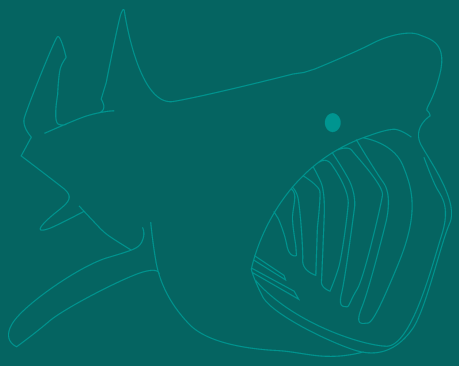




FIRTH OF CLYDE MARINE SPATIAL PLAN

SSMEI
CLYDEPILOT

STRATEGIC ENVIRONMENTAL ASSESSMENT: NON-TECHNICAL SUMMARY

JULY 2010

Scottish Sustainable Marine Environment Initiative



Strategic Environmental Assessment: Non Technical Summary

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Topics covered in the SEA:

- Biodiversity, flora and fauna: protected sites and associated species, seabed and intertidal habitats and species, mobile and migratory species (e.g. seabirds, fish, basking sharks)
- Health, communities and heritage: viability and health of coastal communities around the Firth, maritime heritage including historic features and cultural traditions.
- Water and substrate quality: chemical, bacteriological, nutrient and ecological status of the water column; physical status of seabed substrates
- Amenity: landscape/seascape including designated sites and overall visual quality; marine and beach litter; tranquillity
- Material assets: use of infrastructure such as ports, harbours, and slipways
- Climatic factors: CO2 emissions and coastal flooding

Key to summary assessment tables:

The assessments for each sector and crosscutting theme are summarised in tables, which are colour coded as indicated below. The colours indicate the overall direction and strength of the predicted effects of the policies considered on each *SEA* topic.

Policies not anticipated to exert any significant effect(s) as against the status quo
Policies anticipated to exert significant positive effect(s) of high magnitude and/or duration
Policies anticipated to exert significant positive effect(s) of limited magnitude and/or duration
Policies may exert positive effects, but extent and significance uncertain
Policies anticipated to exert mixed positive and negative effect(s)
Policies may exert negative effects, but extent and significance uncertain
Policies anticipated to exert significant negative effect(s) of limited magnitude and/or duration
Policies anticipated to exert significant negative effect(s) of high magnitude and/or duration
Significant effect(s) of policies uncertain or unpredictable

All assessments were qualitative in nature and focused on the potential *significant* effects (positive or negative) of the preliminary draft policies relative to the situation if no Plan were developed (the *status quo*). Hence, the assessments were of the *potential additive environmental effects of implementing these draft policies* and not of the overall effects of particular sectors or activities.

Abbreviations and Acronyms

EIA	Environmental Impact Assessment
IMS	Indicative Mariculture Strategy
RFS	Responsible Fishing Scheme
SEA	Strategic Environmental Assessment
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage
SSMEI	Scottish Sustainable Marine Environment Initiative
SSSI	Site of Special Scientific Interest

Alien Species: a species that has been transported by human activity, intentionally or accidentally, into a region where it does not occur naturally.

Amenity: the physical and social features of settlements and countryside that contribute to creating a comfortable and desirable living environment.

Appropriate Assessment: test of whether a plan or project is likely to have significant negative impacts on Natura sites.

Aquaculture: the farming of freshwater and saltwater organisms including fish, molluscs (e.g. scallops), crustaceans (e.g. crabs) and aquatic plants.

Ballast Water: water carried in unladen ships to provide stability.

Biodiversity: the variety (within and between species) of living things from all sources (terrestrial, marine, aquatic).

Capital Dredging: excavation of the seabed, generally for construction or navigational purposes, in an area or down to a level (relative to Ordnance Datum) not previously dredged during the preceding 10 years.

Carrying Capacity: the capacity of a location or system to cope with a particular use, activity or species population without being fundamentally altered.

Cumulative Effects (in context of this SEA): the combined environmental effects of different elements of the Plan, including additive, synergistic or secondary effects.

Ecosystem Approach or Ecosystem Based Management: the integrated management of multiple human activities based on knowledge of ecosystem dynamics to achieve sustainable use of ecosystem resources and maintenance of ecosystem integrity.

Environmental Impact Assessment: a detailed assessment of a particular development and its impact upon the environment of the surrounding area.

Environment Report: report describing a Strategic Environmental Assessment

Fauna and Flora: animals and plants

Geomorphology: the study of landforms (in this case the coastline), including their origin and evolution, and the processes that shape them.

Habitat: the environment in which a species lives at any stage in its life cycle.

Intertidal: the area of coast between the mean high water level and the mean low water level.

Land Claim: the process of creating dry land, for agriculture or development, from marine, usually intertidal, areas.

Mariculture: aquaculture practised in marine environments.

Marine Renewables: wave and tidal power technologies.

Marine Spatial Planning: strategic, forward-looking planning for regulating, managing and protecting the marine environment.

Mitigation: measures to avoid, reduce or offset predicted adverse environmental implications.

Modal shift: a change in the proportion of journeys using different modes of transport.

Natura Site: sites that represent areas of the highest value for natural habitats and species of plants and animals that are rare, endangered or vulnerable in the European Community

Precautionary Approach: the adoption of precautionary measures with respect to an activity that raises threats of harm to human health or the environment even if some cause and effect relationships are not fully established scientifically

Pressure-sensitivity Measure or Indicator: a measure that indicates the sensitivity of an environmental feature (e.g. a habitat, species or group of species) to environmental stresses or pressures arising from human activities or natural processes.

Seabed Morphology: the form of the seabed, which is determined by underlying geomorphology and the nature and depth of overlying sediments.

Seascape: the coastal landscape and adjoining areas of open water, including views from land to sea, from sea to land and along the coastline

Site of Special Scientific Interest: areas of special interest by reason of their flora, fauna, geological or physiographical features which have been notified under the Wildlife and Countryside Act, 1981.

Status Quo: the current situation or set of conditions

Strategic Environmental Assessment: the process of assessing policies, plans and programmes (rather than individual projects) for their environmental impacts.

Subtidal: seabed area from the low tide line to the seaward edge of the continental slope.

Sustainable Development: development that meets today's needs without compromising the ability of future generations to meet their own needs.

Water Framework Directive: EC Directive which requires member states to achieve good ecological status of surface waters, including transitional and coastal water bodies.

Wireweed: fast growing seaweed (Sargassum muticum) that competes with native species such as seagrasses and is considered a nuisance in harbours, beaches and shallow waters.

Non-technical summary

This non-technical summary sets out the purpose, methods and findings of a Strategic Environmental Assessment *(SEA)* which has informed the development of a draft Firth of Clyde Marine Spatial Plan ("the Plan"). The summary can be read on its own or as part of the full *SEA* Environment Report, which can be found, along with the Plan, at www.clydeforum.org/SSMEI

Purpose of strategic environmental assessment *(SEA)*

Strategic Environmental Assessment *(SEA)* is a process intended to ensure that the possible environmental effects of public plans, programmes and strategies are fully considered and taken account of in the course of their development. *SEA* is a legal requirement with respect to "certain plans and programmes" for member states of the European Union. In Scotland, this legal requirement is enacted through the Environmental Assessment (Scotland) Act 2005 ("the Act"). The Plan has been subject to *SEA* under section 5.3 of the Act.

The principle of *SEA* is that if aspects of the environment, such as plants and animals, water quality, historic features, and human health, are considered whilst a plan is being prepared, then it can be modified to avoid or limit harmful effects and to promote or increase positive effects. *SEA* also promotes transparency in the development of plans through the involvement of key stakeholders. This includes public consultation on outputs, such as the Environment Report summarised here.

Firth of Clyde marine spatial plan

The Plan is a product of the Scottish Sustainable Marine Environment Initiative (SSMEI) Clyde Pilot project. The SSMEI was initiated by the Scottish Government to inform future policy with respect to management of Scotland's marine and coastal waters.

The Clyde Pilot is one of four SSMEI pilot projects. It aims to deliver integrated and sustainable management of the marine and coastal areas of the Firth of Clyde through an effective stakeholder-regulator partnership. A key objective is the development and implementation of a voluntary Marine Spatial Plan for natural resource use, development control, and management of the marine and coastal areas of the Firth of Clyde (Figure A).

The Plan is intended to deliver the SSMEI ideals of ecosystem based management and sustainable development. The Plan is a framework, based on the aspirations of stakeholders and regulators within the Clyde, which sets out how an agreed vision can be achieved. Its purpose is to guide the sustainable development of activities by both the public and private sectors within the Firth of Clyde.



Based upon Ordanance Survey Data with the permission of the Controller of HMSO (GD03135G0005) and Seazone Hydrospatial Data (022007.002-SEPA)

Figure A
Area covered by Firth of Clyde Marine Spatial Plan

How *SEA* was applied

The application of *SEA* to the development of the Plan is illustrated in Figure B.

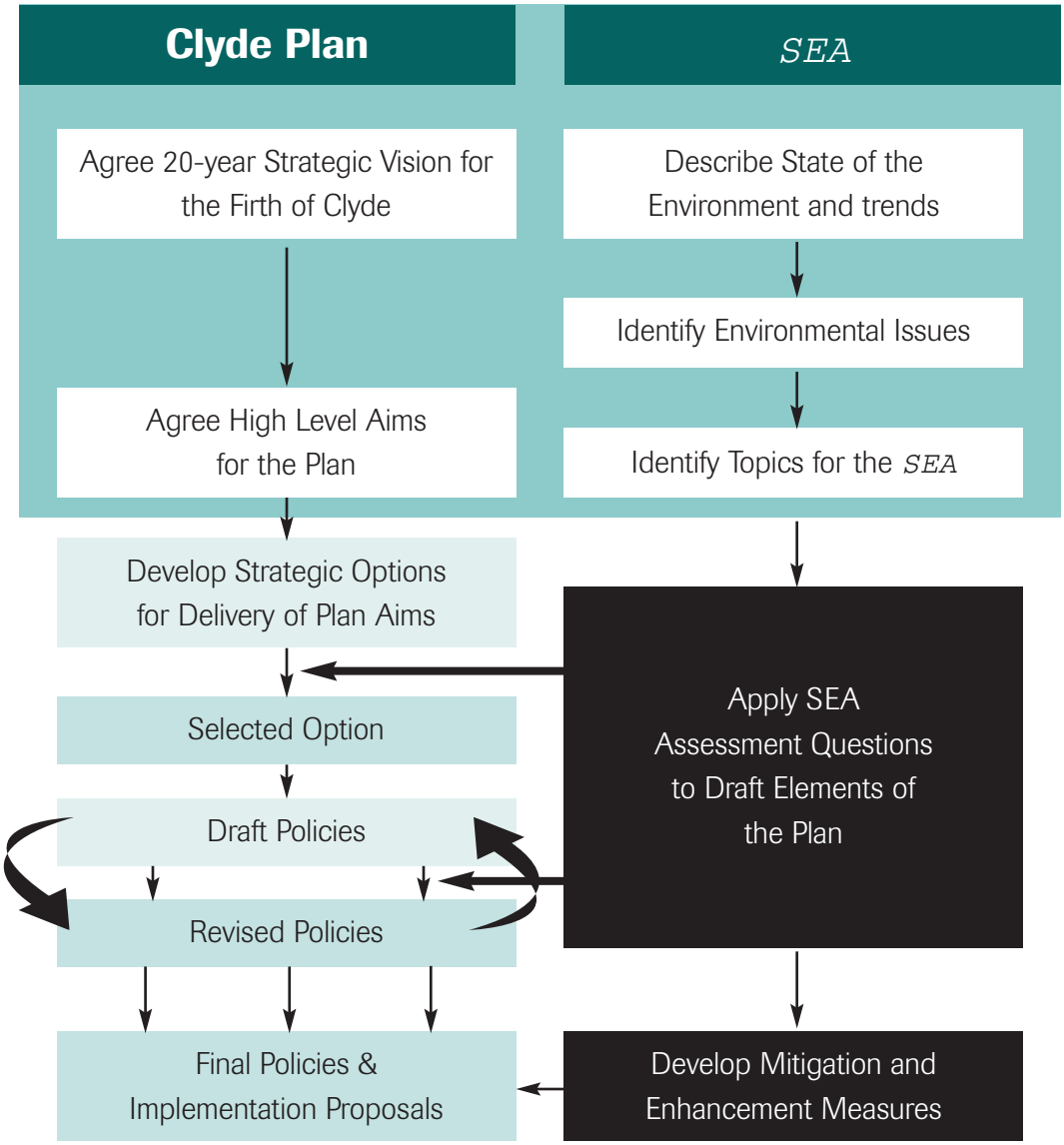


Figure B Application of SEA to Plan Development

The *SEA* was underpinned by a baseline *State of the Clyde* report[1] on the current status, and, where known, underlying trends (e.g. ongoing increases in numbers of breeding gannets at Ailsa Craig) of key features of the Clyde's environment. The report also identifies key environmental issues and data gaps. Additional issues were identified by stakeholders, including members of the project steering group and participants in a study of interactions among sectors within the Clyde.[2] Key issues that might potentially be influenced or affected by the Plan, and which were therefore also a focus of the SEA, included: loss of intertidal habitats to land claim; damage to seabed habitats; marine and beach litter; low dissolved oxygen levels in the upper Clyde estuary; and, high levels of coronary heart disease in some coastal communities.

[1] Ross, D., Thompson, K. and Donnelly, J.E. (2009) The State of the Clyde: Environment Baseline Report SSMEI Clyde Pilot Project Report (available at **www.clydeforum.org/SSMEI**).

[2] Thompson, K., Donnelly, J.E. and Ross, D. (2008) Sectoral Interactions in the Firth of Clyde: Report of Sectoral Interactions Survey SSMEI Clyde Pilot Project Report (available at **www.clydeforum.org/SSMEI**).

Choice of *SEA* topics and questions

The choice of environmental topics included in the *SEA* was based upon those specified in the Act, adapted to reflect the Plan's marine nature, its strategic focus and scope, and the issues identified in the *State of the Clyde* report. For example, the assessment considered marine and beach litter, the potential impacts of which cut across several topics identified in the Act, including fauna and water quality. Tranquillity was also considered important, and these two issues were grouped together with landscape (which is included in the Act and which was presumed to also include seascape), into an 'amenity' topic.

The Act also includes soils as a topic. In the context of a marine plan, this was taken as referring to seabed substrates and was grouped with water quality, as seabed morphology is one of the quality elements for assessing the ecological status of water bodies under the Water Framework Directive. Air quality, which is a topic in the Act, was not included as it was judged that the Plan would not generate significant effects.

Within the topics identified for consideration, a total of 27 questions were formulated to enable assessment of the developing Plan. Examples of these questions are shown below. The choice of topics and questions was initially proposed in a Scoping Report[3] and accepted by the statutory Consultation Authorities (SNH, SEPA and Historic Scotland). These and other consultees' comments informed the final assessment methods used.

Topic	Examples of *SEA* Questions
Biodiversity, flora and fauna	Does the Policy safeguard the designated interests of Natura sites?
	Does the policy safeguard the biodiversity, flora or fauna of the intertidal zone of the Clyde outwith protected sites?
	Does the policy help to safeguard and enhance mobile and migratory species in Clyde waters?
Health, Communities and Heritage	Does the policy improve the health of the Clyde's coastal communities?
	Does the policy protect or enhance the Clyde's historic environment?
Water Quality and Substrates	Does the policy safeguard the physical resource of the Clyde's seabed (e.g. substrate condition)?
	Does the policy help decrease nutrient pollution to Clyde waters?
	Does the policy reduce bacterial pollution to Clyde waters?
Amenity	Does the policy protect or enhance the Clyde's landscape character and the visual quality of its seascapes and landscapes?
	Does the policy reduce litter pollution to Clyde waters?
Other	Does the policy reduce emissions from fossil fuels?
	Does the policy protect or enhance the efficient use of the Clyde's existing ports, harbours, piers, marinas or slipways?

Application of *SEA* questions

SEA was applied to the development of the Plan at two key stages; the elaboration of an overall strategic approach to the delivery of the Plan's high-level aims, and, the development of specific policies. The assessments also identified a number of suggested mitigation and enhancement measures, many of which were incorporated into revised policies and implementation proposals within the Plan. Two members of the SSMEI Clyde Pilot project team, with professional knowledge of marine water quality, biodiversity conservation and sustainability issues, led the assessments. The team also drew upon the extensive knowledge of the Firth of Clyde held by members of the SSMEI Clyde Pilot steering group and consulted specialist staff within member organisations. In addition, a senior representative of Health Scotland, provided advice on consideration of health aspects.

[3] Thompson, K., Ross, D. and Donnelly, J.E. (2007) Firth of Clyde Marine Spatial Plan Strategic Environmental Assessment Scoping Report SSMEI Clyde Pilot Project Report (available at **www.clydeforum.org/SSMEI**).

Assessment of the *status quo*

As detailed in Section 5 of the Environment Report, preliminary assessment of the *status quo* highlighted several aspects of the management of the marine and coastal environment that might potentially gain from the development and implementation of a strategic Marine Spatial Plan for the Clyde. These included: safeguard of seabed habitats and species; protection of marine historic heritage; consideration of the impacts of development on seascape; understanding and management of marine and beach litter; management of greenhouse gas emissions associated with maritime sectors; and,
efficient use of existing infrastructure such as harbours and slipways.

Assessment of alternative plan strategies

Three strategic options, focused respectively on maximising the Plan's potential environmental, social and economic benefits, were considered in the development of an overall strategic approach for the Plan. *SEA* of these options, as detailed in section 6 of the Environment Report, informed the development of a final mixed strategy. This strategy, based on the principle of sustainable development, focuses on: recognition and sympathetic management of the Clyde's defining natural and man-made features; minimising conflicts among marine users; and, maximising potential gains to the well-being of coastal communities arising from marine-based industries and activities.

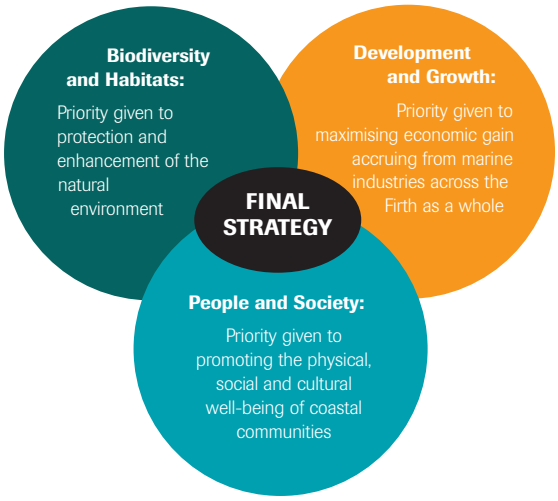


Figure C Options considered in development of strategic approach

Assessment of draft policies

The Plan contains policies for five sectors and four crosscutting themes.

Sectors	Crosscutting Themes
Recreation & Tourism	Environment
Shipping & Transport	Communities
Mariculture	Heritage
Fishing	Safety
Energy and Subsea Infrastructure	

The thematic policies assist the integration of the sectoral policies within the Plan's sustainable development framework. The Plan policies were developed with reference to:

- Existing higher level international, EU, UK and Scottish policy instruments
- The stated aspirations of sectoral representatives for the future development of their sectors within the Firth of Clyde, as elicited at a series of workshops
- The study of interactions among sectors within the Firth of Clyde
- The issues identified by the *State of the Clyde Report*
- The outcomes of the *SEA*

The 27 *SEA* questions were addressed to preliminary draft policies, for all five sectors and three of the crosscutting themes, in order to identify any potentially significant effects (both positive and negative) of those policies on the *SEA* topics. These assessments informed the further development of policies up to the publication of the Plan at March 2009. The safety theme was not assessed, as its focus, on the impacts of terrestrial infrastructure developments on navigational safety, was not directly relevant to the *SEA* topics.

The original assessments are detailed in Appendix 5 and discussed in Section 7 of the Environment Report. In this Summary, the assessment outcomes are summarised in tables for each sector and crosscutting theme. These tables are colour coded, as outlined in the key to assesment of draft policies, to indicate the overall direction and strength of the predicted effects of the preliminary draft sectoral or thematic policies on each *SEA* topic.

Assessment results for draft sectoral policies

Recreation and tourism

The recreation and tourism policies within the Plan are intended to support opportunities for the sustainable growth of a broad range of marine recreation and tourism activities, for the benefit of both local residents and tourists. The preliminary draft Plan contained two specific policies relating to infrastructure development to support the growth of the sector. As indicated in the assessment summary table, these policies related to maintenance and enhancement of slipways and other access points to the water, for activities such as diving and kayaking, and to development of infrastructure to support the expanding sailing and cruising sector.

The principle environmental impacts identified were the potential for significant cumulative effects on aspects such as biodiversity and amenity, especially litter and tranquillity, arising from numerous, mainly small-scale, developments across the Clyde. In particular, the creation of activity hotspots in novel locations, and/or extension of the peak season, might exert significant additional impacts on mobile marine species. Larger developments, such as marinas, might also generate significant local impacts on biodiversity and water quality, and the assessment also identified potential increases in greenhouse gas emissions associated with owners accessing their leisure craft by air and road.

There is potential for these policies to deliver more efficient use of existing infrastructure, such as slipways and jetties, and to contribute to the viability of coastal communities. However, any health effects were judged unlikely to be significant at the local population level, given high entry costs into activities such as recreational sailing or scuba diving.

Policies on: *SEA* Topics	Maintenance and enhancement of slipways and shore-side infrastructure	Development of infrastructure for leisure boating including marinas and hop-on/off network
Biodiversity, Flora and Fauna	Cumulative direct impacts on inter-tidal habitats and disturbance impacts along shore line and in marine space (e.g. from RIBs at sensitive locations)	Increased development pressure along coast (e.g. for large marinas). Possible significant additional impacts on some species/habitats
Health, Communities and Heritage	Potential health benefits in local communities and may assist to preserve cultural links to sea. Potential spin-off benefits to local businesses	Strategic approach to growth of marine leisure sector offers opportunity to generate targeted local economic benefits
Water Quality (incl. Substrates) morphology)	Possible (cumulative) physical damage to intertidal substrates but may also provide impetus for improved bacteriological standards	Potential (cumulative) physical damage to intertidal and subtidal substrates. Possible localised impacts on bathing or shellfish waters
Amenity	Overall impact on litter probably insignificant. Possibly some loss of tranquillity associated with improved access for RIBs	Major growth in marine leisure might have potential to increase marine litter Expansion of marinas etc could potentially impact landscapes and seascapes
Other (CO_2 emissions, use of existing infrastructure)	Strategic approach to management of slipways should promote their efficient use but effects on greenhouse gas emissions uncertain	Increased carbon emissions, through growth in (air) travel to the area by boat owners

Shipping and transport

The overarching objective of the shipping and transport policies within the Plan is that movement of goods and people by sea should be encouraged, and associated infrastructure safeguarded and developed to accommodate increases in coastal freight transhipment and the movement of passengers. The preliminary draft Plan contained seven policies, under three main topics, namely: safeguard of assets and critical marine space, such as ferry routes and Hunterston deep water port; development of existing ports and ferry terminals/facilities, in particular to enhance integration with terrestrial transport, and distribution systems; and, environmental protection with respect to risk of introduction of invasive alien species in ballast and to capital dredging.

As shown in the summary table, the policies on safeguard of assets and sea space were judged equivalent to the *status quo* However, the assessment highlighted the desirability of Scotland/UK level analysis of the implications for greenhouse gas emissions of the existing high-level policy to develop an international container port at Hunterston.

The policies on development of existing ports were assessed as generating potentially significant negative impacts on marine wildlife, for example through increased risk of oil spills and collisions. Land claim and/or capital dredging associated with port infrastructure developments are also potentially detrimental to habitats and substrates. Public access to the shore or water might be restricted at some locations, with potentially detrimental impacts on health within affected communities. However, improved ferry services have potential to improve the viability of isolated communities, and better integration of ports with terrestrial transport systems should promote their efficient use. Potential impacts on greenhouse gas emissions and tranquillity are uncertain, depending on extent of modal shift in relation to increased freight volumes or passenger numbers. The policies on ballast and dredging offered some potential safeguard for biodiversity and water quality interests affected by proposed developments.

Policies on: *SEA* Topics	Safeguard of assets and marine space	Development of ferry services and ports facilities, including better integration with terrestrial infrastructure	Ballast water and dredging
Biodiversity, Flora and Fauna	No significant effect on this topic	Increased risk of oil spills, introduction of invasive species and of wildlife collision/ disturbance. Biodiversity/ hab-itats affected by land claim or dredging	Improved ballast management and precautionary approach to capital dredging potentially beneficial to habitats/species
Health, Communities and Heritage	No significant effect on this topic	Expansion of ferry services may improve viability of coastal communities. Expansion of major port facilities may restrict coastal and marine access	No significant effect on this topic
Water Quality (incl. Substrates) morphology)	No significant effect on this topic	Increased risk of chemical pollution (oil spills). Capital dredging and/or land claim impacts on substrates; overall significance uncertain	Improved ballast management may reduce risk of algal blooms. Pre-cautionary approach to capital dredging may safeguard substrates
Amenity	No significant effect on this topic	Impacts on tranquillity uncertain depending on balance road/ship transport. Potential increases in litter derived from ships/ferries/ports	No significant effect on this topic
Other (CO_2 emissions, use of existing infrastructure)	Higher level analysis of options desirable	Policy promotes efficient use of ports Impacts on CO2 emissions uncertain depending on extent of modal shift in relation to overall expansion in activity	No significant effect on this topic

Mariculture

Policies on: *SEA* Topics	Encouraging the sustainable growth of mariculture and developing an Indicative Mariculture Strategy (IMS)
Biodiversity, Flora and Fauna	Enhanced safeguard of natural heritage interests through strategic approach of IMS.
Health, Communities and Heritage	Sustainable growth of mariculture, with strategic consideration and resolution of potential interactions with other sectors, such as recreation and tourism, is potentially beneficial to viability of coastal communities.
Water Quality (incl. Substrates) morphology)	The IMS would provide a strategic approach to consideration of aspects of water quality already considered within licensing procedures.
Amenity	Incorporation of landscape and seascape carrying capacity assessment within IMS will provide basis for coherent approach to management with respect to visual impacts.
Other (use of existing infrastructure)	The IMS could potentially promote the efficient use of existing infrastructure.

The mariculture policies within the Plan are intended to promote a strategic approach to the sustainable growth of the sector, in order to minimise conflicts with other interests and to improve clarity of decision making. The main policy, to develop an Indicative Mariculture Strategy (IMS) to provide a planning framework for the sector, was assessed as summarised above.

The development of an IMS for the Firth of Clyde would represent a strategic approach to the application of planning and consents processes for mariculture. As such, it was judged to be potentially beneficial to those aspects of the environment, such as nutrient loadings and designated sites or protected species, which are already considered within the licensing and planning regimes applied to this sector.

Incorporation of a landscape and seascape carrying capacity assessment within an IMS would also provide a basis for a coherent approach to management of mariculture development with respect to visual impacts. Sustainable growth of the sector is also potentially beneficial to the viability of coastal communities, particularly within the sea lochs, and to the efficient use of infrastructure.

Fisheries

Policies on: *SEA* Topics	Shore-side infrastructure and roads	Safeguard of fishing grounds	Study of fisheries impacts and promotion of voluntary measures etc
Biodiversity, Flora and Fauna	No significant effect on this topic	Potential reduction in extent of displacement of fisheries to novel areas	Systematic study of fisheries impacts potentially highly beneficial. Better discards management and removal of marine litter also positive
Health, Communities and Heritage	Clyde fishing fleet important to long-term viability of some coastal communities and to cultural heritage.		RFS promotes safe working on vessels. Historic heritage may benefit from measures aimed primarily at protection of natural heritage
Water Quality (incl. Substrates) morphology)	No significant effect on this topic	Potential reduction in extent of displacement of fisheries to novel areas	Systematic study of fisheries impacts potentially beneficial to safeguard/ enhancement of seabed substrates
Amenity	No significant effect on this topic		Promotion of fishing for litter scheme may improve amenity
Other (CO_2 emissions, use of existing infrastructure)	Improving facilities at existing harbours promotes efficient use. May be increased CO2 emissions associated with road aspects	Strategic approach may tend to promote efficient use of harbours	Potential impacts of any restrictions on fished areas on greenhouse gas emissions are uncertain.

The fisheries policies within the Plan are intended to promote a sustainable fishing industry within the Firth of Clyde that supports and brings benefits to local communities. The four policies within the preliminary draft Plan related to three main topics, namely: development of a strategic plan to deliver and maintain infrastructure for a sustainable fishing industry, and encouragement of measures to maintain and improve key roads; safeguard of fishing grounds; and (voluntary) protection of habitats and species, informed by mapping of fishing activity and intensity, and a study of fishing impacts on the marine environment and ecosystem services within the Firth of Clyde.

As indicated in the summary table, the effects identified include potential for long-term benefits to the safeguard or enhancement of seabed habitats and species and of seabed morphology, depending upon how the results of the proposed fisheries impacts study might subsequently be applied to fisheries management. Such measures could also generate some incidental benefits for historic heritage. Adoption of a strategic approach to the management of displacement of fishing activity by other interests is also potentially beneficial to protection of seabed features.

More generally, the long-term viability of a number of coastal communities, together with maintenance of cultural traditions, is to a greater or lesser extent dependent upon the presence of a sustainable inshore fisheries sector. The proposed development of a strategic infrastructure plan should assist the efficient use of existing ports and harbours. However, the potential impacts on greenhouse gas emissions were judged unclear.

Energy and subsea infrastructure

The energy policies within the Plan are intended to safeguard the operation of critical energy infrastructure and facilities around the Clyde and, where technically and environmentally appropriate, to promote local development of marine renewables. Policies within the preliminary draft Plan relating to safeguard of water space around existing infrastructure are equivalent to the status quo in terms of potential impacts and, as such, were not assessed. The assessment of the other two policies, relating to development of renewables, especially tidal turbines, and to burial of new subsea cables or pipelines is summarised below.

The burial of new subsea cables and pipelines could exert localised, temporary, impacts on seabed substrates and associated habitats and species, but any such impacts were not assessed to be significant at the Clyde level.

Three small areas either side of the seaward boundary of the Firth of Clyde, at Mull of Kintyre, Sanda Sound and Mull of Galloway (of which only part lies within the Plan area), have been identified as currently potentially suitable for the development of tidal technology. The findings of a higher level *SEA*[4] on the development of marine renewable energy capacity across Scotland concluded that most effects from renewable devices could be reduced to minor or negligible significance with implementation of appropriate mitigation measures. However, exceptions include: displacement of fishing activity; displaced/ increased shipping density; and, effects of noise on marine birds and marine mammals. In addition, there are significant unknown effects in relation to collision risks for birds, mammals and fish, and displacement of foraging birds. Consideration of these findings in the context of the Firth of Clyde suggests that there could be particular issues with respect to potential impacts on seabirds.

Policies on: *SEA* **Topics**	**Promotion and facilitation of sustainable development of marine renewables**	**Burial of new cables and pipelines**
Biodiversity, Flora and Fauna	Potential noise, collision risk and displacement impacts on mobile species, especially seabirds from Sanda and/or Ailsa Craig	Any localised, temporary, impacts on seabed substrates, habitats and species, and water quality gauged to be insignificant at the Clyde level
Health, Communities and Heritage	Increased risk of chemical pollution (oil spills) associated with increased levels of shipping activity required to construct and service sites	
Water Quality (incl. Substrates) morphology)	The number and scale of potential developments across the Firth of Clyde is limited; significance of cumulative impacts uncertain	No significant effect on this topic
Amenity	Assuming no development of marine wind farms, impacts of small scale tidal stream developments unlikely to be significant	No significant effect on this topic
Other (CO_2 emissions, use of existing infrastructure)	Depending on end use of any electricity generated, there may be some reduction in CO2 emissions across the Clyde	No significant effect on these topics

[4] Scottish Executive (2007) Scottish Marine Renewables SEA Report prepared for the Scottish Executive by Faber Maunsell and Metoc plc (available at http://www.seaenergyscotland.co.uk/)

Assessment results for draft crosscutting policies

Environment

The environment theme of the Plan addresses various issues affecting the delivery of its high level environmental aim of "maintaining and enhancing the biodiversity, landscape and seascape of the Firth of Clyde". The preliminary draft Plan contained eleven policies relating to five issues, namely: gaps in knowledge; damage to habitats and disturbance of wildlife; threats posed by non-native invasive species; development impacts on landscape and seascape; and, marine litter. The *SEA* of these draft policies is summarised below.

The policies relating to developing a strategic approach to landscape and seascape and to expanding knowledge of the biodiversity, plants and animals of the Firth of Clyde (in particular the development of pressure-sensitivity measures) were identified as generating potentially highly positive and long-lasting effects with respect to protection of the biological and visual environments. Such gains would also be anticipated to generate indirect benefits for the viability and population health of coastal communities.

Various aspects of water quality might benefit from management aimed at safeguarding habitats or species, in cases where the damaging pressures on these features arise because activities affect water quality. Similarly, (voluntary) protection of features such as spawning/nursery grounds for fish or shellfish might safeguard sectors, such as inshore fisheries and tourism, that contribute to the viability of coastal communities.

The extent to which a more strategic approach to litter management might deliver real gains is anticipated to be highly dependent upon the origins of litter in the Firth of Clyde. Reductions in litter would benefit amenity and reduce risks of injury to wildlife. Other potential indirect benefits include more efficient use of coastal infrastructure, improved human health, and better water quality.

Policies on: *SEA* Topics	Improving knowledge base	Protection from damaging development or activities	Non-native invasive species	Landscape and seascape	
Biodiversity, Flora and Fauna	Seabed habitats, mobile species & pressure-sensitivity measures	Depends upon how enhanced knowledge is applied	Management of wireweed etc may benefit native habitats/species	No significant effect on this topic	Potential for reduced impacts; more information needed
Health, Communities and Heritage	No significant effect on this topic	Environmental safeguard may yield economic benefits	Management may reduce damage to community resources	Potential benefits to well-being and sectors such as tourism	Management may reduce damage to boats and improve well-being
Water Quality (incl. Substrates) morphology)	Application of knowledge of seabed habitats or pressures/sensitivities may lead to incidental improvements in seabed morphology or water quality		No significant effect on this topic	No significant effect on this topic	Potential for reduced impacts; more information needed
Amenity	No significant effect on this topic	No significant effect on this topic	No significant effect on this topic	Strategic approach has potential to yield significant long-term benefits	Potential for improvement depending on litter origins
Other (efficient use of existing infrastructure)	No significant effect on this topic	No significant effect on this topic	No significant effect on this topic	Greater protection may favour use of existing ports etc	May reduce management costs and promote efficient use

Communities

Policies on: *SEA* Topics	"Sympathetic" development to benefit coastal communities	Re-engagement with marine environment and maritime heritage	Increased participation in marine leisure pursuits
Biodiversity, Flora and Fauna	Potential impacts depend upon specifics of proposed developments	Increased awareness beneficial, but may be disturbance impacts with improved access	Disturbance related impacts on marine wildlife, especially mobile species
Health, Communities and Heritage	Potential impacts depend upon specifics of proposed developments	Increased awareness plus improved access to coast may benefit heritage and /or health	Health benefits. Impacts on historic heritage depend on management
Water Quality (incl. Substrates) morphology)	Potential impacts depend upon specifics of proposed developments	No significant effect on this topic	Greater focus on improvements in bacteriological water quality for recreation
Amenity	Potential impacts depend upon specifics of proposed developments	Potential to improve amenity for residents if litter etc managed	Depends upon activities promoted (e.g. jet skiing vs. kayaking) and their location / management
Other (CO_2 emissions, risk of flooding, use of existing infrastructure)	Potential impacts depend upon specifics of proposed developments	Greenhouse gas emissions depend on travel modes to access coast/sea	Potentially positive benefits for efficient use of existing slipways and jetties etc

The communities theme within the Plan contains a number of policies that focus on maximising the potential social and economic benefits to coastal communities of living adjacent to the Firth of Clyde. The preliminary draft Plan contained three policies relating to coastal communities. The *SEA* of these draft policies is summarised above.

It was not possible to determine the likely nature, direction or scale of potential effects of the first of these policies in the absence of more detailed explanation of the meaning of the word "sympathetic", as applied to marine-related developments within the stated context of maximising socioeconomic benefits to local communities.

Greater access to the coast and increased local participation in marine leisure activities, as promoted under the other two draft policies, was assessed as potentially beneficial to the health and long-term viability of coastal communities, as well as to the efficient use of existing infrastructure, such as slipways and jetties. However, increased access, especially to the shore, also has potential to exert negative environmental impacts, for example through disturbance and displacement of wildlife, loss of tranquillity and increased littering.

Heritage

The heritage theme within the Plan focuses on ensuring that the maritime heritage of the Firth of Clyde is recognised and that infrastructure developments and marine activities within the Clyde do not threaten the integrity of this heritage. The preliminary draft Plan contained one heritage policy, which encompassed two distinct elements, as indicated in the *SEA* summary assessment table.

The extent of potential positive impacts, both directly on safeguard of historic heritage, and indirectly on aspects such as the protection or enhancement of marine biodiversity or cultural awareness, was judged to be uncertain given the policy's reliance on voluntary approaches. The potential impacts on efficient use of existing infrastructure are also uncertain. Improved safeguard of infrastructure such as slipways and piers could potentially facilitate their continued use, especially for recreational activities such as kayaking, diving or angling. However, for larger structures, such as harbours, the safeguard of historic features might constrain options for developments to facilitate their ongoing use by either traditional (e.g. fishing) and/or other interests, such as leisure craft.

Policies on: *SEA* **Topics**	**Development controls and precautionary approach**	**Voluntary approaches to management of activities**
Biodiversity, Flora and Fauna	Any enhanced protection of wrecks and other underwater archaeology may benefit biodiversity interests, including fish, by providing safe "reefs"	
Health, Communities and Heritage	Potential for direct benefits to historic heritage interests and for associated indirect benefits to cultural awareness	
Water Quality (incl. Substrates) morphology)	No significant effect on this topic	Potential safeguard of seabed substrates around (unscheduled) wreck sites
Amenity	Enhanced safeguard of coastal historic sites has potential to impact positively on landscape	Not anticipated to affect amenity, other than for recreational divers
Other	Depends on whether safeguard of historic features promotes or constrains use in 21st C	No significant effect on this topic

Cumulative impact

	Thematic Policies			Sectoral Policies					
SEA Topics	Environment	Communities	Heritage	Recreation & Tourism	Shipping & Transport	Mariculture	Fisheries	Energy	Cumulative impacts across all policies
Biodiversity, Flora and Fauna									Mixed, mostly positive, but cumulative disturbance/dis-placement and/or develop-ment footprint impacts
Health, Communities and Heritage									Potentially largely positive, but significance uncertain
Water Quality (incl. Substrates) morphology)									Limited and mixed. Impacts on seabed morphology may be reduced by improved knowledge base
Amenity									Largely positive given strategic approaches to landscape & seascape and litter. Some cumulative development impacts possible
Other (CO_2 emissions, risk of flooding, use of existing infrastructure)									Impacts on greenhouse gas emissions uncertain. Plan may promote more efficient use of existing infrastructure
Cumulative impacts across all topics									**Mixed, largely positive**

An important aspect of *SEA* is the consideration of cumulative effects. Cumulative effects of the policies in the preliminary draft Plan are identified in the summary table above.

An important aspect of *SEA* is the consideration of cumulative effects. Cumulative effects of the policies in the preliminary draft Plan are identified in the summary table below.

Reading down columns indicates the cumulative effects of the preliminary draft policies in each crosscutting theme or sector. The environment, heritage, mariculture and fisheries policies exert positive cumulative effects, while those for recreation and tourism, shipping and transport and energy are mixed, including negative impacts, particularly for some aspects of biodiversity, flora and fauna. The outcomes of communities policies are largely uncertain, depending on the specific characteristics of associated physical developments.

Reading across rows indicates the cumulative effects of all policies within the preliminary draft Plan on each of the *SEA* topics. Those on biodiversity, fauna and flora are mixed but largely positive, particularly with respect to the development and strategic application of an enhanced knowledge base, including the proposed study of fisheries impacts. However, there could be cumulative disturbance or displacement impacts, arising in particular from increased recreational activities. There might also be cumulative impacts on seabed and intertidal habitats and associated species, associated with the proposed developments of infrastructure such as marinas, leisure moorings, ports and tidal energy capture devices.

Positive cumulative impacts on health and community viability might arise from enhanced environmental protection and the safeguard of ferry services and traditional maritime sectors, together with increased engagement in the marine leisure industry and associated recreational activities. However, the overall strength and significance of such benefits are uncertain, as are the potential cumulative effects on historic heritage, which would depend largely on the effectiveness of proposed voluntary initiatives.

Water column quality is already highly regulated, so the cumulative effects of the Plan are relatively limited. However, marine substrates might be subject to cumulative development impacts across several sectors. Such impacts could be partially avoided or reduced by the proposed application of improved knowledge of seabed habitats and sensitivities to regulatory decision making and by voluntary restrictions on activities such as capital dredging and trawl fishing.

The development and application of strategic approaches to the safeguard of landscape and seascape, and to the survey and management of marine litter, should generate positive cumulative impacts on amenity. However, general increases in levels of activity across sectors might cumulatively reduce tranquillity and increase litter.

Strategic approaches to the future development of the marine leisure, mariculture, shipping and fishing sectors would all tend to promote more efficient use of existing infrastructure. Actions to safeguard landscape and seascape and manage marine litter might also tend to support use of existing facilities. However, there could be some localised tensions between safeguard of historic features and their efficient use.

The potential cumulative impacts on greenhouse gas emissions were uncertain and highly complex, depending in part on the geographical scale considered. Expansion of berthing capacity for leisure craft on the Clyde could increase both local and global greenhouse gas emissions, largely through (air) travel to the area by boat owners resident elsewhere, while development of tidal renewables could reduce local emissions, depending on end users.

Overall, implementation of the policies within the preliminary draft Plan would be anticipated to exert mixed, but largely positive effects. These benefits would arise mainly from the strategic application of an improved knowledge base, including understanding of the environment and of interactions among sectors and associated activities, to the future development of infrastructure and activities across the Clyde as a whole. The potential negative impacts identified arise primarily from disturbance or displacement of native wildlife and from (cumulative) damage to seabed or intertidal habitats associated with infrastructure developments. Many of these potential impacts were addressed in the revised draft Plan, as detailed in the following section.

Mitigation and enhancement measures

A key function of *SEA* is to identify measures that might be used to mitigate (i.e. avoid, reduce or offset) any significant damaging effects or to enhance any significant positive effects identified by the assessment. Mitigation and enhancement measures identified with respect to the preliminary draft Plan are shown in the following table. Where applicable, these measures are cross-referenced to relevant policies (e.g. ENV3, R&T5) in the Plan. Some of the proposed measures identified with respect to the preliminary draft policies were too detailed or specific for inclusion within these amended strategic policies, but may inform future approaches to (voluntary) implementation of the Plan.

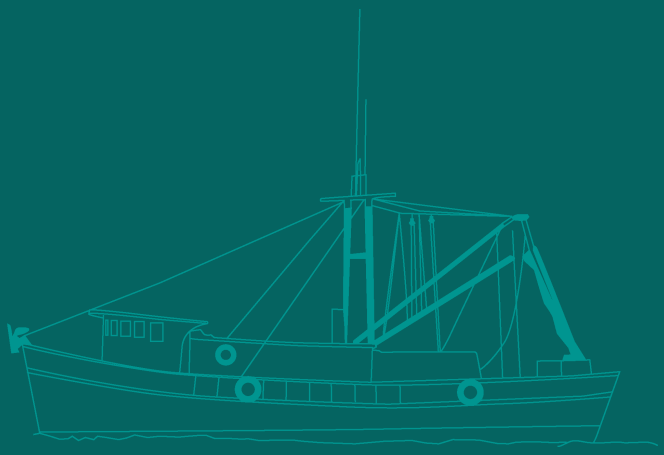
Potential mitigation measures

Potential Impacts	Proposed Mitigation Measures
Disturbance/displacement and/or collision risk for mobile/ migratory species	Collate data on occurrence of mobile and migratory species (ENV3) to identify any (seasonal) activity hotspots that should where possible be avoided by merchant shipping and leisure craft; promote relevant codes of conduct (e.g. R&T5). Encourage local residents to take part in relevant recording and reporting schemes. Undertake proactive *SEA* of likely disturbance effects (informed by ENV3 & 4) across the Clyde of numerous small-scale developments in the recreation and tourism sector (under R&T2 & 3) once options for preferred industry/user locations have been identified. Adopt a strategic approach to the development of infrastructure associated with improving access to the shore or water including prior identification of key feeding, roost or moulting sites for wading birds and waterfowl (ENV3) and subsequent design and management of access e.g. appropriate siting of routes/access points; provision of information; use of byelaws; promotion of codes of conduct (R&T5). Include consideration of disturbance or displacement impacts in Appropriate Assessments for Natura sites (ENV7). Socioeconomic analysis of mariculture (MAR1) should include analysis of potentially competing interactions of mariculture with intangibles such as safeguard of wildlife and the IMS should consider potential cumulative effects of site developments on mobile and migratory species. Location of renewable energy devices and timing of construction should give particular consideration to impacts on seabirds (ENV6).
(Cumulative) physical damage to seabed substrates, habitats and species	Identify areas sensitive to further or new developments (ENV1, 2 & 4; MAR1, FISH4) and direct development appropriately (ENV6). Undertake proactive *SEA* of likely cumulative effects across the Clyde of numerous small-scale developments in the recreation and tourism sector (under R&T2 & 3) once options for preferred industry/user locations have been identified. The IMS (MAR1) should consider potential cumulative effects of site developments on biodiversity and recognise limits to ecosystem capacity. Adopt a precautionary approach to capital dredging (S&T7) and promote use of infrastructure and equipment with reduced seabed impacts (e.g. mooring types that reduce seabed footprint). Avoidance of fishing grounds (FISH1) should not displace other types of developments or activities into areas that are more environmentally sensitive to them. Areas subject to (voluntary) restrictions on fishing effort (FISH4) should be systematically monitored against comparable control areas to improve understanding of fisheries impacts and possible approaches to management within the Clyde.
(Cumulative) damage to protected or locally important intertidal habitats and associated species	Undertake Appropriate Assessment of such impacts for Natura sites (ENV7) and only permit developments impacting on SSSIs where damaging effects are outweighed by national social or economic benefits (ENV8). Any development at Hunterston should include detailed EIA level assessment of impacts on Portencross Coast SSSI. Undertake *SEA* of likely cumulative effects (informed by ENV4) across the Clyde of numerous small-scale developments in the recreation and tourism sector (e.g. pontoons, slipways with car parking) under R&T2 & 3 once options for preferred locations have been identified.
Possible reduction in water quality	Consider siting of new marinas (R&T3) in relation to sensitivities of adjacent users (e.g. shellfish harvesters, bathers) to sewage (informed by ENV4); minimise potential environmental impacts in sensitive areas through requirement to incorporate sewage holding tanks on leisure craft

Potential Impacts	Proposed Mitigation Measures
Increased risk of introduction of non-native invasive species	Develop a guiding framework for invasive non-native species in the Clyde (ENV5). Expansion or development of port facilities should include infrastructure and procedures compatible with the Ballast Water Convention (S&T6).
Increased risk of oil spills	Future revisions of the Firth of Clyde oil spill contingency plan should take account of any new information arising from the marine planning process (e.g. with respect to locations of important species and habitats ENV2, hotspots for mobile/migratory species ENV3, and development of pressure-sensitivity indicators ENV4).
Increased litter	Development of a coordinated marine litter strategy, including encouraging and aiding integration of existing initiatives in the Firth of Clyde (ENV11) and promote voluntary initiatives (e.g. Green Blue) to reduce littering (R&T5). Littering impacts need to be fully considered in context of specific proposals for improved access to the coast (e.g. development of footpaths or slipways and associated car parks), to enable appropriate design and management to be put in place.
Possible loss of tranquillity	A strategic approach to improving access to the water (under COM2 and/or R&T2) to enable appropriate siting of routes/access points would assist in avoiding or reducing impacts to tranquillity. The socioeconomic assessment of mariculture (MAR1) should include valuation of intangibles, such as safeguard of tranquillity, to ensure that mariculture development does not detract from the defining characteristics that make the Clyde attractive to other activities.
Possible impacts on landscape and seascape	Undertake strategic analysis of landscape and seascape and produce guidance for developers and Local Authorities (ENV10) and include landscape and seascape carrying capacity analysis in Indicative Mariculture Strategy (MAR1) Renewable energy installations should be located to maximise the distance of devices from shore, reduce the height of devices, reduce the area of sea occupied by the devices and modify the position and layout to suit characteristics of the local seascape.
Access restrictions	Identify options for compensatory measures for loss of recreational access around developments (COM1).
Possible increases in greenhouse gas emissions	Minimise and offset increased carbon emissions associated with expansion of berthing capacity (R&T3) and associated (air) travel by boat owners (e.g. location of marinas adjacent to public transport facilities; incorporation of renewable energy devices into infrastructure). Need for higher level (Scotland/UK) consideration of the potential greenhouse gas emissions associated with alternative strategic approaches to the import (export) and internal distribution (movement) of goods and in particular the development of Hunterston as an alternative point of entry to Scotland/UK for international containerised freight (see S&T4). Decisions on where to locate key infrastructure for the fishing fleet (FISH2) should include consideration of impacts on carbon emissions, both for vessels at sea and transport of catch to processors and/or end consumers. Similar considerations should be applied to decisions on appropriate locations and nature of infrastructure associated with policies intended to facilitate public access to the coast and water (COM2, R&T2) and the development of new or enhanced ferry services/facilities (S&T1).
Possible damage to historic harbour features	Harbour improvement works should be sympathetic to the historic heritage of Clyde fishing harbours. Such safeguard of the historic environment could potentially be linked to marketing initiatives for environmentally sympathetic “Clyde” branded products.

Potential enhancement measures

Potential Impacts	Proposed Enhancement Measures
Enhanced safeguard of biodiversity, fauna and of physical/ morphological features	Extend data gathering to include consideration of linkages between natural heritage and economic interests (e.g. the importance of the presence of wildlife to recreational users). Encourage voluntary community-based approaches to management/protection of sensitive features (ENV9, R&T5, FISH4) and encourage local residents/schools to take an art in biological recording and reporting schemes. Application of enhanced knowledge to project level decision making could be facilitated by development of a regularly updated GIS-based decision making tool, available to potential developers and regulators/consultation bodies through a web portal. Retain examples of unpressurised habitats, for ongoing comparison with pressurised, to assess effectiveness of approaches to management. The proposed Indicative Mariculture Strategy (MAR1) should take account of features identified as of local importance to marine biodiversity within Firth of Clyde. The sensitivities of such features to mariculture development (ENV4) should be incorporated within the IMS. The development of partnerships to translate results of study of fisheries impact into management mechanisms to safeguard features of physical or biological or importance (FISH4) could be linked to marketing of environmentally sympathetic "Clyde" branded products and to the promotion of accreditation schemes, such as that operated by the Marine Stewardship Council.
Marine and beach litter may be reduced	Beaches and litter could be included within the proposal to develop pressure-sensitivity indicators for important habitats (ENV4). Data collection to inform the litter strategy (ENV11) should include: information on the specific impacts of litter on receptors within the Firth of Clyde (e.g. entanglement of mobile species) (cf ENV4); and, any available data on the probable origins of marine litter within the Clyde. Beach clearance should avoid unintentional damage to biodiversity interests (e.g. through removal of invertebrates in natural debris).
Potential health benefits to coastal communities	Opportunities to improve health in local communities should be maximised, particularly through early provision of targeted opportunities for disadvantaged groups to engage in marine recreation activities (COM2, R&T7). Countryside Ranger Services could potentially promote the coast and maritime heritage to local residents. Promotion of local consumption of high quality seafood (e.g. procurement for school meals) could benefit health in local communities.
More efficient use of ports, harbours, piers, marinas, slipways etc	Clear planning guidance should be developed with respect to the expansion of leisure berthing capacity (R&T3) within the Firth of Clyde to promote where possible take up of unused capacity in existing ports and harbours. Adopt a strategic approach to COM2 to identify where existing infrastructure, particularly slipways and jetties, might most readily be used to enhance opportunities for local participation in activities such as sea angling and kayaking (see R&T2).
Enhanced protection of (unscheduled) features of historic environment	Adopt a proactive strategic approach to identify elements of the maritime heritage, such as wrecks and dry docks of local or regional interest. Voluntary approaches to the safeguard of such features could be explicitly linked to the development of innovative interpretative materials. Strategic assessment of landscape and seascape (ENV10) should recognise importance of the Clyde's historic built heritage to its visual character.



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