

Water Framework Directive: Retrospective Assessment for the River Tyne to Flamborough Head SMP2

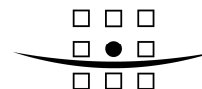
Scarborough Borough Council

December 2008

Final Report

9T8312

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Document title Water Framework Directive: Retrospective
Assessment for the River Tyne to
Flamborough Head SMP2

Document short title WFD Assessment for NECAG SMP2

Status Final Report

Version 2

Date December 2008

Project name WFD Assessment for NECAG SMP2

Project number 9T8312

Client Scarborough Borough Council

Reference 9T8312/R/303731/Newc

Drafted by Hilary Crane

Checked by Helen Dangerfield

Date/initials check

Approved by Helen Dangerfield

Date/initials approval

Foreword on the Water Framework Directive Assessment

The River Tyne to Flamborough Head SMP2 is the first of the SMP reviews to have an assessment for the Water Framework Directive undertaken in line with guidance prepared by the Environment Agency, the competent authority in England for delivering the Directive.

As the policy options have already been set for this SMP2, the assessment of the policies in relation to the Directive is retrospective. Consequently it has not been practicable to influence the SMP2 policy development or consider opportunities for delivering mitigation measures from the River Basin Management Plan, which is a statutory document. The current assessment can therefore be considered to be a baseline assessment. It is possible that the SMP2 policy options will be challenged as a result of the current or further assessment against the Directive.

CONTENTS

	Page
1 INTRODUCTION	1
1.1 Purpose of Report	1
1.2 Background	1
2 ASSESSMENT METHODOLOGY	3
2.1 Scoping the SMP2 – Data Collation	3
2.2 Defining Features and Issues	6
2.3 Assessment of the SMP2 Policy against the Environmental Objectives	6
3 RESULTS	8
3.1 Scoping the SMP2 – Data Collation	8
3.2 Defining Features and Issues	12
3.3 Assessment of the SMP2 Policy against the Environmental Objectives	17
4 DISCUSSION AND CONCLUSIONS	40
REFERENCES	41

Glossary

AA	Appropriate Assessment
AWB	Artificial Water Body
BQE	Biological Quality Element
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
SMP	Shoreline Management Plan
SPZ	Source Protection Zone
WFD	Water Framework Directive
TraC water bodies	Transitional and Coastal water bodies
WPM	With Present Management

1 INTRODUCTION

1.1 Purpose of Report

The River Tyne to Flamborough Head SMP2 policy options were completed in February 2007. As a part of this project some work was undertaken to begin to assess the implications of the Water Framework Directive (referred to as the Directive in this report) for the SMP2. Since that time the implementation and interpretation of the requirements of the Directive has been developed by the Environment Agency (the competent authority for delivering the Directive) and Defra. As a result, a revised assessment of the SMP2 in terms of the requirements of the Directive has been identified as necessary. This report provides a retrospective assessment of the policies defined under this SMP2.

1.2 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 below.

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)

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 RBMP Process and listed in a Programme of Measures within the RBMP.

1.2.1 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.

1.2.2 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.

2 ASSESSMENT METHODOLOGY

The methodology devised for this exercise follows the Guidance for the assessment of SMPs under the Water Framework Directive which is currently being finalised by the Environment Agency and Defra. 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.

2.1 Scoping the SMP2 – Data Collation

All the Transitional and Coastal (TraC) water bodies present within the River Tyne to Flamborough Head SMP2 area were identified. Their ID numbers, designation and draft classification details were obtained from the Environment Agency.

As the Environmental Objectives have not yet been set or made available at the time of this assessment, a general set of WFD environmental objectives for all water bodies within the SMP2 area were identified as set out below (based on Article 4 of the Directive and described in **Table 1.1**).

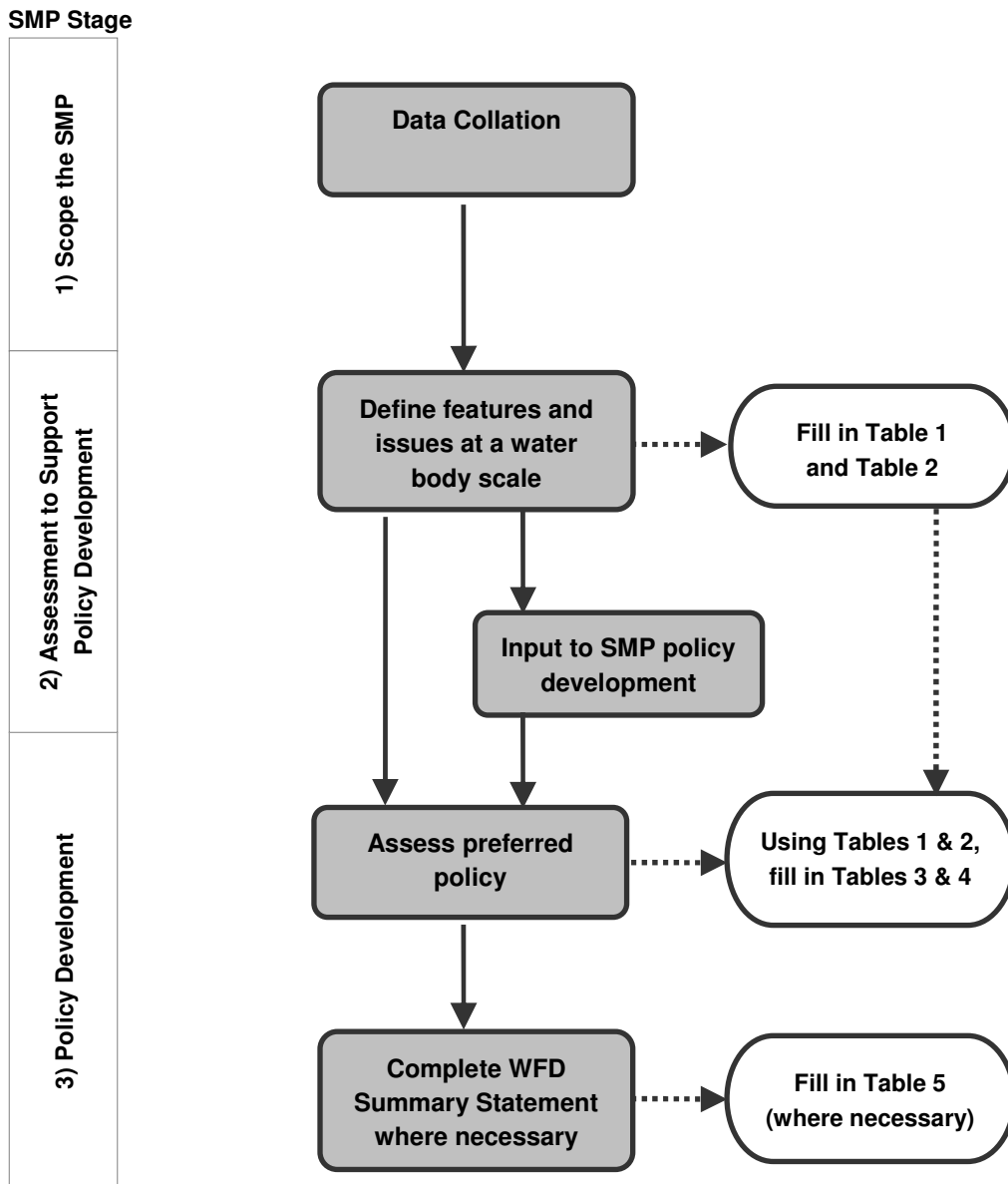
- WFD1: No changes affecting high status sites.
- WFD2: No changes that will cause failure to meet surface water Good Ecological Status or Potential or result in a deterioration of surface water Ecological Status or Potential.
- WFD3: No changes which will permanently prevent or compromise the Environmental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

The Environment Agency web-based 'Flood Map'¹ was used to assess whether there are any landward fresh water bodies that have the potential to be influenced by SMP2 policies and should, therefore, be covered within this assessment. 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.

¹ 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

All Natura 2000 designated sites were identified from the existing Appropriate Assessment of the SMP2. Consideration of any boundary issues and identification of where changes of the SMP2 boundary would be recommended to attain consistency with water body boundaries was also undertaken. 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). For example, the impacts of changes in sediment transport may be wider for BQEs, such as fish, than for other interest features designated under Natura 2000 sites.

Figure 2.1 Water Framework Directive assessment process for SMPs



2.2 Defining Features and Issues

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

Completing **Table 1** allowed the BQEs for each water body that potentially could be affected by SMP2 policies to be identified. These then defined the key features and issues for each water body for use in assessing whether the SMP2 policy has the potential to meet or fail the Environmental Objectives. The key features and issues identified in **Table 1** were then transferred into **Table 2** and the water body classification and Environmental Objectives outlined. The generic Environmental Objectives set out in **Section 2.1** were used to populate this column of **Table 2**.

2.3 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 (**Table 3**). Using the information on the water body features and issues defined in **Tables 1 and 2**, the potential impact of the SMP2 policy for each Management Area was assessed in relation to aspects of the Directive and recorded in **Table 3**. For each Management Area, the potential changes to the relevant physical and hydromorphological parameters that might occur as a result of the SMP2 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 **Table 2**.

The assessment of the SMP2 policies in **Table 3** also included consideration of the potential for impact upon GWBs. Particular attention was paid to Management Areas where the SMP2 policy is No Active Intervention, Retreat or Managed Realignment as these policies could potentially result in the saltwater – freshwater interface moving landwards, 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 a 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 of deterioration were then checked against the Environmental Objectives (as set out in **Table 2** for each water body). For each Policy Unit, it was recorded in **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 (**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 it was determined that a Water Framework Directive Summary Statement should be completed for that water body and this was recorded in the final column of **Table 4**. A separate Water Framework Summary Statement was completed for each water body where it was identified that there is potential for deterioration to occur as a result of the SMP2 policies (**Tables 5a-d**).

3 RESULTS

3.1 Scoping the SMP2 – Data Collation

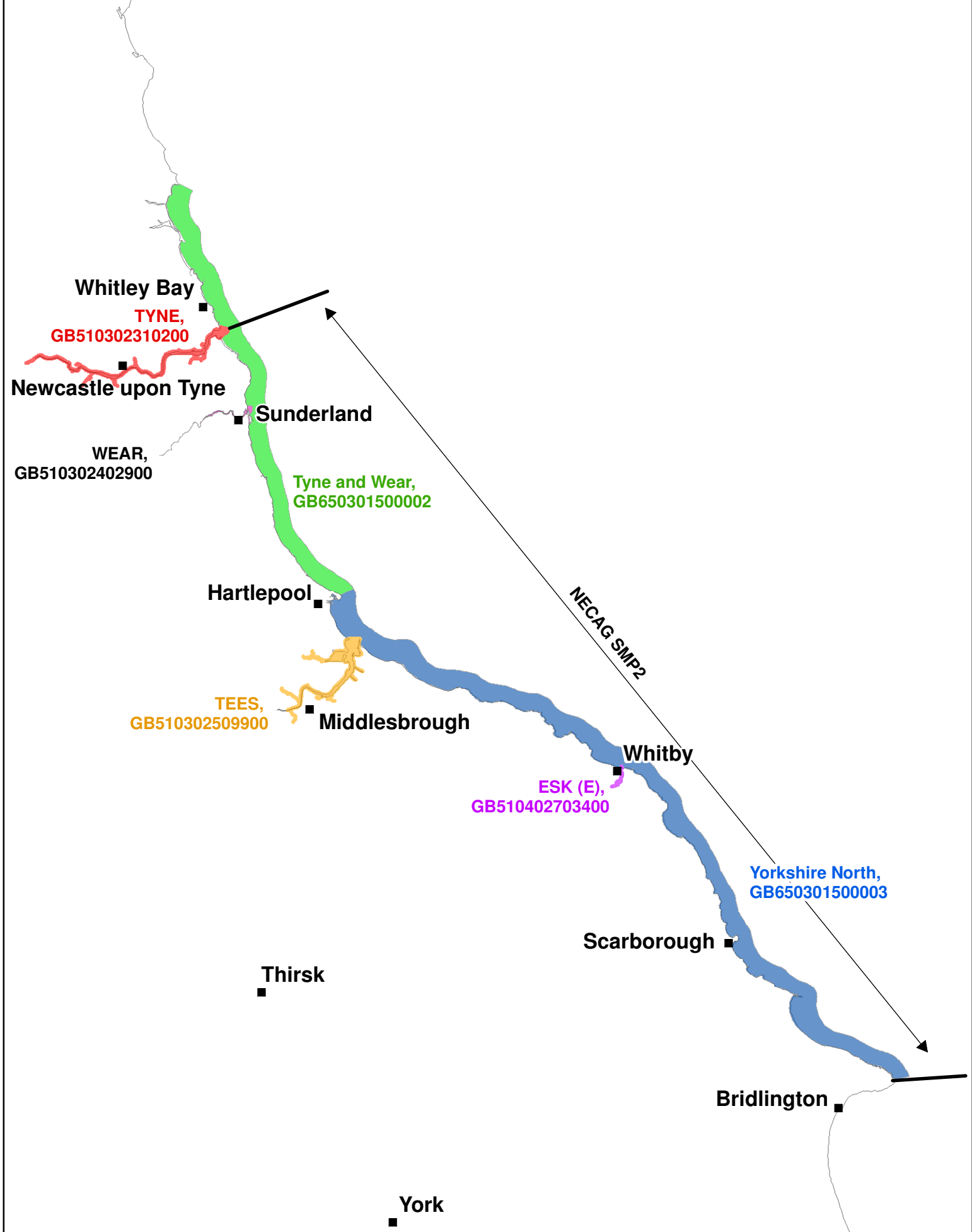
There are six TraC water bodies within the River Tyne to Flamborough Head SMP2 area (**Figure 3.1**). These include two Coastal water bodies - the Yorkshire North water body stretching from Hartlepool Headland to Flamborough Head and part of the Tyne and Wear water body from Hartlepool Headland to the River Tyne. The four Transitional water bodies in the SMP2 area are the Tyne, Wear, Tees and Esk water bodies.

After consulting the Environment Agency's Flood Map, it was concluded that there are no expected linkages between the SMP2 policies and potential consequences for landward fresh water bodies. Hence, fresh water bodies were ruled out from any further consideration within this assessment. These were mainly ruled out as the coastline is predominantly cliffed with relatively (to the sea level) steeply sloping river channels meeting the sea at a point. Thus these fresh water bodies have very little potential flood plain and most have no control structure at their lower limit. Landward recession of the mouths of these freshwater rivers is not likely to impact them as water bodies and hence further assessment of them has been discounted. The existing Transitional water bodies (estuaries) identified above have, however, been assessed.

The Groundwater Bodies (GWBs) present within the River Tyne to Flamborough Head SMP2 are shown in **Figure 3.2**. Within the SMP2 area there are three GWBs that have been designated as 'at risk', 'probably at risk' or 'Poor Status': the Wear Magnesian Limestone (G7017), the Derwent Vale Pickering Corallian Limestone (G7012), and the Hull and East Riding Chalk (G7007). Only these three GWBs were considered further in the assessment of potential deterioration in water body status.

Boundary issues within the assessment area are clear. At Flamborough Head the SMP2 boundary is consistent with the water body boundary. The northerly coastal water body (Tyne and Wear) extends outside of the SMP boundary for some distance to Newbiggin-by-the-Sea thus potential changes in Northumbria should be checked as a part of that SMP2. Whilst the SMP2 boundaries set do not compromise this assessment, one boundary could be adjusted to logically align with the water body without affecting the SMP2 policy setting. This is the boundary at Hartlepool Headland where the SMP2 boundary between MA11 and MA12 is not consistent with the boundary between the Yorkshire North and Tyne and Wear water bodies. This is shown in **Figure 3.3**.

The Natura 2000 designated sites within the River Tyne to Flamborough Head SMP2 area are the Northumbria Coast SPA and Ramsar sites, the Durham Coast SAC, Castle Eden Dene SAC, Teesmouth and Cleveland Coast SPA and Ramsar sites, Beast Cliff-Whitby (Robin Hood's Bay) SAC, Flamborough Head and Bempton Cliffs SPA, and Flamborough Head SAC. It was determined that no additional studies are required to address the zone of influence for this assessment.



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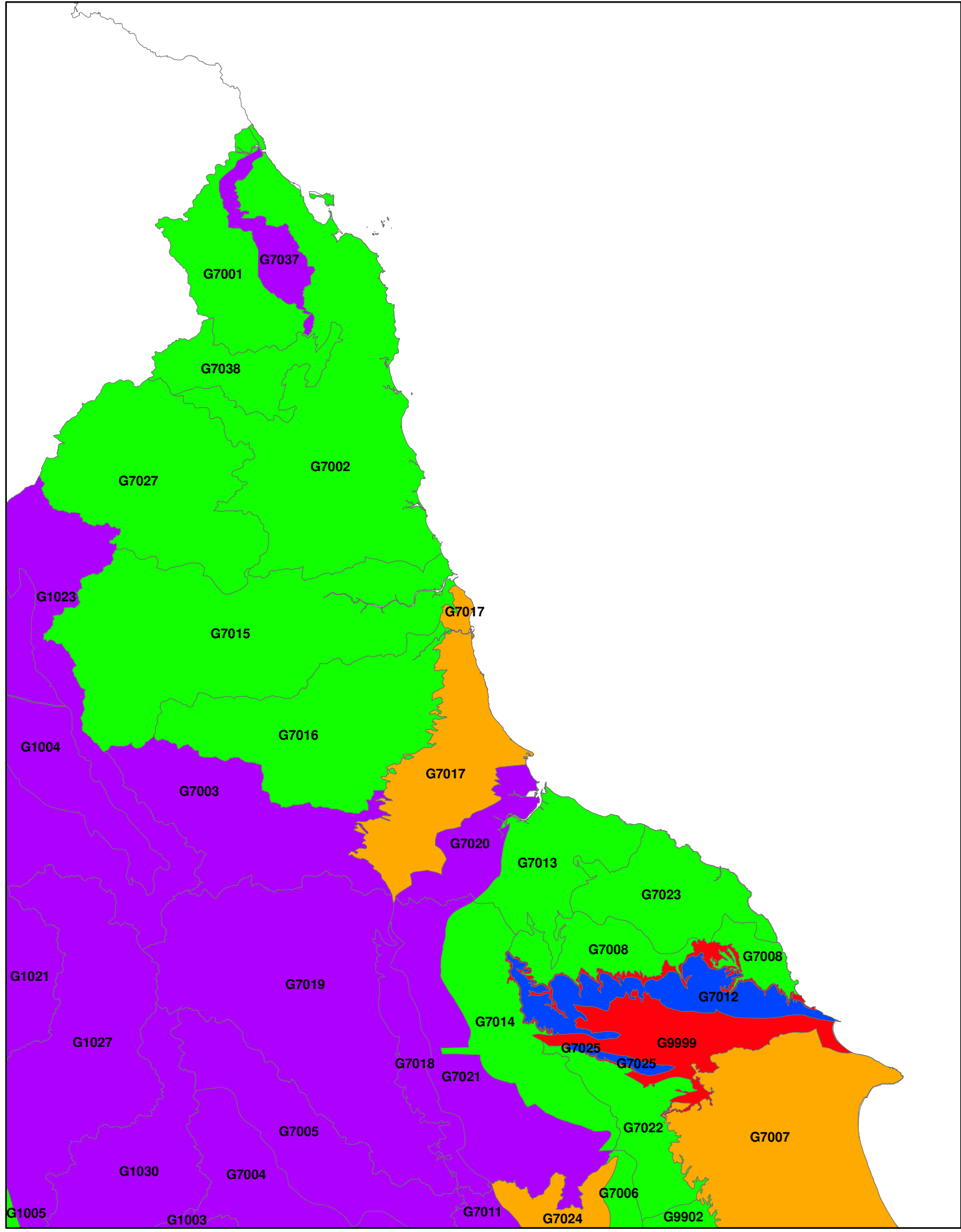
Title:
WFD Water bodies within the
NECAG SMP2 area

Project:
WFD Assessment of River Tyne to
Flamborough Head SMP2

Client:
Scarborough Borough Council

Date: Sept 2008	Scale: 1 : 625,000	
Figure: 3.1	Drawn: TC	Checked: HC





Key:

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

Title:
Ground Water Bodies in the SMP2 Area

Project:
WFD Assessment of River Tyne to Flamborough Head SMP2

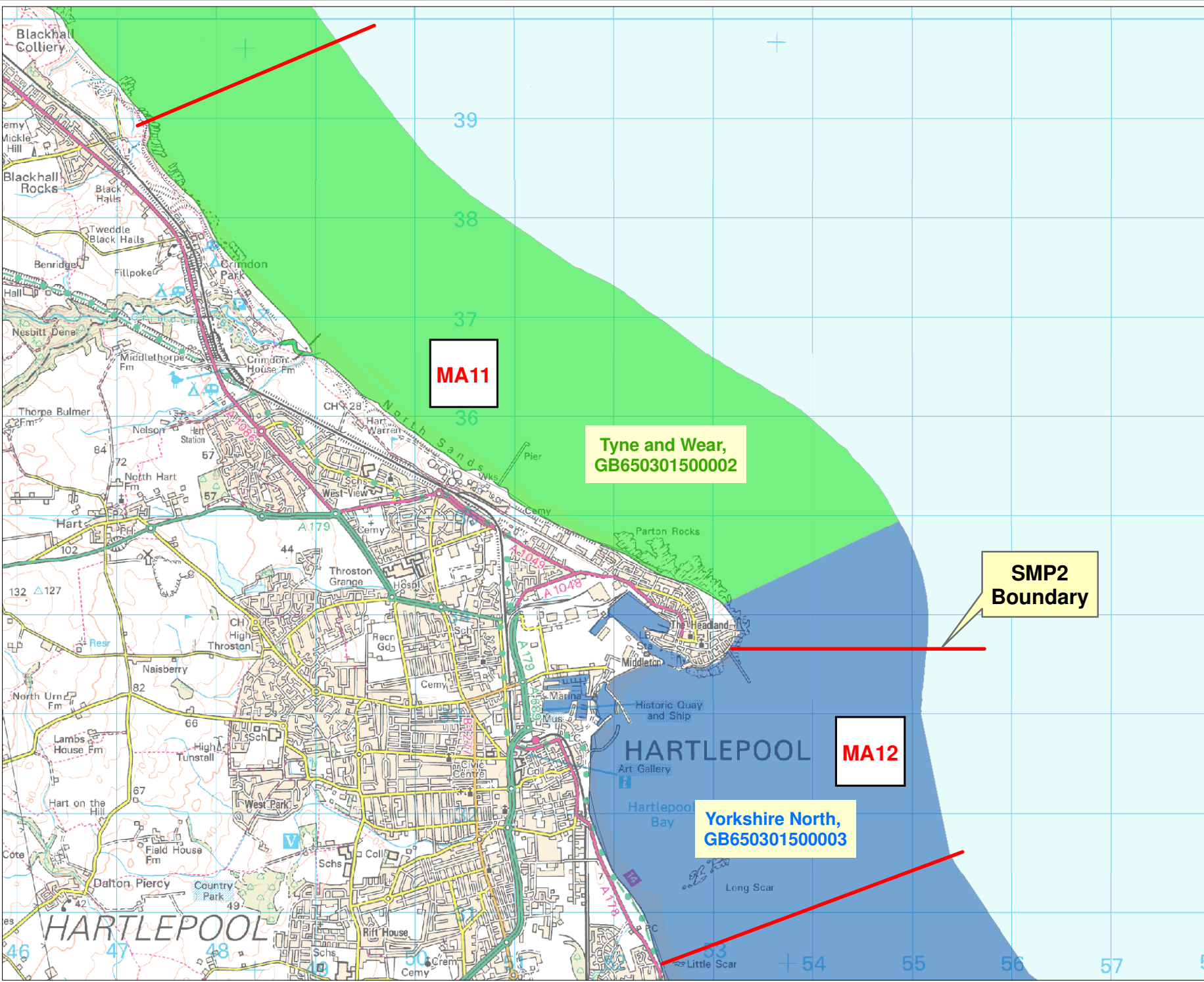
Client:
Scarborough Borough Council

Date: Dec 2008	Scale: 1 : 925,000
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Figure: 3.2	Drawn: TC	Checked: HC
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Source:
Environment Agency





MA11

**Tyne and Wear,
GB65030150002**

**SMP2
Boundary**

MA12

**Yorkshire North,
GB65030150003**

Title:
Existing SMP2 Management Area
Boundary and WFD Water Body
Boundary at Hartlepool Headland

Project:
WFD Assessment of River Tyne
to Flamborough Head SMP2

Client:
Scarborough Borough Council

Date:
September 2008

Scale:
1 : 50,000

Figure:
3.3

Drawn:
TC

Checked:
HC



3.2 Defining Features and Issues

There are no High Status Water Bodies within the River Tyne to Flamborough Head SMP2 area. Hence, no further consideration of the baseline responses for NAI and WPM and any other changes which could have an impact on high status water bodies is required.

The hydromorphological parameters that could potentially be affected by SMP2 policies and the BQEs present within each water body that are dependent on these are shown in **Table 1**. These are largely the same for both the Transitional and Coastal water bodies, with the main difference being the added need to consider impacts on fish through changes to the heterogeneity of habitat and accessibility to nursery areas within the Transitional water bodies. The key features and issues for each water body in the SMP2 area are summarised in **Table 2** together with the classification and the Environmental Objectives for each water body.

Table 1 BQEs within 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					
		Yorkshire North	Tyne and Wear	Tyne	Wear	Tees	Esk
Biological Quality Element (BQE)	Hydromorphological Parameter						
	Macroalgae	Episodicity (at low end of velocity spectrum)					
		Salinity					
		Abrasion (associated to velocity)	✓	✓	✓	✓	✓
Angiosperms		Inundations (tidal regime)	✓	✓	✓	✓	✓
		Sediment loading	?	?	?	✓	✓
		Land elevation	✓	✓	✓	✓	✓
		Salinity					
		Abrasion (associated to velocity)	✓	✓	✓	✓	✓
Benthic/macro invertebrate		Beach water table (TRaC)	✓	✓	✓	✓	✓
		Light					
		Groundwater connectivity	✓	✓	✓	✓	✓
		Availability of leaf litter/organic debris					
		Connectivity with riparian zone					
Fish		Heterogeneity of habitat (substrate, provision of shelter)			✓	✓	✓
		Continuity for migration routes			✓	✓	✓
		Substrate conditions	✓	✓	✓	✓	✓
		Presence of macrophytes					
		Accessibility to nursery areas (elevation of saltmarsh, connectivity with shoreline/riparian zone)			✓	✓	✓

Table 2 Water Framework Directive Features and Issues for the River Tyne to Flamborough Head SMP2

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
Tyne and Wear (MA01 – MA11)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity).	Moderate Ecological Status <ul style="list-style-type: none"> • 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 in groundwater status.
	Angiosperms	Potential changes to angiosperms through changes in land elevation, inundations (tidal regime), abrasion (associated increased velocities) and, potentially, sediment loading.	
	Benthic/macro invertebrate	Potential changes to benthic/macro invertebrates through changes in the beach water table and groundwater connectivity.	
	Fish	Potential changes to fish through changes in substrate conditions.	
Yorkshire North (MA12 – MA33)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity).	Good Ecological Potential (HMWB) <ul style="list-style-type: none"> • 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 in groundwater status.
	Angiosperms	Potential changes to angiosperms through changes in land elevation, inundations (tidal regime), abrasion (associated to velocity) and, potentially, sediment loading.	
	Benthic/macro invertebrate	Potential changes to benthic/macro invertebrates through changes in the beach water table and groundwater connectivity.	
	Fish	Potential changes to fish through changes in substrate conditions.	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
Tyne (MA01)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity).	Moderate Ecological Potential (HMWB) <ul style="list-style-type: none"> • 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 in groundwater status.
	Angiosperms	Potential changes to angiosperms through changes in land elevation, inundations (tidal regime), abrasion (associated to velocity) and, potentially, sediment loading.	
	Benthic/macro invertebrate	Potential changes to benthic/macro invertebrates through changes in the beach water table and groundwater connectivity.	
	Fish	Potential changes to fish through changes in heterogeneity of habitat (substrate, provision of shelter), continuity for migration routes, substrate conditions, and accessibility to nursery areas (elevation of Saltmarsh, connectivity with shoreline/riparian zone).	
Wear (MA07)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity).	Moderate Ecological Potential (HMWB) <ul style="list-style-type: none"> • 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 in groundwater status.
	Angiosperms	Potential changes to angiosperms through changes in land elevation, inundations (tidal regime), abrasion (associated to velocity) and, potentially, sediment loading.	
	Benthic/macro invertebrate	Potential changes to benthic/macro invertebrates through changes in the beach water table and groundwater connectivity.	
	Fish	Potential changes to fish through changes in heterogeneity of habitat (substrate, provision of shelter), continuity for migration routes, substrate conditions, and accessibility to nursery areas (elevation of Saltmarsh, connectivity with shoreline/riparian zone).	

Feature		Issue	Water body Classification and Environmental Objectives
Water Body (Management Areas)	Biological Quality Element	Changes to BQE physical and/or hydromorphological dependencies	
Tees (MA13)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity).	Moderate Ecological Potential (HMWB) <ul style="list-style-type: none"> • 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 in groundwater status.
	Angiosperms	Potential changes to angiosperms through changes in land elevation, inundations (tidal regime), abrasion (associated to velocity) and, potentially, sediment loading.	
	Benthic/macro invertebrate	Potential changes to benthic/macro invertebrates through changes in the beach water table and groundwater connectivity.	
	Fish	Potential changes to fish through changes in heterogeneity of habitat (substrate, provision of shelter), continuity for migration routes, substrate conditions, and accessibility to nursery areas (elevation of Saltmarsh, connectivity with shoreline/riparian zone).	
Esk (MA23)	Macroalgae	Potential changes to macroalgae through changes in abrasion (associated to velocity).	Good Ecological Potential (HMWB) <ul style="list-style-type: none"> • 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 in groundwater status.
	Angiosperms	Potential changes to angiosperms through changes in sediment loading, land elevation, inundations (tidal regime), and abrasion (associated to velocity).	
	Benthic/macro invertebrate	Potential changes to benthic/macro invertebrates through changes in the beach water table and groundwater connectivity.	
	Fish	Potential changes to fish through changes in heterogeneity of habitat (substrate, provision of shelter), continuity for migration routes, substrate conditions, and accessibility to nursery areas (elevation of Saltmarsh, connectivity with shoreline/riparian zone).	

Note: There are no High Status Water Bodies within the River Tyne to Flamborough Head SMP2 area and, hence, Environmental Objective WFD1 is not applicable.

3.3 Assessment of the SMP2 Policy against the Environmental Objectives

The assessment of SMP2 policies for potential to lead to deterioration in Ecological Status or Potential at a later date and their potential to meet or fail the other Environmental Objectives is shown in **Table 3**. For most Management Areas the SMP2 policy is not considered likely to result in deterioration in the Ecological Status or Potential of the water body and, hence, meets the Environmental Objectives. The SMP2 policies for all Management Areas meet with objective WFD3 (no changes which permanently prevent the Environmental Objectives of other water bodies being met).

3.3.1 SMP2 ramifications for Environmental Objective WFD2

There are, however, some Management Areas which have been identified as having potential to fail 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 several Management Areas (MA06, MA08, MA09, MA11, MA14, MA19, MA22, MA23, MA25, MA27, MA28, MA31 and MA33) where the SMP2 policy of HTL for the defence of property or assets could result in loss of sand foreshore and/or dunes. This could impact upon the BQEs identified in **Table 2** and, hence, there is potential for deterioration in Ecological Status or Potential of the relevant water body and/or failure to meet good Status or Potential. In addition, at Hendon to Pincushion Rocks (MA08) and to the south of Seaham Harbour (MA09) there is potential for the SMP2 policy of semi-natural retreat of the coastline to result in contamination from the exposure of historic landfill / coal mining waste and, hence, there is potential for deterioration in Ecological Status.

At Hartlepool Bay (MA12) the policy to HTL may result in changes in the hydrodynamics leading to increased abrasion and changes in substrate conditions which could potentially impact upon the macroalgae, angiosperm, benthic/macro invertebrates and fish BQEs.

Within MA19 (Cowbar and Staithes) the SMP2 policy is to HTL at Cowbar Cottages, whereas, taking into account the slow erosion rates at this section of coastline, the preferred policy in relation to the Directive would be for NAI to avoid disrupting existing ecological interests. Similarly, at Port Mulgrave within MA20 (Staithes to Runswick Bay), the SMP2 policy is for realignment whilst a policy of NAI supporting natural development of the coastline may be more appropriate for meeting the Environmental Objectives. However, the SMP2 does acknowledge that the maintenance of the old harbour walls at Port Mulgrave is questionable and this is to be subject to further investigation.

3.3.2 SMP2 ramifications for Environmental Objective WFD4

All Management Areas except MA05 and MA13 meet with Environmental Objective WFD4 (no deterioration of groundwater status). At Lizard Point to Souter Point (MA05) it was identified that the SMP2 policy for the long-term natural retreat of the coastline has the potential to lead to deterioration in groundwater quality due to the presence of a groundwater abstraction with a Source Protection Zone 3 that extends to the coast. Therefore, any coastal erosion as a result of the NAI or Retreat policies could potentially result in saline intrusion and an increasing trend or an exceedence of threshold values of sulphate, chloride or sodium concentrations or electrical conductivity measured in the groundwater abstraction. This could in turn lead to deterioration in the status of the Wear Magnesian Limestone GWB (G7017). At Tees Bay (MA13) the potential impact of

the SMP2 policy on groundwater is uncertain and requires further investigation. The need to retreat at North Gare Sands requires checking and a policy of NAI may be more appropriate for meeting the Environmental Objectives.

3.3.3 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 indicates that completion of a Water Framework Directive Summary Statement was necessary for the Tyne and Wear, Yorkshire North, Tees and Esk water bodies. These Water Framework Directive Summary Statements can be found in **Tables 5a – d** respectively.

Table 3 WFD Assessment of SMP Policy for the River Tyne to Flamborough Head SMP2

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
Tyne	MA01	River Tyne to South Pier	1.1	South Groyne	HTL	HTL	HTL	Maintenance of control structures with MR at Littlehaven should result in the maintenance of sand foreshore as policy supports natural development of the bay. Hence there should be no significant changes to physical or hydromorphological parameters that could impact on macroalgae, angiosperms, benthic/macro invertebrates or fish. As such deterioration in Ecological Potential is not considered likely as a result of the SMP2 policy.	N/A	✓	✓	✓
			1.2	Littlehaven	MR	HR	HR		N/A	✓	✓	✓
			1.3	South Pier	HTL	HTL	HTL		N/A	✓	✓	✓
Tyne and Wear	MA02	Herd Sands	2.1	Herd Sands North	HTL	HTL	R	SMP2 policy supports retreat of dune and cliff habitat to allow long-term natural development of the dunes. This may result in some loss of vegetated sea cliff at the southern end of the sands. However, there should be no significant changes to physical or hydromorphological parameters that could impact on angiosperms, benthic/macro invertebrates and fish. As such deterioration in Ecological Status is not considered likely as a result of the SMP2 policy.	N/A	✓	✓	✓
			2.2	Herd Sands South	HTL	MR	HR		N/A	✓	✓	✓
			2.3	Trow Point (north)	R	MR	HR		N/A	✓	✓	✓
Tyne and Wear	MA03	Trow	3.1	Trow Point (south)	R	MR	HR	The policy of long-term natural retreat of the frontage and natural roll back of cobble beaches will allow natural development of the coastline. The defences at Trow Quarry will remain to prevent contamination from landfill material. As such, there should be no significant changes	N/A	✓	✓	✓
			3.2	Trow Quarry	HTL	MR	MR		N/A	✓	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
								to physical or hydromorphological parameters that could impact on macroalgae, angiosperms, benthic/macro invertebrates or fish. Therefore, deterioration in Ecological Status is not considered likely as a result of the SMP2 policy.				
Tyne and Wear	MA04	Frenchmans Bay to Lizard Point	4.1	North of Lizard Pt.	R	R	NAI	Allowing the long-term natural retreat of cliff and littoral rock habitat is not likely to significantly affect the physical and hydromorphological parameters (e.g. changes in abrasion, inundation, land elevation etc.) so there should be no impact on the macroalgae, angiosperms, benthic/macro invertebrates and fish. As such, deterioration in Ecological Status is not considered likely as a result of the SMP2 policy.	N/A	✓	✓	✓
			4.2	Lizard Pt.	NAI	NAI	NAI		N/A	✓	✓	✓
Tyne and Wear	MA05	Lizard Point to Souter Point	5.1	Harbour Quarry	HTL	R	R	The long-term natural retreat of cliff and littoral rock habitat could result in exposure to contaminants from nearby landfill (Harbour Quarry); therefore short-term protection is necessary until potential pollution from in-fill has been investigated. Providing these measures are taken it is anticipated that there will be no significant changes to the physical and hydromorphological parameters that would impact on the macroalgae, angiosperms, benthic/macro invertebrates and fish. Therefore, deterioration in Ecological Status of surface waters is not considered likely as a result of the SMP2 policy. However, there is potential for deterioration in the GWB	N/A	✓	✓	x
			5.2	Harbour Quarry to Souter Point	NAI	NAI	NAI		N/A	✓	✓	x

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
								Status due to the presence of a groundwater abstraction with a Source Protection Zone 3 that extends to the coast. Therefore, NAI and R could potentially result in saline intrusion to the GWB.				
Tyne and Wear	MA06	Souter Point to Sunderland Harbour	6.1	Whitburn Cliffs	NAI	NAI	NAI	Defence of South Bent, Seaburn and north Sunderland frontage may lead to losses of the existing sandy foreshore, which may impact upon angiosperms and benthic/macro invertebrates through changes in land elevation, tidal regime, abrasion and water table. Natural development of the coastline elsewhere will mean changes to physical and hydromorphological parameters are unlikely. Overall, there is potential for deterioration in surface water Ecological Status as a result of the SMP2 policy.	N/A	✓	✓	✓
			6.2	The Bents	MR	MR	HR		N/A	✓	✓	✓
			6.3	South Bent/ Seaburn	HTL	HTL	HTL		N/A	x	✓	✓
			6.4	Parson's Rock	HTL	HTL	R		N/A	x	✓	✓
			6.5	Marine Walk	HTL	HTL	HTL		N/A	x	✓	✓
Wear	MA07	Sunderland Harbour	7.1	Main Harbour Piers	HTL	HTL	HTL	The SMP2 policy supports the continued defence of the Harbour. There will be no change to the geomorphology or hydrodynamics. Deterioration in Ecological Potential is considered unlikely as a result of the SMP2 policy.	N/A	✓	✓	✓
			7.2	North Harbour	HTL	HTL	HTL		N/A	✓	✓	✓
			7.3	South Harbour	HTL	HTL	HTL		N/A	✓	✓	✓
Tyne and Wear	MA08	Sunderland Harbour to Pincushion Rocks	8.1	Harbour East Bay	HTL	HTL	HTL	Defence of south Sunderland frontage may lead to losses of sand foreshore. This could potentially lead to changes in land elevation, the beach water table, abrasion, and inundations upon which the macroalgae, angiosperm,	N/A	x	✓	✓
			8.2	Harbour South Face	HTL	HTL	HTL		N/A	x	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
			8.3	Hendon Seawall	HTL	HTL	HTL	benthic/macro invertebrate and fish BQEs of the water body depend. In addition, semi-natural retreat of the cliff and littoral rock habitat could result in potential contamination from the exposure of landfill at Haliwell Banks. Hence, there is potential for deterioration in surface water Ecological Status as a result of the SMP2 policy.	N/A	x	✓	✓
			8.4	Hendon to Pincushion	R	MR	MR		N/A	x	✓	✓
Tyne and Wear	MA09	Pincushion to Chourdon Point	9.1	Pincushion to Seaham	NAI	NAI	NAI	Defence of Seaham North Promenade may result in losses of sand foreshore, which may impact upon angiosperms and benthic/macro invertebrates. The continued defence of Seaham Harbour is not expected to change the geomorphology or hydrodynamics. The natural development of coastline (i.e. retreat) elsewhere could result in contamination from exposure of historical landfill and coal mining waste within the cliffs to the south of Seaham Harbour. Any contamination may impact on the surrounding macroalgae, benthic/macro invertebrates, angiosperms and fish. Hence, there is potential for deterioration in surface water Ecological Status as a result of the SMP2 policy.	N/A	✓	✓	✓
			9.2	Seaham North Prom.	HTL	HTL	HTL		N/A	x	✓	✓
			9.3	Red Acre Cliffs	R	HR	HR		N/A	✓	✓	✓
			9.4	Seaham Harbour	HTL	HTL	HTL		N/A	✓	✓	✓
			9.5	Seaham South	HTL	HTL	HTL		N/A	✓	✓	✓
			9.6	Dawdon Beach	NAI	NAI	NAI		N/A	x	✓	✓
			9.7	Blast Beach	NAI	NAI	NAI		N/A	✓	✓	✓
Tyne and Wear	MA10	Chourdon Point to Blackhall	10.1	Chourdon Point to Blackhall	NAI	NAI	NAI	The SMP2 policy supports natural development of the coastline. This may result in the exposure of mining waste but is likely to be outside the time period of the SMP2. As such,	N/A	✓	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
		Rocks		Rocks				deterioration in Ecological Status is considered unlikely as a result of the SMP2 policy.				
Tyne and Wear	MA11	Blackhall Rocks to Heugh Breakwater	11.1	Crimdon Valley	NAI	NAI	NAI	The SMP2 policy supports natural development of the coastline at Crimdon valley. However, the continued defence of North Sands may lead to losses of sand foreshore and dunes, which may impact upon angiosperms and benthic/macro invertebrates. HTL at Hartlepool Headland may result in increased energy in the foreshore that could potentially impact macroalgae, benthic/macro invertebrates through changes in abrasion (associated with velocity). For these reasons, there is potential for deterioration in surface water Ecological Status as a result of the SMP2 policy.	N/A	✓	✓	✓
			11.2	North Sands	HTL	HTL	MR		N/A	x	✓	✓
			11.3	Headland	HTL	HTL	HTL		N/A	x	✓	✓
Yorkshire North	MA12	Hartlepool Bay	12.1	Hartlepool	HTL	HTL	HTL	The SMP2 policy to HTL at Hartlepool may result in a change in the hydrodynamics, potentially increasing scour of the substrate and thus increased abrasion. Any changes in substrate conditions and/or increased abrasion could potentially result in a deterioration of BQEs dependent upon these physical parameters (i.e. macroalgae, benthic/macro invertebrates, angiosperms and fish). Hence, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.	N/A	x	✓	✓
			12.2	Seaton Carew north	HTL	HTL	HTL		N/A	x	✓	✓
Tees	MA13	Tees Bay	13.1	Seaton Carew	HTL	HTL	HTL	The SMP2 policy supports the natural long-term development of Seaton Dunes and Coatham Sands (NAI), and the	N/A	✓	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
			13.2	Seaton Sands	NAI	NAI	NAI	maintenance of North and South Gares (HTL) to retain sediments in place and avoid issues associated with BQEs (abrasion, substrate conditions). Deterioration in surface water Ecological Potential is considered unlikely as a result of the SMP2 policy, though the potential for impacts on groundwater needs further investigation.	N/A	✓	✓	✓
			13.3	North Gare	HTL	HTL	HTL		N/A	✓	✓	✓
			13.4	North Gare Sands	NAI	R	R		N/A	✓	✓	?
			13.5	Bran Sands	NAI	NAI	NAI		N/A	✓	✓	?
			13.6	South Gare	HTL	HTL	HTL		N/A	✓	✓	✓
			13.7	Coatham Sands	NAI	NAI	NAI		N/A	✓	✓	?
Yorkshire North	MA14	Coatham and Redcar	14.1	Coatham East	HTL	HTL	HTL	The defence of Redcar frontage may lead to losses of the sand foreshore, which may potentially impact upon angiosperms and benthic/macro invertebrates. Therefore, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.	N/A	x	✓	✓
			14.2	Redcar	HTL	HTL	HTL		N/A	x	✓	✓
			14.3	Redcar East	HTL	HTL	MR		N/A	x	✓	✓
Yorkshire North	MA15	Marske and Saltburn Sands	15.1	Red Howles	NAI	NAI	NAI	The SMP2 policy supports the natural development of the coastline with HTL in front of populated areas and NAI in between the towns, which will lead to the creation of two headlands and two bays. Therefore, sediment budgets are expected to balance. There may be some deterioration of Ecological Potential at protected (HTL) areas but this is anticipated to be balanced by natural development of embayments, resulting in no overall deterioration in Ecological Potential as a result of the SMP2 policy.	N/A	✓	✓	✓
			15.2	Marske	HTL	HTL	MR		N/A	✓	✓	✓
			15.3	Marske Sands	NAI	NAI	NAI		N/A	✓	✓	✓
			15.4	Saltburn	HTL	HTL	HTL		N/A	✓	✓	✓
Yorkshire	MA16	Huntcliffe	16.1	Saltburn /	NAI	NAI	NAI	The SMP2 policy supports the natural development of the	N/A	✓	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
North				Huntcliff				coastline. No impacts on BQEs are likely as this is a rock headland and, hence, the SMP2 policy is unlikely to result in deterioration in Ecological Potential.				
Yorkshire North	MA17	Skinningrove	17.1	Cattersty Sands	R	NAI	NAI	The SMP2 policy to supports the natural development of coastline but with maintained defence of jetty and Skinningrove (HTL), as the removal would cause loss of sediments from Cattersty Sands. As such, deterioration in Ecological Potential is considered unlikely as a result of the SMP2 policy.	N/A	✓	✓	✓
			17.2	Skinningrove	HTL	HTL	HTL		N/A	✓	✓	✓
			17.3	Hummersea	NAI	NAI	NAI		N/A	✓	✓	✓
Yorkshire North	MA18	Boulby	18.1	Boulby	NAI	NAI	NAI	The SMP2 policy supports the natural development of the coastline and ongoing processes are likely to persist. Deterioration in the Ecological Potential is considered very unlikely.	N/A	✓	✓	✓
Yorkshire North	MA19	Cowbar and Staithes	19.1	Cowbar Cottages	HTL	HTL	HTL	The cliffs will be left to develop naturally, whilst the defences of Cowbar Cottages and Staithes will be maintained. The SMP2 policy for HTL at Cowbar Cottages may disrupt existing ecological interests and there is the potential that the slow erosion rates along this section of coastline mean that HTL is not necessary, it may be more appropriate to have a policy of NAI to avoid deterioration through intervention. Therefore, it is anticipated that, under the current SMP2 policy, there is potential for deterioration in surface water Ecological Potential.	N/A	x	✓	✓
			19.2	Cowbar Cliffs	NAI	NAI	NAI		N/A	✓	✓	✓
			19.3	Staithes	HTL	HTL	HTL		N/A	✓	✓	✓
Yorkshire North	MA20	Staithes to Runswick	20.1	Old Nab	NAI	NAI	NAI	The SMP2 policy is to allow the natural development of the coastline with the exception of the proposed retreat of the	N/A	✓	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
		Bay	20.2	Port Mulgrave	R	R	NAI	old harbour structures at Port Mulgrave; this would result in the loss of the beach area but a gain in rocky surfaces available for colonisation by macroalgal communities. In line with assessment of potential for deterioration it is anticipated that the present SMP2 policy may potentially result in the deterioration.	N/A	x	✓	✓
			20.3	Lingrow	NAI	NAI	NAI		N/A	✓	✓	✓
Yorkshire North	MA21	Runswick Bay to Sandsend Ness	21.1	Runswick Village	HTL	HTL	HTL	Allow the natural development of the coastline at Runswick Bay and Kettleiness but with maintained defence of Runswick Village. There is no soft substrate in front of the village (rocky foreshore) so there is no potential loss of sediment as a result of HTL at this section of coast. Hence, deterioration in Ecological Potential is considered unlikely as a result of the SMP2 policy.	N/A	✓	✓	✓
			21.2	Runswick Bay	NAI	NAI	NAI		N/A	✓	✓	✓
			21.3	Kettleiness	NAI	NAI	NAI		N/A	✓	✓	✓
Yorkshire North	MA22	Sandsend Wyke	22.1	Sandsend cliffs	NAI	NAI	NAI	The SMP2 policy allows for the natural development of the coastline at Sandsend Cliffs and Upgang Beach, though there is potential for loss of sandy foreshore due to maintaining defence of Sandsend Village and the coastal road. The loss of sand foreshore may impact upon angiosperms and benthic/macro invertebrates. As such, it is anticipated that the present SMP2 policy may potentially result in the deterioration in surface water Ecological Potential.	N/A	✓	✓	✓
			22.2	Sandsend Village	HTL	HTL	HTL		N/A	x	✓	✓
			22.3	Coastal road	HTL	R	R		N/A	x	✓	✓
			22.4	Upgang Beach	NAI	NAI	NAI		N/A	✓	✓	✓
Esk	MA23	Whitby	23.1	Upgang Beck	HTL	R	R	Potential loss of sand foreshore due to defence of Whitby. This could impact upon the macroalgae, angiosperms, benthic/macro invertebrates and fish BQEs through	N/A	x	✓	✓
			23.2	West cliff	HTL	HTL	HTL		N/A	x	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
			23.3	Harbour and Abbey cliffs	HTL	HTL	HTL	potential changes in abrasion, sediment loading, inundation, land elevation, and beach water table. Hence, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.	N/A	✓	✓	✓
Yorkshire North	MA24	Whitby to Saltwick Nab	24.1	The Stray	NAI	NAI	NAI	The SMP2 policy supports the natural long-term development of the coastline. As the cliffs and foreshore are rocky it is anticipated that there is unlikely to be any deterioration in the Ecological Potential as a result of the SMP2 policy.	N/A	✓	✓	✓
Yorkshire North	MA25	Saltwick Nab to Hundale Point (Robin Hoods Bay)	25.1	Saltwick to Hundale	NAI	NAI	NAI	The SMP2 policy will allow for the natural development of the coastline, particularly the sea cliffs. However, defence of the village at Robin Hood's Bay may result in the loss of sediment from the foreshore at this section of coastline. The loss of sediment could impact the benthic/macro invertebrate, angiosperms and fish. Hence, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.	N/A	✓	✓	✓
			25.2	Village of Robin Hood's Bay	HTL	HTL	HTL		N/A	x	✓	✓
Yorkshire North	MA26	Hundale Point to Scalby Ness	26.1	Burniston	NAI	NAI	NAI	The SMP2 policy supports the natural long-term development of the coastline. As the cliffs and foreshore are rocky, it is considered unlikely that the policy will result in deterioration in Ecological Potential.	N/A	✓	✓	✓
Yorkshire North	MA27	Scarborough North Bay and Castle Cliffs	27.1	North Bay	HTL	HTL	HTL	Maintaining the defence of North Bay frontage may lead to losses of sand foreshore, which could potentially impact upon the benthic/macro invertebrate, angiosperms and fish through potential changes in abrasion, sediment loading, inundation,	N/A	x	✓	✓
			27.2	Castle Headland	HTL	HTL	HTL		N/A	✓	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
								land elevation, and beach water table. Hence, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.				
Yorkshire North	MA28	Scarborough South Sands and Harbour	28.1	Harbour	HTL	HTL	HTL	Maintaining the defence of South Bay frontage may lead to losses of sand foreshore, which could potentially impact upon the benthic/macro invertebrate, angiosperms and fish through potential changes in abrasion, sediment loading, inundation, land elevation, and beach water table. Hence, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.	N/A	x	✓	✓
			28.2	Foreshore Road	HTL	HTL	HTL		N/A	x	✓	✓
			28.3	Spa and access	HTL	HTL	HTL		N/A	✓	✓	✓
			28.4	Cliff Gardens	HTL	HTL	HTL		N/A	✓	✓	✓
			28.5	South Cliffs	NAI	NAI	NAI		N/A	✓	✓	✓
Yorkshire North	MA29	Black Rocks to Filey Brigg	29.1	Cornelian Bay	NAI	NAI	NAI	The SMP2 policy allows for the natural long-term development of the coastline and it is considered unlikely that the policy will result in deterioration of Ecological Potential.	N/A	✓	✓	✓
			29.2	Cayton Bay	NAI	NAI	NAI		N/A	✓	✓	✓
			29.3	Cayton Bay Access	MR	MR	MR		N/A	✓	✓	✓
Yorkshire North	MA30	Filey	30.1	Gristhorpe Cliff	NAI	NAI	NAI	The SMP2 policy allows for the natural long-term development of the coastline and it is, therefore, unlikely that the policy will result in deterioration of Ecological Potential.	N/A	✓	✓	✓
			30.2	North Cliff	NAI	NAI	NAI		N/A	✓	✓	✓
Yorkshire North	MA31	South Filey Bay	31.1	North of Filey	NAI	NAI	NAI	The SMP2 policy supports the continued defence of the Filey frontage, whilst allowing for the natural long-term development of the coastline elsewhere. Maintaining the defences may potentially lead to losses of sand foreshore, which could impact upon benthic/macro invertebrates, angiosperms and	N/A	✓	✓	✓
			31.2	Filey	HTL	HTL	HTL		N/A	x	✓	✓
			31.3	Muston	NAI	NAI	NAI		N/A	✓	✓	✓

Water body	Management Area		Policy Unit		Policy Plan			WFD Assessment of Deterioration	Environmental Objectives met?			
					2025	2055	2105		WFD 1	WFD 2	WFD 3	WFD 4
				Sands				fish through potential changes in abrasion, sediment loading, inundation, land elevation, and beach water table. Hence, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.				
Yorkshire North	MA32	Muston Sands to Speeton Cliffs	32.1	Hunmanby Sands	NAI	NAI	NAI	The SMP2 policy supports the natural long-term development of the coastline and it is therefore considered unlikely that the policy will result in deterioration of Ecological Potential.	N/A	✓	✓	✓
			32.2	Hunmanby Gap	NAI	NAI	NAI		N/A	✓	✓	✓
			32.3	Reighton	NAI	NAI	NAI		N/A	✓	✓	✓
Yorkshire North	MA33	Muston Sands to Flamborough Head	33.1	Speeton	NAI	NAI	NAI	The SMP2 policy supports the continued defence of North Landing frontage, whilst allowing for the natural long-term development of the coastline elsewhere. Maintaining the defences may lead to losses of sand foreshore, which could potentially impact upon the benthic/macro invertebrate, angiosperms and fish through potential changes in abrasion, sediment loading, inundation, land elevation, and beach water table. Hence, there is potential for deterioration in surface water Ecological Potential as a result of the SMP2 policy.	N/A	✓	✓	✓
			33.2	Flamborough Head	NAI	NAI	NAI		N/A	✓	✓	✓
			33.3	North Landing	HTL	HTL	HTL		N/A	x	✓	✓
			33.4	Flamborough	not defined	Reviewed following monitoring.			No SMP2 policy defined.			
Key: HTL - Hold the line, A - Advance the line, R - Retreat or Realignment, NAI – No active intervention, HR – Hold the Line on a retreated alignment, MR – Managed Realignment												

Table 4 Summary of achievement of WFD Environmental Objectives for each water body in the River Tyne to Flamborough Head SMP2 area

Water body (Management Areas)	Environmental Objectives met?	WFD Summary Statement required?
Tyne and Wear (MA01 – MA11)	The SMP2 policy for all management areas meets objectives WFD3 and WFD4. The policies for four management areas (MA06, MA08, MA09 and MA11) have potential to fail WFD2.	Yes – Environmental Objective WFD2 may not be met in all management areas in this water body under SMP policies.
Yorkshire North (MA12 – MA33)	The SMP2 policy for all management areas meets objective WFD3. The policy for 11 management areas has the potential to fail WFD2. The policy for MA13 has potential to fail WFD4.	Yes – Environmental Objectives WFD2 and WFD4 may not be supported in all management areas in this water body under SMP policies.
Tyne (MA01)	SMP2 policy for this water body meets WFD2, WFD3 and WFD4. Overall at the water body scale the Environmental Objectives are unlikely to be compromised.	No - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies.
Wear (MA07)	The SMP2 policy meets WFD2, WFD3 and WFD4. Overall at the water body scale the Environmental Objectives are unlikely to be compromised.	No - not necessary as delivery of Environmental Objectives is likely to be supported by the proposed SMP policies.
Tees (MA13)	The SMP2 policy meets WFD2 and WFD3. Further investigation is required regarding the potential impact on groundwater and hence it is unclear whether WFD4 is met for this water body.	Yes – uncertainty regarding the potential for impact on groundwater means that Environmental Objective WFD4 may not be supported by the proposed SMP policies.
Esk (MA23)	The SMP2 policy meets objectives WFD3 and WFD4. The policy has potential to fail WFD2.	Yes – Environmental Objective WFD2 may not be supported in this water body under SMP policies.

Table 5a WFD Summary Statement for the Tyne and Wear 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 and Wear (MA01 – MA11)	<p>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>	<p>Mitigation measures incorporated into SMP policies:</p> <p>Ensure local management options to maintain sand foreshore are incorporated into engineering measures to defend the frontages of South Bents, Seaburn, North Sunderland, South Sunderland, Seaham North Promenade and North Sands.</p> <p>Monitoring of erosion rates between the Hendon seawall and Pincushion together with investigation of the potential contamination from the landfill at Haliwell Banks.</p> <p>Implementation of appropriate further mitigation measures based on results of this monitoring and investigation.</p> <p>Investigation of the nature of the contamination within the cliffs to the south of Seaham Harbour. The retreat of the cliffs should also be monitored to assess the risk of exposure of contaminated material and the potential for the coast to absorb any effects of diffuse pollution.</p>
	<p>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?</p>	<p>Policy of maintaining defences at South Bents, Seaburn, North Sunderland, South Sunderland, Seaham North Promenade and North Sands is required to protect property and infrastructure 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.</p>
	<p>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</p>	<p>There are no significantly better environmental policy options available – NAI and MR are not feasible at South Bents, Seaburn, North Sunderland, South Sunderland, Seaham North Promenade and North Sands due to the need to protect these frontages for property, road or urban development assets. Advancing the line is</p>

Water body and Management Areas	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
	disproportionately costly?	<p>unrealistic and would increase the impact on the sand foreshore at these locations. NAI is not feasible between the Hendon seawall and Pincushion due to need to manage potential contamination from landfill.</p> <p>MR at North Sands may be possible in the longer-term subject to development of a master plan.</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 that there are no landward fresh water bodies that could be impacted by SMP2 policies.</p> <p>SMP2 policies for Management Areas in the adjacent TraC water bodies (Yorkshire North, Tyne, Wear, Tees and Esk) 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 parts of the Northumbria Coast SPA and Ramsar sites, the Durham Coast SAC, the Teesmouth and Cleveland Coast SPA and Ramsar sites and the Castle Eden Dene SAC. The Appropriate Assessment (AA) concluded that no adverse effects are anticipated on the integrity of the designated sites provided that the mitigation measures recommended in the AA are implemented. These include:</p> <ul style="list-style-type: none"> • Ensuring that any control structures required within the foreshore zone at South Bents, Seaburn, north and south Sunderland take the form of rock habitat suitable for SPA interest. • The risk of exposure from contaminants to the south of Seaham Harbour is fully assessed and monitored and appropriate mitigation measures are implemented once this has been determined. • Limiting and managing erosion between North Sands and Hartlepool Headland through control structures, ensuring these take the form of rock habitat suitable for SPA interest.

Table 5b WFD Summary Statement for the Yorkshire North 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
Yorkshire North (MA12- MA33)	<p>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>	<p>Mitigation measures incorporated into SMP policies:</p> <p>Ensure local management options to maintain sand foreshore are incorporated into engineering measures to defend the frontages of Redcar, Sandsend Village, Whitby, Robin Hood's Bay, Scarborough, Filey and North Landing.</p> <p>Monitoring of Seaton Dunes and anticipated reduction in beach levels with future management to allow natural retreat of the dunes and reduce landward pressure.</p> <p>Monitoring/further investigation of potential impacts on groundwater.</p> <p>At Hartlepool Bay, consider methods for HTL which may allow maintenance of substrate and lower abrasion. A detailed consideration of the future management of the Heugh Breakwater is required.</p> <p>Further investigation of the significance of Port Mulgrave in maintaining the stability of the coastal slope at this location.</p> <p>Consider options for natural development/retreat in the medium to longer-term at Sandsend and Uppang Beck.</p>
	<p>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?</p>	<p>Policy of maintaining defences at Hartlepool, Redcar, Sandsend Village, Whitby, Robin Hood's Bay, Scarborough, Filey and North Landing is required to protect property as well as harbour and infrastructure assets property – i.e. ROPI and benefits to sustainable development. Policy of maintaining the North and South Gares is required to protect and maintain the use of the port and industrial area at Teesmouth. See the 'Implications with Respect of Built Environment' for each Management Area set out in the SMP2 report for further cost/benefit analysis.</p> <p>However, the SMP2 policy of HTL at Cowbar Cottages (MA19) may disrupt existing ecological interests and the slow erosion rates along this section of the coastline (2.5m</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>in next 100 years) mean that HTL may not be necessary and a policy of NAI might be more appropriate to avoid deterioration through intervention. Therefore, at MA19, it can not be shown that there are ROPI or that the environmental benefits are outweighed by benefits to human health, maintenance of health and safety, or sustainable development.</p>
	<p>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?</p>	<p>NAI and MR are not feasible at Hartlepool, Redcar, Sandsend Village, Whitby, Robin Hood's Bay, Scarborough, Filey and North Landing due to the need to protect these frontages. Advancing the line at these locations is unrealistic and would increase the impact on the sand foreshore. At Teesmouth, NAI or MR on the North and South Gares is not feasible due to the need to protect the port and associated industrial area which is of high economic value. Advancing the line is unrealistic. Therefore, at these locations, there are no significantly better environmental options available.</p> <p>However, at Cowbar Cottages (MA19) a policy of NAI would provide a better environmental option to avoid deterioration through intervention and, given the slow erosion rates along this section of coastline, would achieve the same benefit for the SMP2 policy since HTL may not be necessary or justifiable.</p> <p>Similarly, at Port Mulgrave within MA20 (Staithes to Runswick Bay), the SMP2 policy is for realignment whilst a policy of NAI supporting natural development of the coastline may be more appropriate for meeting the Environmental Objectives. However, the SMP2 does acknowledge that the maintenance of the old harbour walls at Port Mulgrave is questionable and this is to be subject to further investigation.</p>
	<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>	<p>See detailed information within this assessment report – the Environment Agency Flood Map application has been consulted to check that there are no landward fresh water bodies that could be impacted by SMP2 policies.</p> <p>SMP2 policies for Management Areas in the adjacent TraC water bodies (Tyne 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
		Wear, Tyne, Wear, Tees and Esk) 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)?	<p>This water body includes parts of the Teesmouth and Cleveland Coast SPA and Ramsar sites, the Beast Cliff – Whitby (Robin Hood’s Bay) SAC, the Flamborough Head and Bempton Cliffs SPA and the Flamborough Head SAC. The Appropriate Assessment (AA) concluded that no adverse effects are anticipated on the integrity of the designated sites as a result of SMP2 policies, provided that the mitigation measures recommended in the AA are implemented. These include:</p> <ul style="list-style-type: none"> • A detailed consideration of the future management of the Heugh Breakwater and effects on the integrity of adjacent international sites. • Local management options to maintain sand foreshore are incorporated into engineering measures to defend the frontages of Redcar, Sandsend Village, Whitby, Robin Hood’s Bay, Scarborough, Filey and North Landing.

Table 5c WFD Summary Statement for the Tees water body

Water body and Management Area	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Tees (MA13)	<p>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>	<p>Mitigation measures incorporated into SMP policies:</p> <p>SMP2 policy allows natural development of the coastline within control imposed by structures – it is important to maintain North and South Gares to retain sediments in place and avoid issues associated with BQEs (e.g. due to potential changes in abrasion, substrate conditions).</p> <p>Monitoring of Seaton Dunes and anticipated reduction in beach levels with future management to allow natural retreat of the dunes and reduce landward pressure is outlined in the SMP2.</p> <p>There is potential for enhancement of the habitat behind Coatham Sands.</p> <p>Monitoring/further investigation of potential impact on groundwater.</p>
	<p>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?</p>	<p>Policy of maintaining the North and South Gares is required to protect and maintain the use of the port and industrial area whilst maintenance of defences at Seaton Carew is required to protect property – i.e. ROPI and benefits to sustainable development. Policy will also potentially enhance the recreational value of Coatham Sands and will support watersports within South Gare. However, there will be loss to the Golf Course at Seaton and potential loss to existing sea front at Seaton Carew. See the ‘Implications with Respect of Built Environment’ set out in the SMP2 report for further cost/benefit analysis.</p>
	<p>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?</p>	<p>There are no significantly better environmental policy options available – NAI or MR on the North and South Gares is not feasible due to the need to protect the port and associated industrial area at Teesmouth which is of high economic value (the economic implications of the policy options are set out within the SMP2 report).</p>

Water body and Management Area	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
		<p>Advancing the line is unrealistic.</p> <p>At Seaton Sands, North Gare Sands, Bran Sands and Coatham Sands NAI is the best policy option – MR is unnecessary and provides no advantage.</p>
	<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>	<p>See detailed information within this assessment report – the Environment Agency Flood Map application has been consulted to check that there are no landward fresh water bodies that could be impacted by SMP2 policies.</p> <p>SMP2 policies for Management Areas in the adjacent TraC water bodies (Yorkshire North, Tyne and Wear, Tyne, Wear, and Esk) 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 part of the Teesmouth and Cleveland Coast SPA and Ramsar sites. SMP2 policy allows natural development of the coastline between the control structures of the North and South Gares. Therefore, the Appropriate Assessment concluded that no adverse effects are anticipated on the integrity of the designated sites.</p>

Table 5d WFD Summary Statement for the Esk water body

Water body and Management Area	WFD Summary Statement checklist	A brief description of decision making and reference to further documentation within the SMP
Esk (MA23)	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: Review works at Upgang Beck with a view to retreat in this area in the longer term. Ensure local management options to maintain sand foreshore are incorporated into engineering measures to defend Whitby frontage.
	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?	Policy of maintaining defences at Whitby is required to protect property at West Cliff, maintain the use of the Harbour and protect heritage structures on the Abbey Headland – i.e. ROPI and benefits to sustainable development. However, there will be some reduction in beach levels. 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 - Advancing the line would increase the impact. NAI and MR are not feasible due to need to protect Whitby town and hence would not deliver the same benefit as HTL.
	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 fresh water bodies that could be impacted by SMP2 policies. SMP2 policies for Management Areas in the adjacent TraC water bodies (Yorkshire North, Tyne and Wear, Tyne, Wear, and Tees) have also been assessed within this report for potential to cause deterioration in Ecological Status / Potential.

Water body and Management Area	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)?	There are no Natura 2000 designated sites within this water body.

4 DISCUSSION AND CONCLUSIONS

For most Management Areas, it is considered unlikely that the policies within the River Tyne to Flamborough Head SMP2 will affect the current or target Ecological Status or Potential of water bodies and, hence, the policies meet the Environmental Objectives. There are, however, several Management Areas where the SMP2 policies have the potential to contribute to failure of Environmental Objectives (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 assessment of potential deterioration with respect to the Directive highlighted three Management Areas (MA13, MA19, and MA20) which provide an opportunity to re-consider the SMP2 policy in the future. At Tees Bay (MA13), further investigation is required into the potential impacts of the SMP2 policy on the groundwater. A policy of NAI could be considered at Cowbar Cottages (MA19) to avoid disrupting existing ecological interests and the preferred policy for Port Mulgrave (MA20) also needs further investigation with regards to the maintenance of the old harbour walls.

There is a need for monitoring of potential contamination and erosion rates of the coastline within MA05, MA08, MA09, and MA10 to avoid potential deterioration in Ecological Status within these units and to inform the next round of Shoreline Management Planning. Monitoring of the potential for coastal erosion to result in saline intrusion into the Wear Magnesian Limestone GWB at MA05 should also be carried out. In addition, it is recommended that, for the next round of SMPs, the boundary between MA11 and MA12 could be adjusted to align with the water body boundary between the Yorkshire North and Tyne and Wear water bodies unless the current boundary is most representative of the sediment divide.

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.

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