

Appendix K

Water Framework Directive Assessment

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Water Framework Directive Assessment

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Glossary

AA	Appropriate Assessment
ATL	Advance the Line
AWB	Artificial Water Body
BQE	Biological Quality Element
CFMP	Catchment Flood Management Plan
EU	European Union
FWB	Freshwater Body
GWB	Groundwater Body
HMWB	Heavily Modified Water Body
HTL	Hold the Line
MR	Managed Realignment
NAI	No Active Intervention
RBD	River Basin District
RBMP	River Basin Management Plan
ROPI	Reasons of Overriding Public Interest
SMP	Shoreline Management Plan
SPZ	Source Protection Zone
WFD	Water Framework Directive
TraC water bodies	Transitional and Coastal Water Bodies
WPM	With Present Management

K1 INTRODUCTION

K1.1 Purpose of Report

The Water Framework Directive (referred to in this report as the Directive) came into force in 2000 and is the most substantial piece of EC water legislation to date. The Directive will need to be taken into account in the planning of all new activities in the water environment. Therefore, the Environment Agency (the competent authority in England and Wales responsible for delivering the Directive) has recommended that decisions setting policy, including large-scale plans such as Shoreline Management Plans (SMPs), take account of the requirements of the Directive.

The 'Water Framework Directive Guidance for the Assessment of SMPs' has recently been developed by the Environment Agency and the first pilot assessment has been undertaken on the River Tyne to Flamborough Head SMP2. The guidance describes the methodology for assessing the potential hydromorphological change and consequent ecological impact of SMP policies and ensuring that SMP policy setting takes account of the Directive.

This guidance can now be applied to the assessment of the Northumberland SMP2 policy options in terms of the requirements of the Directive. The Northumberland SMP2 policy options were completed in February 2009 and, therefore, it is not feasible for the Water Framework Directive assessment to influence the SMP2 policy development or consider opportunities for delivering mitigation measures from the River Basin Management Plan. Consequently, this report provides a retrospective assessment of the policies defined under the Northumberland SMP2 highlighting future issues for consideration at policy implementation stage.

K1.2 Background

The EU Water Framework Directive was transposed into law in England and Wales by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. The requirements of the Directive need to be considered at all stages of the river and coastal planning and development process. For the purposes of large-scale plans, such as SMPs, the consideration of the requirements of the Directive when setting and selecting policies must be necessarily high level but sets the framework for future delivery of smaller-scale strategies or schemes.

The Directive requires that Environmental Objectives be set for all surface and groundwaters in each EU member state. The default Environmental Objectives of relevance to the SMP2 are shown in **Table 1.1**.

Specific mitigation measures will be set for each River Basin District (RBD) to achieve the Environmental Objectives of the Directive. These measures are to mitigate impacts that have been or are being caused by human activity. In other words, measures to enhance and restore the quality of the existing environment. These mitigation measures will be delivered through the River Basin Management Plan (RBMP) process and listed in a Programme of Measures within the RBMP. The RBMPs are currently in draft and undergoing public consultation with the final plans due to be produced in December 2009.

Table 1.1 Environmental Objectives in the Directive

Objectives (taken from Article 4 of the Directive)	Reference
Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water	4.1(a)(i)
Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good surface water status by 2015.	4.1(a)(ii)
Member States shall protect and enhance all artificial and heavily modified Bodies of water, with the aim of achieving good ecological potential and good surface water chemical status by 2015.	4.1(a)(iii)
Progressively reduce pollution from priority substances and cease or phasing out emissions, discharges and losses of priority hazardous substances.	4.1(a)(iv)
Prevent Deterioration in Status and prevent or limit input of pollutants to groundwater	Ground Water 4.1(b)(i)

K1.2.1 Preventing deterioration in Ecological Status or Potential

As stated in **Table 1.1**, a default Objective in all water bodies is to prevent deterioration in either the Ecological Status or, for HMWBs or AWBs, the Ecological Potential of the water body. Any activity which has the potential to have an impact on ecology (as defined by the biological, physico-chemical and hydromorphological Quality Elements listed in Annex V of the Directive) will need consideration in terms of whether it could cause deterioration in the Ecological Status or Potential of a water body. It is, therefore, necessary to consider the possible changes associated to baseline policies for each water body within the SMP2 area so that a decision making audit is available should any later failure to meet the Environmental Objectives need to be defended and issues for consideration when implementing policy are highlighted.

K1.2.2 Achieving objectives for EU protected sites

Where there are sites protected under EU legislation (e.g. the Birds or Habitats Directives, Shellfish Waters Directive), the Directive aims for compliance with any relevant standards or objectives for these sites. Therefore, where a site which is water-dependent in some way is protected via designation under another EU Directive and the Good Ecological Status or Good Ecological Potential targets set under the Water Framework Directive would be insufficient to meet the objectives of the other relevant environmental Directive, the more stringent targets would apply.

K2 ASSESSMENT METHODOLOGY

The methodology devised for this assessment follows the Guidance for the assessment of SMPs under the Water Framework Directive which has been developed by the Environment Agency. The process has been broken down into a series of clearly defined steps, broadly following the tasks and activities described within the Defra guidance on producing SMPs (Defra, 2006), to provide a transparent and accountable assessment of the SMP2 policies. The Water Framework Directive assessment process for SMPs is shown in **Figure 2.1** and these steps are described in detail in the sections below.

As the policy options have already been set for this SMP2, a retrospective assessment of the policies in relation to the Directive has been undertaken and, therefore, it has not been practicable to influence the SMP2 policy development or consider opportunities for delivering mitigation measures from the RBMP.

K2.1 Scoping the SMP2 – Data Collation

All the Transitional and Coastal (TraC) water bodies present within the Northumberland SMP2 area were identified and their ID numbers, designation and draft classification details obtained from the Environment Agency.

The generic Environmental Objectives set out below (based on Article 4.1 of the Directive and as described in **Table 1.1**) will be used for the assessment of the SMP in relation to the Directive.

- WFD1: No changes affecting high status sites.
- WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential.
- WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies.
- WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration of groundwater status.

The specific objectives for the water bodies within the Northumberland SMP2 area were also identified from the draft RBMPs for the Northumbria and Solway Tweed RBDs, which were obtained from the Environment Agency's website¹. However, for some water bodies in the SMP2 area, the current overall status and objectives have not yet been assessed.

The Environment Agency web-based 'Flood Map'² was used to assess whether there are any landward freshwater bodies that have the potential to be influenced by SMP2 policies and should, therefore, be covered within this assessment. The names, ID numbers, designation and classification details for any such freshwater bodies were obtained from the Environment Agency.

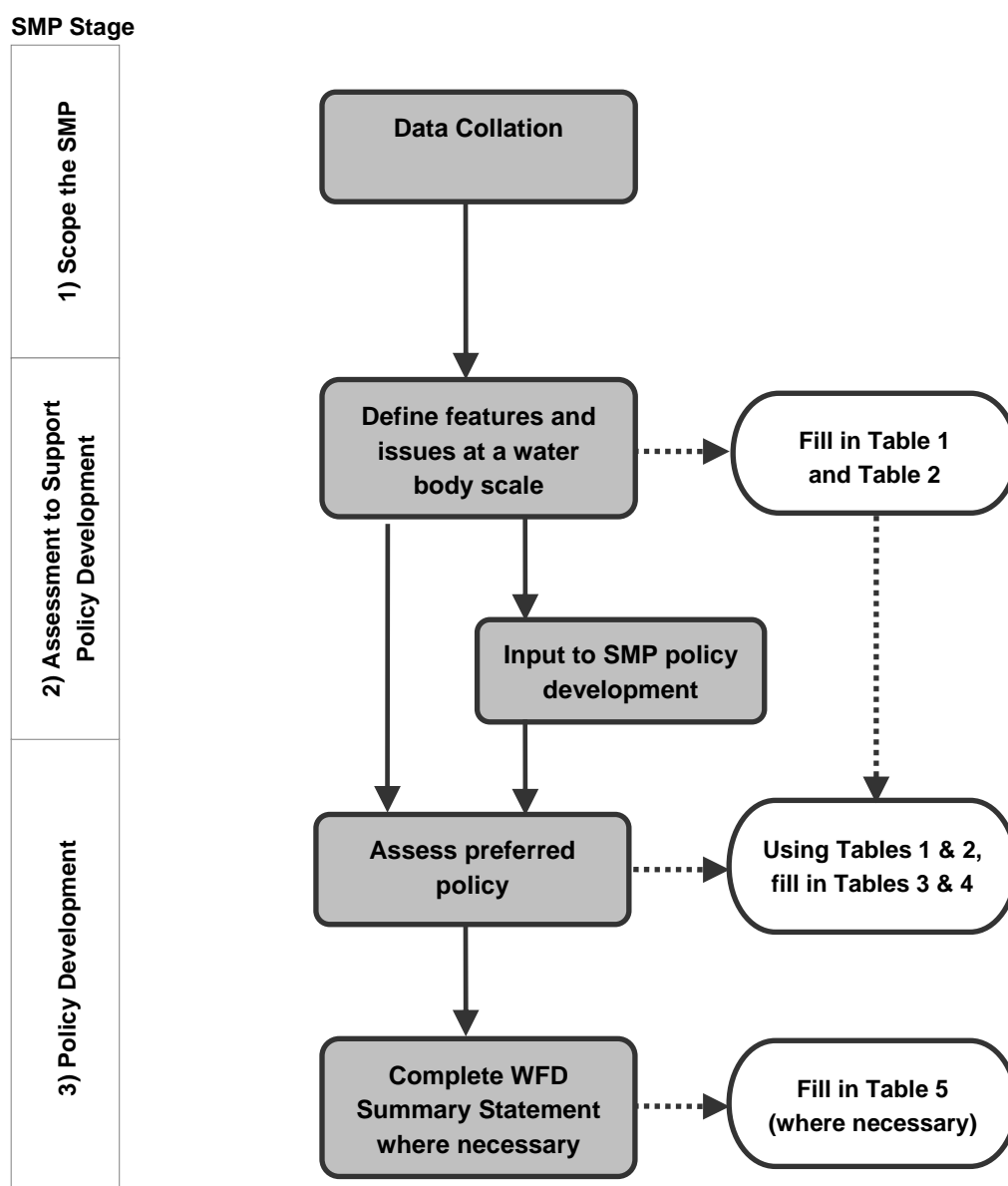
¹ The draft RBMPs are available at <http://www.environment-agency.gov.uk/research/planning/33106.aspx>

² The Environment Agency's Flood Map is available at http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&lang=_e&textonly=off&topic=floodmap

Groundwater bodies (GWBs) that could potentially be impacted by SMP2 policies were also identified by reviewing the Water Framework Directive compliance mapping for groundwater risk (known as River Basin Characterisation 2 (RBC2) and status assessment). Using the RBC2 mapping and the Water Framework Directive status maps for saline intrusion obtained from the Environment Agency, the GWBs designated as being 'at risk', 'probably at risk' or at 'Poor Status' within the SMP2 area were identified. The locations of groundwater abstractions with Source Protection Zones (SPZs) within the SMP2 area were also obtained from the Environment Agency's website.

Any discrepancies between water body boundaries and SMP2 boundaries were examined and any locations where changes of the SMP2 boundary would be recommended to attain consistency with water body boundaries were identified. It was also determined at this stage whether there were any additional investigations that could be recommended for the next round of SMPs to inform the Water Framework Directive assessment, such as studies to address the zone of influence in terms of Biological Quality Elements (BQEs).

Figure 2.1 Water Framework Directive assessment process for SMPs



K2.2 Defining Features and Issues

The Water Framework Directive features which SMP2 policies may affect are the Biological Quality Elements (BQEs) of water bodies. The issues are the hydromorphological and physical parameters (upon which the BQEs are dependent) that could potentially be changed.

For all TraC water bodies in the SMP2 area, the hydromorphological parameters that could be changed by potential SMP2 policies, with potential impact on the BQEs, were identified using **Assessment Table 1**. To identify changes in hydromorphology which may impact on biology, the baseline scenarios i.e. No Active Intervention (NAI) and With Present Management (WPM) which are described for groups of Management Areas in the SMP2 report.

The key features and issues identified in **Assessment Table 1** were then transferred into **Assessment Table 2** and the water body classification and Environmental Objectives set out in **Section 2.1** were used to populate the final column of **Assessment Table 2**.

K2.3 Assessment of the SMP2 Policy against the Environmental Objectives

The assessment of SMP2 policies against the Environmental Objectives was supported by a tabulated account based on the adaptation of the Policy Summary table within the SMP2 report. Using the information on the water body features and issues defined in **Assessment Tables 1 and 2**, the potential impacts of the SMP policy for each Management Area was assessed in relation to aspects of the Directive and recorded in **Assessment Table 3**. For each Management Area, the potential changes to the relevant physical and hydromorphological parameters that might occur as a result of the SMP policy were identified. The impacts of climate change on baseline processes were taken into account when assessing all epochs. The assessment of deterioration with respect to the Directive considered the impact of any changes to the surface water body features (BQEs) that were identified in **Assessment Table 2**.

The assessment of SMP2 policies also included consideration of the potential for impact upon the landward freshwater bodies identified during the data collation phase as having the potential to be influenced by SMP2 policies (see **Section 2.1**). Landward freshwater bodies could potentially be impacted where the SMP2 policy for a Management Area is No Active Intervention (NAI) or Managed Realignment (MR) as these policy options could result in saline inundation of freshwater habitats and, hence, could potentially impact upon the freshwater biology.

In addition, the assessment of the SMP2 policies in **Assessment Table 3** also included consideration of the potential for impact upon GWBs. Particular attention was paid to Management Areas where the SMP2 policy is NAI or MR as these policies could potentially result in the saltwater – freshwater interface moving landward, which, coupled with abstraction pressures, could result in saltwater intrusion and deterioration of the GWB. For these Management Areas, the extent of groundwater abstractions was identified through the use of Zone 3 (total catchment of the groundwater abstraction) of the SPZ. Where Zone 3 of an abstraction was found to extend to the coastline, or where it extended to the long term (100 years) predicted shoreline, it was considered that an SMP2 policy could potentially cause deterioration in the quality of the abstraction due to saline intrusion. Consideration was also given to the potential for SMP2 policies to lead to deterioration in Status or Potential of the TraC water bodies as a result of groundwater pollution.

The outcomes of the assessment for each Management Area were then checked against the Environmental Objectives (as set out in **Section 2.1**). For each Policy Unit, it was recorded in **Assessment Table 3** whether the SMP2 policy has the potential to meet or fail the Environmental Objectives. Following the assessment of SMP2 policies for each Management Area, a summary of the achievement (or otherwise) of the Environmental Objectives was completed at the water body scale (**Assessment Table 4**).

Where it was identified that the Environmental Objectives are not met for one or more Management Areas and there is potential for deterioration in a water body, then the need for a Water Framework Directive Summary Statement was recorded in the final column of Assessment Table 4. The Summary Statement itself was completed for each water body in **Assessment Table 5**.

K3 RESULTS

K3.1 Scoping the SMP2 – Data Collation

K3.1.1 Transitional and Coastal water bodies (TraC)

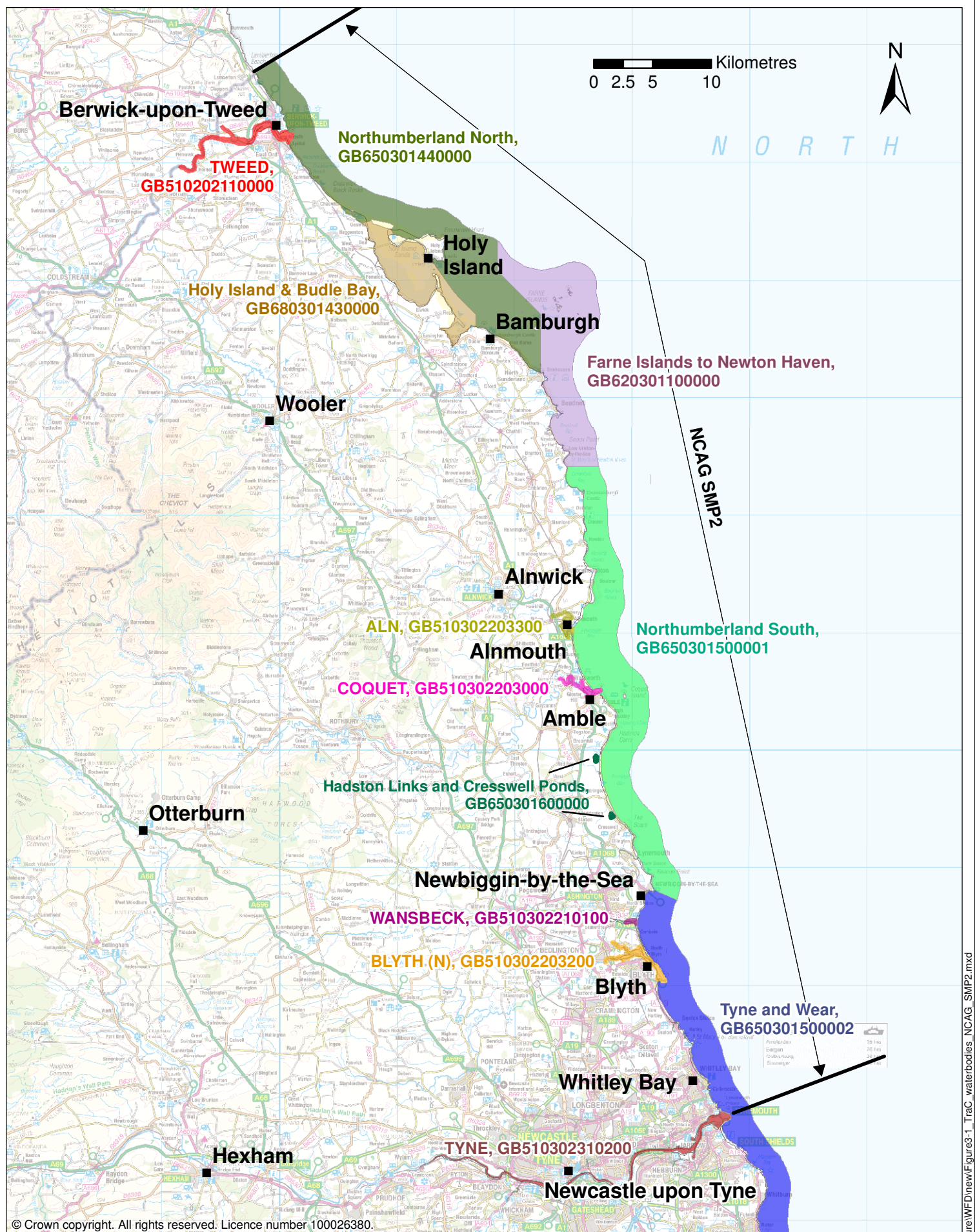
There are 12 TraC water bodies within the Northumberland SMP2 area (**Figure 3.1**). These include six coastal water bodies (Northumberland North, Holy Island & Budle Bay, Farne Islands to Newton Haven, Northumberland South, Hadston Links and Cresswell Ponds, and Tyne and Wear), and six transitional water bodies (Tweed, Aln, Coquet, Wansbeck, Blyth (N) and Tyne). Of these transitional water bodies all are designated as Heavily Modified except for the Aln and the Tweed. Both the Aln and the Tweed could be water bodies that are referred for review in the next round of RBMP as a large proportion of both estuaries are heavily modified by hard coastal defences.

K3.1.2 Freshwater bodies (FWBs)

After consulting the Environment Agency's Flood Map, several areas where the SMP2 policies could potentially impact upon landward FWBs were identified. Any River or Lake water bodies present within these risk areas were identified and are listed in **Table 3.1**. It should be noted that some River water bodies within the risk areas were ruled out from any further consideration in this assessment and, hence, are not included within **Table 3.1**. These were mainly ruled out because they are either located on a cliffed section of the coastline and/or have relatively (to the sea level) steeply sloping river channels meeting the sea at a point, or they are protected by flood defences and dunes. There is little potential flood plain and landward recession of the mouths of these freshwater rivers and is not likely to impact them as water bodies.

Table 3.1 Landward FWBs that have the potential to be impacted by policies in the Northumberland SMP2

Potential issue identified with respect to Freshwater bodies	Freshwater bodies that may be impacted by SMP2 policies (ID number)
Tweed Catchment Rivers SSSI – potential for changes in salinity, inundations and the presence of macrophytes due to saltwater inundation upstream of the estuary, which potentially could impact on the BQEs and lead to the loss of freshwater habitats.	Tweed (GB10202173070, GB102021072990, GB102021073010, GB102021073060, GB102021073090, GB102021073110) Whiteadder (GB102021073100)
Annstead Dunes – potential for saline inundation of the flood plain of Annstead Burn behind to dunes to create new saltmarsh.	Swinehoe Burn from Source to N Sea (GB103022077080)
Beadnell Bay – potential for increased flooding of the hinterland to the centre of the bay.	Brunton Burn from Source to N. Sea (GB103022076400) Long Nanny from Source to N. Sea (GB103022077070)
Embleton Bay – potential for saline inundation of low-lying flood plain behind the dune system.	Embleton Burn from Source to N Sea (GB103022076370)
Aln Estuary – potential for saline inundation of flood plain, particularly to the west of the estuary.	Hipsburn Catchment (trib of tidal Aln) (GB103022076240)



Title:
TraC water bodies within the
Northumberland SMP2 area

Project:
Northumberland SMP2

Client:
Wansbeck District Council

Date:
February 2009

Scale on A4:
1 : 415,000

Figure:
3.1

Drawn:
TC

Checked:
HC



K3.1.3 Groundwater bodies (GWBs)

Four groundwater bodies within the Northumbria SMP2 were identified, as indicated in **Table 3.2** and **Figure 3.2**. All GWBs have been defined as being at 'Good' chemical status under the WFD. With the exception of the Northumberland Carboniferous Limestone and Coal Measures groundwater body (G7002), which is assigned as being at 'Moderate' risk, all other GWBs are assigned as being 'Not At Risk' for saline intrusion under RBC2.

Table 3.2 Groundwater bodies that have the potential to be impacted by policies in the Northumberland SMP2

Potential issue identified with respect to Groundwater bodies	Groundwater bodies that may be impacted by SMP2 policies (ID number)
Solway Tweed – no risk of saline intrusion. No nearby abstractions.	Till Devonian and Carboniferous (GB40202G700100)
Solway Tweed – no assessment available of risk of saline intrusion as a new GWB. Three abstractions located south of the River Tweed.	Till Fell Sandstone (GB40302G703700)
Northumbria – moderate risk of saline intrusion. Bates minewater pumping at Blyth has the potential to pull in saline water due to its proximity to the coast.	Northumberland Carboniferous Limestone and Coal Measures (GB40302G700200)
Northumbria - no risk of saline intrusion. No nearby abstractions.	Tyne Carboniferous Limestone and Coal Measures (GB40302G701500)

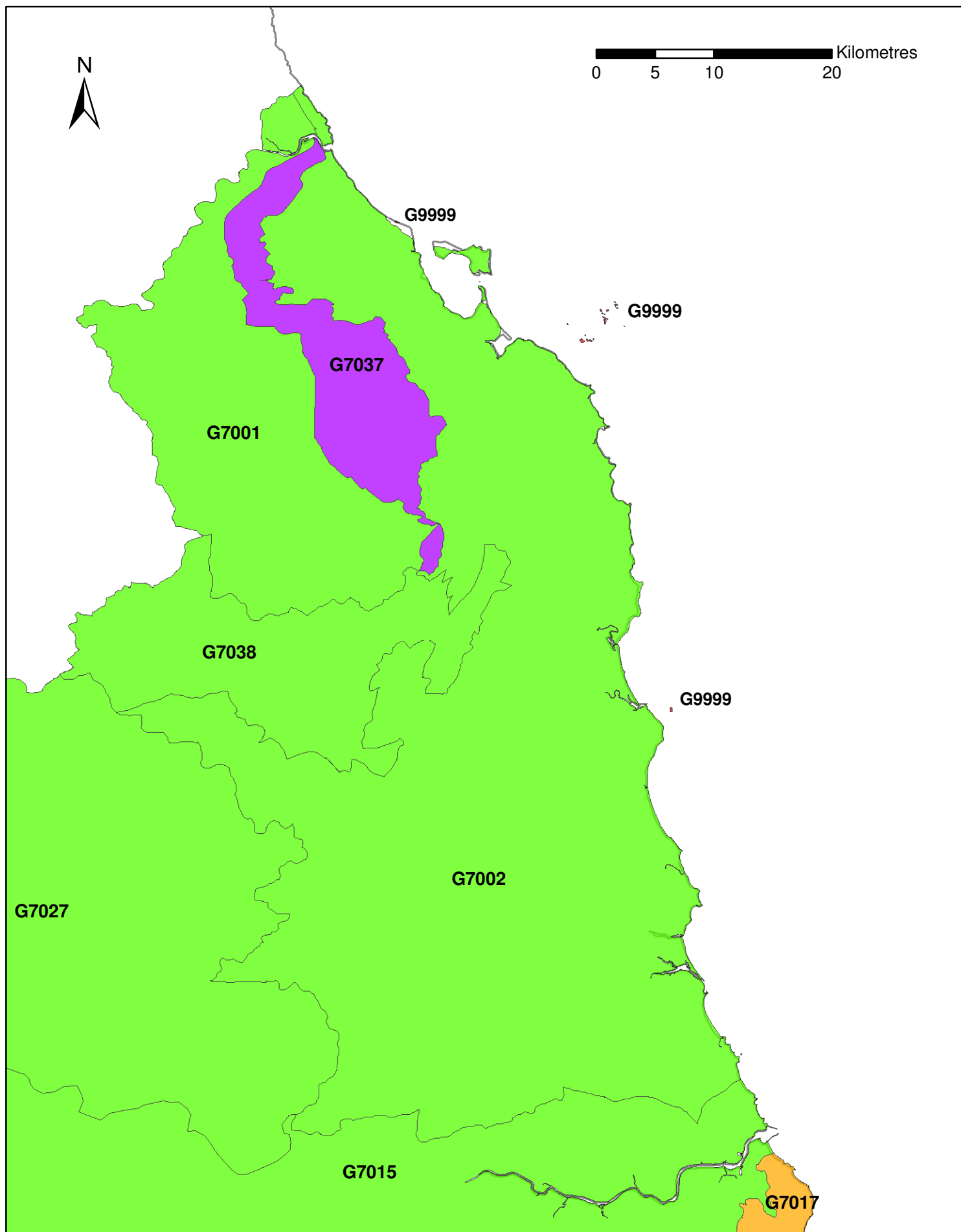
K3.1.4 Boundary issues

Boundary issues within the Northumberland SMP2 assessment area are fairly complex, especially around the Holy Island hinterland. The majority of the TraC water body boundaries are inconsistent with the SMP2 Management Area boundaries. The only locations where water body and SMP2 boundaries align are at the Scottish border; this is where the northern boundary of the Northumberland North coastal water body is the same as the northern boundary of the SMP2 area. At Amble the boundaries of the Coquet Transitional water body align to the boundaries of MA15 of the SMP2, and at Blyth Harbour the Blyth Transitional water body has the same boundaries as MA22 of the SMP2.

Although many of the SMP2 Management Area boundaries are inconsistent with water body boundaries they have been set on the basis of coastal processes and/or socio-economic reasons and, hence, it is often not appropriate to adjust them. There are, however, a few locations where the SMP boundary could be reconsidered in the future to logically align with the water body without affecting the SMP policy setting. These are the boundaries are shown in **Figures 3.3 and 3.4**. The boundaries between MA04 and MA05 on the south-east corner of Holy Island and at Bamburgh could be aligned with the boundary between the Holy Island & Budle Bay and the Northumberland North water bodies at these two locations (**Figure 3.3**). The SMP boundary between MA19 and MA20 could also be adjusted to align with the boundary between the Northumberland South and the Tyne and Wear water bodies (**Figure 3.4**). The southerly coastal water body (Tyne and Wear) extends outside of the SMP2 boundary for some distance to Hartlepool Headland. Thus potential changes in the southern part of this water body have been checked as part of the River Tyne to Flamborough Head SMP2 Water Framework Directive assessment (Royal Haskoning, 2008).



0 5 10 20 Kilometres



**Groundwater Body Saline
Intrusion Status and Confidence**

- GOOD, HIGH
- GOOD, LOW
- POOR, HIGH
- POOR, LOW
- Unproductive strata (not assessed)

Title:
Groundwater Bodies in the
Northumberland SMP2 area

Project:
Northumberland SMP2

Client:
Wansbeck District Council

Date:
February 2009

Scale:
1 : 415,000

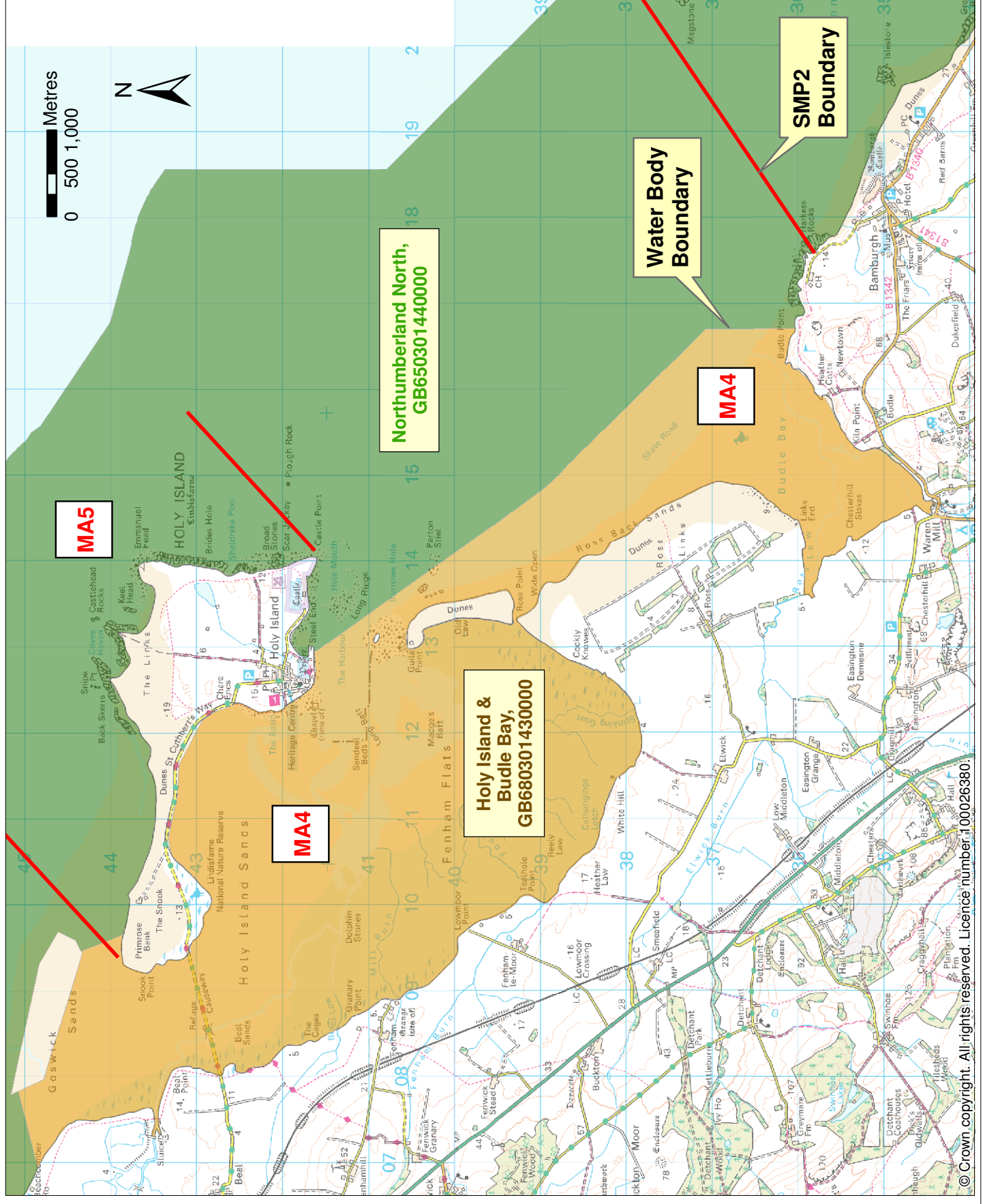
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RB

Source:
Environment Agency





Title:
SMP2 Management Area and WFD water body boundaries at Holy Island and Bamburgh

Project:
Northumberland SMP2

Client:
Wansbeck District Council

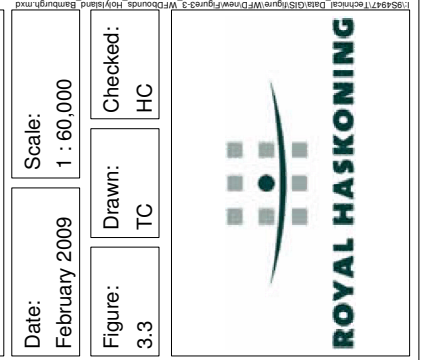
Date:
February 2009

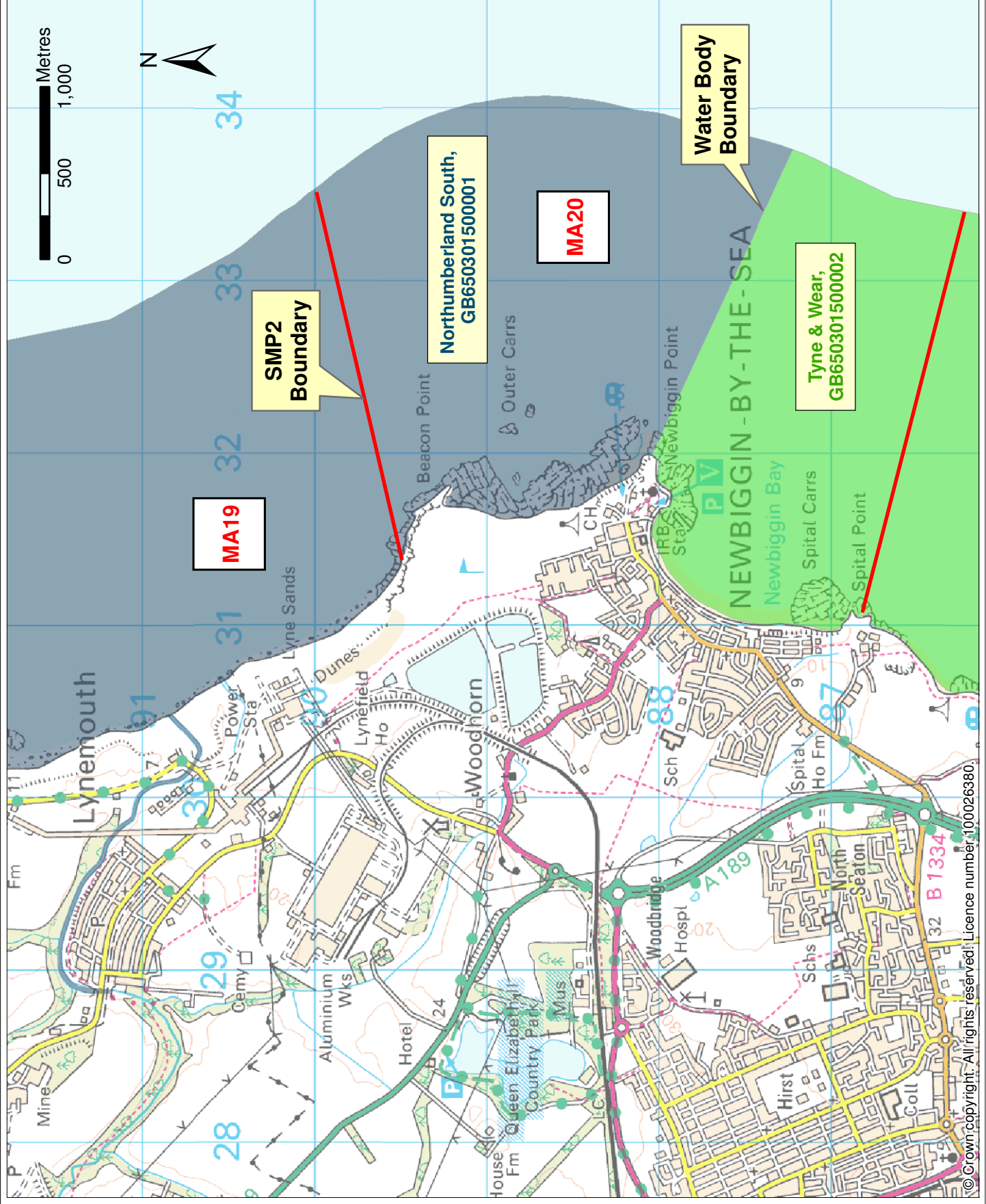
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Figure:
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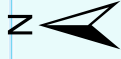
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HC





Metres
0 500 1,000



MA19

**SMP2
Boundary**

**Northumberland South,
GB650301500001**

MA20

**Water Body
Boundary**

**Tyne & Wear,
GB650301500002**

NEWBIGGIN-BY-THE-SEA

Newbiggin Bay

Spital Carrs

Spital Point

Beacon Point

Woodhorn

Woodbridge

Hospital

Sch

Spital

Ho Fm

North

Seaton

Coll

Hirst

Aluminium Wks

Hotel

House

Queen Elizabeth

Country Park

Mus

24

Fm

Mine

Lynemouth

Power Sta

Dunes

Lynemouth

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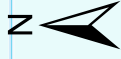
51

52

53

54

Metres
0 500 1,000



MA19

**SMP2
Boundary**

**Northumberland South,
GB650301500001**

MA20

**Water Body
Boundary**

**Tyne & Wear,
GB650301500002**

NEWBIGGIN-BY-THE-SEA

Newbiggin Bay

Spital Carrs

Spital Point

Beacon Point

Woodhorn

Woodbridge

Hospital

Sch

Spital

Ho Fm

North

Seaton

Coll

Hirst

Aluminium Wks

Hotel

House

Queen Elizabeth

Country Park

Mus

24

Fm

Mine

Lynemouth

Power Sta

Dunes

Lynemouth

29

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Title:
SMP2 Management Area and WFD
water body boundaries at
Newbiggin-by-the-Sea

Project:
Northumberland SMP2

Client:
Wansbeck District Council

Date:
February 2009

Figure:
3.4

Scale:
1 : 30,000

Drawn:
TC

Checked:
HC



ROYAL HASKONING

K3.2 Defining Features and Issues

For the TraC water bodies in the Northumberland SMP2 area, the hydromorphological parameters that could potentially be affected by SMP2 policies and the BQEs that are dependent upon these are shown in **Assessment Table 1**. The key features and issues for each water body in the SMP2 area are then summarised in **Assessment Table 2**, together with the classification and Environmental Objectives for each TraC water body. The features and issues are largely the same for each of the coastal water bodies, with the main difference being for the Hadston Links and Cresswell Ponds water body, which comprises brackish and freshwater lagoons (discussed within Northumberland South water body). Consequently, this water body has the potential to be affected by changes in salinity, turbidity and light levels as a result of SMP2 policies, in addition to the potential changes identified for the other coastal water bodies. The features and issues for the Transitional water bodies are similar to those for the coastal water bodies but with the added need to consider impacts on phytoplankton and the potential impacts for fish through changes to the heterogeneity of habitat and accessibility to nursery areas and migration routes.

There is one High Status water body in the Northumberland SMP2: the Farne Islands to Newton Haven water body, which includes the stretch of coastline between Seahouses and Low Newton. Environmental Objective WFD1 states that there should be no changes affecting high status sites (**Section 2.1**) and, hence, SMP2 policies within this section of the coastline will need particularly careful assessment.

Assessment Table 1
BQEs within TraC water bodies that could be affected by changes to hydromorphology as a result of relevant SMP policies

✓ = Applies to water body ? = Might apply and hence included

Feature	Issues	Water Body											
		Northumberland North	Holy Island & Budle Bay	Farne Islands to Newton Haven	Northumberland South	Hadston Links & Cresswell Ponds	Tyne and Wear	Tweed	Aln	Coquet	Wansbeck	Blyth (N)	Tyne
Biological Quality Element (BQE)	Potential for change in physical or hydromorphological parameter												
	Residence time							?	?	?	?	?	?
	Water depth					?		?	?	?	?	?	?
	Thermal regime												
Phytoplankton	Turbidity					?		?	?	?	?	?	?
	Episodicity (at low end of velocity spectrum)												
	Salinity					✓							
	Abrasion (associated to velocity)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Macroalgae	Inundations (tidal regime)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Sediment loading	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Land elevation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Salinity					✓							
	Abrasion (associated to velocity)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Angiosperms	Beach water table (TraC)	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
	Light					?							
	Groundwater connectivity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Availability of leaf litter/organic debris					✓							
	Connectivity with riparian zone												
Benthic/macro invertebrates	Heterogeneity of habitat (substrate, provision of shelter)		✓			✓		✓	✓	✓	✓	✓	✓
	Continuity for migration routes							✓	✓	✓	✓	✓	✓
	Substrate conditions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fish													

Feature	Issues	Water Body											
Biological Quality Element (BQE)	Potential for change in physical or hydromorphological parameter	Northumberland North	Holy Island & Budle Bay	Farne Islands to Newton Haven	Northumberland South	Hadston Links & Cresswell Ponds	Tyne and Wear	Tweed	Aln	Coquet	Wansbeck	Blyth (N)	Tyne
	Presence of macrophytes												
	Accessibility to nursery areas (elevation of Saltmarsh, connectivity with shoreline/riparian zone)	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓

Assessment Table 2 **Water Framework Directive Features and Issues for TraC water bodies in the Northumberland SMP2 (colour shading equivocates to the shaded water bodies in Figure 3.1)**

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
Northumberland North (MA01 – MA06)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP policies. For example, changes to control structures or defences may result in changes in wave and current dynamics and subsequent changes in abrasion patterns.	Classification: Good Ecological Status <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. Proposed Status Objective (from the draft RBMP for the Northumbria RBD): Good Status by 2015.
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated to velocity) which may impact upon angiosperms. In particular, there is potential for impact on dune flowering plants as this SMP2 has large stretches of sand dunes and policy options for these sections of coastline have the potential to result in changes to the dunes.	
	Benthic/macro invertebrates	SMP2 policies have the potential to cause changes in the beach water table and/or the groundwater connectivity upon which invertebrates are dependent. For example, at Berwick the breakwater affects the stability of sediment supplies to the Spittal frontage and changes to this control structure would have the potential to result in changes to beach levels.	
	Fish	Potential impacts on fish due to changes in substrate conditions and/or accessibility to nursery areas.	
Holy Island & Budle Bay (MA04)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP policies. For example, changes to natural control points, control structures or defences may result in changes in wave and current dynamics and subsequent changes in abrasion patterns. This is of particular concern at the entrances to the area behind Holy Island where flows are currently locally strong but could be changed as a result of SMP	Classification: Poor Ecological Status <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
		policies.	<p>Status or Potential.</p> <ul style="list-style-type: none"> WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. <p>Proposed Status Objective (from the draft RBMP for the Northumbria RBD): Good Status by 2027.</p>
	Angiosperms	SMP2 policies have the potential to impact angiosperms through changes to tidal inundations, sediment loading, land elevation and abrasion (associated to velocity). The area behind Holy Island has extensive areas of fringe saltmarsh as well as sand dunes at Ross Links.	
	Benthic/macro invertebrates	There is potential for changes to groundwater connectivity and/or the beach water table through changes in wave and erosion patterns along the coastline. This has potential to impact invertebrates particularly in relation to the extensive mud and sandflats behind Holy Island.	
	Fish	Potential impacts on fish due to changes in substrate conditions, heterogeneity of habitats and/or accessibility to nursery areas. Changes to control structures, natural controls and/or defences may lead to changes in wave patterns, resulting in changes in erosion and hence substrate conditions. There is also potential for changes in mudflats and sandflats which may result in changes to the accessibility of the area behind Holy Island, for example if the northern entrance was substantially closed.	
Farne Islands to Newton Haven (MA06 – MA09)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity) as a result of SMP2 policies.	<p>Classification: High Ecological Status</p> <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent
	Angiosperms	There are extensive widths of dunes backing the series of curved bays along this stretch of coastline and there is potential for SMP2 policies to result in changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated to velocity), which may impact upon dune flowering plants.	
	Benthic/macro invertebrates	SMP2 policies have the potential to result in changes to wave patterns, erosion and sediment transport which may lead to changes	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
		in beach water tables and groundwater connectivity and, hence, could have an impact upon invertebrates.	or compromise the Environmental Objectives being met in other water bodies.
	Fish	Fish have the potential to be impacted by SMP2 policies through changes to substrate conditions. The substrate could be affected by changes in wave and sediment dynamics as a result of policies.	<ul style="list-style-type: none"> WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. <p>Proposed Status Objective (from the draft RBMP for the Northumbria RBD): High Status by 2015.</p>
Northumberland South (MA09 – MA20)	Macroalgae	SMP2 policies have the potential to result in changes in abrasion (associated to velocity) through changes to wave and flow patterns. This potentially could impact upon macroalgae in the water body.	<p>Classification: Good Ecological Status</p> <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. <p>Proposed Status Objective (from the draft RBMP for the Northumbria RBD): Good Status by 2015.</p>
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated to velocity) which may impact upon angiosperms. There are extensive areas of dunes and saltmarsh along the coast in this water body, particularly at Alnmouth, Warkworth and Druridge Bay, and SMP2 policies have to potential to impact upon these.	
	Benthic/macro invertebrates	Invertebrates have the potential to be impacted by SMP2 policies through changes to beach water tables and groundwater connectivity. Changes in current patterns which could result from SMP2 policies may also impact upon invertebrates, particularly the benthos.	
	Fish	Fish have the potential to be impacted by SMP2 policies through changes to substrate conditions and/or accessibility to nursery areas. These parameters could potentially be affected by changes to control structures, natural controls or defences leading to changes in wave and sediment dynamics.	
Hadston Links and Cresswell Ponds	Phytoplankton	There is potential for SMP2 policies to result in changes in water depth and turbidity within the ponds since they are small water	Classification: Status not yet assessed.

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
(MA17)		bodies, which could potentially impact upon phytoplankton populations.	<ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Macroalgae	One of the ponds at Cresswell is a permanent brackish water lagoon whilst the other ponds are freshwater. As such, SMP2 policies have the potential to impact upon macroalgae through changes in salinity in the ponds. There is also potential for policies to result in changes in abrasion (associated to velocity) which could impact macroalgae.	
	Angiosperms	There is potential for changes in the frequency of tidal inundations, sediment loading, land elevation and abrasion (associated to velocity) which may impact upon angiosperms, in particular the dune ridge system at Hadston.	
	Benthic/macro invertebrates	Invertebrates have the potential to be impacted by SMP2 policies through changes to light, groundwater connectivity and/or the availability of leaf litter/organic debris in the ponds.	
	Fish	SMP2 policies have the potential to result in changes to the heterogeneity of habitat, substrate conditions and accessibility to nursery areas and, hence, could potentially impact upon fish.	
Tyne and Wear (MA20 – MA26)	Macroalgae	There are a series of both natural and artificial hard control points along this stretch of coastline and SMP2 policies have the potential to result in changes to wave and current patterns. This could, in turn, result in changes to abrasion (associated to velocity) and potentially impact upon macroalgae.	Classification: Moderate Ecological Status <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies.
	Angiosperms	SMP2 policies have the potential to impact angiosperms through changes to tidal inundations, sediment loading, land elevation and abrasion (associated to velocity). This could potentially impact upon the dune systems present along sections of this coastline.	
	Benthic/macro invertebrates	Invertebrates have the potential to be impacted by SMP2 policies through changes to beach water tables and groundwater connectivity. Changes in current patterns which could result from	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
		SMP2 policies may also impact upon invertebrates, particularly the benthos.	<ul style="list-style-type: none"> WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. <p>Proposed Status Objective (from the draft RBMP for the Northumbria RBD): Good Status by 2027.</p>
	Fish	Fish have the potential to be impacted by SMP2 policies through changes to substrate conditions and/or accessibility to nursery areas. These parameters could potentially be affected by changes to hard controls leading to changes in wave and sediment dynamics.	
Tweed (MA02)	Phytoplankton	There is potential for SMP2 policies to result in changes to the residence time of the estuary, the water depth and turbidity through changes to defences and/or hard control points. This potentially could impact upon phytoplankton populations within the estuary.	<p>Classification: Good Ecological Status</p> <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. <p>Proposed Status Objective (from the draft RBMP for the Solway Tweed RBD): Good Status by 2015.</p>
	Macroalgae	SMP2 policies could result in changes to wave and flow patterns in the estuary and, hence, could lead to changes in abrasion (associated to velocity) which may affect macroalgae.	
	Angiosperms	Changes to erosion and sediment supplies within the estuary potentially could result from SMP2 policies, which could lead to changes in sediment loading, land elevation and abrasion. Changes in defences or the alignment of the coastline have the potential to result in changes in the frequency of tidal inundations which could also affect angiosperms within the estuary (specifically saltmarsh and dune communities).	
	Benthic/macro invertebrates	Invertebrates have the potential to be impacted by SMP2 policies through changes to beach water tables and groundwater connectivity. Changes in current patterns which could result from SMP2 policies may also impact upon invertebrates, particularly the benthos.	
	Fish	There is potential for changes to substrate conditions, heterogeneity of habitats, continuity for migration routes and accessibility to nursery areas to result from SMP2 policies. For example, through	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
		changes to control structures (breakwater at the mouth and other defences along the estuary) and associated impacts on flow patterns and the sedimentary regime.	
Aln (MA13)	Phytoplankton	There is potential for SMP2 policies to result in changes to the residence time of the estuary, water depth and turbidity which could impact upon phytoplankton.	Classification: Not yet assessed <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Macroalgae	SMP2 policies could result in changes to wave and flow patterns in the estuary and, hence, could lead to changes in abrasion (associated to velocity) which may affect macroalgae.	
	Angiosperms	SMP2 policies have the potential to result in a change in the area subject to tidal inundation. In addition, there could also be a change to flows within the estuary. These changes potentially could lead to changes in abrasion, sediment loading and land elevation, with potential subsequent impacts on the saltmarsh and dunes in the estuary.	
	Benthic/macro invertebrates	Invertebrates in the estuary could be affected by changes in the beach water table and groundwater connectivity as a result of SMP2 policies, particularly within the mud and sandflats. Changes to flows and abrasion could also impact upon benthic invertebrates.	
	Fish	Fish have the potential to be impacted by SMP2 policies through changes to substrate conditions, habitat heterogeneity, continuity for migration routes and/or accessibility to nursery areas.	
Coquet (MA15)	Phytoplankton	There is potential for SMP2 policies to result in changes to the residence time of the estuary, the water depth and turbidity through changes to defences and/or hard control points. This potentially could impact upon phytoplankton populations within the estuary.	Classification: Not yet assessed (cHMWB) <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological
	Macroalgae	Potential for SMP2 policies to result in changes to flow and wave patterns could lead to changes in abrasion (associated to velocity)	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
		which has the potential to impact on macroalgae.	<p>Status or Potential.</p> <ul style="list-style-type: none"> WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Angiosperms	Angiosperms in the estuary have the potential to be impacted through changes to tidal inundations, sediment loading, land elevation and abrasion (associated to velocity – for example if there was to be a change to the breakwater/jetty). There is a particular issue in the Coquet estuary regarding the squeeze of saltmarsh against the natural rising land.	
	Benthic/macro invertebrates	SMP2 policies potentially could result in changes to the beach water table and/or groundwater connectivity, with potential impacts on invertebrates. Changes to flow and sedimentary regimes could also impact on invertebrates through changes to the extent of mud and sandflats in the estuary.	
	Fish	Changes to control structures leading to changes in wave and sediment dynamics, or changes in the alignment of the estuary could lead to changes in substrate conditions and heterogeneity of habitat. There potentially could also be changes to the accessibility to nursery areas and continuity of migration routes within the estuary, which could impact on fish.	
Wansbeck (MA21)	Phytoplankton	SMP2 policies have the potential to result in changes to residence time, water depth and/or turbidity in the estuary. In particular, management options in relation to the weir have the potential to impact upon these parameters and, hence, potentially impact phytoplankton.	<p>Classification: Not yet assessed (cHMWB)</p> <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being
	Macroalgae	There is potential for changes to abrasion (associated to velocity) which could impact on macroalgae in the estuary.	
	Angiosperms	SMP2 policies have the potential to result in changes to inundations, sediment loading, land elevation and/or abrasion in the estuary. Potential management options being considered for the Wansbeck estuary include weir removal and/or river training, which have	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
		potential to impact upon angiosperms.	<p>met in other water bodies.</p> <ul style="list-style-type: none"> WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.
	Benthic/macro invertebrates	SMP2 policies potentially could result in changes to the beach water table and/or groundwater connectivity, with potential impacts on invertebrates. Changes to flow and sedimentary regimes could also impact on invertebrates through changes to the extent of mud and sandflats in the estuary.	
	Fish	Fish have the potential to be impacted by SMP2 policies through changes to substrate conditions, habitat heterogeneity, continuity for migration routes and/or accessibility to nursery areas. In particular, management options for the estuary such as removal of the weir or diverting flows could impact upon fish populations in the Wansbeck.	
Blyth (N) (MA22)	Phytoplankton	SMP2 policies potentially could impact phytoplankton through changes to the residence time, water depth and/or turbidity in the estuary (e.g. through changes to the piers).	<p>Classification: Good Ecological Potential (cHMWB)</p> <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. <p>Proposed Status Objective (from the draft RBMP for the Northumbria RBD): Good Potential by 2027.</p>
	Macroalgae	There is potential for SMP2 policies to result in changes to flow and wave patterns (particularly as a result to changes in the management of the piers or realignment of the estuary) which could lead to changes in abrasion (associated to velocity) and, hence, potentially impact on macroalgae.	
	Angiosperms	Angiosperms in the estuary have the potential to be impacted through changes to tidal inundations, sediment loading, land elevation and abrasion (associated to velocity), for example if there was to be a change to the management of the piers or realignment of the estuary).	
	Benthic/macro invertebrates	Invertebrates in the estuary could be affected by changes in the beach water table and groundwater connectivity as a result of SMP2 policies, particularly within the mud and sandflats. Changes to flows and abrasion could also impact upon benthic invertebrates.	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
	Fish	Changes to control structures leading to changes in wave and sediment dynamics, or changes in the alignment of the estuary could lead to changes in substrate conditions and heterogeneity of habitat. There potentially could also be changes to the accessibility to nursery areas and continuity of migration routes within the estuary, which could impact on fish.	
Tyne (MA27)	Phytoplankton	Phytoplankton have the potential to be impacted through changes to the residence time, water depth and/or turbidity in the estuary (e.g. through changes to the piers).	Classification: Moderate Ecological Potential (cHMWB) <ul style="list-style-type: none"> WFD1: No changes affecting high status sites. WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential. WFD3: No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies. WFD4: No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status. Proposed Status Objective (from the draft RBMP for the Northumbria RBD): Good Potential by 2027.
	Macroalgae	There is potential for SMP2 policies to result in changes to flow and wave patterns (particularly if there was to be a change in the management of the piers) which could lead to changes in abrasion (associated to velocity) and, hence, potentially impact on macroalgae.	
	Angiosperms	Changes to erosion and sediment supplies within the estuary potentially could result from SMP2 policies, which could lead to changes in sediment loading, land elevation and abrasion. Changes to the piers would have the potential to result in changes in the frequency of tidal inundations which could also affect angiosperms.	
	Benthic/macro invertebrates	SMP2 policies potentially could result in changes to the beach water table and/or groundwater connectivity, with potential impacts on invertebrates. Changes to flow and sedimentary regimes could also impact on invertebrates.	
	Fish	There is potential for changes to substrate conditions, heterogeneity of habitats, continuity for migration routes and accessibility to nursery areas to result from SMP2 policies. For example, through changes to control structures (i.e. the piers at the mouth and other defences along the estuary) and associated impacts on flow	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
		patterns and the sedimentary regime.	

K3.3 Assessment of the SMP2 Policy against the Environmental Objectives

Assessment Table 3 below expands on the assessment of the SMP2 policies, indicating whether there is potential for environmental objectives to be compromised at a Management Area scale. Further to the Management Area scale assessment, an assessment of the effect of potential failure at the Waterbody scale is made in **Assessment Table 4**. Both **Assessment Tables 3** and **4** identify potential for failure and consequently track the decisions that have been made within the SMP to meet conditions required to defend any later failure. The process enables key potential areas of concern to be flagged up and considered later at the strategy or scheme level.

Assessment Table 3 WFD Assessment of SMP Policy for the Northumberland SMP2 (colour shading equivocates to the shaded water bodies in Figure 3.1)

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
MA01	North of Berwick	1.1	St John's Cliffs	NAI	NAI	NAI	The SMP2 policy supports the natural development of the coastline but with short-term defence of Fisherman's Haven. Maintenance of the breakwater and short sections of defence at Fisherman's Haven should result in the maintenance of the sand foreshore in the short-term. In the longer-term, there would be increased erosion as the breakwater and local defences at the back of the beach fail. However, Managed Realignment should help to ensure that a sand foreshore is maintained at this location and, therefore, deterioration in surface water Ecological Status is considered unlikely as a result of SMP2 policy.	N/A	✓	✓	✓
		1.2	Fisherman's Haven	HTL	MR	NAI		N/A	✓	✓	✓
		1.3	Pier Cliffs	NAI	NAI	NAI		N/A	✓	✓	✓
MA02	Tweed Estuary	2.1	North Breakwater	HTL	HTL	HTL	The continued defence of the estuary should maintain the current shape and habitats within the estuary, although some intertidal areas may be lost due to sea level rise. Maintenance of the defences and recognition of the need to increase defence crest levels due to sea level rise should limit the potential for impact on upstream freshwater habitats in the Tweed Catchment Rivers SSSI. There is the potential for some loss of sediment from the foreshore at Sandstell Point and Spittal, which may potentially impact upon angiosperms and benthic/macro invertebrates. However, in mitigation for some of this potential loss of	N/A	✓	✓	✓
		2.2	Inner Estuary North	HTL	HTL	HTL		N/A	✓	✓	✓
		2.3	Inner Estuary South	HTL	HTL	HTL		N/A	✓	✓	✓
		2.4	Sandstell Point	MR	HTL	HTL		N/A	✓	✓	✓
		2.5	Spittal	HTL	HTL	HTL		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							<p>sediment, there is scope for Managed Realignment at Sandstell Point. The intention is that this would create a more stable condition for retaining sediment, with minor enhancement of dunes and saltmarsh. Therefore, deterioration in Ecological Status is considered unlikely.</p> <p>There are three licensed groundwater abstractions located in Berwick within the Till Fell Sandstone GWB. Two are designated SPZs, whilst the third is not designated and is adjacent to the Tweed estuary within PU2.3. The policies for the inner estuary and Sandstell Point comprise of HTL and MR, respectively. HTL will ensure that the defences are maintained, though an assessment will be required to determine the need for upgrading the defences. MR of Sandstell Point will pull the shoreline forward, creating habitat. Both policies will not result in the shoreline retreating, and therefore it is considered unlikely that the policies will impact the abstractions and result in deterioration of groundwater status (Environmental Objective WFD4).</p>				
MA03	Scremerston Cliffs	3.1	Scremerston Cliffs	NAI	NAI	NAI	The policy supports the natural development of this stretch of rocky coastline and existing processes are likely to persist. Therefore, deterioration in Ecological Status is considered unlikely.	N/A	✓	✓	✓
MA04	Holy Island Hinterland	4.1	North and South Low	MR	MR	MR	The SMP2 policy supports the long-term natural development but with maintenance of access to Holy	N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
		4.2	Beal Point and causeway	NAI	NAI	NAI	<p>Island and defence of the Holy Island harbour. The combined policies of HTL and MR at Ross Low are to maintain two flood defences in order to defend the dune system on the headland from being eroded away and allow dune accretion. At Waren Mill a small section of the coastline is being held, whilst the rest of the bay is being allowed to behave naturally. These HTL policies do not have the potential to change the geomorphology or hydrodynamics of the area. Defence of Holy Island village and harbour should also not result in changes to the geomorphology or hydrodynamics. MR at North and South Low will allow the dunes to roll back, whilst maintaining hinterland flood defences and stopping saline inundation, which is why there is no potential impact on the freshwater bodies (North Low from Berrington Burn to N. Sea and South Low from Source to N. Sea) in the low lying area behind. The assessment therefore determines that deterioration in Ecological Status for both the surface water bodies and freshwater bodies is considered unlikely.</p>	N/A	✓	✓	✓
		4.3	Fenham	NAI	NAI	NAI		N/A	✓	✓	✓
		4.4	Ross Low	HTL	HTL	MR		N/A	✓	✓	✓
		4.5	Waren Mill	HTL	HTL	HTL		N/A	✓	✓	✓
		4.6	Shell Road (Holy Island)	MR	MR	MR		N/A	✓	✓	✓
		4.7	Holy Island Clay Cliff	NAI	NAI	NAI		N/A	✓	✓	✓
		4.8	Holy Island Harbour	HTL	HTL	HTL		N/A	✓	✓	✓
MA05	Holy Island North and East	5.1	North coast	NAI	NAI	NAI	<p>The plan is to allow the natural development of the coastline and, hence, there is unlikely to be deterioration in Ecological Status as a result of the SMP2 policy.</p>	N/A	✓	✓	✓
		5.2	East coast	NAI	NAI	NAI		N/A	✓	✓	✓
MA06	Budle Bay to Seahouses	6.1	Bamburgh and St Aiden's dunes	NAI	NAI	NAI	<p>The SMP2 policy supports the natural development of the coastline but with maintained defence of</p>	N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
		6.2	North Seahouses	HTL	HTL	MR	Seahouses village. There will be some loss of width to both Bamburgh Dunes and St Aiden's Dunes as a result of rising sea levels and hence natural squeeze against a higher coastline. However, this loss will be due to a natural process, and as such it is not considered as potential deterioration in Ecological Status due to the SMP2 policy. Continued defence of Seahouses and North Seahouses may result in loss of foreshore rock outcrop as existing outcrops are submerged and hard defences prevent erosion from exposing new rock outcrop. Though the MR of the road in the third epoch at North Seahouses will reduce potential for coastal squeeze. Hence there is potential for deterioration in surface water Ecological Status as a result of the SMP2 policy.	N/A	✓	✓	✓
		6.3	Seahouses	HTL	HTL	HTL		N/A	x	✓	✓
		6.4	South Seahouses	NAI	NAI	NAI		N/A	✓	✓	✓
MA07	Seahouses to Beadnell Bay	7.1	Annstead Dunes	NAI	NAI	NAI	Policy supports the natural development of the coastline with potential for developing the floodplain of Annstead Burn to create new saltmarsh. Hence, deterioration in surface water Ecological Status of the coastal water body is unlikely, but there is potential for deterioration in the Ecological Status of the landward freshwater body 'Swinehoe Burn from Source to N Sea' as a result of potential changes in salinity and inundations, which would impact on the freshwater biology.	✓	✓	x	✓
		7.2	Beadnell Links	NAI	NAI	NAI		✓	✓	✓	✓
MA08	Beadnell and Beadnell Bay	8.1	Beadnell North	HTL	HTL	HTL	The plan aims to allows for the natural development of the much of the coastline, whilst protecting Beadnell	x	x	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
		8.2	Beadnell South	HTL	HTL	HTL	Village and Beadnell Harbour, and managing the semi-natural development of Beadnell Bay. Defending the village may potentially result in a small loss of the foreshore rocky outcrop as the existing intertidal outcrops are submerged and hard defences avert erosion from exposing new rock outcrop. There will be partial mitigation for this loss by keeping the vegetated headlands within the SMP2 undeveloped so that they can erode back naturally. Based on this assessment, there is potential for change affecting the high status water body and potential for deterioration in surface water Ecological Status as a result of the SMP2 policy. Furthermore, the opportunity to allow increased inundation of the flood plain behind the dune system of Beadnell Bay South means though there will be creation of saltmarsh habitat. However, there is potential for deterioration in Ecological Status or potential failure to meet Environmental Objectives of two designated landward freshwater bodies (Brunton Burn from Source to N Sea and Long Nanny from Source to N Sea) through changes to salinity and tidal inundations that could potentially impact upon the freshwater BQEs.	x	x	✓	✓
		8.3	Beadnell Harbour	HTL	HTL	HTL		✓	✓	✓	✓
		8.4	Beadnell Bay North	MR	MR	MR		✓	✓	✓	✓
		8.5	Beadnell Bay South	NAI	NAI	NAI		✓	✓	x	✓
MA09	Embleton Bay	9.1	Football Hole and headlands	NAI	NAI	NAI	The SMP2 policy recognises the need to maintain the highly important assemblage of habitats within this high status water body. The natural development of the coastline will be encouraged through NAI and MR and	✓	✓	✓	✓
		9.2	Low Newton	HTL	HTL	HTL		✓	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
		9.3	Chuck Bank	MR	MR	NAI	Low Newton will be defended by maintaining the existing natural dune and beach system. Therefore, potential for change affecting a high status water body and deterioration in surface water Ecological Status of the coastal water body is unlikely. At Embleton Bay the policy of NAI means there is potential for saline inundation of the low-lying flood plain behind the dune system. As such, there is potential for deterioration in Ecological Status or failure to meet Environmental Objectives of the landward freshwater body 'Embleton Burn from Source to N Sea' through changes to salinity and tidal inundations.	✓	✓	✓	✓
		9.4	Embleton	NAI	NAI	NAI		N/A	✓	x	✓
MA10	Castle Rock to Boulmer	10.1	Dunstanburgh	NAI	NAI	NAI	The plan is for natural development of the coastline, particularly with respect to continued exposure of rock platforms, but with defence of the harbour and village at Craster. The cliffs and foreshore are rocky, with little erodable till material. Therefore, it is anticipated that for the majority of the management area the rocky cliffs will erode back naturally so that there is little potential for habitat loss with sea level rise, however, this will potentially not be the case at Craster, where the defences will be maintained. Therefore, there is potential for there to be deterioration in surface water Ecological Status as a result of the SMP2 policy.	N/A	✓	✓	✓
		10.2	Craster	HTL	HTL	HTL		N/A	x	✓	✓
		10.3	Howick	NAI	NAI	NAI		N/A	✓	✓	✓
MA11	Boulmer to Seaton Point	11.1	Boulmer Village	HTL	HTL	MR	The SMP2 policy supports the natural development of the coastline but with maintenance of the low level	N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
		11.2	Seaton Point	NAI	NAI	NAI	defences of Boulmer Village. The majority of the foreshore for this stretch of coastline consists of rocky intertidal and subtidal reef outcrops, which act as barriers reducing exposure at the shore. There is also a small sandy beach south of Boulmer Village. The sand and till vegetated backshore could be vulnerable to erosion with sea level rise, so in the long term it has been identified that there may be a need for additional defence to retain this beach material but through Managed Realignment, which will allow the coastline to move slightly landward. Therefore, deterioration in Ecological Status is considered unlikely.	N/A	✓	✓	✓
MA12	Foxton Bay	12.1	Foxton Bay	MR	NAI	NAI	The plan is to maintain the natural realignment of much of Foxton Bay, allowing both the natural erosion of the rock outcrops to the north and south of the bay and the sandy beach in between, thus maintaining the ecological function. The natural development of the bay means there will be no foreshore squeeze, meaning no loss of habitat during sea level rise. The defences at Foxton Hall will, however, be maintained, and as the bay develops over time actions will be developed to allow the necessary realignment of the defences and bay access. The defended area, and south of it, may experience some loss of rocky foreshore outcrop as existing outcrops are submerged and defences prevent erosion from exposing new rock, which potentially could impact upon macroalgae and	N/A	✓	✓	✓
		12.2	Golf Club	HTL	MR	HTL		N/A	✓	✓	✓
		12.3	Marden Rocks	NAI	NAI	NAI		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							macro invertebrates, though this would be minimal due to the area being small. Therefore, it is considered that there will be no potential for deterioration in the surface water Ecological Status as a result of the SMP2 policy.				
MA13	Alnmouth	13.1	North Links	MR	MR	MR	The policy has three distinct aspects to the management of this area. The defences around the built up areas of the estuary mouth will be managed in order to maintain the integrity of Alnmouth residential areas and the entrance to the estuary channel. Whilst those defences along low-lying agricultural land will be realigned so as to address the problem of sea level rise and attempt to reduce squeeze on protected habitats around the estuary mouth. To the north, the coast (Alnmouth golf course) will be realigned, whilst maintaining and increasing the dune system. To the south, the North Northumberland Dune SAC will be left to develop naturally. The increase in the tidal prism, together with sea level rise, erosion of the estuary mouth and sediment loading will result in loss of some of estuarine mudflat and saltmarsh areas, particularly on the southern side of the estuary. The change in the tidal prism could also cause a change in hydrodynamics and sediment movements along Alnmouth Beach and Bay, which could impact on the benthic/macro invertebrate communities, potentially changing the type of communities present. There could be changes in the water depth and turbidity in the	N/A	✓	✓	✓
		13.2	Golf Links	MR	MR	MR		N/A	✓	✓	✓
		13.3	Alnmouth Corner	HTL	HTL	HTL		N/A	x	✓	✓
		13.4	Estuary Outer North	HTL	HTL	HTL		N/A	x	✓	✓
		13.5	Bridge frontage	HTL	HTL	HTL		N/A	x	✓	✓
		13.6	Estuary Inner	MR	MR	MR		N/A	✓	x	✓
		13.7	Estuary Outer South	NAI	NAI	NAI		N/A	✓	✓	✓
		13.8	Church Hill	HTL	HTL	HTL		N/A	x	✓	✓
		13.9	Buston Links	NAI	NAI	NAI		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							estuary which could impact upon phytoplankton communities. It is unlikely however, that there will be any significant change in the access to the River Aln, meaning little or no potential change for migrating fish. It is considered that there is potential for deterioration in surface water Ecological Status (yet to be assessed) as a result of the SMP2 policy. The Aln waterbody could be one that is referred for review as a large proportion of it is heavily modified by coastal defence. It should be noted that the Managed Realignment of the golf course should create intertidal sand banks and rocky foreshore. Though the Managed Realignment in the Inner Estuary should help to mitigate for some of the loss in estuarine intertidal mudflats, sandbanks and saltmarsh habitats there is potential for saline inundation of the flood plain. As such, there is potential for deterioration in Ecological Status or failure to meet Environmental Objectives of the landward freshwater body 'Hipsburn Catchment (trib of tidal Aln)'.				
MA14	Birling Links	14.1	Birling Links	NAI	NAI	NAI	The SMP2 policy supports the natural development of the coastline from Aln through to the North Breakwater, allowing the existing processes to persist. Therefore, deterioration in Ecological Status is considered unlikely. There is to be a period of Managed Realignment of the sediments adjacent to the North Breakwater to encourage a build up of sediments in the corner of the beach as at present sediments move north away from	N/A	✓	✓	✓
		14.2	Breakwater Dunes	MR	MR	NAI		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							this area. Following this, the coastline will be left to develop naturally again. In this area there will be no coastal squeeze as there are no hard defences, instead the Managed Realignment will create dune and beach habitat on the edge of the Warkworth Dunes and Saltmarsh SSSI. There is potential though for some impact on benthic/macro invertebrates of the beach system from the increase in sediments which will change the land elevation, water table level and exposure. However, it is still considered that deterioration in Ecological Status due to SMP2 policy is unlikely.				
MA15	Amble	15.1	North Breakwater	HTL	HTL	HTL	The plan aims to maintain and protect Amble harbour and town through maintaining existing defences. The maintenance of the South Jetty may result in some loss of the foreshore rocky outcrop due to sea level rise and subsequent coastal squeeze. The maintenance of the defences within the harbour and marine areas together with sea level rise will result in loss of important designated salt marsh and estuarine habitats, as existing habitats are submerged and the hard defences prevent the creation of further estuarine habitats. The loss of these habitats has the potential to impact on resident and migratory fish communities with the loss of available food items (benthic/macro invertebrates) and habitat for shelter. There is opportunity to mitigate for the loss of estuarine and salt marsh areas through	N/A	x	✓	✓
		15.2	Inner Estuary	MR	MR	MR		N/A	✓	✓	✓
		15.3	Marina Area	HTL	HTL	HTL		N/A	x	✓	✓
		15.4	Harbour	HTL	HTL	HTL		N/A	x	✓	✓
		15.5	South Jetty	HTL	HTL	HTL		N/A	x	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							Managed Realignment in the middle of the estuary, which will also enhance the protected dune system. However, this may change the water depth and turbidity in the estuary that could potentially impact upon phytoplankton populations within the estuary. The Coquet waterbody has not yet been assessed. As the intent of the plan it to maintain present management whilst increasing estuarine habitat, should no large scale measures be identified that could be taken it is not considered that there would be a deterioration in the Ecological Potential of the Coquet waterbody through SMP policy. However, as this has not yet been assessed, the precautionary approach has been taken and the potential for a deterioration in Ecological Potential has been assumed. It is also worth noting, that with sea level rise the small undesignated freshwater body (Guilder's Burn) in the flood plain to the east of the River Able has the potential to experience saline inundation.				
MA16	South Amble	16.1	Island View Bay	HTL	HTL	HTL	The SMP2 policy aims to maintain the defences at Pan Point and Island View, whilst allowing the natural adjustment of the coastline between Island View and Beacon Hill, particularly to allow the dunes to naturally roll back. The maintenance of the hard defences together with sea level rise will result in a small loss of designated intertidal rocky shore, as the existing shore will become submerged with water level increases and	N/A	✓	✓	✓
		16.2	Amble Links	MR	NAI	NAI		N/A	✓	✓	✓
		16.3	Coquet Bay	NAI	NAI	NAI		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							hard defences prevent the erosion of any new rocky shore habitats. However, Managed Realignment at Amble Links will mitigate for this loss, as the rocky shore and sandy beach will be maintained and even enhanced at Amble Links. It is therefore, considered that there is no potential for deterioration in surface water Ecological Status.				
MA17	Beacon Hill to Creswell	17.1	Beacon Hill Links	MR	MR	MR	The policy plan is to actively manage the coast through Managed Realignment, whilst maintaining existing defences at the villages of Low Hauxley and Creswell. The northern headland (Beacon Carrs to Bondi Carrs) is predominantly a rocky headland that is formed of relatively soft erodible tills underlain with a harder rock base. The backshore consists of coastal scrubland, with a relatively wide sandy foreshore and rocky subtidal platform. Where there are defences along the Low Hauxley village frontage there will be some loss of sediments from the sandy foreshore, and with sea level rise the beach will become narrower, which could potentially impact upon angiosperms and benthic/macro invertebrates, as a result in changing land elevation, beach water table and abrasion from eroding sediments. However, through MR of Druridge Bay the dune system will be allowed to develop naturally so that the dunes roll back, with a small area of increased sandy foreshore below Ladyburn lake, which will mitigate for the small loss of sandy beach at	N/A	✓	✓	✓
		17.2	Low Hauxley	HTL	HTL	HTL		N/A	✓	✓	✓
		17.3	Druridge Bay north	MR	MR	MR		N/A	✓	✓	✓
		17.4	Druridge Bay south	MR	MR	MR		N/A	✓	✓	✓
		17.5	Creswell	HTL	HTL	HTL		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							Low Hauxley. This management will also increase drainage and therefore improve the flood defence to the low lying land behind. Therefore, there will be no potential cause for saline intrusion to the number of freshwater (Chevington Burn from Steads Burn to tidal limit, High Hauxley Coastal Area, and Ladyburn Lake - undesignated) and brackish ponds (Hadstone Links (PU17.4) and Cresswell Ponds (PU17.5)) in the flood plain behind Druridge Bay. At Cresswell village the maintenance of the defences, with sea level rise may cause a small loss of habitat of the Scars rocky headland as it becomes more submerged; this could potentially result in changes in water depth, currents and water flow, which in turn could potentially impact macroalgae through changes in abrasion and light levels. Overall, deterioration in the surface water Ecological Status within this Management Area and nearby freshwater bodies is unlikely as a result of the SMP2 policy.				
MA18	Snab Point	18.1	Broad Sands Rock	MR	NAI	NAI	The SMP2 policy aims to allow the natural development of this stretch of coastline, with the plan to realign the coast road as it is an important road link. The coast would be able to erode back naturally, so that as the sea level rises new intertidal rocky and sandy beach areas would be exposed resulting in no coastal squeeze; this would particularly be the case at Broad Sands Rock. The long-term natural retreat of cliff and	N/A	✓	✓	✓
		18.2	Snab Point	NAI	NAI	NAI		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							littoral rock habitat is not likely to significantly affect the physical and hydromorphological parameters (e.g. changes in abrasion, inundation, land elevation, etc). It is worth noting though that with sea level rise and some erosion of the hard rocky cliffs at Snab Point, the small undesignated water body on top of the cliff at Snab Point has the potential to be overtopped later in the SMP policy, thus becoming a brackish water body. Overall, deterioration in Ecological Status is not considered likely as a result of the SMP2 policy.				
MA19	Lynemouth Bay	19.1	Lynemouth north	NAI	MR	MR	The plan is to continue protecting the coastline around the coal and steel power station for the majority of the policy, whilst allowing the rest of the Lynemouth Bay to progress naturally. In the latter part of the policy, the coastline will be realigned based on a land use plan. Prior to allowing the coast to progress naturally (which would lead to habitat creation) the integrity of the coastline must be maintained until detailed investigations of the area and its land use have been carried out. In the past large amounts of mining waste were tipped into the bay, and therefore if the coastline was allowed to erode back naturally, the integrity of the coastal and marine environment would undoubtedly be at risk from deteriorating. Providing these measures are taken it is anticipated that there will be no significant changes to the hydromorphological and water quality parameters that would impact on the	N/A	✓	✓	✓
		19.2	Power station	HTL	HTL	MR		N/A	✓	✓	✓
		19.3	Lynemouth Dunes	NAI	NAI	MR		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							macroalgae, benthic/macro invertebrate and fish species of the area. There is also the potential for loss of some saltmarsh habitat around the mouth of the River Lyne due to rising sea levels, and for the tidal limit to extend a little further up the river. Though this could have the potential to impact upon the freshwater body BQEs (Lyne from Source to Tidal Limit) it is unlikely. Whilst, south of the power station the area is developing into a dune system, which would be allowed to form and roll back naturally over the course of the SMP2 policy. Overall, deterioration in Ecological Status (yet to be assessed) of the water body within this Management Area is not considered likely as a result of the SMP2 policy.				
MA20	Newbiggin	20.1	Newbiggin Moor	NAI	NAI	MR	The SMP2 policy is to maintain the existing defence of Newbiggin Bay, whilst allowing a more natural development of the headland, with the exception of maintaining the defences at Newbiggin Point where there is a cliff top cemetery. The headland consists of two hard rocky outcrops (Beacon Point and Newbiggin Point) with a soft erodable till beach lying between. Leaving Newbiggin Moor to progress naturally allows for the sand dunes fronting the golf course to roll back naturally. Newbiggin Bay is protected by Church Point breakwater and a recently constructed low crested breakwater in the middle of the bay, both of which will have changed the local geomorphology and	N/A	✓	✓	✓
		20.2	Newbiggin Point	HTL	HTL	HTL		N/A	✓	✓	✓
		20.3	Newbiggin Bay	HTL	HTL	HTL		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							hydrodynamics. The recent beach recharge will have changed the benthic communities from that previously. The change in sedimentary regime may impact on the rocky headlands either side of Newbiggin, which will have, and could continue with maintenance, to have small impacts on macroalgae on the adjacent headlands due to changes in abrasion. In compensation, the breakwater will provide additional hard surfaces for colonisation by macroalgae, macro invertebrates and fish species. Overall, it is therefore considered that deterioration in Ecological Status is unlikely as a result of the SMP2 policy.				
MA21	Spital Point to Blyth East Pier	21.1	Spital Point	NAI	NAI	NAI	The aim of the plan is to allow the coast north of Wansbeck Estuary to respond naturally. The rock platforms of Spital Point are relatively resistant to erosion, so sea level rise will cause the submergence of the rock platform and, where the backshore is erodable soft till (e.g. Hawks Cliff), the coastline will roll backwards. The eroded material from the soft cliffs contributes to the beach and sand dune system on the north bank of the estuary. Any significant change in the amount of suspended sediments from the cliffs may impact on macroalgae species through abrasion, though any increase in material for the sand dunes is beneficial to angiosperms. There is potential for medium and long term realignment (weir removal and/or river training/control points) within the estuary,	N/A	✓	✓	✓
		21.2	Hawks Cliff	NAI	NAI	NAI		N/A	✓	✓	✓
		21.3	Sandy Bay	NAI	NAI	NAI		N/A	✓	✓	✓
		21.4	Wansbeck Estuary	NAI	MR	MR		N/A	✓	✓	✓
		21.5	Cambois Beach	MR	HTL	HTL		N/A	✓	✓	✓
		21.6	Blyth East Pier	HTL	HTL	HTL		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							<p>which will enable the estuary mouth to respond naturally. If, for example, the weir was to be removed, there would be large impacts on the present environment, in that there would be tidal inundation further up the Wansbeck Estuary, and the original intertidal mudflats would once again be exposed. This would result in changes in the hydrodynamics and sediment transport within the estuary and mouth, which would influence the geomorphology of the estuary and impact upon the phytoplankton communities, benthic/macro invertebrates, angiosperms and fish. Though there would be large changes, this would not cause deterioration in the water body, as the natural course of the estuary would be returned to that prior to the weir being in place. Cambois Bay to the south of the Wansbeck estuary is to have selective works (e.g. groynes) to assist realignment and to ensure that the dunes are not breached. This will mean some loss of sandy beach habitat, though the creation of buffer zones in places between the coastline and any regeneration will allow the soft cliffs and dune system to roll back, with very little or no loss in coastal margin. Blyth East Pier is to be maintained, though as there is no erodible material behind it (as this is the mouth of the Blyth Estuary), the rocky outcrops in front will be lost naturally due to sea level rise. Overall, it is therefore considered that potential for deterioration in</p>				

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							Ecological Status (yet to be assessed) is unlikely as a result of the SMP2 policy. It should be noted that the Managed Realignment at Wansbeck will mitigate for some of the habitat loss in Cambois Bay.				
MA22	Blyth Harbour	22.1	Blyth Harbour	HTL	HTL	HTL	<p>The SMP2 policy for Blyth Harbour is to HTL. The harbour and its approaches have historically been defended and the SMP2 represents no changes from previous policy. The inner estuary (upstream from the former Bates Colliery on the south bank and Blyth Coal Staithes on the north bank) lies outside of the boundary of the SMP2. Therefore, the saltmarsh and mudflats within this part of the Blyth (N) water body are not likely to be affected by the HTL policy within Blyth Harbour.</p> <p>Blyth (N) is currently at GEP. As the intent of the plan it to maintain present management and no large scale measures have been identified that could be taken, it is not considered that there would be deterioration in the Ecological Potential through SMP policy. However, localised opportunities should be sought.</p>	N/A	✓	✓	✓
MA23	Blyth West Pier to Seaton Sluice	23.1	Blyth West Pier to Beach Gardens	HTL	HTL	HTL	<p>The defences at the northern end (Blyth West Pier to the end of the Promenade) and the southern end of the bay (Seaton Sluice) are to be maintained. With sea level rise this will mean there is potential for loss of the sandy foreshore at the northern end of the beach and loss of rocky foreshore at Seaton Sluice headland.</p>	N/A	x	✓	✓
		23.2	Beach Gardens to Promenade	HTL	HTL	MR		N/A	✓	✓	✓
		23.3	South Beach	MR	MR	MR		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
		23.4	Seaton Burn	HTL	HTL	HTL	This could impact upon the benthic/macro invertebrates and macrophytes through changes in abrasion, land elevation and beach water table. These SMP2 policies will thus contribute to the potential deterioration in surface water Ecological Status as a result of the SMP2 policy. The central and southern sections of South Beach are to be managed so that the dunes are not breached. Some realignment of the coast may be necessary (further investigation is required first) so that the dunes are permitted to roll back naturally as the sea level rises; this will mean no habitat loss and thus little change to the coastal water BQEs.	N/A	x	✓	✓
MA24	Seaton Sluice to Curry's Point	24.1	Collywell Bay	HTL	HTL	HTL	The SMP2 policy is to maintain defence of Seaton Sluice, Collywell Bay, and Harley Cove steps, whilst supporting the natural development of the rest of the rocky cliff coastline. Where defences are maintained, there will be loss and changes to the designated rocky intertidal platform, because as sea levels rise, the coastline cannot erode back. The intertidal platform will become increasingly submerged, so that the intertidal area available for macroalgae communities will diminish, as well as any changes in the hydrodynamic regime will impact the macroalgae species (i.e. through changes in abrasion). Therefore, deterioration in Ecological Status is considered likely as a result of the SMP2.	N/A	x	✓	✓
		24.2	Crag Point to Curry's Point	NAI	NAI	NAI		N/A	✓	✓	✓
MA25	Curry's Point to	25.1	Curry's Point to	HTL	HTL	HTL	The plan is to maintain all the existing defences along	N/A	x	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
	Brown's Point		Trinity Road Car Park				this stretch of the coastline, with MR of the undefended area between Trinity Road Car Park and Briardene Burn. Maintaining and reinforcing the defence at Curry's Point will reduce wave energy and potentially change currents, which in turn could result in changes to abrasion (associated with velocity) and potentially impact upon the macroalgal communities on the rocky headland. In addition there will be loss of intertidal rocky shore and sandy beach habitats due to coastal squeeze as a result of sea level rise and the presence of the defence structures. There may also be requirement to install cross shore defence structures between Briardene Burn and Table Rocks; these structures will change the wave and flow patterns of the bay, which would impact upon the benthic/macro invertebrate communities of the sandy beach, as well as the macroalgal communities on the rocky platform due to changes in abrasion (associated to velocity). Where there is MR, defence works will be needed at access points to the beach, as well as at transition locations between defended and undefended areas, otherwise the area will be left to behave naturally, which will mean that the sand dune backshore will be allowed to roll inland. These works should not have an impact on the surface water BQEs. It should be noted that, the degree of saline influence up the Briardene Burn will not extend landward as the mouth is				
		25.2	Trinity Road Car Park to Briardene Burn	MR	MR	MR		N/A	✓	✓	✓
		25.3	Briardene Burn to Table Rocks	HTL	HTL	HTL		N/A	x	✓	✓
		25.4	Table Rocks to Brown's Point	HTL	HTL	HTL		N/A	x	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							defended. Overall, there is potential for impact on the surface water BQEs and hence deterioration in Ecological Status and failure to meet Environmental Objectives in this water bodies is likely.				
MA26	Brown's Point to Tynemouth North Pier	26.1	Brown's Point	NAI	NAI	NAI	The SMP2 policy is to maintain the defences where there is important infrastructure and developed areas, whilst three of the main rocky headlands (Brown's Point, Tynemouth North Point and Sharpness Point) will be left to erode naturally, which means over time that sea level rise will not result in coastal squeeze or habitat loss. The fourth headland (Tynemouth Headland) will be defended to protect the medieval structure on the cliff. As sea levels rise, there will be loss of intertidal rocky platform, as well as changes in coastal flow and currents that will impact upon the colonising macroalgae species (due to changes in abrasion). The maintenance of Tynemouth North Pier, together with sea level rise, will mean the loss of the underlying rocky platform, though because there is no available erodible material behind, this would be natural loss. There are also three areas that are defended within this management area that are sandy bays (Cullercoats Bay, Tynemouth Longsands and King Edward's Bay). The two smaller bays will eventually be lost with sea level rise, as they are backed by defended high cliffs, which will not be allowed to erode naturally. Tynemouth Longsands is the largest bay and is backed	N/A	✓	✓	✓
		26.2	Cullercoats Bay	HTL	HTL	HTL		N/A	x	✓	✓
		26.3	Tynemouth North Point	NAI	NAI	NAI		N/A	✓	✓	✓
		26.4	Tynemouth Longsands	HTL	HTL	MR		N/A	✓	✓	✓
		26.5	Sharpness Point	NAI	NAI	NAI		N/A	✓	✓	✓
		26.6	King Edward's Bay	HTL	HTL	HTL		N/A	x	✓	✓
		26.7	Tynemouth Headland	HTL	HTL	HTL		N/A	x	✓	✓
		26.8	Tynemouth North Pier	HTL	HTL	HTL		N/A	✓	✓	✓

Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
				2025	2055	2105		WFD1	WFD2	WFD3	WFD4
							by sand dunes. Later in the policy MR of the dune system will allow them to roll back naturally, whilst the use of strategically placed structures will widen the beach, though this widening may potentially change the currents and water flow in the bay, which could impact on the benthic/macro invertebrates and angiosperms by changing the beach water table. Therefore, it is likely that there will be deterioration in Ecological Status as a result of the SMP2 policy.				
MA27	Tynemouth North Pier to Fish Quay	27.1	Prior's Haven	NAI	NAI	NAI	The SMP2 policy supports natural development of the bay (Prior's Haven) immediately behind the breakwater with continued defence of the frontages within the mouth of the Tyne. Prior's Haven is relatively well sheltered by the pier, so there will be no changes to the surface water conditions from that at present. The coastline from Freestone Point to Fish Quay is currently defended and consists of intertidal rocky, sandy and mudflat areas. As the sea level rises, these habitats will be squeezed and eventually lost as the coastline is maintained. As the current GEP of this waterbody is moderate maintaining the current management policies may be contributing to a deterioration in Ecological Potential.	N/A	✓	✓	✓
		27.2	Quayside	HTL	HTL	HTL		N/A	x	✓	✓

K3.3.1 Environmental Objective WFD1

WFD1 is only applicable to one High Status water body, the Farne Islands to Newton Haven water body. There is only one Management Area (MA08) that has been identified as having potential to fail to meet Environmental Objective WFD1 (no changes affecting high status sites) where the SMP2 policy of HTL for the defence of property or assets could potentially result in the compromise of a small area of highly valuable rocky outcrop (as indicated in **Table 4**). This could impact upon the BQEs identified in **Table 2** and, hence, there is potential for affecting this high status site.

K3.3.2 Environmental Objective WFD2

The majority of the Management Areas were identified as having potential to contribute to a failure to meet Environmental Objective WFD2 (no changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential). These include four Management Areas (MA08, MA09, MA23 and MA25) where the SMP2 policy of HTL for the defence of property or assets could result in loss of sand foreshore and/or dunes, which may potentially impact upon angiosperms and benthic/macro invertebrates. Furthermore, there are ten Management Areas (MA06, MA08, MA09, MA10, MA15, MA23, MA24, MA25, MA26 and MA27) where the SMP2 policy of HTL could result in the loss of foreshore rock outcrop, because as existing outcrops are submerged, the hard defences prevent erosion from exposing new rock outcrop, which potentially could impact upon macroalgae. Where the SMP2 policy is HTL in the estuaries (MA13, MA15, MA22, MA27), there could be changes in the hydrodynamics, tidal elevation and light levels (due to suspended sediments) leading to increased abrasion and changes in substrate conditions which could potentially impact upon the macroalgae, phytoplankton, angiosperms, benthic/macro invertebrates and fish BQEs (as identified in **Table 2**), as well as the loss of saltmarsh habitats and estuarine mud and sand flats from sea level rise. However, all of the estuaries apart from the AIn are HMWBs and as the intent of future management is in line with the present management, and in many cases the intent is to improve the overall waterbody through MR, a deterioration in Ecological Potential is not considered likely.

K3.3.3 Environmental Objective WFD3

The SMP2 policies for ten of the Management Areas have potential to contribute to a failure WFD3 (no changes which permanently prevent the Environmental Objectives of other water bodies being met). This includes one Management Areas (MA13) where the SMP2 policy of MR allows saline inundation of low lying land behind dune systems to create flood plains and saltmarsh habitats, and for these MAs there are freshwater bodies (FWBs) behind the dunes. Consequently, saline inundation can potentially result in changes in salinity of the FWBs and impact on the freshwater BQEs (e.g. macrophytes), and hence deterioration in Ecological Status and failure to meet Environmental Objectives in the freshwater bodies. There are also four Management Areas (MA07, MA08, MA09, MA13) where the SMP2 policy of NAI also eventually results in saline inundation and flooding of low lying land where there are freshwater bodies.

At Wansbeck (MA21) there is currently a weir north of the A189, which retains upstream freshwater levels. The SMP2 policy of NAI in the first epoch and MR in the latter two epochs means accepting, or managing, the cliff recession along the adjacent frontages (Sandy Bay and Cambois Beach), followed by MR. The MR will either be to remove the

existing weir, which would allow the natural realignment of the spit on the northern bank, and result in habitat creation (e.g. intertidal sand and mud flats and saltmarsh) or the diversion of the flow at the mouth, helping to reduce the natural changes in alignment, which would mean relatively small-scale and localised changes, though not creating any habitat. If the weir is removed, SMP2 option will result in permanent change to the Wansbeck River, however it would be restoring the estuary to the natural tidal state before the weir was in place (for aesthetic reasons), enabling greatly improved passage for migrating fish, and therefore will facilitate the Environmental Objectives for this transitional water body to be met.

K3.3.4 Environmental Objective WFD4

Although all Management Areas meet the Environmental Objective WFD4 (no deterioration of groundwater status), given the proximity of the groundwater abstractions to the coast, there is a risk to groundwater depending on the policies proposed for Policy Unit (PU) 2.3 (Inner Estuary South) and 2.4 (Sandstell Point) at Berwick-on-Tweed. Therefore, an assessment of the proposed policies and their potential to cause deterioration to groundwater status has been undertaken.

The moderate risk of saline intrusion in the Northumberland Carboniferous Limestone and Coal Measures is based on evidence of elevated chloride, EC and sulphate concentrations monitored in groundwater pumped from Bates Minewater Pumping Station operated by the Coal Authority. However, it is considered unlikely that the SMP2 policy of HTL will result in further deterioration in groundwater quality of this abstraction.

There are three licensed groundwater abstractions located in Berwick within the Till Fell Sandstone GWB (GB40202G703700). This GWB has been not been assessed by the EA as part of RBC, as the groundwater body was defined after the RBC process (the GWB was formerly part of GB40202G700100). It has, however, been assessed as being at Good status with High confidence under the WFD status assessment. Two of the licensed abstractions have been designated SPZs, which can be viewed on the EA's website (What's in your backyard)³. The zone '3s' of the SPZs extend to the coastline of PU2.3 and 2.4. Information regarding the third abstraction, which has not been designated a SPZ, has been provided by the EAs North East Groundwater Team. This abstraction is located immediately adjacent to the Tweed Estuary on Dock Road, within PU2.3. The EA have reported elevated concentrations of chloride, EC and sulphate monitored in this abstraction.

The policies within PU2.3 and 2.4 comprise HTL and MR, respectively. HTL will comprise maintaining or upgrading the level of protection provided by defences at Inner Estuary South, resulting in the shoreline staying at its current position. Whereas, the policy of MR at Sandstell Point will comprise pulling the frontage forward to create more stable conditions for dune development and possibly limited areas of saltmarsh or mudflat. As neither policy will result in the land retreating, it is considered unlikely that the implementation of these policies will impact these abstractions and result in the deterioration of groundwater status.

K3.3.5 Water Framework Directive Summary Statements

A water body by water body summary of achievement (or otherwise) of the Environmental Objectives for the SMP2 policies is shown in Table 4. This table

³ The Environment Agency's 'What's in your backyard' mapping tool can be found at <http://www.environment-agency.gov.uk/homeandleisure/37793.aspx>

indicates that completion of a Water Framework Directive Summary Statement was necessary for ten of the water bodies, the exception being Tweed water body. These Water Framework Directive Summary Statements can be found in **Tables 5a – 5h**.

Assessment Table 4 Summary of achievement of WFD Environmental Objectives for each water body in the Northumberland SMP2 area (colour shading equivocates to the shaded water bodies in Figure 3.1)

Water body (Management Areas)	Environmental Objectives met?				WFD Summary Statement required?
	WFD1	WFD2	WFD3	WFD4	
Northumberland North (MA01 – MA06)	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies.
Holy Island & Budle Bay (MA04)	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies
Farne Islands to Newton Haven (MA06 – MA09)	x MA08	x MA06 & MA08	x MA07 & MA08	✓	Yes – Environmental Objectives WFD1, WFD2 and WFD3 may not be met in some management areas in these water bodies under SMP policies.
Northumberland South (MA09 – MA20)	N/A	x MA10	x MA09	✓	Yes – Environmental Objectives WFD2 and WFD3 may not be met in some management areas in these water bodies under SMP policies.
Tyne and Wear (MA20 – MA26)	N/A	x MA23, MA24, MA25 & MA26	✓	✓	Yes – Environmental Objective WFD2 may not be met in some management areas in this water body under SMP policies.
Tweed (MA02)	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies.
Aln (MA13)	N/A	x	x	✓	Yes – Environmental Objectives WFD2 and WFD3 may not be met in some management areas in these water bodies under SMP policies.
Coquet (MA15)	N/A	x	✓	✓	Yes – Environmental Objective WFD2 may not be met in some management areas in this water body under SMP policies.
Hadstone Links & Cresswell Ponds (MA17)	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies.
Wansbeck (MA21)	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies.
Blyth (N) (MA22)	N/A	✓	✓	✓	No – not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies.
Tyne (MA27)	N/A	x	✓	✓	Yes – Environmental Objective WFD2 may not be met in some management areas in this water body under SMP policies.

Table 5a WFD Summary Statement for the Farne Islands to Newton Haven water body (colour shading equivocates to the shaded water bodies in Figure 3.1)

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Farne Islands to Newton Haven (MA06 – MA09)	Have all practicable mitigation measures been incorporated into the preferred SMP policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.	Mitigation measures incorporated into SMP policies: <ul style="list-style-type: none"> • Discussion with landowners regarding the potential increase in the flood plains of Annstead Burn and Brunton Burn for nature conservation purposes; • Development control, seaward of Beadnell harbour road; • Beadnell North Sea Wall Improvements Project Appraisal Report; • Development control on northern section of Beadnell Bay to maintain 'buffer zone'; and • Coastal monitoring.
	Can it be shown that the reasons for selecting the preferred SMP policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP policies to human health, to the maintenance of health and safety or to sustainable development?	The policy of maintaining the defences (HTL) at Seahouses village, Beadnell village and harbour, and Low Newton are required to preserve the integrity of property and infrastructure - i.e. ROPI. See the 'Implications with Respect of Built Environment' for each Management Area set out in the SMP2 report for further cost/benefit analysis. The policy also supports the natural development and possible breach of the Annstead Dunes thus creating new saltmarsh habitat, so though there is potential for deterioration in Ecological Status of the landward freshwater body (refer to Table 3 , MA07), the Environmental Objectives outweigh the need to create or maintain defences along this coastline.
	Have other significantly better options for the SMP policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	NAI and MR are not feasible at Seahouses village, Beadnell village and harbour, and Low Newton due to the need to protect these frontages for property, road and harbour assets. The SMP2 has fully explored the alternative options for these frontages and has concluded that the proposed policies are the most suitable for the sustainable development of these areas. Advancing the line is unrealistic and would increase the impact on the rocky foreshores at Seahouses, and the rocky and sandy foreshores at Beadnell, and Low Newton. Therefore, for these locations, there are no significantly better environmental

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
		<p>policy options available.</p> <p>At Beadnell Bay South (MA08) a policy of NAI will allow the shoreline to retreat, which will mean flooding of the low lying land behind the dunes, and thus saline inundation of two freshwater bodies. Any attempt to intervene is likely to create difficulty in maintaining the natural shape of the bay, so therefore HTL or MR are not realistic options.</p> <p>The loss of rocky shore habitat has been highlighted as a significant issue within the SMP2. A regional habitat compensation plan has been recommended and any scheme resulting from policies that may result in deterioration of a high status water body should be subject to a rigorous assessment.</p>
	Can it be demonstrated that the preferred SMP policies do not permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River Basin District that are outside of the SMP2 area?	<p>See detailed information within this assessment report – the Environment Agency Flood Map application has been consulted to check for landward freshwater bodies that could be impacted by the SMP2 policies. There are three freshwater bodies that have the potential to be impacted by saline intrusion, as a result of the SMP2 policy; these are 'Swinehoe Burn from Source to N. Sea' behind Annstead Dunes (MA07), and 'Brunton Burn from Source to N. Sea' and 'Long Nanny from Source to N. Sea' behind Beadnell Bay (MA08).</p> <p>SMP2 policies for Management Areas in the adjacent TraC water bodies (Northumberland North, Holy Island & Budle Bay, Northumberland South, Tyne and Wear, Tweed, Aln, Coquet, Wansbeck, Blyth (N), Tyne, and Hadston Links and Cresswell Ponds) have also been assessed within this report for potential to cause deterioration in Ecological Status / Potential.</p>
	Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?	<p>This water body includes part of the Berwickshire and North Northumberland Coast SAC, the North Northumberland Dunes SAC, the Northumbria Coast SPA and Ramsar Site, the Lindisfarne SPA and Ramsar Site and the Farne Islands SPA and Ramsar Site. The intent of the SMP2 policy is to allow the coastline to develop naturally, whilst defending the integrity of the villages of Seahouses, Beadnell and</p>

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
		<p>Low Newton.</p> <p>A Strategic Appropriate Assessment has been carried out on the SMP2 area under the Habitats Regulations. Whilst loss of rocky shore habitat has been identified, it is not considered that this loss will cause an adverse effect on the integrity of the site at an SMP level. However, as habitat loss has been identified, this must be compensated for. One of the actions detailed in Section 7 of the SMP, and recommended by Natural England, is that a Regional Habitat Creation Plan is compiled to address the issue of loss of rocky shore habitat in the North East of England.</p>

Table 5b WFD Summary Statement for the Northumberland South water body (colour shading equivocates to the shaded water bodies in Figure 3.1)

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Northumberland South (MA09-MA20)	Have all practicable mitigation measures been incorporated into the preferred SMP policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.	<p>Mitigation measures incorporated into SMP policies:</p> <ul style="list-style-type: none"> • Detailed examination of benefits of protecting areas adjacent to the harbour at Craster; • Plan for longer-term realignment of the road north of Howick. Incorporate within Development Plans; • Planning to set back the access steps in Foxton Bay; • Investigate how <i>ad hoc</i> defences at Foxton Hall can be adapted to encourage sediment retention; • Managed Realignment of Amble Links will mitigate for the loss of intertidal rocky shore, by maintaining and widening the foreshore; • Investigate local risk to the cemetery at South Amble from instability of the coastal slope; • Develop a progressive transitional management approach, with ongoing discussion regarding the possible need for further management to the area behind Bondi Carrs; • Managed realignment at Druridge Bay and Beacon Hill Links • Consideration of longer-term options for drainage of Ladyburn Lake within a Druridge Bay Adaptation Strategy; • Discussion with landowners about potential habitat enhancements associated with opening low lying land to flooding; • Detailed study at Lynemouth Bay to inform future defence schemes • Investigate flood risk to the Newbiggin-by-the-Sea via Newbiggin Moor; • Plan for longer-term realignment of sections of the Newbiggin golf course and Caravan Park; • Newbiggin Bay Caravan Park cliff top bi-annual surveys; • Coastal monitoring;
	Can it be shown that the reasons for selecting the preferred	The policy of maintaining the defences (HTL) at the villages of Craster, Island View

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
	SMP policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP policies to human health, to the maintenance of health and safety or to sustainable development?	Bay, Low Hauxley and Creswell, as well as Foxton Bay Golf Club, are required to preserve the integrity of residential property, recreational and heritage assets - i.e. ROPI. See the 'Implications with Respect of Built Environment' for each Management Area set out in the SMP2 report for further cost/benefit analysis.
	Have other significantly better options for the SMP policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	There are no significantly better environmental policy options available – NAI or MR at the villages of Craster, Island View Bay, Low Hauxley and Creswell are not feasible due to the need to protect the frontages. For Foxton Bay Golf Club and Foxton Hall, the policy is HTL in the short term, as Foxton Hall is a valued heritage asset, in the second epoch there will be MR, following the stability of the MR of Foxton Bay. Advancing the line at these locations is unrealistic and would increase the impact on the sandy and rocky foreshores. There are also policies of NAI for Embleton Bay, Marden Rocks and Newbiggin Moor that will allow the coastline to develop naturally. This is the best option, as MR is unnecessary and provides no advantage.
	Can it be demonstrated that the preferred SMP policies do not permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River Basin District that are outside of the SMP2 area?	See detailed information within this assessment report – the Environment Agency Flood Map application has been consulted to check for landward freshwater bodies that could be impacted by the SMP2 policies. There is one freshwater body that has the potential to be impacted by saline intrusion, as a result of the SMP2 policy; this is 'Embleton Burn from Source to N. Sea' behind Embleton Bay (MA09). SMP2 policies for Management Areas in the adjacent TraC water bodies (Northumberland North, Holy Island & Budle Bay, Farne Islands to Newton Haven, Tyne and Wear, Tweed, Aln, Coquet, Wansbeck, Blyth (N), and Tyne) have also been assessed within this report for potential to cause deterioration in Ecological Status / Potential.
	Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations	This water body includes part of the Berwickshire and North Northumberland Coast SAC, and the Northumbria Coast SPA and Ramsar Site, the North Northumberland

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
	of the Appropriate Assessment)?	Dunes SAC and the Coquet Island SPA. The intent of the SMP2 policy is to allow the coastline to develop naturally, whilst defending the integrity of Craster village, Boulmer village, Foxton Bay Golf Club, Island View Bay, Low Hauxley village, Creswell village, Lynemouth power station and Newbiggin Point.

Table 5c WFD Summary Statement for the Tyne and Wear water body (colour shading equivocates to the shaded water bodies in Figure 3.1)

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Tyne and Wear (MA20 – MA26)	Have all practicable mitigation measures been incorporated into the preferred SMP policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.	<p>Mitigation measures incorporated into SMP policies:</p> <ul style="list-style-type: none"> • Plan for longer-term realignment of sections of the Sandy Bay Caravan Park; • Inform land use plan to set development back from the eroding shore by a suitable buffer zone; • Realignment of Wansbeck Estuary • Cambois cliff top monitoring; • Sandy Bay Caravan Park cliff top bi-annual surveys; • Selective local works (hard points) on a retreated alignment to safeguard properties and assets (e.g. Cambois House and cottages) and help with wider-scale coastal configuration; • Investigate local erosion around the outfall of Meggie's Burn; • Habitat enhancement of the central and south sections of South Beach to mitigate against the potential for coastal squeeze in the north of the beach caused by maintaining the defences. • Think about the means of retaining sediment on Whitley Sands when considering the detailed management of the defences, as this may require the use of cross shore structures rather than merely maintaining the linear defence as at present. • Local realignment at the southern end of the existing Blyth promenade in the longer-term; • Develop solution to longer-term management of Tynemouth Longsands that avoids new lengths of linear defence; • Coastal monitoring.
	Can it be shown that the reasons for selecting the preferred SMP policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of	The policy of maintaining the defences (HTL) at Newbiggin-by-the-Sea, Cambois Bay, Blyth Town, Blyth Power Station, Blyth Links, Seaton Sluice, Whitley Bay and Tyne are required to preserve the integrity of commercial and residential property and

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
	achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP policies to human health, to the maintenance of health and safety or to sustainable development?	infrastructure, as well as regeneration opportunities - i.e. ROPI and benefits to sustainable development. See the 'Implications with Respect of Built Environment' for each Management Area set out in the SMP2 report for further cost/benefit analysis. The SMP2 policy also allows for the maintenance of defences on Curry's Point rocky headland, as this will ensure less pressure and thus less maintenance along Whitley Bay.
	Have other significantly better options for the SMP policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	NAI and MR are not feasible at Newbiggin-by-the-Sea, Cambois Bay, Blyth Links, Blyth Power Station, Seaton Sluice, Whitley Bay and Tyne due to the need to protect these frontages. At Blyth (MA22), NAI or MR of the town, East Pier and within the harbour is not feasible due to the need to protect the port and associated industrial area, which is of high economic value, as well as enabling more sustainable management of the surrounding coastline. Advancing the line is unrealistic. Therefore at these locations, there are no significantly better environmental options available.
	Can it be demonstrated that the preferred SMP policies do not permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River Basin District that are outside of the SMP2 area?	See detailed information within this assessment report – the Environment Agency Flood Map application has been consulted to check that none of the landward freshwater bodies could be impacted by the SMP2 policies. SMP2 policies for Management Areas in the adjacent TraC water bodies (Northumberland North, Holy Island & Budle Bay, Farne Islands to Newton Haven, Northumberland South, Tweed, Aln, Coquet, Wansbeck, Blyth (N), Tyne, and Hadston Links and Cresswell Ponds) have also been assessed within this report for potential to cause deterioration in Ecological Status / Potential.
	Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?	This water body includes part of the Northumbria Coast SPA and Ramsar Site. The intent of the SMP2 policy is to defend the integrity of Newbiggin Bay, Blyth East Pier, Blyth West Pier to South Beach Promenade, Seaton Burn, Collywell Bay, Curry's Point to Trinity Road Car Park, Briardene Burn to Brown's Point, King Edwards Bay, Tynemouth Headland and Tynemouth North Pier, with a combination of Managed Realignment and natural development for the remaining coastline of this water body.

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
		The Appropriate Assessment (AA) concluded that there would be adverse effects on the integrity of some of the designated sites, as there is limited opportunity to create new areas of rock outcrop to replace that which will be lost at various locations of the coastline within this water body (e.g. Seaton Sluice).

Table 5d WFD Summary Statement for the Aln water body (colour shading equivocates to the shaded water bodies in Figure 3.1)

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Aln (MA13)	Have all practicable mitigation measures been incorporated into the preferred SMP policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.	Mitigation measures incorporated into SMP policies: <ul style="list-style-type: none"> • Adapt the present land use to allow a more natural system approach to management – i.e. realignment in the Inner Estuary; • Formal review of Alnmouth Strategy; and • Coastal monitoring.
	Can it be shown that the reasons for selecting the preferred SMP policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP policies to human health, to the maintenance of health and safety or to sustainable development?	The policy of maintaining the defences of the channel entrance to the estuary is required to preserve the integrity of Alnmouth town, whilst allowing management of issues in relation to the open coast. Within the Estuary, the plan supports the need for realignment of defences to low lying agriculture land to address the impact of sea level rise on designated habitat - i.e. ROPI and benefits to sustainable development. See the 'Implications with Respect of Built Environment' set out in the SMP2 report for further cost/benefit analysis.
	Have other significantly better options for the SMP policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	NAI and MR are not feasible along Alnmouth town frontage due to the need to protect these frontages for the residential and road assets. Advancing the line is unrealistic and would increase the impact on the saltmarsh and intertidal mud and sand flats. At Church Hill, HTL controls the estuary mouth and supports the development of the sand noses to the north and south, thus maintaining both the saltmarsh area to the rear of the defences, as well as maintaining the navigation channel of the estuary. Overall, the SMP2 options achieve a balance between the natural values of the estuary and the use of the area. Therefore, there are no significantly better environmental policy options available.
	Can it be demonstrated that the preferred SMP policies do not permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River	See detailed information within this assessment report – the Environment Agency Flood Map application has been consulted to check for landward freshwater bodies that could be impacted by the SMP2 policies. There is one freshwater bodies that has the potential to be impacted by saline intrusion, as a result of the SMP2 policy of MR

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
	Basin District that are outside of the SMP2 area?	of the inner estuary; this is Hipsburn Catchment (trip of tidal Aln). SMP2 policies for Management Areas in the adjacent TraC water bodies (Northumberland North, Holy Island & Budle Bay, Farne Islands to Newton Haven, Northumberland South, Tyne and Wear, Tweed, Coquet, Wansbeck, Blyth (N), Tyne, and Hadston Links and Cresswell Ponds) have also been assessed within this report for potential to cause deterioration in Ecological Status / Potential.
	Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?	This water body includes parts of Berwickshire and North Northumberland Coast SAC, the North Northumberland Dunes SAC, Northumbria Coast SPA, Northumberland Shore SSSI, Alnmouth Saltmarsh and Dunes SSSI. The intent of the SMP2 policy is to maintain the designated nature conservation features whilst defending the integrity of Alnmouth.

Table 5e WFD Summary Statement for the Coquet water body

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Coquet (MA15)	Have all practicable mitigation measures been incorporated into the preferred SMP policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.	Mitigation measures incorporated in SMP policies: <ul style="list-style-type: none"> • Investigations into structural condition of North Breakwater; • Investigate need to raise/realign the road within the Inner Estuary and habitat enhancement opportunities to the west of the marina; and • Coastal monitoring.
	Can it be shown that the reasons for selecting the preferred SMP policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP policies to human health, to the maintenance of health and safety or to sustainable development?	The policy of maintaining the North Breakwater, South Jetty and the defences protecting the Amble marina, harbour and town are required to protect property and infrastructure assets from tidal and/or river flooding – i.e. ROPI and benefits to sustainable development. See the ‘Implications with Respect of Built Environment’ set out in the SMP2 report for further cost/benefit analysis. However, the SMP2 policy allows for the maintenance and enhancement of coastal and estuarine habitats (e.g. dunes, salt marsh, mud flats) through the Managed Realignment of the inner estuary.
	Have other significantly better options for the SMP policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	The harbour area and town of Amble is regionally important, with potential economic growth. NAI would support the ecological value of the estuary, however, this is not feasible as it would cause unacceptable loss to the socio-economic environment, through loss of residential properties, the marina and harbour area. MR of the harbour would allow little or no ecological gain, whereas, management of the inner estuary is a viable ecological and economical option. Advancing the line is also not an option as this would both narrow the harbour approach, thus reducing navigational safety and increase the loss of estuarine mudflat, and rocky and sandy foreshore within and outside the harbour. Therefore, at these locations, there are no significantly better environmental policy options available than HTL for the harbour area and MR of the inner estuary.
	Can it be demonstrated that the preferred SMP policies do not	See detailed information within this assessment report – the Environment Agency

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
	<p>permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River Basin District that are outside of the SMP2 area?</p>	<p>Flood Map application has been consulted to check that there are no landward freshwater bodies that could be impacted by the SMP2 policies.</p> <p>SMP2 policies for Management Areas in the adjacent TraC water bodies (Northumberland North, Holy Island & Budle Bay, Farne Islands to Newton Haven, Northumberland South, Tyne and Wear, Tweed, Aln, Wansbeck, Blyth (N), Tyne, and Hadston Links and Cresswell Ponds) have also been assessed within this report for potential to cause deterioration in Ecological Status / Potential.</p>
	<p>Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?</p>	<p>This water body includes the North Northumberland Dunes SAC, and the Northumbria Coast SPA and Ramsar Site. The policy is to Hold The Line to maintain the long term viability of the harbour and the town, which would significantly change the overall configuration of the estuary.</p>

Table 5f WFD Summary Statement for the Tyne water body

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Tyne (MA27)	Have all practicable mitigation measures been incorporated into the preferred SMP policies that affect this water body in order to mitigate the adverse impacts on the status of the water body? If not, then list mitigation measures that could be required.	Mitigation measures incorporated into SMP policies: <ul style="list-style-type: none"> • Examine defence standards against tidal flooding at Fish Quay; • Ongoing coastal monitoring; and • Natural development of the area immediately behind the North Pier Breakwater.
	Can it be shown that the reasons for selecting the preferred SMP policies are reasons of overriding public interest (ROPI) and/or the benefits to the environment and to society of achieving the Environmental Objectives are outweighed by the benefits of the preferred SMP policies to human health, to the maintenance of health and safety or to sustainable development?	The policy of maintaining the defences along the Quayside of the Tyne is required to protect existing fishing facilities, RNLI Lifeboat station and infrastructure assets from tidal and/or river flooding, as well as maintaining opportunity for regeneration – i.e. ROPI and benefits to sustainable development. See the 'Implications with Respect of Built Environment' set out in the SMP2 report for further cost/benefit analysis.
	Have other significantly better options for the SMP policies been considered? Can it be demonstrated that those better environmental policy options which were discounted were done so on the grounds of being either technically unfeasible or disproportionately costly?	There are no significantly better environmental policy options available, as NAI and MR are not feasible along the Quayside due to the need to protect these frontages for the amenity, commercial and industrial assets. Advancing the line is unrealistic and would increase the impact on the intertidal rocky shore.
	Can it be demonstrated that the preferred SMP policies do not permanently exclude or compromise the achievement of the objectives of the Directive in water bodies within the same River Basin District that are outside of the SMP2 area?	See detailed information within this assessment report – the Environment Agency Flood Map application has been consulted to check that there are no landward freshwater bodies that could be impacted by the SMP2 policies. SMP2 policies for Management Areas in the adjacent TraC water bodies (Northumberland North, Holy Island & Budle Bay, Farne Islands to Newton Haven, Northumberland South, Tyne and Wear, Tweed, Aln, Coquet, Wansbeck, Blyth (N), and Hadston Links and Cresswell Ponds) have also been assessed within this report for potential to cause deterioration in Ecological Status / Potential.

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
	Can it be shown that there are no other over-riding issues that should be considered (e.g. designated sites, recommendations of the Appropriate Assessment)?	This water body includes parts of Northumbria Coast SPA and Ramsar Site, and Northumberland Shore SSSI. The SMP2 policy allows natural development of the coastline at Prior's Haven.

For most of the Management Areas, it is considered unlikely that the policies within the Northumberland SMP2 will affect the current or target Ecological Status or Potential of water bodies and, hence, the policies meet the Environmental Objectives. The Environmental Objective WFD4 (no deterioration of groundwater status) will be met by all the water bodies within this SMP2 area. However, there are some Management Areas, where the SMP2 policies have the potential to contribute to failure of Environmental Objectives WFD1, WFD2 and WFD3 (as identified by 'x' under the 'Environmental Objectives met?' column in **Table 3**). A Water Framework Directive Summary Statement has been completed for those relevant water bodies where there is potential for failure. The Summary Statement outlines the reasons behind selecting the preferred SMP2 policy and any mitigation measures that have been incorporated into the policies.

The most significant potential failure of Environmental Objectives is that of the potential to fail to meet Environmental Objective WFD1 (no changes affecting high status sites). There were four Management Areas (MA06, MA08, MA07 and MA09) within the SMP2, which are within the Farne Islands to Newton Haven water body. The SMP2 policy of HTL for the defence of property and assets of Beadnell village (MA08) could result in the loss of highly valuable rocky outcrop and sand foreshores. As it is acknowledged in the SMP2 the maintenance of these defences will require a decision from the Secretary of State stating interests of overriding public opinion and compensation for the loss/deterioration of these habitats will need to be identified.

There is a need for topographic surveys of Holy Island (MA04) on an annual basis and monitoring of erosion rates of the coastline around the outfall of Meggie's Burn (MA23). Investigations will be needed into the management options for the mouth of the Wansbeck estuary (MA21), particularly with reference to the ecological impacts of the option of removing the weir. In addition, it is recommended that, for the next round of SMPs, the boundary between MA04 and MA05 could be adjusted to align with the water body boundary between the Holy Island & Budle Bay and Northumberland North water bodies unless the current boundary is most representative of coastal processes in the area. This is also the case for between MA19 and MA20, so that they align with the Northumberland South and Tyne & Wear water bodies.

The opportunity to deliver the Programme of Measures has not been included in this retrospective assessment, as policies have already been set and the Programme of Measures has not yet been finalised.

REFERENCES

Defra (2006) Shoreline management plan guidance Volume 2: Procedures. Department for Environment, Food and Rural Affairs, March 2006, 77pp.

Royal Haskoning (2008) Water Framework Directive: Retrospective Assessment for the River Tyne to Flamborough Head SMP2. December 2008.

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