Headlines

Progress is being made in improving the state of Scotland's seas especially in relation to contaminants. Eutrophication is not an issue in Scotland's seas. There are mixed pictures for marine mammals, birds, fish and marine litter and there are signs of change in plankton. There are increasing pressures associated with non-indigenous species, climate change and ocean acidification, while the ability to draw conclusions about benthic habitats and underwater noise is limited by current knowledge.

The marine economy (2017) is worth £14.66 billion Gross Value Added (GVA) to Scotland of which £9.52 billion GVA is oil and gas extraction and £5.14 billion GVA comes from other marine industries. This supports important marine sectors including, energy, food production, transport/communications, sport, leisure and recreation, as well as bringing significant well-being to individuals.

Many marine industries are of growing importance to the Scottish economy. Offshore wind (fixed and floating) and marine energy (wave energy and tidal stream) generation increased by 142% between 2014 and 2018 and employment in marine tourism by 16% between 2008 and 2017. The GVA trend for aquaculture, 2013 to 2017, increased by 58% from £224 million to £354 million with employment increasing by 20%.

Climate change is the most critical factor affecting Scotland's marine environment. Impacts are already being seen across the Scottish marine ecosystem. For example, mean sea level around the coast is increasing in all Marine Regions, with the largest changes in the last 30 years observed at Stornoway, Kinlochbervie and Lerwick, increasing the risk of assets being damaged from coastal flooding and coastal erosion. Furthermore, the rise in sea temperature is causing changes in species distributions.

Recent evidence on ocean acidification shows that it has the potential to have an impact on shellfish and other marine invertebrates in Scotland's seas, one of a number of increasing stressors which, in combination, will potentially have significant consequences for the sectors and communities that depend on them.

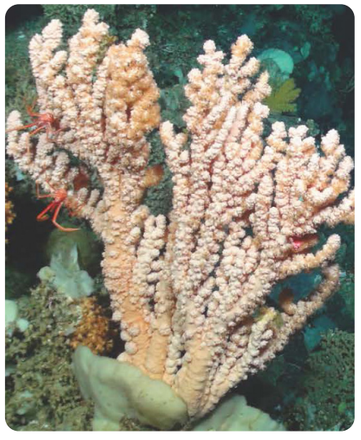
Pressures associated with bottom-contacting and pelagic fishing continue to be the most geographically widespread, direct pressures across the majority of Scottish Marine Regions and Offshore Marine Regions.

Measures are being implemented in response to recognised concerns. Some, such as fisheries management, have been in place for decades, evolving throughout that period to respond to changes in marine ecosystems. Measures will continue to be developed to address current and future challenges, including those highlighted in this assessment.

Marine Protected Areas and measures to tackle marine litter, have developed quite recently and need more time to be fully effective. In addition, further measures are required in response to the loss of biodiversity, impacts associated with climate change and ocean acidification, and to continue to support the aim of sustainable use of Scotland's seas.

There are insufficient data to allow detailed assessment at the scale of the Scottish Marine Regions and Offshore Marine Regions. There are too few ecosystem monitoring sites and understanding cumulative impacts remains a significant challenge.

Delivering clean, healthy, biologically diverse and productive seas will only happen through closer coordination and collaboration, including with coastal communities and international partners.



Next Steps

A. Scotland will continue to develop and improve the body of scientific (natural, social and economic) evidence to inform policy decisions relating to the management of human activities having an impact on Scotland's seas: The evidence from SMA2020 and other assessments indicate that the rate of change due to human activities in marine systems is accelerating. These assessments will continue to be available to inform public awareness and government policy.

B. Our marine science community will work to improve our collective understanding of our marine environment: Many initiatives and strategies exist which provide information and direction. Locally and globally, indicators have been developed, and relevant indicators are used in SMA2020. These provide the basis for informing the action required today. However, further development and refinement of indicators, especially in the healthy and biologically diverse context, is needed to enhance advice and decision-making.

C. Future work on Scotland's National Marine Plan will take an ecosystem-based approach to the protection of Scotland's seas in the management of human activities: As the environment becomes more unpredictable and unstable, with increasing impacts from climate change, SMA2020 shows that the resilience of ecosystems will change. For example, species that can, will move. Those species dependent on ocean currents for dispersal may be affected. Taking account of such changes, including those that are human induced, when considering, developing and implementing marine management measures will be integral to our statutory review of the National Marine Plan in the coming months.

D. The national dialogue must be diverse and effective: The changes that are occurring are accelerating and will have societal impacts, especially on coastal communities and marine sectors. There is a strong imperative to continue to work hard on communicating the state of Scotland's seas with a range of different audiences, allowing decisions to be reached collaboratively about the measures required to address the impacts of human activities.

E. SMA2020 highlights the challenges for the Scottish marine science community to:

(1) Improve the predictions of climate change impacts: Climate change is already resulting in changes in the seas around Scotland, and the pace of change is predicted to increase between now and the next assessment. The most significant changes for Scotland over the next 10 to 20 years still need to be identified and measures will be required to help mitigate and adapt to these changes.

(2) Assess cumulative pressures: While the understanding of the impact of individual pressures (cause and effect) has merit, the reality is that Scotland's seas are subject to multiple pressures, including those arising from a rapidly changing climate. Methods need to be developed that enable future scientific advice to take account of multiple pressures and cumulative impacts.

(3) Improve the understanding of natural capital and ecosystem services: The assessment of economic and social value continues to improve. However, in line with the recommendations last year from the Advisory Group on Economic Recovery there is a need to work collaboratively to embed the concepts of ecosystem services and natural capital in respect of the seas around Scotland. This should be set within the broader context of improved integration of social and natural sciences.

(4) Ensure that account is taken of the bigger marine environmental picture: The movement of pollutants by the currents in the seas and winds in the atmosphere means that the state of the seas around Scotland is not just affected by activities and actions taken in Scotland, and vice versa. A continued involvement and leadership in international initiatives will ensure a joined-up approach across national borders.

(5) Improve the availability of data: The preparation of SMA2020 has involved many experts using the available data. However, some gaps in knowledge exist and not all data are widely available. Enhanced efforts will be made to capture all data relevant to a specific assessment, thereby delivering the most comprehensive evidence-base to guide decision-making, following the 'collect once, use many times' principle, accepting that there will always be gaps in knowledge.

(6) Undertake sustained monitoring and investigative research to explain change: The natural variability in marine systems is large. This means there is a need to explore in greater capacity within Scotland when and where change is occurring and the cause of the change.

(7) Maximise the benefit of our scientific monitoring: Monitoring programmes relevant to the seas around Scotland will be reviewed to make sure that, collectively, they provide the necessary data at the required scale to support future assessments. Challenges include responding to emerging topics and adopting more cost-effective ways to obtain data using new technologies.