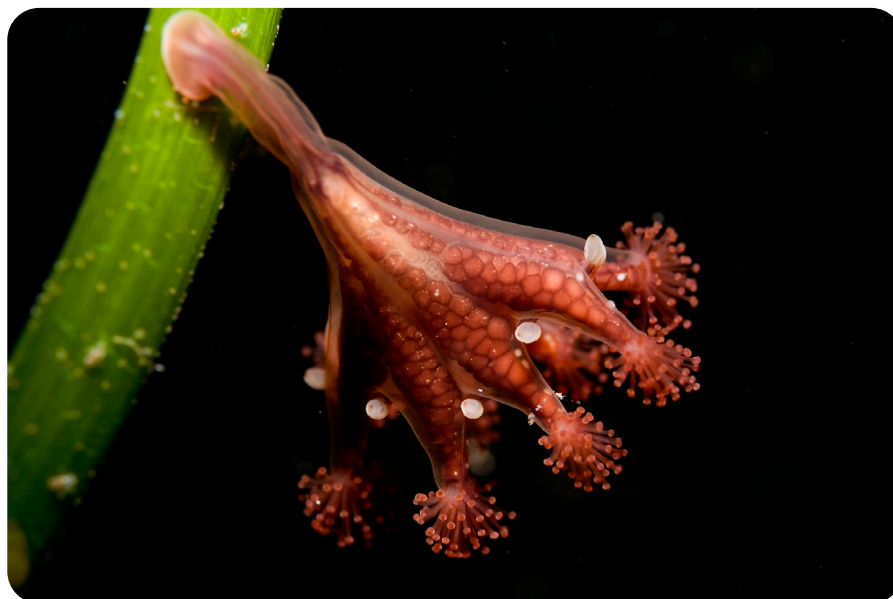


Healthy and biologically diverse

More information on the regions used in the Healthy and biologically diverse assessment is available on the Assessment processes and methods page of the SMA2020 portal: <http://marine.gov.scot/sma/assessment-theme/assessment-processes-and-methods>



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Assessments

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Case Studies

Key words

seabirds
citizen science seals
strandings serpulid reefs
commercial fish oysters shells
salmon disturbance monitoring
skates habitats shellfish sharks
abundance food webs pressures
priority marine features blue carbon
waterbirds marine protected areas
cetaceans intertidal seagrass rays
trends survey ecosystem services
deep-sea fish flame shells
biogenic habitats deep sea
non-native species
continental shelf
sea trout

What is covered

The Scottish marine environment supports a spectacular and diverse range of habitats and species. Whilst much remains to be discovered, in recent years ongoing survey and monitoring work, as well as advances in underwater survey techniques, genetics and tagging technologies have resulted in significant improvements in the knowledge of the distribution of habitats and species, and their behaviour and connectivity.

To establish the health and diversity of Scotland's seas the status of a range of key habitats and species has been assessed:

- The population status and distribution of cetaceans and seals.
- The abundance and breeding success of a wide range of seabirds and numbers of overwintering waterbirds.
- The state of the populations of various commercial fish and shellfish as well as inshore fish, salmon and sea trout.
- The extent and status of the Scottish Marine Protected Area network.
- The scale and variety of non-native species found in Scottish waters and their rate of spread.
- The likely extent of disturbance to, and condition of, pelagic and seafloor habitats and species from fishing and other human activities.
- The status of seagrass beds and subtidal biogenic habitats.
- The progress in measures to protect Priority Marine Features (PMF) both inside and outside of Marine Protected Areas (MPAs).

The basis of the assessment

The assessments of different habitats and species are reliant on various survey and monitoring programmes. For some components there are well tried and tested methodologies such as the biennial grey seal pup counts, and the harbour seal moult counts that are carried out on a rolling five-year cycle. Equally, breeding seabirds are monitored through the UK Seabird Monitoring Programme and non-breeding waterbirds through the Wetland Bird Survey (WeBS). The abundance of offshore cetaceans is assessed via a series of large-scale surveys (SCANS – Small Cetacean Abundance in the European Atlantic and North Sea) carried out

roughly every 10 years, whilst the east coast inshore bottlenose dolphins are the subject of a long-running, annual photo-id monitoring programme.

There are long-established programmes for monitoring commercial fish stocks which are evaluated on the basis of International Council for the Exploration of the Sea (ICES) areas rather than the SMRs and OMRs. *Nephrops* stock assessments are conducted annually by ICES whilst results for crabs, lobsters and scallops are based on Marine Scotland triennial assessments. The wider fish community is covered by the International Bottom Trawl Survey, whilst the deep-sea fish assessment is based on data from scientific trawl surveys. Salmon and sea trout assessments are based on catch returns and counts of returning fish on an individual river basis, and fish communities in transitional waters (i.e. estuaries and reduced salinity sea lochs) are surveyed by SEPA as part of the Water Framework Directive monitoring to assess Good Ecological Status. Changes in the plankton community are derived from the Scottish Coastal Observatory (SCObs) and the Continuous Plankton Recorder (CPR) surveys that provide both fixed point and track samples.

The extent of physical damage to seafloor habitats is based on modelling the exposure to pressures associated with demersal fishing activity as a proxy for habitat condition. Biogenic habitats are assessed largely based on surveys undertaken under the Scottish MPA Monitoring Strategy. Intertidal seagrass data are derived from the SEPA surveys. Other groups such as the non-native species are currently not subject to a regular national survey programme and assessments are based on incidental records or local targeted surveys in response to reports of a species occurrence. At a regional level there are good examples of coordinated monitoring programmes, e.g. work in Orkney, has enabled trends in occurrence and distribution of non-native species to be described.

Many of the programmes rely in part (and in some cases almost entirely) on the contributions by citizen scientists, made over many years. This includes counts and surveys of seabirds, waterbirds, seals, nearshore benthic habitats (e.g. Seasearch) and the reporting of non-native species.

Summary of key messages

- The lack of sufficient data makes it difficult to report on trends for some species and habitats across Scotland (e.g. seagrass, biogenic habitats) and at a regional scale (e.g. waterbirds).
- Disturbance to seafloor habitats from bottom-contact towed fishing gear is estimated to affect at least 15% of the sea bed in all SMRs and seven of the 10 OMRs.
- The UK Marine Strategy 'no loss in extent' target for subtidal biogenic habitats (e.g. blue mussel beds, horse mussel beds, serpulid aggregations, cold water coral and maerl beds) has not been met in certain SMRs.
- The importance in terms of climate change mitigation of a range of marine habitats for carbon sequestration and storage is becoming increasingly evident.
- There have been significant changes in the plankton community over the last 30 years with potential implications for marine food webs.
- The abundance of some species of offshore cetaceans has remained stable, whilst the abundance of coastal bottlenose dolphins on the east coast has increased and their distribution has expanded.
- The grey seal population has increased and whilst the harbour seal population is largely stable, their number continues to decline in the North Coast and Orkney Islands SMRs.
- Since 2011, overall numbers of seabirds have largely been stable but are at a reduced level compared to the baseline values in 1986. Some species show markedly different trends (e.g. decreases in surface-feeding birds).
- Overall, the abundance of Scotland's wintering waterbirds continues to increase although, as for seabirds, different species are exhibiting different trends with some species shifting their distribution in response to environmental change.
- By the end of 2018, Scotland's MPA network comprised 231 sites covering 22% of the Scottish marine environment and progress has been made with the implementation of site-specific management measures. Following designations in December 2020 this increased to 37%.

“We ignore Scotland's seas at our peril. Progress is being made in the protection and sustainable exploitation of this resource but more still needs to be done.”

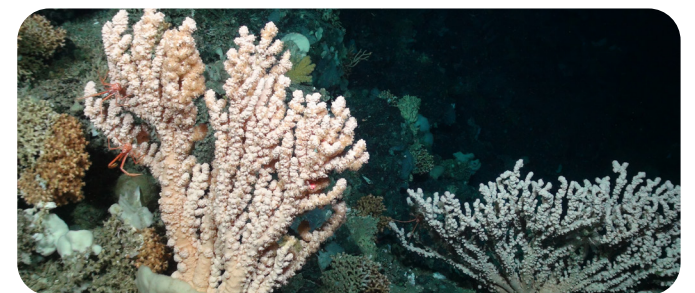
John Baxter, Topic lead



Summary of knowledge gaps

The following knowledge gaps have been identified:

1. The distribution and abundance of inshore fish communities (including transitional waters), including prey species relevant to marine mammals and birds.
2. Implications of the changes in distribution/extent and abundance of species and habitats (e.g. pelagic) for the functioning of the wider marine ecosystem.
3. Trends in seabirds and waterbirds at the SMR/OMR scale.
4. The drivers of decline for some species (e.g. harbour seals, salmon and sea trout).
5. The effects of predation and natural mortality on commercial fish stocks.
6. Implications of climate change and ocean acidification for habitats and species and ecosystem services.
7. Seasonal changes in the distribution of cetaceans and seabirds (including key wintering areas for seabirds that breed in Scotland).
8. At-sea usage and habitat preferences of harbour and grey seals.
9. The presence and location of non-native species and how quickly they are spreading.



10. Pressure-thresholds relating to the impacts of human activities on habitats and species.

11. Trends in the distribution and extent of biogenic habitats across Scotland at both the national and regional scales.



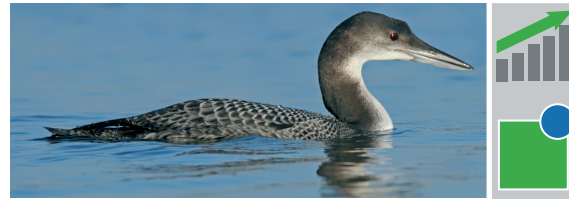
Overview of status and trends for habitats and species in Scotland's seas

Few or no concerns

Bottlenose dolphin (North Sea)



Waterfowl



Harbour porpoise, white-beaked dolphin & minke whale



Commercial fish



Grey seal



Waders



Commercial shellfish



Some concerns

Harbour seal



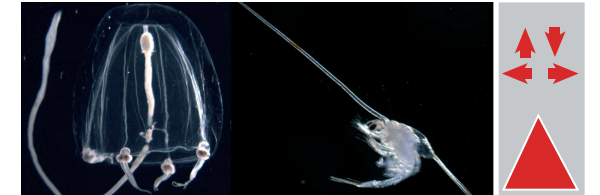
Seabirds



Extent of physical disturbance to seafloor habitats



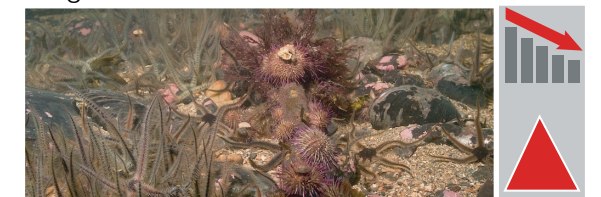
Plankton



Salmon and sea trout

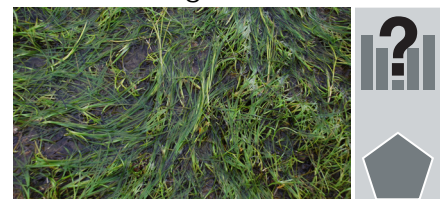


Biogenic habitats



Lack of evidence / robust assessment criteria

Intertidal seagrass



Inshore fish (variable salinity)



Wider fish community



Deep-sea fish



Non-native species



Key to assessment results

- Few or no concerns
- Few or no concerns, but some local concerns
- Few or no concerns, but many local concerns
- Some concerns
- Some concerns, but many local concern
- Many concerns
- Lack of evidence / robust assessment criteria
- Lack of regional evidence / robust assessment criteria, but no or few concerns for some local areas

- Lack of regional evidence / robust assessment criteria, but some concerns for some local areas
- Lack of regional evidence / robust assessment criteria, but many concerns for some local areas
- Decreasing

- No / little change
- Increasing
- No trend discernible
- All trends