the assessment it has been noted that a number of categories of asset are as yet poorly understood making an evaluation of the threat difficult. Examples include the archaeology of pre-industrial shipbuilding, the development of small harbours, the fishing and whaling industries, early land reclamation and the recreational use of the 'sea side'. It has also been noted that while on a national level over 3% of sites recorded in HERs have a measure of statutory protection this falls below 2% in the coastal zone, a discrepancy that needs to be addressed. A separate project design has been prepared for a Phase 2 of the NERCZA which includes the fieldwork priorities.