

Workshop report – Marine Protected Areas and Climate Change

[An introductory presentation](#) by Sarah Cunningham (SNH) outlined the current MPA network in Scotland and the marine habitats and species protected. Some initial results from a contract looking at MPA vulnerability to climate change pressures were presented. The potential roles of MPAs in climate change were outlined which included sentinel sites, blue carbon, coastal protection and areas where public awareness and engagement can be enhanced. The options around managing MPAs for climate change adaptation were summarised and current examples of work in Scottish MPAs on these areas were presented.

[John Baxter](#) then presented research and current research on Blue carbon and gave perspective on the role of MPAs in the adaptation to (and mitigation of) climate change. The storage potential of marine habitats of carbon is huge but they have the potential to be disturbed and impacted. A review of the carbon stores in habitats including maerl beds, seagrass beds, kelp forests and seabed sediments to store carbon was provided. This highlighted that initial estimates were underestimated e.g. for maerl, and we are now beginning to quantify the importance of habitats such as burrowed mud as carbon stores. MPAs are able to protect these stores as well as offering locations where restoration and controlled research can be explored.

Following some Q&A we commenced an interactive session across three sub-groups. Each explored three questions around what MPAs can do to help us deal with climate change and what we need to do for MPAs to help them adapt in the future. The notes below collate the discussion points across sub-groups, highlights from which were later outlined in the closing plenary session of the conference.

The following prompts were provided to further stimulate discussion:

- How should we manage MPAs and other activities in the context of climate change?
- What is the role of the wider seas and connectivity?
- How do we more effectively take account of climate change implications in development applications / case work?
- Should we think about different management approaches depending on the climate change pressure e.g. some will be slow and gradual, others could be shock events?
- How do we work more effectively with other planning e.g. River Basin Management Planning to address terrestrial pressures such as increased freshwater run off and pollution?
- Even if climate change is inevitable, all changes are uncertain in their timing and magnitude so how do we avoid being stifled by uncertainty?
- What are the big science gaps? Are they really an inhibition to action, or can we make progress despite the uncertainties?

1. What are the most important roles for MPAs in dealing with climate change?

Connectivity & source populations	Helping species adapt to climate change by supporting healthy populations that can move/repopulate other areas. This connectivity is between different sites but also to the wider seas.
Resilience	Biodiversity supports evolutionary adaptation & resistance to disease/non-natives. Habitats and species that function naturally support the wider seas (incl. commercial fisheries interests) by providing nursery/spawning areas, blue carbon sinks/stores, coastal protection etc.
Inspiration & education	MPAs and their features can be used to highlight the wonder of the marine environment to a broad audience and heighten appreciation of sensitivities to climate change and other impacts. Knowledge is power.
Focus point for stakeholder engagement	Stakeholder engagement for MPA management is a great opportunity to highlight wider issues for the marine environment, such as climate change.
Monitoring, surveillance & science	By removing other pressures, MPAs can act as sentinel sites to better understand and track climate change effects. Being designated for features of particular sensitivity and functional importance also makes them particularly important for this. They can also provide a focal point for original research.
Enabling range-shifts	Providing a safe place with reduced pressures and monitoring that could enable species to shift their range. It is important that monitoring is sufficient to note new arrivals (nature's climate 'refugees') and ensure management measures are adequate to protect them.
Precaution / back-stop	MPAs are places where we can implement precaution, bearing in mind the uncertain implications of climate change. In this sense, by removing other pressures they might be seen as the last line of defence to climate change, but it is important to highlight MPAs were never expected to do it all, they are just one part of the three-pillar strategy for marine nature conservation.
Protect blue carbon to help mitigation	Make use of the complementarity between ecological and blue carbon functions of various habitats.

2. What can we do to help MPAs adapt and deal with climate change?

Remove other pressures	Remove other pressures on features to give them the best chance in adapting to climate change conditions, and so that we can have more confidence in attributing impacts to climate change. Explore the need and potential for management of impacts from land (e.g. agricultural/forestry/urban-run-off). Ensure management measures remove pressures from functions (not just the features).
Management	Ensure management measures are sufficient for climate change objectives, tailored to each site but in the context of the network.

	<p>Provide clarity on acceptability or otherwise of different sectors wanting to develop in MPAs.</p> <p>Assess at a cumulative level (all sectors) rather than just avoiding the worst individual impacts.</p> <p>Some also consider there should be a leading role for local communities and marine planning partnerships.</p> <p>Ensure management reviews and amendments cycle regularly enough to respond to monitoring and science, and have sufficient sectoral and community engagement.</p> <p>Identify relevant ecosystem services from sites and manage according, including maximising carbon sequestration potential.</p>
Monitoring, surveillance & science	<p>Ensure monitoring and surveillance is sufficient to observe any changes (not just to protected features) so that management can respond.</p> <p>Enable research that makes best use of the sites and protected features. Develop indicators of climate change that can be used consistently.</p> <p>Connectivity science is particularly important: we need to understand the capacity of different species to move/link with other areas (within and outside the MPA network). Can modelling and sensitivity analyses become more advanced to help proactive management?</p>
Communication/engagement & education	<p>Communicate results from monitoring, surveillance to educate and guide good management & societal decisions.</p> <p>Consider more use of art and virtual dives in communication work.</p> <p>Sell the sizzle not the sausage... so focus on longer-term benefits. Better communicate the opportunity MPAs present to avoid further emission release, e.g. by protecting blue carbon sinks/stores and excluding high-emissions industries.</p> <p>Also seek stronger working relationship and common goals with fisheries interests.</p> <p>Set up more 'Friends of...' groups for MPAs, to improve local ownership/support.</p> <p>Youth involvement and support is important for the future of MPAs.</p>
Consider restoration measures	<p>Some habitats/species may recover if pressures are reduced / removed. Others may require interventional restoration, such as translocation of spat.</p>
Enforcement	<p>Improve monitoring of activities and legal action against infringements.</p>
Amend legislation & policies	<p>Ensure legislation for MPAs has sufficient emphasis to deliver climate change objectives (adaptation & mitigation). This should have a bearing on management of existing MPAs, but also the establishment of any new sites.</p> <p>Ensure any protection MPAs can afford aren't considered as a trade-off for avoidable/unsustainable impacts to be allowed elsewhere.</p>

	Also ensure legislation/policy has the flexibility and responsiveness to act quickly to necessary changes of boundary, feature and management measures. Can marine plan policies be advanced to enable climate change objectives for MPAs?
Learning from elsewhere	Are there experiences from land-based/urban development that could be informative?
Resources	Needs better funding! Government/agency funding.

3. What do we need that we don't currently have or do to support MPA roles and/or their ability to adapt?

New policy & management approach (& legislation?)	Introduce policy to explicitly manage MPAs for climate change mitigation and adaptation, to trigger this work on management measures. Generally, consider focus of management on functions and ecosystem rather than features, which would enable management to adapt to uncertain climate scenarios. Would the location and scale of MPAs be any different if we focussed on protecting and improving functions? Give proper attention to the less charismatic features. Is the precautionary principle properly reflected?
Ecosystem services	Set climate resilience work in the context of ecosystem services/benefits for people
Cross-border management	Ensure working across international boundaries to account for shifting ranges of species (more effort may be required for this post EU exit)
Planning across the land-sea interface	Use integration of marine planning with terrestrial planning to help manage effects from land
Communication & information networks	Improve these networks for efficient sharing of information and avoiding duplication. Consider better website/portal to get overview of all MPAs. Use accessible language.
More knowledge of species and habitats in MPAs	More funding and support to improve data on what is in MPAs.
Consider role for more highly protected MPAs	Would stricter protection in some places support climate change objectives?
Think 3D	Consider the water column more in management of MPAs, i.e. plankton ecology.
Restore as well as recover	Consider where interventional restoration measures would be appropriate and possible.
From individual sites to a true network	Work on ensuring connectivity of features beyond individual sites.
Communities and local stakeholders	Place communities of people (including young people) at the heart of the process, and keep working at relations/dialogue with fishers
Citizen science	More of this to help generate the information more cheaply while getting people engaged

Money	Consider alternative financing. What about polluter/beneficiary pays principles rather than just public money for public goods? Link with other management mechanisms, e.g. WFD and LBAP action plans.
Equitable management/enforcement	Ensure all sectors are treated equally, including those which are reserved (not devolved) matters. Bring fisheries management within wider marine governance (i.e. through marine planning). Revisit whose responsibility it is to demonstrate the absence of an impact to be allowed to undertake an economic activity.
Enforcement	Resources and legal instruments very limited at present
Transition schemes	Help those genuinely suffering short-term loss of income from MPA management by helping them transition to different business activities/practices

How SNH will use these workshop results

Within SNH we have already started working on some elements that have been highlighted in the workshop discussions, examples are outlined below:

- Focus on identifying ecosystem services, key functions and natural resources/wider benefits for habitats and species within MPAs – climate change roles such as blue carbon are highlighted. These are now outlined in the new Conservation and Management Advice documents we are developing for MPAs (see [East Mingulay SAC](#) and [possible MPAs](#) as examples).
- Regional Marine Planning in Clyde, Shetland and soon Orkney is looking at integration of marine and terrestrial planning. [MarPAMM](#) project is also considering management of MPAs at a regional level and integration with existing planning will be considered as part of that process
- Management advice has been provided by SNH on various MPAs in relation to removing/avoiding or reducing/limiting pressures on protected features. This is being taken forward by the relevant regulators e.g. [phase 1](#) and [phase 2](#) fisheries management in MPAs by Marine Scotland. Licensing and consenting processes take this advice into account alongside the conservation objectives for the site.
- SNH graduate placement focussed on the development of a MPA monitoring handbook for communities so that they can undertake citizen science and become more involved in their local MPAs.
- Research into species connectivity e.g. horse mussels, flame shell beds being undertaken by Marine Scotland Science.
- [Scottish MPA Monitoring Strategy](#) highlights those MPAs with functional significance e.g. blue carbon stores as priority areas for monitoring.

There may be opportunities to develop other points raised in discussions on going within SNH and future discussions with Scottish Government on climate change in relation to the marine environment:

- Climate change task group within SNH – looking at gathering views from SNH staff (an internal workshop has already been held) with a focus on a new Climate Change Action Plan for SNH to be published later this year setting out how the organisation will contribute towards tackling the climate change emergency.
- Further research on the implications and vulnerability of MPAs to climate change is being considered alongside infographic development to make this information more understandable to the wider public.
- Making information on MPAs more accessible through [SNH's SiteLink](#). We are currently discussing options for making a wider range of information available and how we promote this better.