

## THE SCOTTISH COASTAL OBSERVATORY



### Why monitor Scottish coastal waters?

Scotland's coastal marine environment is subject to frequent short term changes as result of tides, weather, oceanic circulation, and inputs from land and freshwater origin. It is also sensitive to natural and anthropogenic pressures (those caused by human activity) including climate change and ocean acidification. These factors all have the potential to impact the coastal marine ecosystem and the goods and services it provides.

Due to the high degree of variability, long term time series are required to understand how the marine ecosystem in Scotland's coastal waters function, identify impacts from short term events and describe and understand long term environmental change. The importance of these long term time series has been recognised by both the international policy and scientific communities.

### The Scottish Coastal Observatory

Marine Scotland began routine monitoring in the Scottish coastal environment in 1997 and the programme has expanded to include new parameters and sites as interests have changed. Temperature, salinity, nutrients, ocean acidification, algal toxins, pigments, phytoplankton

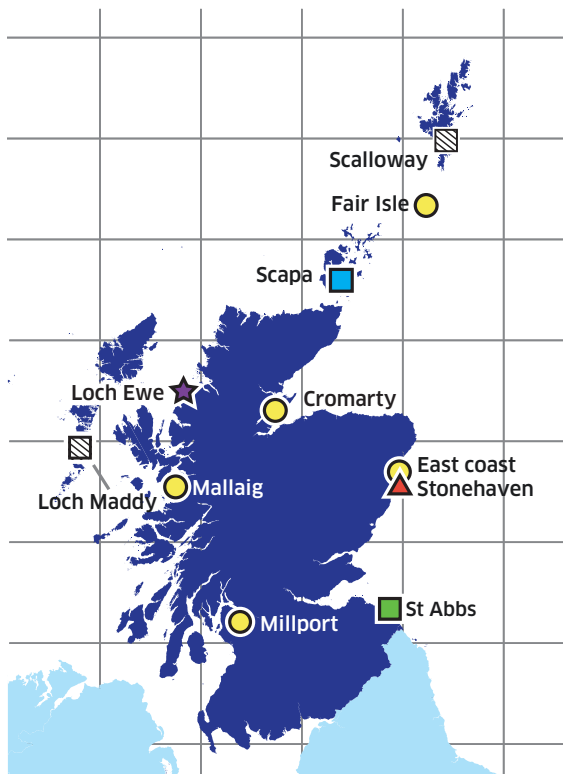
and zooplankton are/have been monitored at different sites. Rebranded as the Scottish Coastal Observatory (SCOs), this programme is making a significant contribution to coastal marine policy and science at a national and international level. Data collection is ongoing with new information gathered weekly.

A summary and description of the SCOs data can be found at <http://data.marine.gov.scot/dataset/scottish-coastal-observatory-1997-2013-parts-1-3>.

Weekly resolved data can be downloaded from <https://data.marine.gov.scot/search/type/dataset>.

### Volunteers

Key to the success of this programme has been the input from the voluntary samplers who have been collecting samples and providing input for the last 20 years. These include staff of the University Marine Biological Station and Field Studies Council, Millport, Orkney Islands Harbour Council, North Atlantic Fisheries College, Isle Ewe Shellfish, Ewen Nicholson, Tim Barton, Fair Isle Bird Sanctuary and St. Abbs Marine Station.



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## What are the data telling us?

These data reveal regional differences in Scotland's coastal ecosystem with temperature, salinity and plankton community differences observed between sites.

A high degree of interannual variability has been observed in the time series. Since measurements began, SCObS data show that 2003 has been the warmest year recorded up until the end of 2016.

The plankton community was also observed to be variable with distinct event periods observed.

For example, from 2001–2004 the spring diatom bloom was reduced, while from 2008 the biomass of some zooplankton groups changed.

SCObS data have provided the first sustained description of ocean acidification parameters in Scottish coastal waters revealing a high degree of variability over short time scales and coherent patterns with other parts of the UK.

## Impact to date – science and policy

Since 2000, data from these time series have addressed a number of policy driven and scientific issues including;

- Supporting a challenge to the Water Framework Directive (WFD) phytoplankton assessment tools ensuring that thresholds were appropriate for Scottish waters. Data are also provided annually for the assessment of Good Ecological Status.
- Providing data to the UK diversity assessment of the pelagic habitat for the Marine Strategy Framework Directive.
- Formed part of the Scottish Ocean Climate Status Report.
- Contributing towards the UK assessment of state in Charting Progress 2, Scotland's Marine Atlas and UK Marine Climate Change Impacts Partnership (MCCIP) report cards.
- Contributing towards the International Council for the Exploration of the Sea (ICES) plankton status reports and the International Group for Marine Time Series (IGMETS) analysis and synthesis of global marine biological changes as seen through biogeochemical and plankton time series.
- Contributing to 46 peer reviewed publications, 17 internal and 21 contract reports, 75 oral and 80 poster presentations at a variety of scientific forums, supported 20 level and 10 secondary school studentships and been included in 10 outputs from external authors.