



# Ayrshire Shoreline Management Plan

## Appendix A: SMP Development

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## Appendix A: SMP Development

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# **1 INTRODUCTION**

This Appendix provides a summary of the Shoreline Management Plan (SMP) development process adopted, a description of the policy decision-making process and outlines the chronology of the SMP development.

As such it provides a 'route map' for the supporting information used in the SMP development included in the other appendices.

## 2 PROJECT INFORMATION

### 2.1 SMP BACKGROUND

The requirement for a SMP covering the Ayrshire coastline was identified by SEPA through the development of the Ayrshire Local Flood Risk Management Strategy and implementation of the strategy is detailed in the Ayrshire Local FRM Plan.

This SMP was developed and produced in accordance with the latest Procedural Guidance (PG) for the production of SMPs (Defra, 2006). The SMP was initiated in May 2016, with this draft for consultation produced in January 2018.

### 2.2 PROJECT STEERING GROUP (PSG)

The Ayrshire SMP has been developed in partnership between the operating authorities and other organisations with key roles in shoreline management. The project was led by a Project Steering Group (PSG), with North Ayrshire Council acting as lead authority in developing and managing the SMP. Members of this group are listed in Table 2.1.

**Table 2.1 Ayrshire SMP Project Steering Group members**

Organisation	Name
North Ayrshire Council (NAC) (involving their engineering and planning departments)	Patricia Rowley
South Ayrshire Council (SAC) (involving their engineering and planning departments)	Scott Greig
Scottish Environment Protection Agency (SEPA)	David Scott
Scottish Natural Heritage (SNH)	Alistair Rennie
Historic Scotland	John Raven

### 2.3 CONSULTANT

RPS was commissioned to produce the SMP on behalf of North and South Ayrshire Councils. The key team members are listed in Table 2.2.

**Table 2.2      Ayrshire SMP Key Team members**

Name	Role
Andrew Jackson	Project Director
Malcolm Brian	Project Manager
Adrian Bell	Coastal Processes Lead
David Irwin	Coastal Processes
Richard Bingham	SEA Lead
Danielle King	SEA and Communications

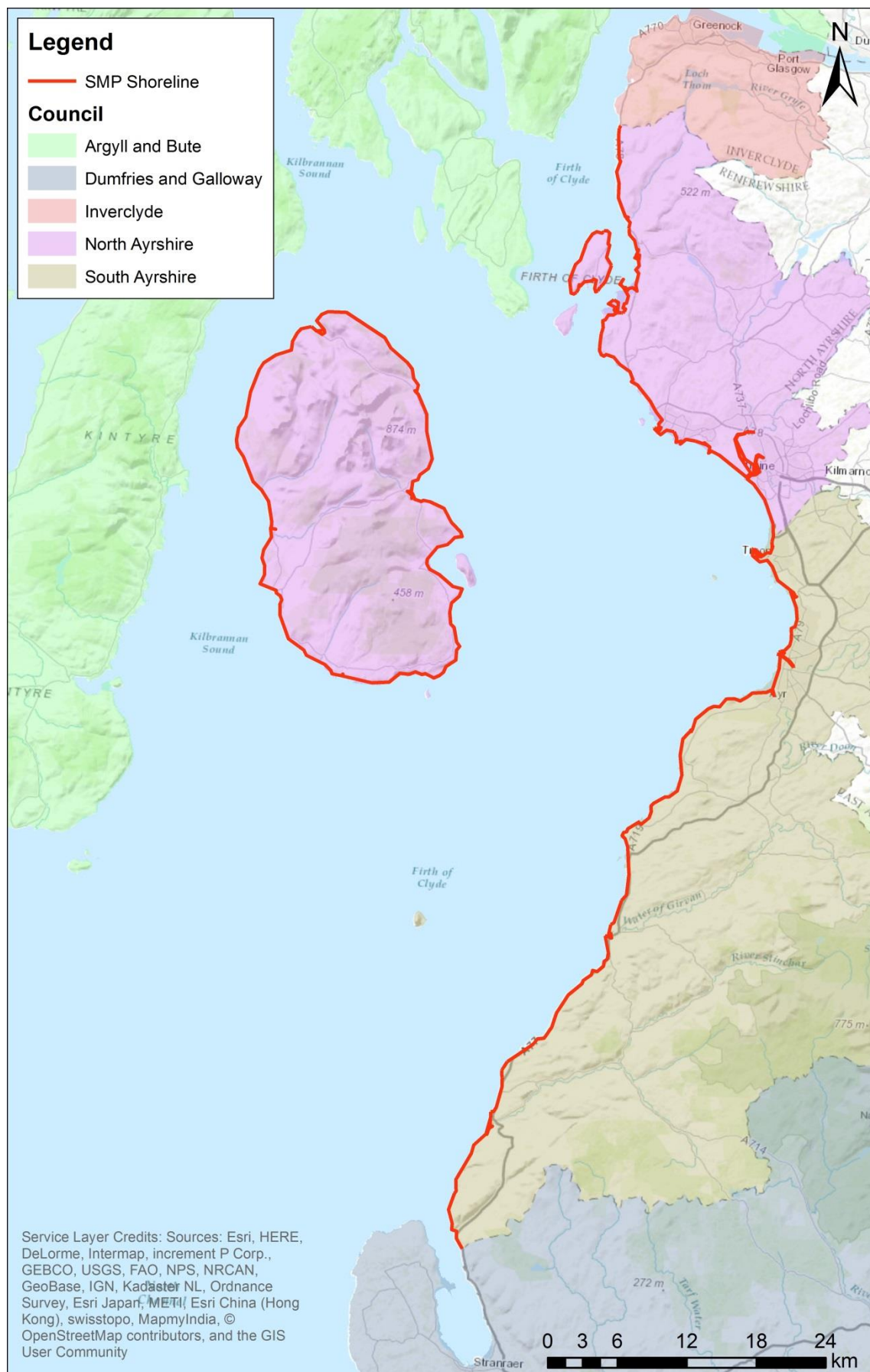
## **2.4    SMP STUDY BOUNDARIES**

The administrative boundaries of the Ayrshire SMP extend from the northern boundary of the North Ayrshire Council area to the southern boundary of the South Ayrshire Council area. This is approximately from the town of Skelmorlie to the outlet of the Galloway Burn on the north-eastern edge of Loch Ryan. The islands of Great Cumbrae and Arran are also included within the scope of the Ayrshire SMP.

Coastal processes are not restricted by the presence of these administrative boundaries, therefore the implications of the suggested management measures have been considered for the adjacent council areas of Inverclyde and Dumfries & Galloway, even though policy for these areas is not set by the Ayrshire SMP.

The area of application of the Ayrshire SMP is illustrated graphically in Figure 2.1.





**Figure 2.1 Ayrshire SMP area**

### 3 SMP PROGRAMME

Table 3.1 illustrates the timetable of activities carried out as part of the SMP development. Activities which involved stakeholder engagement are highlighted in *italics*.

**Table 3.1 Ayrshire SMP Programme**

Stage	Activities
Stage 1: Scope SMP	<ul style="list-style-type: none"> <li>Undertaken by North and South Ayrshire Councils</li> <li>Data Collection and Data Gap Analysis</li> </ul>
Stage 2: Assessments to Support Policy	<ul style="list-style-type: none"> <li>Baseline Process Understanding of coastal behaviour and dynamics developed</li> <li>Sediment Sub-cell definition</li> <li><i>PSG meeting to discuss proposed sediment sub-cells</i></li> <li>Stakeholder feedback incorporated</li> <li>Flooding and Erosion Risk Assessment</li> <li><i>SEA scoping undertaken</i></li> </ul>
Stage 3: Policy Development	<ul style="list-style-type: none"> <li><i>PSG meeting to discuss assets at risk of flooding and/or erosion, and to develop policy ideas by coastal sub-cell</i></li> <li>Consideration of Stakeholder feedback</li> <li>Derivation of policy units and draft policies</li> <li>Strategic Environmental Assessment of draft policy</li> <li>Appropriate Assessment of draft policy</li> <li><i>PSG workshop to discuss potential shoreline management actions</i></li> <li>Develop Action Plan</li> <li>Economic Appraisal</li> <li>Preparation of draft consultation SMP document and appendices</li> </ul>
Stage 4: Public Examination	<ul style="list-style-type: none"> <li><i>Public Consultation</i></li> <li>Analysis of consultation responses</li> <li>Produce Consultation report</li> </ul>
Stage 5: Finalise SMP	<ul style="list-style-type: none"> <li>Determine and implement revisions to SMP and SEA</li> </ul>

Stage	Activities
	<ul style="list-style-type: none"><li>• Finalise SMP and SEA</li></ul>
Stage 6: SMP Dissemination	<ul style="list-style-type: none"><li>• Publicise SMP</li><li>• Implement SMP</li></ul>

### 3.1 STAGE 1: SCOPE SMP

Scoping for the Ayrshire SMP was completed by North and South Ayrshire Councils in July 2015. This set out the guiding principles of the Ayrshire SMP, along with the required location and extent. The overall development process was determined along with target timescales.

#### 3.1.1 Data Collection and Data Gap Analysis

An initial review of available information was undertaken by North and South Ayrshire Councils. The information obtained is shown in Table 3.2.

**Table 3.2 Data obtained during initial review**

Source	Data
North Ayrshire Council	<ul style="list-style-type: none"> <li>• Irvine to Ardrossan Coastal Study               <ul style="list-style-type: none"> <li>○ Main Report</li> <li>○ Ardrossan Harbour and Headland</li> <li>○ North Ardrossan Local Study</li> <li>○ Ardeer Peninsula &amp; Garnock &amp; Irvine Estuaries</li> <li>○ Saltcoats Bay &amp; Harbour Feasibility Study</li> </ul> </li> <li>• Ardrossan Northshore Development – Technical Note</li> <li>• Coastal Protection Asset Survey Report               <ul style="list-style-type: none"> <li>○ Mainland</li> <li>○ Arran</li> <li>○ Cumbrae</li> </ul> </li> <li>• North Ayrshire Coastal Study – Farland Pt to Skelmorlie</li> <li>• Sandylands Promenade Engineers Report</li> <li>• Millport Coastal Flood Risk Assessment</li> <li>• Millport FRA Option Appraisal</li> </ul>
South Ayrshire Council	<ul style="list-style-type: none"> <li>• Coastal Protection Study</li> <li>• Defence Inspections 2015</li> <li>• Local Development Plan</li> <li>• FRA North Beach Road Barassie</li> <li>• FRA Doune Mill Burns Girvan</li> <li>• FRA Troon Shore</li> <li>• FRA Cunning Park, Ayr</li> <li>• SNH Report – Beaches of Southwest Scotland</li> </ul>

Source	Data
SEPA	<ul style="list-style-type: none"><li>• Study of the Clyde Sea Tidal Circulation</li></ul>

This information was reviewed by RPS' coastal engineers in order to ascertain if sufficient information was available to fully inform the development of the Ayrshire SMP. It was concluded that there was not enough existing information regarding the baseline coastal processes within the remit of the Ayrshire SMP study area.

An approach to provide the required information and inform the understanding of the coastal processes was agreed. This involved detailed computational modelling as detailed in **Appendix C**.

## **3.2 STAGE 2: ASSESSMENTS TO SUPPORT POLICY DEVELOPMENT**

### **3.2.1 Baseline Process Understanding of coastal behaviour and dynamics**

#### **3.2.1.1 Assessment of coastal processes and evolution**

An assessment of coastal behaviour and understanding was undertaken. Computational modelling of the hydrodynamic processes around the Firth of Clyde was undertaken to gain an understanding of the tides, wave climate and sediment transport regime. The impact of climate change was also considered in order to gain an understanding of how these coastal processes may change in the future. This assessment is detailed in **Appendix C**.

#### **3.2.1.2 Assessment of Shoreline Management Assets**

Information from coastal asset inspection and survey reports has been used to identify the shoreline management assets currently in place along the Ayrshire coast, and is included within **Section 3** of the main SMP document.

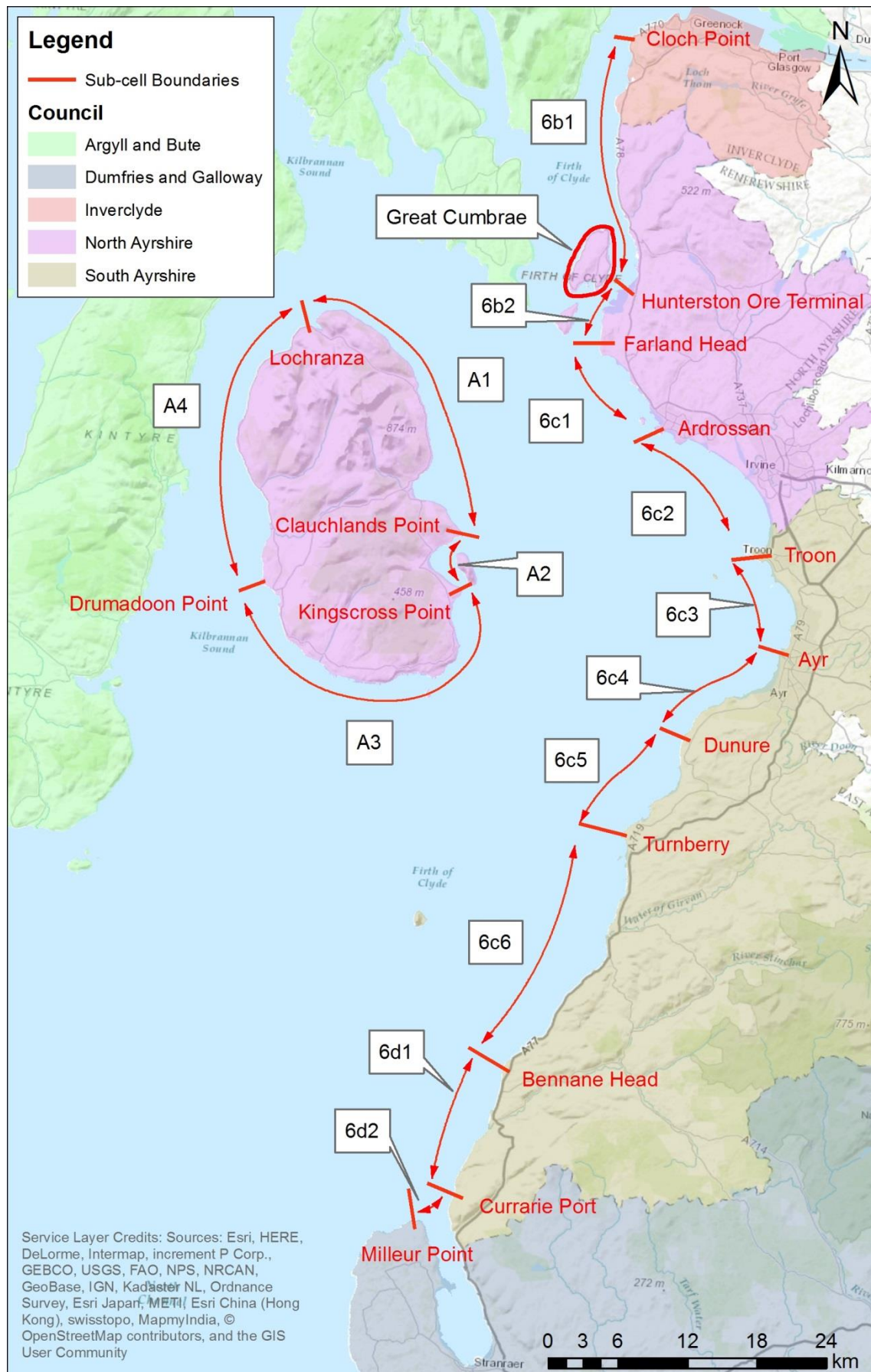
Inspection Reports from surveys carried out for North Ayrshire by AECOM between October 2013 and February 2014 adopted the methodology described in the Condition Assessment Manual (Environment Agency, 2006) to determine the overall condition of structures, with defences identified as being in Very Good, Good, Fair, Poor or Very Poor condition. A Coastal Protection Study incorporating inspections of the shoreline was carried out for South Ayrshire in 1999 by White Young Green with further coastal inspections were undertaken for South Ayrshire in 2015. Condition classification in these studies was based on BA 63/94 for each element of the structures and the extent and severity of any defects was also noted.

### **3.2.2 Sediment Sub-cell definition**

In order to facilitate the development and presentation of appropriate shoreline management policies for the Ayrshire Coastline it was essential to sub-divide the full extent of the Ayrshire coastline in to a number of smaller geographic sections. The detailed assessment of sediment transport potential using computational modelling was used to sub-divide the Ayrshire coastline in to coastal 'sub-cells'. The boundaries between adjacent coastal sub-cells were defined as locations across which there is little or no sediment exchange.

A total of 15 sub-cells were thus identified as shown in Figure 3.1.





**Figure 3.1 Coastal sub-cell boundaries for the Ayrshire and Arran coastlines**

### 3.2.3 Flooding and Erosion Risk Assessment

An assessment of the assets at risk of flooding or erosion was undertaken. Properties, roads and environmentally designated areas were all assessed. Both the erosion and flood risk data was derived from nationally consistent datasets.

Reported information on the susceptibility of the shoreline to coastal erosion was drawn from the outputs of The National Coastal Change Assessment (NCCA). This study is a national study undertaken by SNH to quantify the amount and rate of coastal change around the Scottish Coast. Data for the Ayrshire coast in the form of derived erosion rates and potential coastline set-back lines, was made available in GIS format by the SNH team. This dataset was used to assess the assets predicted to be at risk of damage due to shoreline change.

Similarly reported information on the coastal flood risk was drawn from the information developed by SEPA as part of the process of implementing the EU Floods Directive in Scotland. Data in the form of flood risk extents was made available in GIS format by SEPA for this study. This dataset was used to assess the assets predicted to be at risk of damage due to coastal inundation, however this dataset does not account for flood risk due to wave overtopping.

No comparable datasets were identified from which the risk associated with wave overtopping could be identified, some local studies were found, for example for Millport on Great Cumbrae, however as there was not consistent coverage of the entire Ayrshire coastline this source of flood risk has not been fully considered in this version of the Ayrshire SMP. Instead an approach has been taken of recommending further study in areas where anecdotal evidence suggests that wave overtopping may be a contributor to flood risk.

### 3.2.4 SEA Scoping Report

A SEA Scoping Report (**IBE1107Rp0001**) was prepared to determine the level of detail to be included in the SEA Environmental Report, including the proposed SEA methodology, and to enable the Statutory Consultation Authorities to form a view on the scope of the Plan. The Scoping Report described relevant environmental baseline data, proposed a framework of SEA objectives, presented our initial understanding of key environmental issues within the SMP area at that time, and considered other plans and programmes of relevance. This report also scoped out issues not requiring further assessment.



### **3.3 STAGE 3: POLICY DEVELOPMENT**

#### **3.3.1 Derivation of policy units and draft policies**

Defra SMP guidance (Defra, 2006) was used to outline four potential shoreline management policies, namely:

- Hold the existing defence line
- Advance the existing defence line
- Managed realignment
- No active intervention

The main factors influencing policy decisions along the coast were determined based on the flooding and erosion risk assessment and consultation with the PSG. Stakeholder engagement was sought at this stage in order to gain a wider appreciation of the shoreline features which may influence the chosen policy for a particular section of shoreline.

A screening procedure taking into consideration the assets at risk and stakeholder feedback was undertaken to further sub-divide the study area into 'policy units' and determine draft shoreline management policy for each policy unit. In this context a policy unit is defined by the geographic extent of the applicability of a particular management policy, ownership of assets at risk and the extent of administrative responsibilities. Policy units as defined for the Ayrshire SMP always lie within a single sub-cell, even though there may be locations where the recommended management policy and other defining parameters may be the same in the adjacent sub-cell.

#### **3.3.2 Supporting Assessments**

##### **3.3.2.1 Strategic Environmental Assessment**

An important part of the SMP process is to understand and assess how the Plan will impact on the environment by considering both positive and negative effects of policies on, and relationships between, wildlife and habitats, people and their health, soil, water, air, climate, landscape and cultural heritage.

Under the SEA Directive (2001/42/EC) of the European Parliament and European Council on the assessment of the effects of certain plans and programmes on the environment, a SEA is required for certain statutory plans. As SMPs are not required by legislation, SEA is also not strictly required. However, SMPs do set a framework for future coastal risk management and for planning decisions, and have the potential to result in significant environmental effects, and consequently an SEA has been undertaken as best practice. This is detailed in the SEA Environmental Report (**IBE1107Rp0003**).

### 3.3.2.2 Appropriate Assessment

An Appropriate Assessment for the Ayrshire SMP has been carried out in parallel with the SEA process. The output of this is a Habitats Regulations Appraisal (HRA), which has been prepared in accordance with the requirements of the EC Habitats Directive (92/43/EEC) and European Union Birds Directive (79/409/EEC) to influence the draft Plan and to provide SNH with information on the draft Plan, the process undertaken for the HRA and to establish whether or not the Ayrshire SMP is likely to have a significant effect upon any European sites(s). The findings of the HRA have been integrated into the SEA Environmental Report (**IBE1107Rp0003**) and subsequently into the Plan.

### 3.3.3 Develop Action Plan

A long list of potential shoreline management actions (**Appendix D**) was derived based on 'Shoreline Management Guidelines' (Mangor et al., 2017). This is a non-exhaustive list of potential shoreline management actions, and was used to inform the discussion with stakeholders about potential ways the shoreline management policy for each policy unit could be achieved. Stakeholder engagement was sought through a workshop (**Appendix D**) and the feedback from this was used to inform the development of the Action Plan in **section 6** of the main SMP document.

Proposed shoreline management actions were developed for three epochs: short (0 – 20 years), medium (20 – 50 years), and long-term (50 – 100 years). Responsibility for each action was designated based on the stakeholders influencing/ influenced by the action.

A priority level (high, medium or low) was designated to each action based on the importance of the action. For example actions influencing public safety or property damage due to flooding or erosion were designated as high priority.

### 3.3.4 Economic Appraisal

A high level economic review of the actions proposed in **section 6** of the main SMP document was carried out and the results of this Economic Appraisal are given in **Appendix E**.

The potential economic damages to assets due to coastal flooding (excluding wave overtopping) were assessed. Values of Average Annual Damage (AAD) were calculated based on the SEPA Flood Risk Appraisal Baseline National Coastal Receptor outputs.

Based on the AAD values, Present Value Damages (PVD) were calculated for the receptors at risk. The PVD is the cumulative AAD taken over the lifetime of the project discounted back to the present day. A project lifetime of 100 years was assumed.

The PVD is therefore an appropriate indicator of the potential additional economic benefit which could be gained by implementing shoreline management actions which provide effective flood protection. However it is acknowledged that in certain areas the reported PVD will be an underestimation of the actual benefit available due to the omission of costs associated with damages due to wave over-topping and / or coastal erosion from the economic analysis.

Potential cost estimates of each action were also provided based on experience from previous studies. These are high-level estimates and subject to change.

### **3.3.5 Draft Consultation SMP Document and Appendices**

A draft version of the main SMP document has been produced to clearly present the Plan and the associated policies for review and consultation. This includes:

- An introduction to the Ayrshire SMP including why this study is being undertaken.
- Details of the objectives and general principles of the Ayrshire SMP.
- An overview of the Plan development process.
- Draft Policy Statements for each policy unit
- Draft Action Plan

### **3.4 STAGE 4: PUBLIC EXAMINATION**

#### **3.4.1 Gain Approval in Principle**

The draft Plan was presented to North and South Ayrshire Councils for comment between August and November 2017. Following updates to the Plan document and supporting Appendices based on feedback from North and South Ayrshire Councils, this document is being submitted to the Councils for approval to go forward to public consultation.

#### **3.4.2 Confirm Consultation Strategy**

A strategy for the public consultation exercise has been developed. Some of the agreed methods of consultation are:

- Newsletters/ Information leaflets
- Stakeholder workshops/ Public consultation days
- Email service
- Websites
- FAQs
- Feedback forms
- Advertisement/ Press release

#### **3.4.3 Public Consultation**

Public consultation events are scheduled to be undertaken between February-March 2018. The public consultation report based on feedback from these events will be included in **Appendix B**.

### **3.5 STAGE 5: FINALISE PLAN**

#### **3.5.1 Determine revisions to the draft SMP**

Comments received during the public consultation period will be reviewed and any required revisions to the Draft Plan documents based on these comments will be determined.

#### **3.5.2 Finalise SMP**

Any revisions to the Plan documents which have been determined based on feedback received during the public consultation period will be implemented prior to finalising the SMP.

### **3.6 STAGE 6: PLAN DISSEMINATION**

#### **3.6.1 Dissemination and Implementation of the Final SMP**

North and South Ayrshire will be responsible for making the SMP accessible, for publicising its completion and monitoring progress against the Action Plan. The SMP will be published on both the North Ayrshire Council and South Ayrshire Council web pages.

It is considered likely that the next review of the SMP will take place within a 5-10 year period.

## 4 REFERENCES

AECOM, 2014, Study of NAC Coast Protection Structures – Mainland Base Record and Inspection Survey, NAC001\_AI

AECOM, 2014, Study of NAC Coast Protection Structures – Cumbrae Base Record and Inspection Survey, NAC002\_AI

AECOM, 2014, Study of NAC Coast Protection Structures – Isle of Arran Base Record and Inspection Survey, NAC003\_AI

Department for Environment, Food and Rural Affairs (Defra), 2006, Shoreline Management Plan Guidance Vol 1 & 2.

Environment Agency, 2006, Condition Assessment Manual. Document Reference 166\_03\_SD01.

Highways Agency, 1995, DMRB Volume 3 Section 1 Part 5 (BA 63/94), Highway Structures: Inspection and maintenance. Inspection of highway structures.

Mangor, K., Drønen, N.K., Kærgaard, K.H., Kristensen, S.E. 2017, Shoreline Management Guidelines.

White Young Green, 1999, South Ayrshire Council Coastal Protection Study of Selected Lengths of Coastline.