Scottish Environment LINK

Scottish Climate Change Adaptation Programme - Marine

Purpose of this briefing

This LINK briefing from the Climate Adaptation Taskforce (CATF) is intended as a resource and reference to be used by LINK colleagues for information regarding Scottish Government policies relating to adaptation of interest to specific taskforce sectors. **Please note this briefing does not include any analysis of the specific adaptation policies**, although the CATF general concerns are detailed below, alongside links to our previous consultation response. The full Adaptation Programme can be viewed here: http://www.scotland.gov.uk/Resource/0045/00451392.pdf

Scottish Climate Change Adaptation Programme (SAP) background

Climate change impacts are being felt now in Scotland, particularly in the natural environment. Scotland needs to act urgently to address the consequences and impacts of our changing climate. Scotland must reduce GHG emissions but also adapt how we run our economy, our society and how we look after our environment. Adaptation is the term used to describe our responses to a changing climate and its impacts – including building resilience. Adaptation is inevitable – the important thing is to plan early and to do it in the right way. With the publication of the SAP, it's essential that climate adaptation becomes a higher priority within Government - **building the resilience of Scotland's environment to climate change must be a priority at a time when our natural resource base needs to be valued as an important asset.**

The Climate Change (Scotland) Act 2009[1] requires Government to lay before the Scottish Parliament '*programmes for adaptation to climate change*'. The Scottish Government has developed measures based on risks identified for Scotland in the UK Climate Change Risk Assessment (CCRA) 2012. The CCRA is however limited and does not adequately cover some impacts, such as sea-level rise or extreme weather events. Publication of the first Scottish Climate Change Adaptation Programme brings into force the adaptation requirement of the public bodies climate change duties, which requires that a public body must, in exercising its functions, act in the way best calculated to help deliver the Programme.

The programme contains an overall **Aim** – to increase the resilience of Scotland's people, environment and economy to the impacts of a changing climate. Within this are three **Themes** and relevant **Objectives** for the long-term (up to 2050), to facilitate achieving the Aim:

Natural Environment	**Buildings and Infrastructure**	**Society**
Outcome: productive, healthy, diverse natural environment able to adapt to change	*Outcome: well-managed, resilient infrastructure and buildings providing access to amenities and services needed*	*Outcome: strong, healthy, resilient communities which are well informed and prepared for changing climate*
N1: understand effects of climate change and impacts on the natural environment	B1: understand effects of climate change and impacts on buildings and infrastructure	S1: understand effects of climate change and impacts on people, homes and communities
N2: support a healthy and diverse natural environment with capacity to adapt	B2: provide knowledge, skills and tools to manage climate change impacts on buildings and infrastructure	S2: increase awareness of impacts of climate change to enable people to future extreme weather events
N3: sustain and enhance the benefits, goods and services the natural environment provides	B3: increase resilience of buildings and infrastructure to sustain and enhance benefits and services	S3: support health and emergency services to respond effectively to increased CC pressures

1 http://www.legislation.gov.uk/asp/2009/12/part/5/chapter/1

Scottish Environment LINK is a Scottish charity under Scottish Charity No SC000296 and a Scottish company limited by guarantee and without share capital under Company No SC250899

LINK'S general concerns with SAP

Some of our initial main concerns that the SAP contains few *new* policies or *new* resources and funding still stand - it is predominantly a collection of existing policies collected together to address the risks highlighted by the UKCCRA. In general there are also no specific **targets** and **timescales** attached to the programme, making progress difficult to assess. The CATF principle concerns are detailed below and our consultation response can be viewed here - many of our comments still apply: http://www.scotlink.org/files/policy/ConsultationResponses/LINKResponseDraftSCCAP13.pdf

- **Ecosystem approach:** We welcome that the SAP recognises that the natural environment provides benefits to Scotland in terms of resilience to climate change. However, we believe an ecosystem approach of 'working with nature' should be central to the SAP to; avoid maladaptation, ensure appropriate scale of action and provide a sustainable flow of benefits from ecosystems, such as flood attenuation (LINK Consultation: Section 1a/2a)
- **Greater clarity**: We welcome the long list of policies in the SAP, however, too many are vague, lack sufficient detail, and fail to outline the actions to be taken. This makes it difficult to confidently assess whether the SAP Objectives will be met. We recommend effort to further develop the policies (LINK Consultation: Section 2b/d).
- **Implementing existing legislation:** Whilst the SAP does include existing policies to improve the natural environment, LINK wants to see the SAP emphasise the need to fully implement all existing environmental legislation. Improving our environment will increase the resilience of the natural environment, society and economy to climate change impact (LINK Consultation: Section 2c).
- **Demonstrating action:** We welcome efforts to embed adaptation across Government but it is vital that adaptation is embedded throughout wider society too. Demonstration projects and an effective communication strategy must be included in the SAP to allow wider society to understand the need for effective adaptation and ensure appropriate adaptation action (LINK Consultation: Section 5b).

Major climate impacts on marine environment in Scotland

The change at our coast
Sea level rise is already having a widespread impact on parts of Scotland's coast. With this set to accelerate over the coming decades, we can expect to see more coastal flooding, erosion and coastline retreat – with consequences for our coastal communities and supporting infrastructure.

The health of our marine environment
Our marine ecosystems – from plankton through to fish, mammals and seabirds – are already being affected by climate change alongside other pressures, particularly fishing. Changes will continue, with rising temperatures likely to change species and their distributions. The changes will present both threats and opportunities to our commercial fisheries and aquaculture.

Areas of the Scottish Adaptation Programme relevant to Marine Taskforce

Relevant sections of the Programme are reproduced, verbatim, below. SAP references are included and, where applicable, the LINK consultation response references.

Role of Scottish Government
It is vital that the Scottish Government provides clear leadership in promoting a sustainable approach to climate change adaptation (p24).

Marine Scotland supports the work of the Marine Climate Change Impacts Partnership (MCCIP) in its production of evidence of climate change impacts in the marine environment. MCCIP synthesises

broad based evidence on how climate change is affecting our coast and seas and communicates its findings through an annual report card and special topic report cards.

Marine Environment – Coastal flooding resulting from sea level rise and storm surges may damage coastal habitats through saltwater intrusion. Over the next century sea level around Scotland is going to rise. This is mostly due to the global heating and resulting expansion of ocean water, with a smaller contribution from the melting of ice-caps and glaciers. In Scotland, some of this rise will be mitigated by vertical changes in the level of the land.
We may see the arrival of new commercial fish species into Scottish waters and/or the loss of existing species, as the climate warms. The reduced ability for marine species to make shells and skeletons as the oceans become more acidic could impact heavily on Scotland's important shellfish industry. The disruption to or loss of marine ecosystem services, for example if there is increased occurrence of harmful algal blooms, could have a significant impact on Scotland's economy, of which a large contribution comes from the fishing and aquaculture industries. Future temperature increases could provide enhanced opportunities for non-native species at each stage of the invasion process (p42).

What's already being done
The impacts of climate change on Scotland's natural environment are being addressed through the developing framework of marine planning. Through Marine Planning and the Marine Protected Area (MPA) network we can safeguard habitats such as saltmarshes, seagrass beds and kelp forests protecting and enhancing these long-term carbon sinks.

Policy: **Marine Scotland will use marine research strategies and monitoring programmes to gather data** on the impact climate change is having on the seas.
How it will deliver: Research and monitoring findings from various initiatives will help inform decision making on adaptation across all sectors. For example:

1) The UK Marine Science Strategy (2010-2025) and Scottish Marine Science Strategy (2010-2015) set out high level marine science priorities and objectives. These are designed to ensure that marine science delivers both our vision for the seas (clean, healthy, safe, productive and biologically diverse oceans and seas) and sustainable economic growth. Research findings from projects identified in the strategies will be used to identify gaps in knowledge and inform decision making on climate change adaptation. Some specific examples include:
- monitoring carbon chemistry in our seas (including ocean acidification and potential impact on aquaculture);
- a project studying pelagic foodwebs to predict the impact of climate change on marine top predators;
- a project studying pelagic foodwebs to predict the impact of climate change on marine top predators;
- the development of a hydrodynamic model of Scottish shelf waters (the "Scottish Shelf Model"), which will help characterise the marine physical environment, against which changes in future conditions can be identified and potentially forecasted;
- develop a better understanding of the effect of algal blooms on aquaculture through research to increase knowledge and understanding of possible solutions;
- developing a better understanding of the role of blue carbon ecosystems in carbon sequestration and the role of Marine Planning and Marine Protected Areas in protecting these ecosystems.

2) Collaborative research and monitoring approaches across the UK and Europe via, e.g. UK Marine Monitoring & Assessment Strategy (UKMMAS), International Council for the Exploration of the Seas (ICES) and Oslo Paris Convention for the Protection of the North East Atlantic (OSPAR), as well as the implementation of EU Directives such as the Marine Strategy Framework will assist in the monitoring of impacts on, e.g. biodiversity and marine litter.

3) We will build on existing work to improve our understanding of the links between climate change and fish stock location and health. We already have an evidence base, for example a MCCIP report from 2012 on 'Fish, Fisheries and Aquaculture'. We also undertake a programme of

annual surveys to cover major commercial fish stocks. This survey data along with a range of other data (e.g. landings, observer data on discards) is reviewed by ICES scientists and used for fisheries assessment models. ICES take into account a wide range of environmental, biological and management factors when doing stock assessment, including climate change (N1-6, p46; LINK 3c).

Policy: **Continue support for the Marine Climate Change Impacts Partnership (MCCIP)**.
How it will deliver: MCCIP develops high quality evidence - e.g. Annual Report Card, Climate Smart Working Report - on the impacts of climate change on the marine environment that inform policy and decision making. The Report Card explores the issues, challenges, opportunities and achievements in putting climate change adaptation into practice (N1-7, p46).

Policy: **Implement the Scottish Biodiversity Strategy** - promotes action to enhance the health & resilience of the terrestrial and marine environments.
How it will deliver: Climate risk is fully integrated into the Scottish Biodiversity Strategy. Research under the strategy will contribute knowledge regarding the priority risks for biodiversity that need to be managed (N2-9, p52; LINK 2c).

Policy: **The National Marine Plan (NMP**) will set out objectives and policies for sustainable development of Scotland's seas; promoting economic growth while ensuring growth occurs in balance with the protection of natural and historic heritage.
How it will deliver: In accordance with the Marine (Scotland) Act 2010, Scottish Ministers and public bodies must act in a way best calculated to mitigate, and adapt to, climate change so far as is consistent with the purpose of the function concerned – as such the NMP includes objectives and policies for climate change mitigation and adaptation. Objectives and policies relating to the mitigation of, and adaptation to, climate change are embedded throughout the sectoral chapters of the National Marine Plan. Future regional marine plans, sectoral plans, licensing and consenting decisions which affect the sea will have to be taken in accordance with the National Marine Plan. The NMP will be reviewed after 5 years to take account of new information on climate change impacts and ecosystem services. National and Regional Marine Plan, which include clear policies for climate change mitigation and adaptation in relation to marine development and activity will be taken into account in decisions relating to infrastructures which incorporate marine and terrestrial elements (N2-13, p53; LINK 2c).

Policy: **Regional Marine Plans (RMPs)** will be developed from 2014 and will shape regional objectives and policies for coastal and marine management and include policies relating to climate change adaptation (and mitigation).
How it will deliver: RMPs will be required to include objectives and policies for climate change mitigation and adaptation, ensuring that development and activity in the marine environment planned for at a regional level will mitigate, and be adaptive to climate change where appropriate. An adaptive approach will be taken to marine planning at a regional level, meaning that up to date information on climate change and how best to mitigate or adapt will be taken into account. Like the NMP, RMPs will also be reviewed after 5 years (N2-14, p53; LINK 2c).

Policy: **Manage designated sites for the marine environment**.
How it will deliver: Protection of the marine environment helps maintain a healthy ecosystem that in turn supports the natural services that help mitigate climate change. For example: Protection of inshore and offshore reefs that act as natural barriers from storms to help protect coastal communities; Protecting important areas for marine biodiversity helps maintain the abundance of flora and fauna which act as carbon sinks; Protection for native species in MPAs may help maintain resilience against non-native species; Identifying the consequences of climate change for the Natura network and put in place adaptive measures (N2-15, p54 LINK 2c).

Policy: **Develop mechanisms to minimise the introduction and establishment of invasive non-native species into Scottish waters**.

LINK is a Scottish Charity (SC000296) and a Scottish Company Limited by guarantee (SC250899). LINK is core funded by Membership Subscriptions and by grants from Scottish Natural Heritage, Scottish Government and Charitable Trusts.

Registered HQ office: 2 Grosvenor House, Shore Road, Perth PH2 8BD tel 01738 630804 email enquiries@scotlink.org
Parliamentary office: 3rd Floor, Gladstone's Land, 483 Lawnmarket, Edinburgh EH1 2NT tel 0131 225 4345 email parliamentary@scotlink.org

How it will deliver: Early detection of non-native species and putting in place biosecurity measures to limit their impact and spread are important ways of reducing the pressures on the marine environment in a changing climate. For example: Help control the spread of the invasive Didemnum vexillum (DV) (Carpet sea squirt). Continued monitoring of DV in Largs and other sites in Scotland for further spread (N2-16, p54).

Policy: **Common Fisheries Policy (CFP).** Influence the EU reform of the CFP to ensure that it recognises the impacts of climate change and is flexible to environmental change.
How it will deliver: Achieve a CFP that is flexible to environmental change (N3-11, p60; LINK 2d).

Policy: **Improve targeting of species by using selective fishing gear and reducing discards** through conservation credits and TR2 schemes.
How it will deliver: Selective gear and fewer discards will improve sustainability of fisheries management (N3-12, p60; LINK 2d).

Policy: **Manage the impacts of climate change to help fishing industries achieve Maximum Sustainable Yield (MSY) by 2015**, where possible, and by 2020 for all stocks at the latest.
How it will deliver: MSY should be set at a level that takes into account the impacts of climate change (N3-13, p60; LINK 2d).

Policy: **Introduce new Technical Standards for containment by Scottish fish farms**. Enabling provisions for Technical Standards are included in the Aquaculture and Fisheries (Scotland) Act 2013.
How it will deliver: All finfish farms operating in Scotland will have equipment, appropriate for conditions in which they operate, to contain fish (N3-14, p60; LINK 2d).

Policy: **Fishing and aquaculture industries to develop and introduce new technologies** for environmentally sustainable commercial fishing and aquaculture.
How it will deliver: The Aquaculture and Fisheries (Scotland) Act 2013 includes powers to prescribe technical requirements for equipment (nets, pens and mooring systems and training to: (1) ensure installation and deployment of equipment that is well maintained and appropriate for the site conditions; (2) impose a duty for adequate training to use prescribed equipment, and requirements on operators to keep records in relation to training and equipment. These powers will require adherence to Scottish Technical Standards (STS) which are currently in development. STS covers open pen, land-based facilities, ponds, raceways and hatcheries - nets, pens, mooring systems and screens; and sets standards for design, construction, materials, manufacture, installation, maintenance and size of equipment. They will take account of site specific environmental conditions e.g. wave height, wind and current speeds; and flood risk assessments for land-based, pond and raceway sites; and futureproofed for technological developments, novel farming approaches, and moves further offshore or climatic changes. Technical Requirements for fish farm equipment will reduce the risk of storm damage and fish loss, minimise escapes, and limit the risk of spread of fish disease (N3-15, p60; LINK 2d).

Research
The Scottish Government is funding research into the resilience of Scotland's biodiversity to climate change and land-use change.
Other research programmes include:

1) Invasive non-native species (INNS) data gathering in the marine environment, managed by Marine Scotland and SNH. Gathering data regarding the presence of INNS in the marine environment will allow the threat posed to be properly assessed.
2) Marine monitoring programmes, managed by Marine Scotland and MSS. The programmes will allow marine plan and/or atlas information to be updated, and updated overall assessments of the seas to be undertaken.
3) Research vessel monitoring, is being managed by Marine Scotland with support from partners such as SNH and SEPA. Research vessels will gather data to assist with assessment

of ocean acidification in Scottish seas. Data used for other monitoring requirements e.g. the Marine Strategy Framework Directive, will also be used to establish how climate change may be influencing Scottish seas (p62).

Proposals - potential new policies
There are currently only 3 proposals detailed which may become policies if needed during the lifetime of the SAP, 1 of which may be relevant to this sector:

1) Establishment of a co-ordinated Energy Sector Climate Change impacts research programme which would consider the impacts of changing energy generation on biodiversity and ecosystem services.

UK Climate Change Risk Assessment

There are several specific UKCCRA marine impacts not being addressed by this Programme (technical annex p105):

Risk Not Addressed	Reason for Exclusion
Asynchrony between species breeding cycle and food supply	Too uncertain - await second UKCCRA to establish if evidence base has improved.
Decline in marine water quality due to sewer overflows	This is a prediction rather than a risk.
Opening of Arctic shipping routes due to ice melt	To be considered for future Programmes.
Coastal erosion	Low risk for Scotland, although may present local issues.

However, risks that are not considered an issue now in Scotland may become problems in the future, one reason why LINK called for the SAP to set a long-term direction (LINK Consultation[2] Section 2). There may also be other potential climate change risks to your sector that are not addressed on top of the above, especially those not identified in the UKCC Risk Assessment. Of those risks that are addressed in the programme, many may be inadequately dealt with.

[2] http://www.scotlink.org/files/policy/ConsultationResponses/LINKResponseDraftSCCAP13.pdf

LINK is a Scottish Charity (SC000296) and a Scottish Company Limited by guarantee (SC250899). LINK is core funded by Membership Subscriptions and by grants from Scottish Natural Heritage, Scottish Government and Charitable Trusts.

Registered HQ office: 2 Grosvenor House, Shore Road, Perth PH2 8BD tel 01738 630804 email enquiries@scotlink.org
Parliamentary office: 3rd Floor, Gladstone's Land, 483 Lawnmarket, Edinburgh EH1 2NT tel 0131 225 4345 email parliamentary@scotlink.org