



Northumberland and North Tyneside Coastal Monitoring Programme

Defence Inspection Overview 2008

September 2008
Inspection Report
9S0776

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1 INTRODUCTION

1.1 Background

The first generation St Abb's Head to River Tyne Shoreline Management Plan (SMP1) was completed in 1998. The Northumbrian Coastal Authorities Group (NCAG) was keen to build upon the findings of the plan in their future management of the coast. The SMP1 proposed a scheme of future monitoring with the following aims:

- the monitoring must focus on critical areas of concern or uncertainty;
- the monitoring must be coherent, both in its need to provide comparable and compatible data sets covering the whole coast and in its need to examine both the forces acting on the coast and its response;
- the monitoring should be sustainable in terms of the long term commitment needed and the availability of resources necessary to achieve the full benefits of monitoring.

A monitoring programme was established in early 2002 by NCAG, with Royal Haskoning commissioned to manage the programme and report the findings since its inception.

The monitoring programme comprises biannual profile surveys of various sections of the coastline between Berwick-Upon-Tweed and North Tyneside. Further to this surveying a visual inspection of the coastline is undertaken every two years. A database containing details of each coastal defence has been developed and maintained by Royal Haskoning. This includes photographs, assessment of the condition of the assets, and recommended actions. As well as being updated every 2 years by Royal Haskoning following the inspections, it can also be updated throughout the year by the Councils with information such as maintenance works undertaken, any extreme weather events, and the damage caused. In 2007, the (then current) 2006 inspection details were transferred to the Environment Agency's National Flood and Coastal Defence Database.

1.2 This Report

This report provides an overview of the defence inspections undertaken in 2008. It is accompanied by a CD copy of the updated NCAG database in MS Access format.

Following this introduction section, the report provides an outline of each of the Coastal Authority areas in turn, noting:

- the extent of the coastline;
- a description of the coastline;
- an overview of the findings of the visual inspections of the natural features and coastal defences along the coastline;
- all existing studies relevant to the area;
- any recent weather events affecting the area;
- concerns relating to the coastline and its defences;
- any recommended actions.

1.3 The Need for Monitoring

There is a general recognition, both nationally and by the Northumbrian Coastal Authorities Group, that there is a need for monitoring to ensure effective management of the shoreline and its defences. The monitoring is intended to:

- reduce the level of uncertainty, improve understanding and refine the processes of data interpretation upon which decisions are made;
- test assumptions upon which the SMP policies are based and, in the case of strategies and specific schemes, allow proper assessment of their need, scope and ultimate performance;
- allow improved and informed management of coastal defences and the shoreline, including the need for new works to be properly identified and programmed;
- provide baseline and threshold information of possible beach management schemes;
- provide an alert of fundamental change or specific local threat, in the confidence that such change or threat is real and not just transitory.

1.4 The Monitoring Programme

The monitoring programme devised for the Northumbrian Coastal Authorities Group comprises 6 elements:

- annual beach profile surveys of all 96 profiles (the 'full-measures survey');
- 6 monthly beach profile surveys of 39 profiles (the 'part-measures survey');
- annual report on monitoring results;
- two yearly coastal inspection;
- inputting findings of inspection into database;
- two yearly overview report of inspections;
- local monitoring, such as Holy Island causeway, Alnmouth, and cliff lines.

1.5 Division of the Coast

The Northumbrian coastline is divided, at the highest level, into the administration areas of the six operating authorities in the Northumbrian Coastal Authorities Group. Whilst five of these administrative boundaries are set to merge in April 2008 through the creation of a unitary authority for Northumberland, they still form a useful basis for sub-division of this report.

The visual inspection identified 346 defence lengths along the Northumbrian and North Tyneside coasts. These are shown on the maps in Appendix A, described and assessed in detail in the MS Access database, and areas of particular interest are discussed in Sections 2 to 7 of this report.

1.6 How the Monitoring Has Fed into SMP2

In carrying out the coastal inspections, information has fed directly into the process of developing the Northumberland Shoreline Management Plan 2 (SMP2). To this end, the walkover inspections have also provided an opportunity to identify potential SMP2 issues such as coastal squeeze and potential longer term threats to property.

2 BERWICK UPON TWEED

2.1 Extent of the Authority Coastline

Berwick upon Tweed Borough Council is responsible for the 73km stretch of coast from Marshall Meadows Point to Brunton Burn in the centre of Beadnell Bay.

2.2 Description

The Berwick coastline contains a variety of shore types, from high cliffs to wide sandy bays backed by dune systems. To the north, the coast follows a fairly straight overall alignment, with the cliff line indented by several small bays. The River Tweed flows into the North Sea at the town of Berwick, creating an intricate estuary mouth. To the south of this the coast once more follows a fairly straight alignment towards Holy Island with wide sands and flats landward of the island. The land here is generally lower than that in the north. In the lee of Holy Island the mainland coast changes alignment. From Holy Island, through Seahouses, and on towards Beadnell, the coast becomes more rocky, and its alignment is irregular. At the southern end of the borough, Beadnell Harbour sits in the northern corner of Beadnell Bay.

2.3 Overview of Inspection and Surveys

2.3.1 East Hope North

This stretch of coast is characterised by glacial till cliffs, some of which have rock bases.

The cliff is generally stable in the Marshall Meadows area, however there is localised erosion of the vegetated slope particularly in the Marshall Meadows Bay. In particular it is noted that failure of the cliff tends to be as slabs, with accumulation of material at the toe. The risk is therefore principally in terms of sudden failure due to weathering, rather than one of direct coastal erosion. There is currently no obvious risk to the farm, caravan park, agricultural or railway; this based on typical cliff retreat rates determined through the SMP2.



There is erosion at the toe of the cliff throughout the Needles Eye frontage and localised erosion of the soft vegetated slope on top of the rocky cliff. An outfall from the industrial estate to the north of Berwick-upon-Tweed

has been constructed in this unit. The current inspection noted no significant change, with continuing slow erosion and slips. The SMP2 highlights future possible failure due to the caving of the under-cliff. This is not anticipated to create any immediate threat to assets.

There was noted to be erosion at the toe of the cliffs at East Hope Bay in addition to localised failures of the vegetated slope above the rocky cliff during the 2006 inspection. This has not significantly worsened.

2.3.2 Berwick North

Erosion at the toe of the cliffs between Brotherston's Bay and Green's Haven, in addition to localised failures of the vegetated slope above the rocky cliff, was noted in 2006. This slow process continues but with no major slips. The undermining and general condition of the breakwater below Magdalene Fields Holiday Camp continues to deteriorate. In terms of undermining, this is not assessed as severe and is not significantly affecting the structure at present. The worsening of the condition at the crest does require attention.



The wooden steps to providing access from the cliff crest are worn and potentially dangerous.

There was some indication that beach levels had improved along the general frontage and no significant deterioration was noted to structures.

No additional erosion was noted to the toe of the cliffs in Colly Skerr, although the coastal slope is still oversteep and likely to slump.



The North Tweed Breakwater is generally in moderate condition as identified in the recent Babbie study. At the head there has been actual loss of masonry with movement in other areas. Urgent action is considered necessary here to prevent more major damage over this next year. Repairs are still required to the southern face of the breakwater, particularly in the area where a previous encasement is being damaged by outflanking.

The defences along the northern bank of the River Tweed require minor maintenance repairs and the concrete slope at the western end of the wall needs replacement. These defences provide protection to the roads, buildings and car park on the estuary shore. Of particular local concern is the slipway along pier road. Here the edge stone has fallen away and the cobbles set forming the slipway are in danger of being lost. Of potentially longer term concern is the corner between the new sheet piled quay along Quay Walls and the older masonry quay. Here there is evidence of movement of the stone suggesting internal failure within the short section.



2.3.3 Berwick South

The inspection this year extend further upstream of the bridge. There was local damage to the river wall down-stream of the rail bridge. This requires repair to maintain the overall integrity of the structure. The defence along the southern bank of the River Tweed mainly consist of rock gabions and masonry walls. The rock gabions were repaired prior to the 2006 inspection. There are still several areas, however, where further repairs are required. This needs to be considered in conjunction with future land use of the area and potentially an alternative softer approach to defence may be more sensible; potentially relaxing the slope of the front face and using the stone from the gabions as a semi natural backshore.



The survey data has shown continued variation in erosion and accretion along the river frontage behind Spital. This is reflected in the observed erosion of the dune line behind the point and the increased nose of sand at the head of the point. There is good evidence linking this behaviour to change in position of the channel between Sandstell Point and the North Breakwater. This influence and variation would also appear to extend over the northern half of the Spital open coast frontage.



At present the erosion to the rear of Spital does not significantly increase flood risk to the area. However, management of this in the future needs to be considered in relation to management needs over the whole section of the coast.

Man-made defences along the front face of the Spital frontage comprise a rock revetment at the northern end and heavy concrete sea walls over the main frontage. The inspection this year shows substantial loss of beach in front of the revetment. This is not resulting in any damage at present but does expose the steep rock toe. The beach levels generally over the northern half of the concrete sea wall have also fallen considerably since 2006. This to a degree has been matched by accretion of the beach to the southern end.

In 2006 it was noted that there was a considerable amount of river debris along the coast and the shoreline had been subject to several severe storms. The change in beach levels highlights the potential vulnerability of sections of defence to quite specific storm directions. There are no major concerns for the defences over this section but at the north the long term defence management does need to be examined in relation to the management as a whole of the Spital/Sandstell Point area.

The coast to the south of Spital shows little specific change, although there are areas of local slow erosion.

The natural dunes of the Cheswick or Goswick Sands show little change from 2006. As then there are areas of continuing local erosion but the overall impression is that the beach levels have built to the toe of the dunes.

It is reiterated from previous reports that the wide sandy beaches of the Goswick Sands frontage will be particularly susceptible to the impacts of future sea level rise as a relatively small change in water level will effectively retreat the Mean Low Water Mark some 500m landward, reducing the beach width significantly. This area is therefore important in the broader understanding of future coastal behaviour, providing a strong indicator of change and response.

Inspection of the sluice at South Low showed little deterioration although some minor damage was noted to the adjacent wing wall revetment.

There are currently no issues of immediate or major concern on Holy Island. The minor issues noted included high exposure of the main road just before it rounds a bend and approaches the tourist car park. This is caused by a lack of fronting marsh to dissipate incoming energy before it impacts on the road edge. Some asphalt repairs have been made but the exposure continues.



Also, one wall on the south side of the island and the inner quay could usefully have some new mortar between masonry blocks and some new blocks inserted in places, and there is minor abrasion at the toe of the slipway and access steps at the quay. There appears also to have been ordnance exposed at two foreshore locations.

The inter-tidal area adjacent to the Holy Island causeway has been topographically surveyed annually since October 2004 following completion of upgrade works to the causeway. The surveys have indicated some movement of the primary and secondary channels but no significant changes or trends so far.

The undefended coastline in the lee of Holy Island (Holy Island Sands) and southwards towards Budle Bay and Bamburgh remains stable. The agricultural land on the northern and western shores of Budle Bay is defended by numerous minor rock/masonry /concrete revetment structures of varying design and form. As noted previously these structures are generally in a state of disrepair with issues of undermining, outflanking, subsidence and localised minor erosion evident. However, there was no significant deterioration between 2006 and 2008.

2.3.4 Budle Bay to North Sunderland

At Warren Mill there was no significant deterioration of structures. The blow out to the dunes noted in previous year's reports now has a substantial fore-dune growth closing the entrance to the blow out. There has been a general increase in volume of sand over Harness Rocks headland and this tends to extend down past Bamburgh. Much of the erosion to the toe of the dunes is now reversed with some areas of new fore-dune growth. This reflects a capacity for the frontage to respond to storms and the availability of sand over the foreshore to repair periods of damage.



2.3.5 North Sunderland

At North Sunderland harbour, the car park and road to the north of the harbour is protected by breeze block walls with concrete toe. These structures show little change although the central masonry wall does require repointing. The erosion of the cliff to the north still persists but at an apparently slow rate

The harbour itself consists of four main structures: the north pier, middle pier, old pier and the east breakwater. All of the structures are showing signs of wear.

The wall in front of the Lifeboat Station is still generally in good condition however the crack in the crest wall may have opened slightly. Minor repairs to this are recommended at present.

Works have now been undertaken to the wall at the root of the main breakwater. This is to be further supported by construction of a rock mound to the foreshore.

There are reports of some undermining towards the head of the main breakwater. This could not be confirmed due to water levels and this will be inspected separately. Otherwise the breakwater remains in reasonable condition. The only point noted within the harbour was that stones are missing beneath the timber coping to the inner breakwater. This would not appear to be significant risk at present but will need to be addressed to stop further deterioration.



Repairs to the wall below the work sheds on Harbour Road are to be included within the scheme to reinstate the south breakwater and repair the northern breakwater. The aim of this scheme is to maintain the protection afforded by these structures to the whole harbour and Crewe Street frontages. These works were on-going during the period of the inspection.

2.3.6 Beadnell

Annstead Links, to the north of Beadnell, is a wide sandy bay backed by a dune system. This then gives way to the Beadnell frontage which comprises a series of rock headlands and bays. The bays are generally backed by defences ranging from masonry and concrete walls to gabion and Reno mattress revetments.

While not rebuilding to quite the same extent as the area around Bamburgh, the erosion at St Annstead observed in 2006 does not appear to have persisted. There has been some apparent return of sand to the toe of the dune. In much the same way the erosion of the Beadnell Links frontage is not strongly evident and beach levels seem to have rebuilt.

Within the first of the two main bays in front of Harbour Road, there is little evidence of significant change between 2006 and 2008. There is further staining of the slab wall in front of the private house to the northern side of the bay. Over the centre of the bay, while the old masonry wall does not appear to have deteriorated significantly, there is still serious overtopping.

Within the second southerly bay, the shingle beach levels have varied with material apparently moving over the bay. The Reno mattress has suffered further damage, although it is still functioning as a defence.

The rocky cliffs around Beadnell Haven and Red Brae are generally stable however there is evidence of erosion to the vegetated slope above the rocks.



To the north of the harbour, there has been slightly greater erosion than noted in 2006. This is unusual in that it is one of very few areas of the Berwick coast that appears to have suffered more significantly. In particular in this area, just north of the harbour the small masonry wall protecting the back of the Lime Kiln has suffered undermining. This requires repair so as to prevent a more severe problem developing.



The main harbour structures all appear in good condition with no signs of movement since their repair in 2001. The repair to these structures aimed to provide additional protection to the northern end of Beadnell Bay. This allows this bay to be managed in a more natural way, while still providing adequate flood protection to the housing behind.

There was some evidence of local erosion along the bay frontage close to the beach access and car park. This may be partly related to use of the access and the inability to develop fore-dune.

Beadnell Bay is approximately 3.8km long and is bisected by the local authority boundary around the middle, thus the northern half is the responsibility of Berwick-upon-

Section 3). The bay remains relatively stable, although the large blow outs to the front face of the main dunes continue to suggest slight erosion.

2.4 Studies

Table 2.1: Key Studies recently undertaken in Berwick

Date	Name	Organisation
1999	Beadnell Harbour Strategy	Posford Haskoning
1999	Spittal Strategy (Babtie Group 1999)	Babtie Group
2002	Seahouses Coastal Protection	Posford Haskoning
2002	Magdeline Fields – Geotechnical Study of Slips	Posford Haskoning
2007	Seahouses Project Appraisal	Royal Haskoning
2008	Berwick Breakwater Inspection	Babtie Group

2.5 Events

Table 2.2: Key Events

Date	Event	Location
2002	None identified	
2004	None identified	
2006	2 weeks easterly storms in March	
2008	None identified	

2.6 Summary of Concerns

Table 2.4: Areas of Concern

Location	Concern	Measures Taken
Berwick	General slope instability (Magdeline Fields)	Geotechnical study (2002)
River Tweed	Damage to head of Breakwater	Request CP funding as urgent works
River Tweed	Movement of masonry along Quay Walls	
River Tweed	Poor condition of river walls down stream of railway bridge	
River Tweed	Further deterioration of gabion revetment	Review defence approach
Spital	Long term re-development at Spital influencing coast protection need	Highlighted in SMP
North Sunderland	Condition of breakwater and other existing defences (Harbour Area)	Scheme underway at time of inspection
Beadnell	Erosion of coastal slope fronting properties (17c/27/4)	No significant deterioration
Beadnell	Longevity of existing defences around Nacker Hole	Continued deterioration and overtopping.
Beadnell	Reno Mattress in Lady's Hole deteriorating	Future review of defence

For further detail regarding these concerns refer to the North East Monitoring database.

2.7 Summary of Actions

In the defence inspection database, a number of actions have been identified as being required along the various elements of the Berwick-upon-Tweed coastline. These comprise both immediate work to defences, and recommended longer term examination and possible repairs. The actions, drawn from the database, are outlined in the following table and have been assessed in terms of priority.

Actions – Berwick

Defence			Location	Priority	Date	Action Required
07b	1	1	Berwick North	High	07-Jul-2008	Repair steps up to the breakwater
07b	1	2	Berwick North	High	07-Jul-2008	Repair to crest
07c	5	2	Berwick North	Urgent	07-Jul-2008	Repairs to head of breakwater
07c	5	3	Berwick North	Low	07-Jul-2008	Repoint joints in masonry parapet wall
8a	5	3	Berwick River North	High	07-Jul-2008	Investigate movement of masonry
8a	5	7	Berwick River North	High	07-Jul-2008	Local repair to slipway
9a	5	4	Berwick River South	High	07-Jul-2008	Further localised repairs to the toe gabions
09b	5	5	Berwick River South	Medium	07-Jul-2008	Localised repairs to walls
09b	5	7	Berwick River South	Medium	07-Jul-2008	Local rebuilding of toe
09c	6	1	Berwick River South	Low	07-Jul-2008	Extend the rock revetment to protect the concrete wall. Growth of dunes in front of defence.
10b	9	3	Berwick South	Low	07-Jul-2008	Investigate the exposed reinforcement and check concrete cover
14c	16	6	Budle Bay	Low	07-Jul-2008	Repair revetment
14c	16	8	Budle Bay	Low	07-Jul-2008	Repair revetment
14c	16	10	Budle Bay	Low	07-Jul-2008	Re-bind revetment
14c	16	12	Budle Bay	Low	07-Jul-2008	Re-bind revetment
14c	16	14	Budle Bay	Low	07-Jul-2008	Replace toe rocks near sluice
15	16	20	Waren Mill	Medium	07-Jul-2008	Reinstate block wall
15	17	1	Waren Mill	Medium	07-Jul-2008	Construct drainage channels perpendicular to structure
15	17	2	Waren Mill	Low	07-Jul-2008	Manage potential loss of tall trees from edge of river bank.
15	17	3	Waren Mill	Low	07-Jul-2008	Investigate dune blow out/ drainage issues
17a	18	2	North Sunderland	Medium	10-Jul-2008	Repoint wall
17a	20	1	North Sunderland	Medium	10-Jul-2008	Monitor crack near the top of the wall
17a	21	4	North Sunderland	Medium/Low	10-Jul-2008	Repair coping
17a	27	1	North Sunderland	Urgent	10-Jul-2008	Repair cracks and rebuild breakwater
17b	27	4	Beadnell	High	10-Jul-2008	Dune management required particularly in front of the properties
17c	31	2	Beadnell	Medium	10-Jul-2008	Construct more formal defence to replace tipped material
17c	31	3	Beadnell	High	10-Jul-2008	Re-point masonry wall
17c	32	1	Beadnell	Medium	10-Jul-2008	Localised repairs to the concrete toe and apron
17c	33	1	Beadnell	High	10-Jul-2008	Re-point wall and localised underpinning
17c	35	2	Beadnell	Medium	10-Jul-2008	Watching brief on condition of gabions - replacement likely
17c	36	1	Beadnell	Low	10-Jul-2008	Watching brief on condition of gabions - replacement likely
17c	38	1	Beadnell	Medium	10-Jul-2008	Repair undermining

3 ALNWICK

3.1 Extent of the Authority Coastline

Alnwick District Council (ADC) is responsible for 29km of the coast, from Brunton Burn in the middle of Beadnell Bay to Hadston Carrs in the north of Druridge Bay

3.2 Description

The northern boundary of the Alnwick frontage is midway along Beadnell Bay. The wide sandy bay sweeps into a series of rocky outcrops to the south. These form cliffs, which are indented to form an irregular coastline with a number of bays and havens. This whole stretch of coastline is convex overall, forming an expansive headland to the long sweeping bay between Alnmouth and Amble. Amble itself sits on a rock outcrop that forms the southern headland of the bay, and the southern boundary of the Alnwick frontage.

3.3 Overview of Inspection and Surveys

3.3.1 Beadnell

Beadnell Bay remains generally stable and the dunes to the rear are in good condition.



There appears to be relatively limited pedestrian damage to the dunes considering the high usage of the beach. Again, the use of fencing appears to be working well in limiting pedestrian movement through the dunes. There is evidence however of localised minor erosion and loss of vegetation at the toe of the dunes. While not fully repairing itself from the observed erosion in 2004 and 2006, the 2008 inspections show no greater erosion of the main dunes.

The dunes to the south of the main bay, at Football Hole, remain quite stable however there is still localised erosion at information access points.

3.3.2 Embleton

The defence at Low Newton remains in reasonable condition and growth of fore dune in front of the wall was observed during the inspection.

The cliffing along much of the frontage between Low Newton and Embleton highlighted in 2006 has been smoothed out, although there is no significant forward growth of dunes. In the area of the stream at Embleton it was noted that the stream had to cut deeply through a backshore accumulation of sand. Such an accumulation was not so prominent in 2008. The overall impression is that due to the storm conditions in 2006, there was a general movement of sediment in towards the centre of the Embleton dunes. Much of this sand was obtained from the adjacent dunes frontages. Since that time there has possibly been a redistribution of sand feeding back to the general foreshore over the whole bay.

This tends to confirm the general appreciation that Embleton is a relatively closed sediment system, with a generally good sediment supply.

The tank trap blocks were visible at the base of the dune at the headland to the south of Low Newton.



3.3.3 Craster

There has been some erosion just north of Craster Harbour, but this is not threatening the access to properties.

There has been little obvious deterioration to the structures with the harbour, they appear to be structurally sound at this time. Further repairs to the structures will be required in the future.

There is no sign of recent erosion to the earth bank protecting some of the harbour at the time of the inspection.

To the south of Craster there are no man-made defences, with the coastal edge comprising natural cliffs. Land use is predominantly agricultural with limited assets.



3.3.4 Howick and Longhoughton

There is limited evidence of erosion occurring to the cliffs in the Howick area. The vegetated slope above the rock cliffs remains relatively stable.

3.3.5 Boulmer

The frontage at Boulmer remains vulnerable to erosion but there has been some general rebuilding of the beach and smoothing of the bank since the inspection in 2006.

In general, the defences have not deteriorated. There is no further sign of damage to the rock revetment, nor to the tank block defences at the southern end of the village.

The short study in 2007 demonstrated that the frontage will come under increasing pressure as future sea level rise increases the depth of water and amount of wave activity reaching the shoreline.



To the south of the village there has been some fore-dune growth.

The bay between Seaton Point and Fluke Hole comprises natural cliffs fronted by sand and shingle/pebbles, and is largely undefended. The soft cliffs along the frontage are subject to erosion, though profile surveys indicate that beach levels are relatively stable. Some of the chalets along the cliff top are likely to be threatened by erosion in the future.

The slow erosion either side of the access steps continues but does not at present threaten to outflank the access.

There continues to be concern by the Golf Club as to erosion and slumping of the cliff between the access and the Golf Club area. This slumping is not as evident as in 2007. This may in part be due to the different season when the inspection took place. The Golf Club have investigated possible stabilisation measures.

Towards Fluke Hole at the southern end of the bay, a number of properties, including Foxtan Hall, sit atop a steep embankment fronted by sand and shingle/pebbles and rock platforms. These properties are also likely to come under increasing pressure with sea level rise in the longer term and the limited defence presently provided may be inadequate. There is, however, no sign of such pressure on defences at present and their remains a healthy shingle beach.



3.3.6 Alnmouth Bay and Warkworth Dunes

This frontage consists of a sandy beach backed by limited dunes with ad-hoc defence and a golf course to the north of the River Aln estuary and sandy beaches backed by large natural dune systems to the south.

The defences between the River Aln and Marden Rocks are relatively healthy. There has been a significant build up in beach levels since the 2006 inspection. This is notable over the whole frontage. Work has been undertaken to provide improved public access to the beach through the backshore dunes in the area of the car park and down towards the estuary. This appears to have improved dune development. The frontage will still be vulnerable to severe storm conditions but is likely to recover more quickly, in addition to providing better protection against more minor storm events.

The area north of the river was the subject of the Alnmouth Bay Strategy Study completed by Babbie Group in August 2002. In summary, the findings of the report are that there are areas in need of coast protection works. However, the study also concludes that there is insufficient benefit associated with the works to attract DEFRA funding. ADC therefore sought an alternative management solution. More detailed monitoring was agreed for this frontage to further define the problems and identify possible solutions. Through the recent walkover inspection, the topographic and profile surveys, and the photographic monitoring of this frontage the suggestion is that erosion is more sporadic than possibly thought in 2000, when there appeared to be a period of persistent erosion along the car park frontage. This does not suggest that the frontage is not still vulnerable to erosion however, and indeed it may go through future periods of

erosion. However, neither does the present monitoring indicate that management of the frontage is not sustainable.

To the south of the dune frontage the coast curves around into the estuary. The masonry wall at this point appears to remain in good condition. There has been some lowering of beach levels at this point and this seems to be associated with movement of the channel. Beyond this wall a new masonry wall has been constructed in front of the sailing club boat park. This is in fair condition.

The beach in front of the slipway upstream of the sailing club wall is higher than observed during the previous inspection. Beyond this point, typically the foreshore is mud and salting.

The wall to the back of the salting has suffered significant loss of pointing and potential movement. Some areas of previous repointing have subsequently cracked. Particularly at the corners, the wall may be in danger of collapse. Although only protecting fields, the wall also acts as pathway through to the road bridge. Work is required to improve the condition of this wall.



The continuation of the wall through to the bridge has been repaired.

The flood defences to the south, by the road bridge, have been breached as part of the foreshores project. There is no significant influence on the estuary observable at present

At Church Hill there is some indication that the toe wall to the slope has lost individual stones. This does not appear to be an immediate problem but needs to be noted for future inspection. There may be value in repointing the structure to maintain the stability of the slope.

South of the mouth of the River AIn estuary the dunes at Buston Links are subject to ongoing erosion on the seaward face and concrete anti-tank blocks have been used in places at the dune toe in attempt to provide some stabilisation.



The headland outcrop at Birling Carrs comprises harder rock in the lower section of cliff face, overlain with softer material. There is a rocky shore platform extending seaward. At present the softer cliff material does not exhibit signs of slippage, but the hard rock is highly fractured and there have been several rock falls in the lower cliff ledge which may ultimately contribute to a future slump in the softer upper cliff material.

Between Birling Carrs and Warkworth Harbour at the mouth of the River Coquet estuary, there is an extensive dune system of Birling Links and Warkworth Dunes. This can be sub-divided into six distinct zones.

Furthest north (below left), immediately south of Birling Carrs, the first zone contains dunes that are relatively stable as indicated by their shallower seaward profile and dense vegetation. Occasional outcrops of hard rock at the toe of the dunes indicate a controlling influence on the dune toe. South of here the second zone contains dunes which are more actively eroding, with recent slumping evident (below right).



These dunes are protected to a degree by concrete anti-tank blocks along the foreshore, set away from the dune toe at their southern end and gradually tapering in towards the dune toe at the north (below left). In one location, underlying clay has been exposed at the dune toe through erosion (below right).



With progression south towards the southern end of the anti-tank blocks, the dunes are continuing to erode quite notably, with recent slumps evident (below left) and clear signs of erosion setting back the dune crest position, exposing bracken roots (below right).



There is then a third zone unprotected by concrete anti-tank blocks where the dunes are steep, high and bare of vegetation on their seaward face, exhibiting signs of recent and ongoing erosion. Clumps are being eroded from the dune crest and sliding down the seaward face (below, left and right).



Further south, a fourth zone is characterised by notable erosion around a public beach access point. Here concrete anti-tank blocks have been placed at the dune toe (right).



A fifth zone is then characterised by somewhat more stable dunes, although they are exhibiting some signs of undercutting and cliffing at the toe due to wave action (below left), and are also affected by erosion around informal access points (below right).



The most southerly zone exhibits very stable dunes fronted by relatively high beach levels (below left). Here, pioneer dune vegetation is growing (below right) and the backing dune system is very healthy and unaffected by erosion.



As noted above, the Alnmouth Bay frontage comprises predominantly natural coastal dune defence. A programme of dune management would reinforce these natural defences and potentially alleviate some of the current and likely future problems facing the frontage as pressure on these natural defences increases from sea level rise and increasing human use. Dune management would involve fencing and re-vegetation of the dunes and provision of designated access points with timber boarding or similar to minimise erosion. This can be a very effective, low cost solution if implemented early enough.

3.3.7 Warkworth Harbour

The North Pier at Warkworth Harbour is sub-divided into three defence units. The shore-connecting inner section is in reasonable condition and is well protected by rock armour on both sides. The mid section, however, is starting to exhibit some signs of displacement on the harbour-facing side (below left) and damage to blockwork on the seaward-facing side (below right) but overall remains in a fair condition.



The outer pier end, however, as noted in previous reports is in a bad condition and remains disconnected from the main pier (below). The pier end is used by anglers and access to it remains a health and safety hazard. The pier end failed almost immediately after being constructed since it is not constructed on rock foundations. A study in 1980 (RT James) concluded that the northern tip of the breakwater served no significant coast protection function, so any remedial work would not attract Grand-in-Aid from central government's coastal defence budgets unless this view was revisited.



The north shore Wave Basin, in the lee of the North Pier, is exposed to waves propagating through the harbour mouth. There is considerably storm debris deposited on the beach and the North Jetty is almost totally dilapidated. Due to ongoing siltation problems in the harbour, land based plant is often used to excavate sand from south of the North Jetty and place it over the North Pier onto the beach at the southern end of Alnmouth Bay.



The Amble quayside walls within Warkworth Harbour were all in reasonable condition at the time of inspection, although some minor cracking in the deck was noted (as in previous years).¹

At the root of the recently refurbished South Jetty, there is a short section of rock revetment (below left) which has continued to be outflanked and overtopped resulting in further erosion of grassland behind. Elsewhere within the Little Shore Wave Basin the condition of the seawall and access ramp remains bad and this is in need of repair in several areas before wall failure occurs (example below right).



¹ Subsequent to the inspections, a large crack opened up in part of the quay wall following an intense rainfall event and associated high river flows in the River Coquet in early September 2008. Note: this event caused major flooding to large parts of Northumberland, including from the River Coquet to the town of Morpeth.

The inner face of the South Pier requires some attention (toe and cracks) at either end (below left), although the central section is in reasonable condition. The outer face is generally reasonable, except for longitudinal cracking along its southern most section. There is also major abrasion of the short concrete stub groyne (below right).



Some repairs could also usefully be made to cracks and undermining of the wall around Pan Point.

3.3.8 Island View

The new concrete seawall encasement around the Island View headland that was completed in September 2003 is still in good condition, although there is erosion to both the north and south where rock armour has been placed over short lengths.

3.3.9 Amble Links and Hauxley

The dunes and soft cliffs along Amble Links appear relatively stable and well vegetated, with only minor erosion noticeable. Seaward dune face erosion increases slightly along the frontage towards High Hauxley, but through an ongoing process of occasional slumps rather than major events of significant concern. Around Beacon Hill the shoreline is relatively stable. Immediately to the south of Beacon Hill there is a section of rock armour, somewhat informally placed, that appears to have stabilised the backing cliff/dune. Towards the southern end of this short revetment section, however, the armour stone is sparser and more hap-hazardly placed, leading to more evidence of erosion in the cliffs/dunes behind. At the southern end the cliff cuts back a little and here it is bare of vegetation with near-vertical cliffing at its toe. Just to the south of this eroding section is a property situated very close to the cliff edge. Further south again, the cliff becomes lower with a gentler and more vegetated slope with no obvious signs of significant erosion. However, there is a short section along which a degree of lowering and undercutting is occurring at the toe, close to a second property located close to the cliff edge.

At Low Hauxley village the revetment fronting the low soft cliff has stabilised the slope, which is well vegetated. At the southern end of Hauxley Links the concrete block revetment is showing major signs of displacement (right), but the structure is still holding and protecting the backing slope from erosion.



The shoreline fronting Hauxley Nature Reserve is showing signs of continued erosion along its whole length, with the underlying peat layer exposed through this process to the south. This has, in one location, exposed a fossilised tree stump in the peat layer (left), which is now sticking out from the cliff face. In one short section of about 20m, the erosion appears more rapid.

Along Togston Links to Hadston Carrs, the dunes are continuing to erode in localised sections on their seaward face through ongoing processes of slumping. This has exposed a dead animal carcass in the upper section of dune (right). The localised erosion to the immediate north and the immediate south of the piped outlet has also cut back to the access road and car park along this section in one location.



Four outfall structures, one north of Wellaugh Point, one along the High Hauxley frontage, another along Hauxley Links and the fourth along the northern section of Togston Links, are in a poor state of repair and require attention. The latter in particular requires a replacement cover to prevent public-entry (left). There was also evidence of flytipping along Hauxley Links (grasscuttings, brickwork and masonry rubble) at the time of the inspections.

3.4 Studies

Table 3.1 Key Studies recently undertaken in Alnwick

Date	Name	Organisation
2002	Alnmouth Bay Strategy Study	Babtie Group
2002	Island View Strategy Study	WSP
2006	Foreshores Project study of Aln Estuary	EA
2007	Boulmer Feasibility study	Royal Haskoning
2007	Hydrographic Study of the River Coquet Estuary (Warkworth Harbour) – Stage 1	Royal Haskoning
2007	Low Hauxley Feasibility study	Royal Haskoning
2008	Hydrographic Study of the River Coquet Estuary (Warkworth Harbour) – Stage 2	Royal Haskoning

3.5 Events

Table 3.2: Key Events

Date	Event	Location
2002	December - Rock armour stabilisation to the foreshore access steps required due to ongoing erosion (£7k works plus £1k in-house design fees)	Seaton Point – Boulmer
2002	April – Gabion mattresses behind 2 rows of armour blocks required south of Island View (£9k works + £1.4k in-house fees)	South of Island View
2003	Island View construction	Island View
2004	Coir matting protection to northern section of dunes	North of Alnmouth
2006	2 weeks of easterly storms in March	
2007	Improved access points through dunes	North of Alnmouth
2008	Heavy rainfall afflicting the district at various periods throughout summer, especially intense on 5 th September, resulting in damage to quay wall at Amble.	

3.6 Summary of Concerns

Table 3.3: Areas of Concern

Location	Concern	Measures Taken
Craster	Deterioration of defences	
Boulmer	Erosion of coastal slope fronting properties	Study undertaken with recommendation for works
Alnmouth	Erosion of dunes along frontage north of River (including car park and groyne field area)	Some dune management measures implemented.
Alnmouth	Erosion of dunes south of the river due to human use/informal access	Access improved
Aln Estuary	Deterioration of wall behind marshes	
Amble	Erosion behind revetment at root of south jetty	

Amble	Condition of walls around Little Shore Wave Basin	
Hauxley	The condition of the outfall structure	
Hauxley	Erosion of the coastal slopes – threat to property (between Beacon Hill and Low Hauxley)	Study undertaken with recommendation for works.
Hauxley Nature Reserve	Erosion of coastal slopes due to outflanking at southern end of revetment	

3.7 Summary of Actions

In the defence inspection database, a number of actions have been identified as being required along the various elements of the Alnwick coastline. These comprise both immediate work to defences, and recommended longer term examination and possible repairs. The actions, drawn from the database, are outlined in the following table and have been assessed in terms of priority.

Actions – Alnwick

Defence			Location	Priority	Date	Action Required
22	1	7	Craster	Low	10 Jul 2008	Repair masonry wall
22	1	15	Craster	Low	10 Jul 2008	Localised repair of wall
26	2	2	Boulmer	High	10 Jul 2008	Undertake toe defence and slope regrading
26	3	1	Boulmer	Medium	10 Jul 2008	Longer term need for repair. Review the need for replacement
27	6	2	Alnmouth	Medium	10 Jul 2008	Dune management
27	6	3	Alnmouth	Medium	10 Jul 2008	Dune management
27	7	1	Alnmouth	Medium	10 Jul 2008	Dune management
27	7	2	Alnmouth	Medium	10 Jul 2008	Dune management
28	24	3	Alnmouth	High	10 Jul 2008	Local repairs to wall
28	28	1	Alnmouth	High	11 Jul 2008	Repaint and repair wall
29	7	3	Warkworth	Medium	04 Aug 2008	Dune management, including fencing to control public access, would help stabilise some actively eroding sections
30	9	2	Warkworth Harbour	Medium	04 Aug 2008	Repair damage
30	9	3	Warkworth Harbour	Medium	04 Aug 2008	Repairs needed, but no coast protection benefit.
30	9	5	Amble	Medium	16 Jul 2008	Fill small cracks
30	9	6	Amble	Medium	16 Jul 2008	Fill small cracks
30	9	7	Amble	Medium	16 Jul 2008	Address outflanking erosion at root
30	9	10	Amble	Urgent	16 Jul 2008	Repair wall, deck and capping beam
31	10	1	Amble	Medium	16 Jul 2008	Fill cracks
31	10	2	Amble	Medium	16 Jul 2008	Repointing and fill cracks. Fill missing masonry
31	11	1	Amble	Low	16 Jul 2008	Minor repairs to the wall face, crest and deck
31	11	2	Amble	Low	16 Jul 2008	Repair cracks
31	12	1	Amble	Low	16 Jul 2008	Repair cracks
31	12	2	Amble	Low	16 Jul 2008	Dune management
31	13	3	Amble	Low	16 Jul 2008	Repair or removal of outfall structure
31	13	4	Amble	Low	16 Jul 2008	Fill voids
31	13	6	High Hauxley	Low	16 Jul 2008	Repair/remove outfall
32	13	9	Hauxley	High	16 Jul 2008	Implement scheme in accordance with 2007/2008 Prefeasibility Study.
32	16	1	Low Hauxley	Medium	16 Jul 2008	Resit blocks
32	19	1	Low Hauxley	High	16 Jul 2008	Re-fix cover to seaward end of outfall for health and safety reasons.
32	19	2	Low Hauxley	Medium	16 Jul 2008	Monitor erosion of dunes. Examine and remove animal carcass
32	20	1	Low Hauxley	Medium	16 Jul 2008	Monitor erosion of dunes

4 CASTLE MORPETH

4.1 Extent of the Authority Coastline

Castle Morpeth Borough Council (CMBC) is responsible for 9km of the coast extending from Hadston Carrs in the northern end of Druridge Bay to the burn at the north of the Lynemouth Power Station.

4.2 Description

The Castle Morpeth frontage is predominantly composed of the long, largely natural coastal dune system of Druridge Bay. The small centre of Cresswell is situated to the south of Druridge Bay and is fronted by rocky outcrops extending down to Snab Point. Cresswell is defended by a combination of man-made structures and natural features. Lynemouth Bay then continues south from Snab Point down to Beacon Point. The southern boundary of the Castle Morpeth frontage is midway along Lynemouth Bay.

4.3 Overview of Inspection and Surveys

4.3.1 Druridge Bay

The current shape of Druridge Bay is highly dependant on the continuing stability of Hadston Carrs (and to an extent Silver Carrs and Bondi Carrs further north at Low Hauxley) at the northern end of the Bay and the rocky outcrops around Cresswell in the south.

The rock revetment protecting a concrete outfall structure at Hadston Carrs remains in fair condition.

However, the outflanking and localised scouring of the dune directly south of the structure has continued.

Here, the dune has now eroded through the ramp access path and will soon threaten the coastal road (right).



In the northern end of Druridge Bay, where the dunes are fronted by a notable pebble and cobble ridge, the dunes are exceedingly stable. The fronting concrete anti-tank blocks are buried to varying degrees by sand and cobbles. Minor signs of slumping in the seaward face of the dunes starts to become noticed behind the blocks further south and around informal access routes through the dunes. Just to the south of the Visitor Centre access steps, one notable area of cut-back/blowout was observed.

Further south the concrete blocks are deeply buried and the dunes gentler in profile and well vegetated. Further south still, the dunes are more actively eroding again, through slumping, but not at significant rates. The dunes drop to a lower crest level at the southern end of the anti-tank blocks.

The southern-most section of Druridge Bay is characterised by dunes intersected by drainage outfalls. The most northerly outfall is partially blocked by three concrete blocks. Each of these outfall exhibits similar influences on adjacent sections of coast, since each is set back within something of an embayment caused by local erosion in the vicinity of the outfall mouth. Concrete anti-tank blocks are placed along the coast around the mouth of the outfalls to limit erosion and further embayment of the shore.

4.3.2 Cresswell

Cresswell is defended by a combination of man-made structures (mostly to the north) and natural features (mostly to the south). The most northerly structure is a rock revetment at the northern part of the village. This is in a relatively poor condition with a house located close to the cliff top and consideration could be given to improving the placement of the armourstone.

Further south the revetment becomes fronted by a low concrete seawall. The wall is exhibiting concrete spalling and rust-staining and whilst the revetment is in fair condition the number of gaps increases with progression south. In places rubble has been tipped to infill the gaps.

The revetment composed of interlocking concrete blockwork is in fair condition, but the one area of settlement should be monitoring for signs of worsening.

Moving south to the more natural frontages, the soft cliffs continue to exhibit signs of slumping in places and there is quite bad erosion at the southern end of the bay extending to Snab Point.



Here rock-filled gabions have been installed along some lengths but these are becoming broken-up by wave energy and losing their effectiveness.

In areas where gabions have not been constructed the soft cliffs are actively slumping. Here debris has been tipped in an attempt to counter the erosion (left).

There is also evidence of relict slipping in the upper sections of soft cliff and one are in particular has a slump that has cut the cliff line back to within less than 1m of the road (right). It is recommended that efforts are made to repair and extend the gabions while investigations are made in parallel into longer-term more effective alternative solutions.



4.3.3 Snab Point and Lynemouth Bay (North)

Snab Point comprises a hard rock shore platform and lower cliff section, with an overlying softer cliff (below, left). A large rock fall has occurred in the hard cliff just to the north of the pond. Around the headland itself, to the south, a new private defence has been constructed, comprising drainage pipes and timber retaining boards. This is located within a short section of cliff that has cut back between two harder rock controls and notably has no fronting shore platform, in contrast to the frontages immediately to the north and south. This leaves this short section most vulnerable to incoming wave action, leading to cliff recession events. There is ongoing discussion between Castle Morpeth Borough Council, Natural England and the landowner about the construction of this defence and it seems likely that retrospective planning permission will be required.



Castle Morpeth Borough Council also has responsibility for the northern section of Lynemouth Bay between Snab Point and the River Lyne. The hard rock headland in the north is experiencing both basal undercutting with associated rock falls in the lower hard rock cliffs and active slumping in the upper soft cliffs (below, right).



Within the northern section of the Bay itself, erosion of the backing cliffs/dunes is heavily dependent on the level and width of the fronting colliery waste beaches. Where beach levels are high and widths great, the backing cliffs/dunes are highly stable. Where the beach lowers and narrows, the dune are more actively eroding.

4.4 Studies

Table 4.1: Key Studies recently undertaken in Castle Morpeth

Date	Name	Organisation
1999	Lynemouth Bay Coastal Monitoring	Posford Haskoning
2005	Project Appraisal Report – Lynemouth Power Station Revetment Extension	Royal Haskoning

4.5 Events

Table 4.2: Key Events

Date	Event	Location
2002	None identified	
2004	None identified	
2006	2 weeks of easterly storms in March	
2008	Heavy rainfall afflicting the borough at various periods throughout summer, especially intense on 5 th September, resulting in flooding in Morpeth	

4.6 Summary of Concerns

Table 4.3: Areas of Concern

Location	Concern	Measures Taken
Hadston Carr	Erosion of cliff south of concrete outfall is threatening coastal road	
Druridge Bay	Fluctuating beach levels, general erosion. Dune and access management.	
Cresswell	Road in front of caravan park may be threatened by erosion/slumping of coastal cliffs	
Creswell	Rock-filled gabions are becoming obsolete and need replacing	

For further detail regarding these concerns refer to the North East Monitoring database.

4.7 Summary of Actions

In the defence inspection database, a number of actions have been identified as being required along the various elements of the Castle Morpeth coastline. These comprise both immediate work to defences, and recommended longer term examination and possible repairs. The actions, drawn from the database, are outlined in the following table and have been assessed in terms of priority.

Actions – Castle Morpeth

Defence			Location	Priority	Date	Action Required
32	3	1	Druridge Bay	Low	16-Jul-2008	Dune management - formalised access.
32	3	2	Druridge Bay	Low	16-Jul-2008	Dune management - extend fencing
32	6	1	Cresswell	Medium	16-Jul-2008	Monitor settlement for signs of worsening.
32	8	1	Cresswell	High	16-Jul-2008	Repair and extend gabions/investigate alternative solutions.
33	9	1	Lynemouth	Low	17-Jul-2008	Maintain access steps and monitor cliffs
34	10	2	Lynemouth	Medium	17-Jul-2008	Maintain burn outlet to sea

5 WANSBECK

5.1 Extent of the Authority Coastline

Wansbeck District Council (WDC) is responsible for the coast from the burn to the north of Lynemouth Power Station to Blyth North Pier, a 14km stretch of coastline.

5.2 Description

The northern boundary of the Wansbeck coast is midway along Lynemouth Bay, and includes the Lynemouth Power Station. At the south end of the Bay, Beacon Point and Newbiggin Point form the northern control for both the developed Newbiggin Bay and the largely undefended dunes of Cambois Bay further south. The southern extent of the frontage is marked by the rock outcrop at North Blyth and the Blyth East Pier.

5.3 Overview of Inspection and Surveys

5.3.1 Lynemouth

Lynemouth Power Station is protected by a robust rock revetment (below left) that was constructed in 1995. A 320m extension of this revetment was completed in April 2006. The extension encompasses the coal stocking yard area to the north of the Power Station. Both sections of revetment are in good or very good condition. This coastline has historically been protected by the tipping of colliery waste on the foreshore, however due to the closure of the local mines this practise has ceased. It is therefore expected that the undefended shoreline either side of the Power Station revetment will erode rapidly until a new equilibrium is achieved. This is now visibly occurring to the southern end of the revetment (below, right).



5.3.2 Beacon Point, Newbiggin Moor and Church Point

At Beacon Point, there is evidence of local and small-scale slumping in the soft cliff material that sits atop a harder rock base and in places this causes cut-back of the coastline to within a very short distance of the access track. The more vulnerable coastline of Newbiggin Moor, fronting the golf course, is experiencing active and ongoing erosion. Efforts have been made to reduce this by tipping debris. The worst affected area is in the central section where fronting rock outcrops are absent. The cliff slumping remains ongoing in front of the Caravan park, arrested only by local ad-hoc attempts to stabilise the cliffs (which are partially successful) in the form of concrete cubes and rubble tipping.



The few structures that exist around Newbiggin Point are all in a very poor state of repair due to undermining, outflanking, concrete cracking, spalling and voiding. One structure is now effectively obsolete (left) due to a combination of these defects.

Many of these structures require urgent attention to bring them back to providing a suitable standard of protection.

5.3.3 Newbiggin Bay

Newbiggin Bay has benefited from a capital coast protection scheme, completed in 2007, comprising the construction of a 200m long breakwater some 300m offshore (below left) and the import of sand to replenish beach volumes. The effects of this scheme on the Bay remain dramatic, with high and wide beaches still evident throughout the Bay (below right) and the onset of the formation of a salient feature in the lee of the breakwater. Previous to the scheme, there were major concerns about the beach lowering at the toe of the existing seawall defences leading to undermining of the toe and failure of the structures. With a healthy beach restored, the backing seawalls are now protected against this concern.



5.3.4 Spital Point to River Wansbeck Estuary

South of Spital Point, immediately south of the robust rock armour around the Northumbrian Water Storm Outfall, there is a section of soft eroding cliff sitting atop a raised rock ledge. Considerable rubble has been tipped down the soft cliff face in attempt to arrest the erosion, but this is continuing, quite severely in places.



5.3.5 River Wansbeck Estuary

This section comprises a sheltered estuarine frontage. On the north bank there is an accreting sand spit which is pushing the estuary channel more towards the south bank. This is backed by stable dunes. On the south bank there is a very marked transition from sand-covered foreshore near the mouth to exposed rock and cobble just further upstream.

Associated with the Wansbeck Boat Club is a masonry wall and slipways extending between an undefended slope/cliff section at the mouth and an undefended section upstream of the boat club, tapering into vegetated and undefended slopes and cliffs.

In places the stone wall has been patched-up on an ad-hoc basis with bricks but in many places these are now spilling onto the foreshore. There are several areas where substantive sections of masonry (or the replacement brickwork) are missing or where original masonry is now very loose (pictured, right).



This structure is in a very poor condition and liable to fail under heavy loading conditions. This could lead to navigational issues should debris fall into the channel.

Also the small jetty/pier (pictured, left) forms a river training function and if it were to fail the channel may migrate further towards the southern shore at the mouth.

The undefended section of slope/cliff near the estuary mouth appears very stable (pictured, right).

There are no visible signs of erosion or slippage and the vegetation is dense and comprises trees and shrubs.



5.3.6 Cambois

The northern-most section of Cambois Bay is predominantly an open coast, highly exposed frontage but there is also included a short transition zone between here and the more sheltered estuarine frontage of the River Wansbeck estuary.



Cambois House sits atop the cliffs within this transition zone, approximately some 50m from the cliff edge. In the transition zone, the cliff top does not appear to have substantially changed in position over the past 2 years, but recent undercutting has occurred at the toe (pictured, left). It is envisaged that this will lead to slumping higher up the cliff and, soon, a step-back in the cliff top position by some 1-2 m as a consequence.

Along the more exposed coastal section to the immediate south, the cliff top position is retreating with successive slumping events. The lower 2m of cliff is completely bare of vegetation, suggesting an active exposure. The erosion process seems to be episodic and follow the process of toe undercutting, lower cliff slumping and, ultimately, upper cliff slumping resulting in retreat of the cliff top position.

Towards the southern end there is a section of some 50m where this erosion is particularly severe.

Previous attempts to stabilise the slope have been made using willow fencing, but this is now obsolete although remnants remain (pictured, right).



Also at the intersection with the access path from the car park, some rock armourstone (perhaps surplus from the revetment constructed further south; 39/17/01) and large rubble has been placed/tipped to prevent outflanking of the access point (pictured, below).



This appears to have had success in stabilising this immediate short length. Further to the north a pill box has been eroded from the cliff. This is now, in effect, acting as a

hard point control on the foreshore and an embayment has eroded between here and the rubble/armourstone works at the car park access point.



The revetted frontage itself appears to be very stable and the structure is highly effective (pictured, left).

Minor problems previously reported of displaced armourstone at the toe were not apparent on this inspection.

The armourstone continues around the long sea outfall, but there is notable cut back in the cliffs to the immediate south of the structure (pictured, right).



At present this does not appear to be compromising its integrity through outflanking, but the erosion here should be monitored (visual inspections).



The undefended section of dunes continues to erode, particularly along a length of about 200m immediately south of the end of the rock revetment (30/17/01), between the two sea outfalls.

There is evidence of exposed netting geotextile (presumably placed to aid stabilisation; pictured, left) and ongoing slumping.

South of the southern sea outfall, some areas of the dunes/slopes appear relatively stable and in these places are well vegetated. That said, there is one notable area of material blow-out within this section.

However, there are also sections where the dunes/slopes are more actively eroding and near vertical in profile, especially in the southern half of this frontage (pictured, right).

Here there are also some occasional low spots in the crest level.





At the southern most end, there is notable cut back in the crest-line compared with the defended section to the south (pictured, left).

Attempts have been made to stop this outflanking by tipping rubble.

5.3.7 North Blyth

Man-made defences extend the whole length of this section of the coastline.

The revetment fronting the settlement of North Blyth is very uneven in profile, suggesting it was constructed by tipping, rather than placing, the boulders or that considerable settling and displacement has occurred.² The rock-filled gabions at the revetment crest are generally in reasonable condition, although they have split and leaked cobbles at three visible locations (an example is pictured, right). The gabions and revetment extend around a 90° dog-leg at the northern end.



The North Blyth Alcan facility is protected by timber breastwork fronted by a rock armoured concrete toe, and an adjacent rock revetment (pictured, left).

The upper rubble slope has been subject to wash-out of material, but remains broadly intact behind the timber. The fronting revetment has no major apparent problems although some rocks have been dislodged.

To the south of the timber breastwork, there is a 400m long concrete seawall at the northern end of Blyth East Pier. This is fronted by extensive low lying rock platforms and five concrete groynes in varying states of disrepair. The crest wall is in very poor condition with problems particularly focused between the most northerly wind turbine and the Alcan Coke and Alumina Reclaim Plant.

² During SMP2 consultation, Alcan confirmed that the revetment armour was placed, not tipped and therefore the uneven profile is likely to be due to a degree of settlement.

Along this section there are several cracks on the landward face and crest of the wall, as well as the walkway decking. In one particular location, there is a more significant failure of the crest (pictured, right). There are also cracks at the toe of the wall and there are several locations where there are access gaps through the wall. There are also areas of spalling and corrosion stains and general abrasion along the base of the wall.



This northern section of the Blyth East Pier is in urgent need of repair and maintenance and the situation appears to be progressively deteriorating due to inaction in response to previous recommendations.

Further south of the most landward turbine up to section 40/22/01, the wall appears in a more robust condition at the toe, seaward face, crest and landward face. The main section of Blyth East Pier was not inspected due to lack of access.

It is recommended that the structural integrity of all of the man made structures protecting the North Blyth Alcan facility and the north end of the Blyth East Pier be assessed.

5.4 Studies

Table 5.1: Key Studies recently undertaken in Wansbeck

Date	Name	Organisation
1999	Lynemouth Bay Coastal Monitoring	Posford Haskoning
2000	Lynemouth Bay Strategy	Posford Haskoning
2001	Cambois Bay Study & Pre-Feasibility Study	Posford Haskoning
2001	Lynemouth Bay Coastal Monitoring	Posford Haskoning
2005	Project Appraisal Report – Lynemouth Power Station Revetment Extension	Royal Haskoning
2006	Newbiggin	Atkins

5.5 Events

Table 5.2: Key Events

Date	Event	Location
2002	None identified	
2004	English Nature notified WDC about illegal tipping creating a ramp down to the beach	South of Links Quarry
2006	2 weeks of easterly storms in March	
2007	Construction of the offshore breakwater and beach recharge scheme	Newbiggin Bay
2008	Notable north-easterly storms coinciding with spring equinox tides	

5.6 Summary of Concerns

Table 5.3: Areas of Concern

Location	Concern	Measures Taken
Newbiggin Moor	Erosion of the cliffs	
Newbiggin Point	Cliffs are eroding and defences deteriorating and this is threatening caravan park and amenity assets	
Sandy Bay Caravan Park	Cliffs are eroding and threatening caravan park and amenity	
Cambois	Exposed weak cliffs are eroding and may start to threaten the properties in the near future	
North Blyth and Blyth Harbour	Condition of the man-made defences particularly fronting the Alcan facility and the northern section of Blyth East Pier	

For further detail regarding these concerns refer to the North East Monitoring database.

5.7 Summary of Actions

In the defence inspection database, a number of actions have been identified as being required along the various elements of the Wansbeck coastline. These comprise both immediate work to defences, and recommended longer term examination and possible repairs. The actions, drawn from the database, are outlined in the following table and have been assessed in terms of priority.

Actions – Wansbeck

Defence			Location	Priority	Date	Action Required
34	0	3	Lynemouth	Low	17-Jul-2008	Monitor outflanking
35	1	2	Newbiggin Moor	Low	17-Jul-2008	Monitor erosion
35	3	1	Newbiggin Moor	High	17-Jul-2008	Formal defence to prevent/ reduce erosion
35	5	1	Newbiggin Moor	Urgent	17-Jul-2008	Works to stop outflanking and undermining.
35	5	3	Newbiggin Moor	Urgent	17-Jul-2008	Repair wall
36	6	1	Newbiggin	Urgent	17-Jul-2008	Repair/stabilisation of the vegetated slope & repair/replacement of masonry wall
36	7	1	Newbiggin	Medium	17-Jul-2008	Repairs to wall and replacement of hand rail.
36	8	1	Newbiggin	Low	17-Jul-2008	Repointing
37	16	1	Newbiggin	Medium	17-Jul-2008	Local monitoring to assess when the caravans may be at risk. Investigation into drainage practises at cliff face.
38	16	4	Cambois	Medium	12-Jun-2008	Monitoring of cliff top recession rates along undefended section.
39	17	3	Cambois	Low	12-Jun-2008	Infill blow-out with sand
39	17	2	Cambois	Medium	16-Jun-2008	Monitor erosion at southern end.
40	21	1	Blyth	Urgent	12-Jun-2008	Detailed assessment of failure of crest wall to southern end. Detailed H&S assessment of ancilliary features such as stpe ladders and steps
40	18	1	Blyth	Medium	16-Jun-2008	Repair split gabions.

6 BLYTH VALLEY

6.1 Extent of the Authority Coastline

Blyth Valley Borough Council (BVBC) is responsible for 7km of coast from Blyth South Pier to the beach access steps at Hartley.

6.2 Description

The Blyth Valley coastline comprises mainly dunes and a wide sandy beach (with timber groynes) extending to the rocky outcrop and sheltered harbour at Seaton Sluice. South of Seaton Sluice the coastline comprises numerous man-made structures in Collywell Bay, and natural cliffs further south to the border at Hartley.

6.3 Overview of Inspection and Surveys

6.3.1 Blyth South Beach

Adjacent to the Port of Blyth, the dunes are initially healthy, especially in the spending beach. A short distance south, however, the dunes become narrower in width and are more actively eroding on their seaward face. This, in places, has left only a narrow zone between the dune crest and the backing concrete wall, behind which runs to Port's access road (left).



The rock-filled gabions further south have become exposed and many are broken, spilling rocks onto the foreshore (below, left). At Beach Gardens the wall is aged but in fair condition. There has been some cosmetic damage to the ornamental wall crest by the access steps which needs repair or removal (below, right)



The promenade is in a poor condition at its northern end, especially around the access steps, where concrete cracking, corrosion and staining is evident around the outlet pipes (below, left). Previous repairs are evident, but they need to be extended to new areas. Along its main length, the promenade is in fair condition but with progression south the incidences of damage (cracking, spalling, etc.) increases, corresponding with increasing

exposure, and in some locations towards the southern end the reinforcement bars are exposed through concrete spalling (below, right).



South of the promenade are three long timber groynes. These generally are in reasonable condition at their upper ends (although some gaps are evident between boards) and are proving effective at trapping beach sediment on their northern sides. However, the central groyne has a broken marker beacon and the southern groyne has no beacon. The groynes also have several timber boards missing from their seaward ends (examples below).



Between the groynes, the backing dunes are relatively stable and well vegetated. South of the southern groyne, however, the dunes start to become affected by the outfall channel of Meggies Burn. The channel runs north from the outfall before discharging across the foreshore, eroding the dune toe as it does so (below, left). There is considerable sand partially blocking the outfall pipe of Meggies Burn (below, right).



The central section of South Beach has been severely hit by storm activity, causing toe erosion and crest deflation in places. The areas which historically have been vulnerable, and where in April 2007 sand-filled geotextile bags were placed to reinforce the toe, were worst affected. This has resulted in re-exposure of the sand-filled bags at both locations where it was installed (left), and unravelling of the coir matting, which itself is causing more damage.



The area could usefully benefit from a further 'top-up' of sand recycled from the spending beach.

6.3.2 Seaton Sluice and Rocky Island



At Seaton Sluice harbour certain sections of the masonry wall are in need of repair. This mainly relates to re-pointing of joints, re-placement of blocks and infilling of voids, but in one section a major hole has been created which needs infilling. There is also considerable sand build-up on the crest of the western wall, which proves difficult and hazardous conditions along the footpath (left).

At Rocky Island the soft cliff material has suffered a slippage near the footpath and listed Watch House. However, this is not caused by marine erosion as the soft material sits on top of a high hard rock cliff which is relatively stable. Soil nailing is a potential solution to resolve this concern, but would require more detailed geotechnical assessment.

6.3.3 Collywell Bay

In Collywell Bay one seawall has suffered two major cracks which require re-pointing (below, left) and the gabions along the access ramp at the southern end are starting to bulge and will probably break, making the backing soft cliff vulnerable to marine erosion (below, right).



6.4 Studies

Table 6.1: Key Studies recently undertaken in Blyth Valley

Date	Name	Organisation
2002	Blyth South Beach: Beach Management Scheme	Posford Haskoning

6.5 Events

Table 6.2: Key Events

Date	Event	Location
2002	None identified	
2004	None identified	
2006	NE storm on high water level in January and 2 weeks of easterly storms in March	
2007	Installation of sand-filled geotextile bags along the toe of the dunes in the most vulnerable sections	South Beach

6.6 Summary of Concerns

Table 6.3: Areas of Concern

Location	Concern	Measures Taken
South Beach	Condition of the brick and precast concrete defences	
South Beach	Broken rock-filled gabions	
South Beach	Poor promenade condition	
South Beach	Poor timber groyne condition and missing navigational markers	
South Beach	Ongoing damage to central section of dunes	
Meggies Burn	Dune erosion and partially blocked outfall pipe	
Seaton Sluice	Condition of the old quay walls including repair to the side wall of the launch ramp	
Collywell Bay	Two major cracks in sea wall	
Collywell Bay	Bulging gabions along access ramp	

For further detail regarding these concerns refer to the North East Monitoring database.

6.7 Summary of Actions

In the defence inspection database, a number of actions have been identified as being required along the various elements of the Blyth coastline. These comprise both immediate work to defences, and recommended longer term examination and possible repairs. The actions, drawn from the database, are outlined in the following table and have been assessed in terms of priority.

Actions - Blyth

Defence			Location	Priority	Date	Action Required
42	1	1	Blyth	Low	23-Jul-2008	Minor repairs to cracks, strongbacks and footings.
42	2	1	Blyth	Medium	23-Jul-2008	Dune replenishment and wall repairs
42	2	2	Blyth	High	23-Jul-2008	Repair gabions
42	4	1	Blyth	Low	23-Jul-2008	Repair cosmetic damage to ornamental wall and fill cracks
42	4	2	Blyth	Low	23-Jul-2008	Repair cracks and areas of concrete corrosion.
42	4	3	Blyth	Low	23-Jul-2008	Repair spalling and fill cracks
43	7	1	New Hartley	Medium	23-Jul-2008	Further dune management and stabilisation.
43	7	2	New Hartley	Medium	23-Jul-2008	Replenish with sand from spending beach
44	10	1	Seaton Sluice	Low	23-Jul-2008	Repair timber groyne
44	10	2	Seaton Sluice	Medium	23-Jul-2008	Re-pointing and re-instatement of blocks.
44	10	3	Seaton Sluice	Low	23-Jul-2008	Clear sand from crest. Re-pointing of joints. Monitor bulge.
44	10	4	Seaton Sluice	Urgent	23-Jul-2008	Repair to side wall of launchramp and access steps.
44	10	5	Seaton Sluice	Urgent	23-Jul-2008	Rebuild concrete beam. Reinstate missing blockwork. Repoint
44	10	6	Seaton Sluice	Urgent	23-Jul-2008	Repair masonry wall
44	10	7	Seaton Sluice	Urgent	23-Jul-2008	Repair hole. Repoint minor gaps and voids.
44	13	1	Seaton Sluice	Medium	23-Jul-2008	Replacement of eroded blocks.
44	13	2	Seaton Sluice	Low	23-Jul-2008	The cliff near the Watch House could be stabilised using soil nailing techniques
44	14	1	Seaton Sluice	Low	23-Jul-2008	Fill cracks
44	17	1	Seaton Sluice	Low	23-Jul-2008	Repoint cracks. Cover rebar. Protect toe.
44	18	1	Seaton Sluice	Low	23-Jul-2008	Repointing
44	19	1	Seaton Sluice	Low	23-Jul-2008	Replace/repair gabions

7 NORTH TYNESIDE

7.1 Extent of the Authority Coastline

North Tyneside Council is the Coastal Protection Authority for 9km of the coast, stretching from Hartley in the north around Tynemouth headland and then up-river to the Fish Quay.

7.2 Description

The North Tyneside coastline generally comprises a series of headlands and bays with pocket sandy beaches carved into the rocky shore. The frontage is mostly urban, backed by the townships of Monkseaton, Whitley Bay, Cullercoats and Tynemouth, and is defended along most of its length. At the south end, the coastline turns inland at the North Pier to the River Tyne, running upstream towards the Fish Quay, at North Shields.

7.3 Overview of Inspection and Surveys

Note:

The inspections of Hartley Bay and St. Mary's Island and Headland were undertaken on 23rd July 2008.

The inspections along the rest of the North Tyneside frontage were undertaken on 1st August 2008 immediately after a period of intense rainfall throughout the preceding night.

This rainfall storm caused surcharging of drains and extensive pluvial flooding in parts of North Tyneside, with burst pipes and flood water flowing down beach access steps and ramps (right). Also, drainage outfalls through seawalls and the channel of the Briardene Burn were heavily discharging flood waters, creating or exacerbating channels across the foreshore. Council workforce was present at many locations, rectifying defects and attempting to clear up flood-damaged facilities, such as public toilet facilities. The undefended section of sea cliff to the immediate south of Trinity Road seawall was expelling water through its cliff face.



7.3.1 Hartley Bay

The northern end of the North Tyneside frontage starts to the south of Collywell Bay and comprises undefended rock cliffs between here and the causeway to St. Mary's Island. In the north, the soft cliff material sits on top of a harder rock base and there is evidence of rock falls, some quite notable (below, left), and slippages in the softer material, most of which are relict. To the south, the harder geology dips and the cliffs are composed solely of softer material which is where there are more frequent and more recent slippages (below, right).



7.3.2 St. Mary's Island and Headland

St Mary's Island is accessed by a causeway at low water.

At the northern landward edge of the access ramp to the causeway, rock armour protection works have been constructed in 2006.

Erosion of the undefended cliffs to the north is continuing and this needs to be monitored to ensure outflanking does not occur.



At the southern landward edge of the causeway and the access steps are in a poor condition.

The structures on St Mary's Island are well protected by a variety of defences. Most of the defences are in good condition with the exception of some informal walls on the western side that are dilapidated and have collapsed in places. The seawalls are generally all founded on bedrock.

A robust seawall and promenade extends from the causeway along the southern edge of St. Mary's Nature Reserve access road to the northern end of Whitley Sands. Although previous repairs of this wall are remaining effective, there are some areas of

minor local damage in the form of spalling, abrasion and occasional cracks. Also, there is one section of damaged guard-rail along the promenade and a big drop in level from the base of the access steps to the beach at the southern end of the wall.

7.3.3 Whitley Sands and Whitley Bay

There is a section of undefended sea cliff south of Trinity Road seawall.

At the northern end, outflanking from the seawall is exacerbating erosion (right).

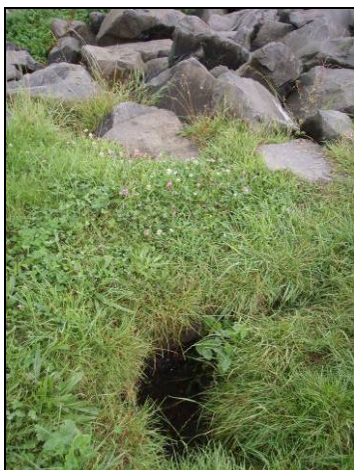
Works are recommended to address this with a degree of urgency and it is known that a Project Appraisal Report is presently underway.



The undefended sea cliffs are actively slumping despite the presence of a boulder beach (below, left), but coastal protection intervention is not recommended due to the nature of the asset being affected (a Council-owned golf course). A small section of wall fronting the boatyard along the otherwise undefended length of cliff is in a poor condition and efforts have been made at patch-work repairs. Despite this, there are sections being both undermined and outflanked. The cliffs were actively expelling rainwater from their seaward face following the preceding night's intense storm (below, right).



At Briardene Burn, much of the riverbank was under flood water and therefore not inspected. The channel flowing across the foreshore was in spate and people were clambering across the revetment at the mouth's southern bank rather than crossing the channel, but this in itself was somewhat hazardous.



It was noted, however, that the trash screen under the pedestrian bridge had been partially blocked by storm-derived debris but this should now have been cleared by Council workforce.

Also noted, in the grassed slope behind the revetment on the southern bank of Briardene Burn, was a sink-hole (left) which presents a public health and safety hazard. This needs filling, if it has not already been done.

At Briardene Burn two other issues were noted. The heavy rainfall had eroded the footpath extending towards the beach from the footbridge (below, left) and a small number of boards on the timber jetty were either damaged or missing (below, right).



Further south, the revetment itself was in fair condition. This extends south around the mouth of the Briardene Burn to join the Whitley Bay seawall and promenade. The seawall structure is in a fair structural condition in most places, but there are specific areas of damage where routine repairs are needed. Cracks, gaps and areas of spalling should be addressed and the section of missing blockwork in the crest wall at its corner near access steps (below, left) should be filled. Also, the access ramp by the Rendezvous Café has a large longitudinal crack and missing section of crest wall (below right).



Between the Rendezvous Café and the Panama Swimming Club there are areas of larger diagonal cracking that need filling. Where previous repairs have been made they are holding effectively. Beach access steps north of the Swimming Club are damaged, as are the steps directly at the Club (missing crest wall on seaward face of steps in both cases). The greatest damage has occurred to the access ramp further south still, where the debris remained on the beach at the time of the inspection (right).



The adjacent seawall, which is backed by a grassed bank, is older and showing signs of deterioration. Some water return holes in the wall crest are blocked with debris and others are collapsed or in danger of imminent collapse (left). There is one very wide vertical crack (below, left) and another wide diagonal (below, right) in need of filling, as well as more moderate or minor longitudinal and vertical cracks.



Towards the southern end beach levels are lower and the toe is exposed over a short section, with undermining of the beach access steps also evident. At the very southern end of the wall, by the Boardwalk Café, the wall is undermined at its toe, exposing timber boards, and the access steps are damaged.



The short section of seawall, blockwork revetment and grassed slope in front of Spanish City is in need of attention.

The wall and grassed slope are in fair condition, but the revetment has misplaced and missing blocks and appears to have an entire missing section.

These defects need attention to safeguard the grassed slope from slippages.

The access steps here also need repair, but this appears to have already been noted by the Council with red spray paint applied to the worst defects in the steps.

The sections of seawall at the southern end of Whitley Bay, extending south from the Beach Lifeguard Office, are probably in the worst condition of all of North Tyneside's assets, with longitudinal and vertical cracks, loss of render and exposure of reinforcement meshes (right), although repairs would be possible to maintain operable serviceability of these structures.



Along the seawall and promenade that stretches southwards towards Table Rocks there are gaps between the decking and the coping which need filling (left).

Some previous repairs here are in need of updating.

The wall in Brown's Bay is in a fair condition, with only routine filling of gaps between joints being required.

The hard rock cliffs leading to Brown's Point are suffering only minor erosion. South of Brown's Point towards Cullercoats Bay, however, the rock at the headland dips and the thickness of the softer capping material increases.

Here there is evidence of recent erosion events, including one located directly seaward of one of the properties on the cliff top. There have also been other rock falls, leading to the removal of the overlying soft material (right).



7.3.4 Cullercoats Bay

In Cullercoats Bay the seawalls, where present, are generally in good to fair condition leading southwards towards the North Pier, although a little abrasion and toe undermining is observed at the southern limit of this section. The North and South Piers appear in need of upgrade, particularly at the heads of the structures. Along the North Pier is an area of rock armour protection (below, left) that was used as emergency works to infill the hole that was punched through the pier during a storm. This is an obvious weak point in the structure, being at a narrow section of the pier and where the structure changes in both plan alignment and outer face gradient. There is significant cracking at the head of the South Pier (below, right). The inner face has suffered loss of render, including one area where an intact section of render is visibly detached from the pier as a whole. The seaward face has cracks, settle and undermining. An urgent investigation of options to upgrade the structures is recommended.



Between the Lifeboat Station and Dove Marine Laboratory, the low concrete wall and access slipway are both in need of repair to holes and cracks. The concrete apron at the southern end of the bay is abraded, but the other sections of seawall in the Bay (around the Dove Marine Laboratory and to the south of the hard rock cliff with natural caves) are in fair condition with no works required.

7.3.5 Tynemouth Longsands

At the northern end of Longsands is a short section of masonry wall. This is in poor condition with the need to infill a gap in the masonry at the northern end (below, left), fill some cracks in the seaward face and address the undermining at the southern end, which is also affecting the concrete apron of the adjacent concrete seawall (below, right). The concrete seawall is in fair condition, with no repairs required but the undermining at the toe seems to be a worsening situation and toe works should start to be considered.



Along the concrete block revetment, there is damage to the crest wall and some cracks between the sloped revetment and the vertical wall (below left) which require repair. The dunes along Longsands are generally well vegetated and relatively stable. The main problem is associated with trampling erosion and efforts have been made to control this through fencing. Some fencing is now obsolete and in need of renewal. At the southern end of Longsands a wall extends around the now disused Outdoor Pool. The concrete coping section of this wall is rust-stained and spalling in places (below, right).



7.3.6 King Edward's Bay

The northern-most section of the seawall is in a poor condition, with repairs needed to the damaged wall and toe apron. The curved seawall extending around central sections of the Bay is in fair condition with only minor re-pointing required.

7.3.7 Tynemouth Headland

There are occasional rock falls in the undefended section, but elsewhere the retaining walls have stabilised the headland. Minor cracking is observed in the short section of wall at the root of the North Pier. The Pier itself has no major cracks or settlement in the visible sections of the outer face despite the poor cosmetic appearance of its decking.

7.3.8 Prior's Haven to Prior's Stone

Both defended and undefended sections of Prior's Haven are stable. There is continued outflanking at the southern end of the seawall at Freestone Point (below, left) which would benefit from some local armouring protection to avoid compromising the structure. The wall at Sandy Goit is very poor (near failing) condition (below, right)



7.3.9 Riverside

Routine repairs are required to the revetments (concrete panel, concrete blockwork, stone and rock).

7.4 Studies

Table 7.1: Key Studies recently undertaken in North Tyneside

Date	Name	Organisation
2007	Hartley Cove to River Tyne Coastal Strategy Study	Scott Wilson

7.5 Events

Table 7.2: Key Events

Date	Event	Location
2002	None identified	
2004	None identified	
2006	2 weeks of easterly storms in March	
2008	Heavy rainfall at various periods throughout summer, especially intense on evening prior to inspections.	

7.6 Summary of Concerns

Table 7.3: Areas of Concern

Location	Concern	Measures Taken
St. Mary's Island	Outflanking of revetment to north of causeway	
Trinity Road	Outflanking of seawall	
Whitley Bay	Numerous cracks and minor defects to walls	
Spanish City	Blockwork revetment to grassed slope is failing	
Whitley Bay	Cracking and render loss in walls	
Cullercoats Bay	Upgrades required to piers	
Longsands	Undermining and outflanking of wall in north	
King Edward's Bay	Repairs required to northerly wall apron	
Sandy Goit	Near-failing wall	

For further detail regarding these concerns refer to the North East Monitoring database.

7.7 Summary of Actions

In the defence inspection database, a number of actions have been identified as being required along the various elements of the North Tyneside coastline. These comprise both immediate work to defences, and recommended longer term examination and possible repairs. The actions, drawn from the database, are outlined in the following table and have been assessed in terms of priority.

Actions – North Tyneside

Defence			Location	Priority	Date	Action Required
44	2	1	Hartley Bay	High	23-Jul-2008	Monitor the erosion of the cliffs where the armour ends.
45	2	2	Whitley Bay	Medium	23-Jul-2008	Repair/replace displaced wall
45	5	1	Whitley Bay	Medium	23-Jul-2008	A damaged guard-rail on the promenade needs repairing.
45	5	1	Whitley Bay	Medium	23-Jul-2008	Fill gaps between causeway at landward end where it meets access steps.
45	6	1	Whitley Bay	Urgent	01-Aug-2008	Works to prevent outflanking from 45/05/01. Cliff drainage works may help improve stability but formal coastal defences not recommended along length due to limited value of assets at risk.
45	6	2	Whitley Bay	Urgent	01-Aug-2008	Extend rock revetment (2006 recommendation; not reviewed due to high flood levels). Repair jetty boards and fill sink hole behind revetment's northern end.
45	7	1	Whitley Bay	Low	01-Aug-2008	Fill cracks, gaps and areas of spalling. Repair damaged access steps and ramps.
45	8	1	Whitley Bay	Medium	01-Aug-2008	Repair damaged sections and fill in cracks. Address undermining of toe at Boardwalk Café
46	9	1	Whitley Bay	Medium	01-Aug-2008	Repair revetment and access steps.
46	10	1	Whitley Bay	Medium	01-Aug-2008	Repair rendered masonry wall
46	11	1	Whitley Bay	Medium	01-Aug-2008	Repairs to render. Fill cracks.
46	13	1	Whitley Bay	Low	01-Aug-2008	Repair crack
46	14	1	Whitley Bay	Low	01-Aug-2008	Replace missing blockwork.
46	15	1	Whitley Bay	Low	01-Aug-2008	Fill cracks and gaps
46	16	1	Whitley Bay	Low	01-Aug-2008	Fill gaps and cracks especially towards southern end.
46	17	1	Whitley Bay	Low	01-Aug-2008	Fill gaps in joints.
47	19	2	Cullercoats	Low	01-Aug-2008	Monitor erosion
47	22	1	Cullercoats	Medium	01-Aug-2008	Monitor undermining of apron toe.
47	23	1	Cullercoats	Urgent	01-Aug-2008	Investigate options to upgrade the pier structure.
47	24	1	Cullercoats	Medium	01-Aug-2008	Repairs to damaged low wall and access ramp.
47	27	1	Cullercoats	Low	01-Aug-2008	Improve facing of the apron
47	28	1	Cullercoats	Urgent	01-Aug-2008	Investigate options to upgrade the pier structure.
47	29	1	Tynemouth	High	01-Aug-2008	Fill large gap at northern end, fill cracks, and address undermining at toe.
47	30	1	Tynemouth	High	01-Aug-2008	Consider toe works to prevent undermining.
47	31	1	Tynemouth	Low	01-Aug-2008	Repair wall crest. Fill gaps between blocks.
47	32	2	Tynemouth	Low	01-Aug-2008	Replace obsolete dune fencing.
47	33	1	Tynemouth	Low	01-Aug-2008	Repair/replace coping stone to revetment

Defence			Location	Priority	Date	Action Required
47	34	1	Tynemouth	Low	01-Aug-2008	Repoint joints in masonry seawall.
47	35	1	Tynemouth	Medium	01-Aug-2008	Consider need to address defects in coping (health and safety)
47	36	1	Tynemouth	Low	01-Aug-2008	Repair/ patch lower portion of brick wall.
47	37	1	Tynemouth	High	01-Aug-2008	Repairs to damaged section of wall, revetment and apron.
47	37	2	Tynemouth	Medium	01-Aug-2008	Re-pointing of joints, filling of longitudinal crack.
47	38	1	Tynemouth	Low	01-Aug-2008	Replace missing bricks.
47	40	1	Tynemouth	Low	01-Aug-2008	Fill cracks
48	44	1	Tynemouth	Low	01-Aug-2008	Armour protection to area of outflanking
48	44	2	Tynemouth	Low	01-Aug-2008	Patch repairs to revetment and wall
48	46	1	Tynemouth	Low	01-Aug-2008	Repair apron damage
48	47	1	Tynemouth	Low	01-Aug-2008	Maintenance/repairs to revetment
48	48	1	Tynemouth	Low	01-Aug-2008	Repairs required to revetment undermining at root