

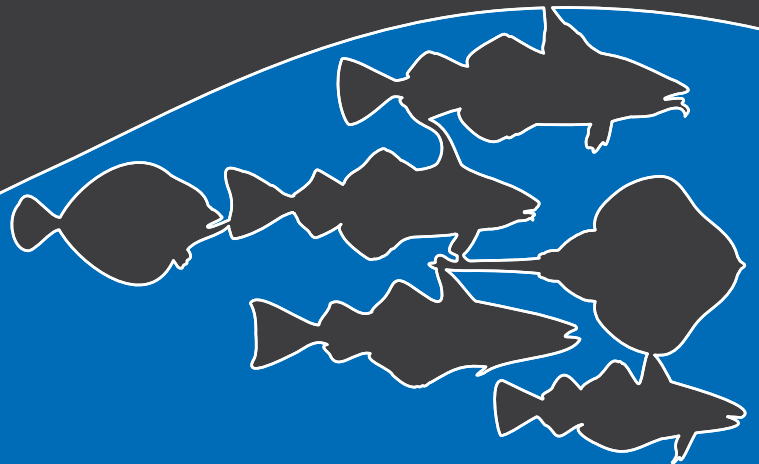


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07



Is There a Biodiversity Crisis in Scotland's Seas?

The Claim

It is frequently implied that there is a 'biodiversity crisis' in Scotland's seas or that Scotland's marine biodiversity is being 'lost'. Such claims are then used to justify management measures such as bans on fishing in marine protected areas.

*"In Scotland, we are understandably proud of our natural environment, whose beauty, richness and diversity is emblematic of our national identity. **We also all recognise the urgency of action to address the twin crises of climate change and biodiversity loss.** So, it is right that we lead the way in creating a coherent network of these protected areas for our most valuable ecosystems that will extend from our coasts to our deep seas."*¹

Mairi McAllan MSP, Minister for Environment and Land Reform

FACT

There is a striking lack of evidence of biodiversity loss in Scotland's seas.

FACT

The fact that biodiversity loss is a global problem does not mean that it is occurring in Scotland's seas.

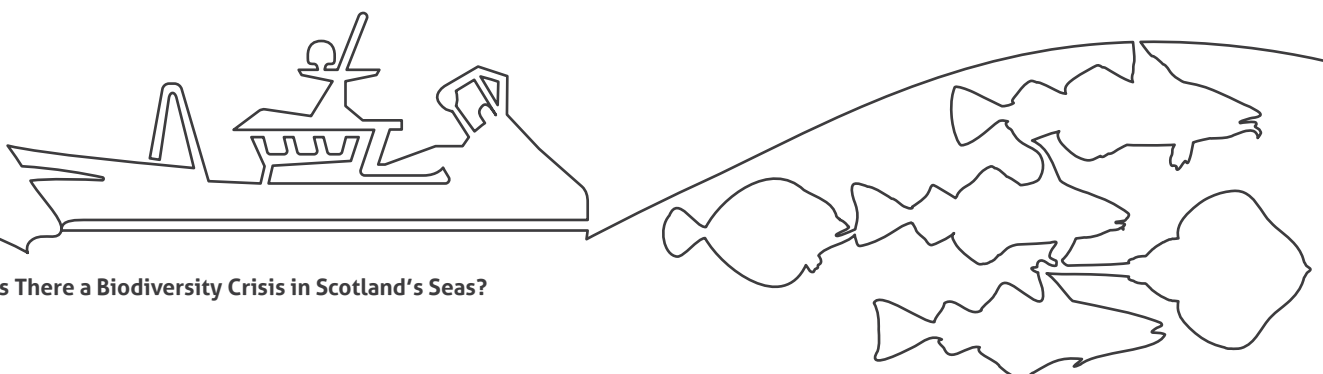
FACT

Globally, most biodiversity loss is occurring in the tropics and outside Europe.

FACT

Claims of a 'biodiversity crisis' (or of biodiversity loss) in Scotland's seas ignore substantial increases in the abundances of many fish and other animals.

¹ Mairi McAllan MSP, Minister for Environment and Land Reform. Ministerial Foreword to Scottish HPMA's Consultation Paper.



What is Biodiversity?

'Biodiversity' is the variety and variability of life on earth. It reflects not just the abundance of plants or animals (how many individuals there are) but also their variety (how many different kinds there are), their genetic diversity, and the interactions between them. Biodiversity tends to be higher in the tropics, especially in tropical forests.

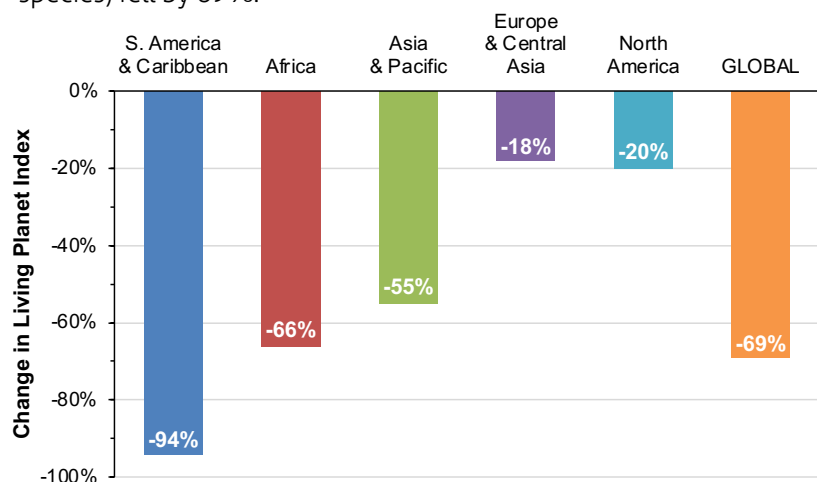
'Biodiversity loss' refers to the decline or disappearance of diversity either globally or in particular areas. Biodiversity loss is about much more than just reductions in the numbers of individual plants or animal species. It includes reductions in genetic diversity, loss of species (extinctions), and changes in ecosystems.

Where is Biodiversity Being Lost?

The WWF's *Living Planet Report 2022*² showed that most biodiversity loss is taking place in the tropics and in the southern hemisphere (Figure 1). The 'living planet index'³ fell by 94% in South America and the Caribbean, 66% in Africa, and 55% in Asia and the Pacific between 1970 and 2018, compared to only 18% in Europe and Central Asia and 20% in North America. Globally, the living planet index (based on changes in the abundances of 31,821 populations of 5,230 species) fell by 69%.

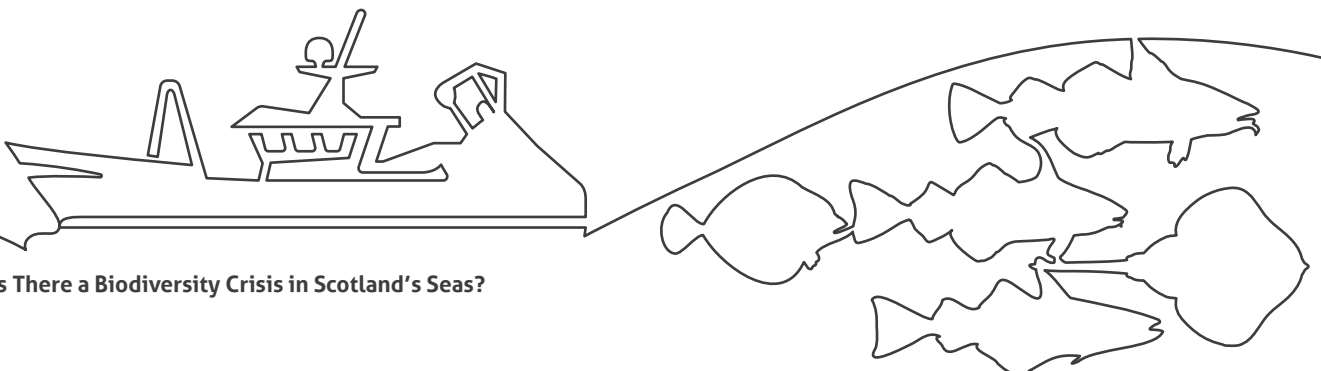
Figure 1

Summary of changes in the Living Planet Index between 1970 and 2018 in different regions of the world.²



² WWF. 2022. *Living Planet Report 2022 – Building a nature positive society*. <https://www.zsl.org/what-we-do/projects/living-planet-index>.

³ The Living Planet Index (LPI) tracks changes in the relative abundance of wild species populations over time and is constructed by calculating an average trend for tens of thousands of populations from across the globe. See *Living Planet Report 2022*¹, page 32.



Is Scotland's Marine Biodiversity Being Lost?

Statements like that made by the Scottish Minister for Environment and Land Reform (quoted above) conflate two separate issues. Whether deliberately or not, references to the state of Scotland's seas alongside references to the very real **global** issue of biodiversity loss create the **impression** that Scotland's marine biodiversity is being lost or that there is a 'biodiversity crisis' in Scotland's seas.

But while there are frequent references to it in Scottish Government publications there is a striking lack of evidence of biodiversity loss in Scotland's seas, far less of a 'biodiversity crisis'. No evidence at all was offered in the HPMA consultation documents, for example.

The Scottish Government does not explain anywhere how it defines or measures biodiversity. The only evidence of biodiversity loss offered in the *Scottish Biodiversity Strategy* is a decline in the abundances of some seabirds.⁴ Official statistics published by NatureScot⁵ also highlight this decline in seabird abundance as evidence of a loss of marine biodiversity in Scotland but give much less prominence to substantial **increases** in the abundances of more than 200 fish and other marine animals in Scotland's seas (see What About the Fish part 1, below).

In any case, biodiversity loss is about much more than just changes in numbers: It includes reductions in genetic diversity, loss of species (extinctions), and changes in ecosystems. So, falls in the abundances of some species are not necessarily evidence of biodiversity loss.

Although extinction is a key element of biodiversity loss only a handful of marine species are known to have become extinct in Scottish waters in historic times.⁶

The *Scottish Biodiversity Strategy* also highlights a failure to achieve 'Good Environmental Status' for some components in the UK Marine Strategy.⁷ While preventing biodiversity loss is an element of Good Environmental Status, failure to achieve that Status is not in itself evidence that biodiversity loss is occurring. Further, reference to the UK Government's 'Summary of Progress Towards Good Environmental Status' shows that for all but one of the elements where Good Environmental Status was not achieved the situation is stable or improving.⁸

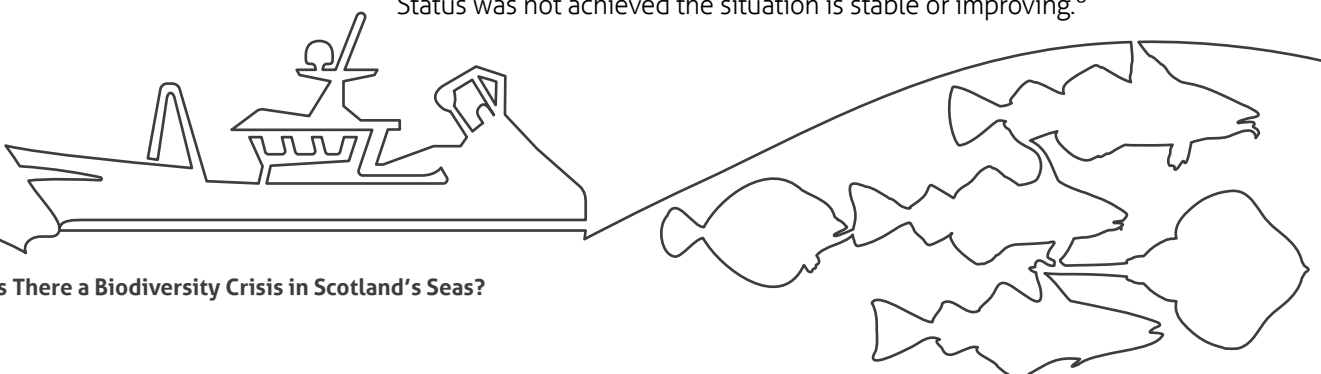
4 Scottish Government. 2022. Biodiversity strategy to 2045: tackling the nature emergency. <https://www.gov.scot/publications/scottish-biodiversity-strategy-2045-tackling-nature-emergency-scotland/>.

5 NatureScot. 2022. Official Statistics - Marine and Terrestrial Species Indicators: Experimental Statistic. <https://www.nature.scot/doc/official-statistics-marine-and-terrestrial-species-indicators-experimental-statistic>.

6 These would include the Great Auk (a seabird) in 1840 and perhaps the Right Whale in the early 20th century.

7 'Good Environmental Status' is a goal of the EU Marine Directive which defines Good Environmental Status (GES) as: "The environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive." https://ec.europa.eu/environment/marine/good-environmental-status/index_en.htm.

8 CEFAS. 2018. Summary of Progress towards Good Environmental Status. <https://moat.cefas.co.uk/summary-of-progress-towards-good-environmental-status/>.



What About the Fish (part 1)?

While NatureScot has highlighted a decline in seabird abundances as evidence of a decline in marine biodiversity in Scotland it gave much less prominence to substantial increases in the abundances of more than 200 fish and invertebrates in Scotland's seas (*Figure 2*).⁵

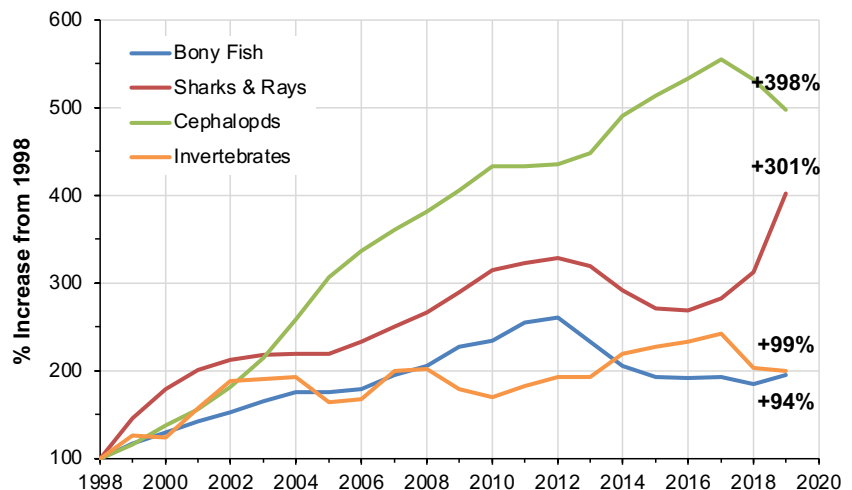
These data show that between 1998 and 2019:

- ❖ The average abundance of 147 species of bony fish (common fish including haddock, cod and similar species) almost doubled (a **94% increase**).
- ❖ The average abundance of 37 species of sharks, skates and rays quadrupled (a **301% increase**).
- ❖ The average abundance of 11 species of cephalopods (squid and octopuses) increased five-fold (a **398% increase**).
- ❖ The average abundance of 6 species of crabs, lobster and scallops (invertebrates) doubled (a **99% increase**).

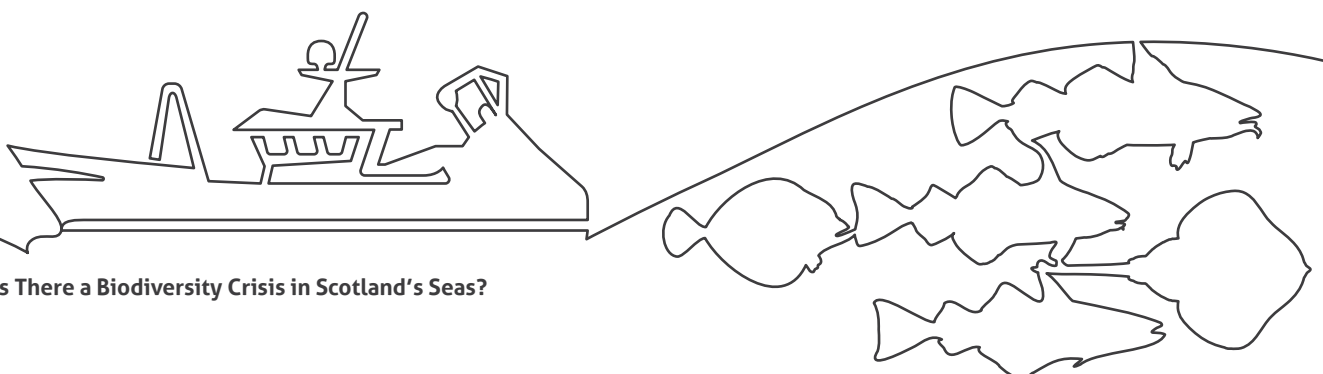
The increase in the abundances of sharks, skates and rays in Scottish waters is in striking contrast to a 71% decline in their **global** abundance over the last 50 years⁹.

Figure 2

The average changes in abundances in Scottish seas from 1998 to 2019 of bony fish (includes many common fish); sharks, skates and rays; cephalopods (squid, etc.); and crabs, lobsters and scallops (invertebrates). Figures show the percentage changes in abundances from 1998. (Data from NatureScot. 2022.⁵)



⁹ Oceanic Shark and Ray Numbers Down 71 Percent over Past 50 Years. *The Scientist*, 28Jan 2021. <https://www.the-scientist.com/news-opinion/oceanic-shark-and-ray-numbers-down-71-percent-over-past-50-years-68399>.



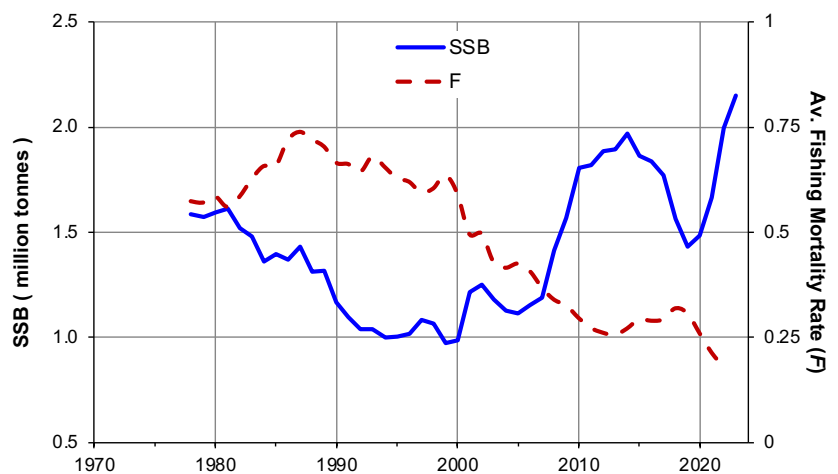
What About the Fish (part 2)?

Data published by ICES also show substantial increases in the abundances of commercially exploited fish stocks in Scottish waters (Figure 3). While the abundances of stocks generally declined during the 1980s and 1990s (partly due to the end of the gadoid outburst and partly due to high fishing pressure) they have increased substantially since the late 1990s.

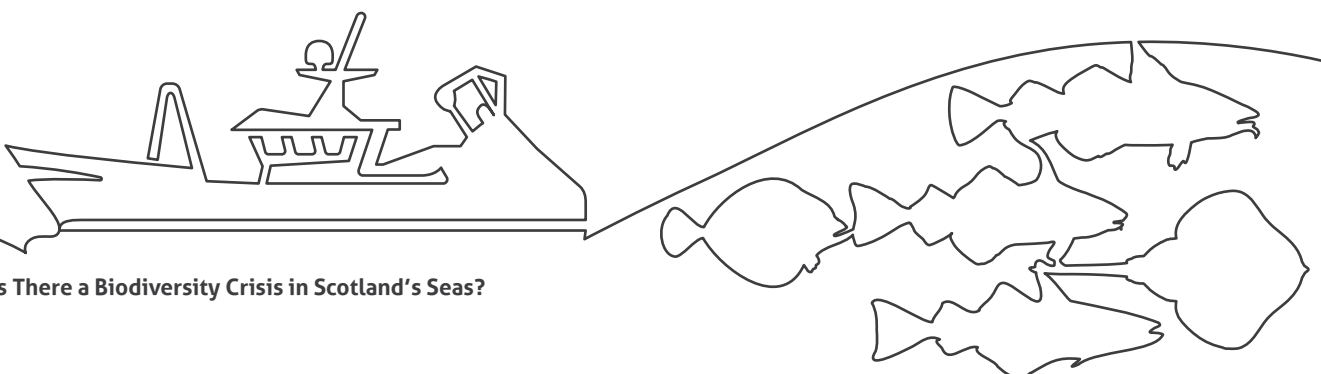
According to these data the total spawning stock biomass of six stocks more than tripled between 1999 and 2022 (a 205% increase) with a further increase predicted in 2023. There has also been a substantial decrease in the average fishing mortality rate for these stocks (a measure of the fishing pressure on stocks) which in 2022 was estimated to be less than a quarter of what it was in the late 1980s.

Figure 3

The total Spawning Stock Biomass (SSB) and the average Fishing Mortality Rate (F) of six fish stocks for which long-term time-series are available (North Sea cod, plaice & whiting, North Sea & West of Scotland haddock and saithe, and northern hake). The dip in the abundances in the late 2010s was mainly due to a fall in the abundance of plaice. (Based on analysis of ICES Data: Napier, 2022¹⁰).



¹⁰Napier. 2022. Trends in Scottish Fish Stocks 2022. <https://www.shetland.uhi.ac.uk/research/statistics/reports/trends/>.



Conclusions

Biodiversity loss is a serious global problem. But while the Scottish Government apparently wants to create the impression that there is a biodiversity 'crisis' in Scotland's seas in order to justify its policy choices it offers little real evidence of such a crisis.

Despite repeated insinuations of biodiversity loss in its publications and public statements the Scottish Government offers no explanation of how it defines or measures biodiversity in Scotland's seas and no factual evidence that biodiversity is being lost.

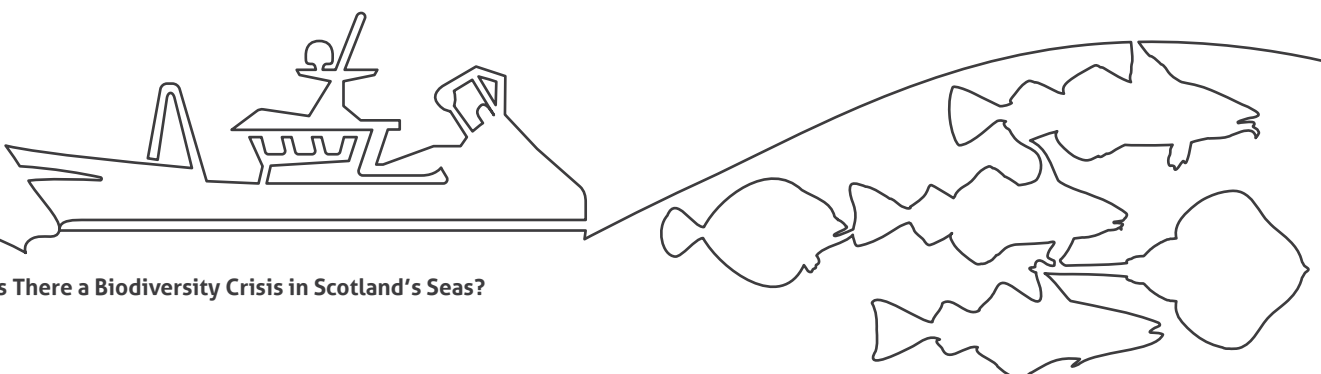
Rather, marine biodiversity loss appears to be taken on faith alone. That is, rather than determining **whether** biodiversity is being lost the Government appears to have started with an assumption (if not a desire) that there is a 'biodiversity crisis' in Scotland's seas. While the extinction of species (species loss) is a defining characteristic of biodiversity loss there is no evidence of any recent extinctions in Scotland's seas.

Almost the only numerical evidence offered of a loss of marine biodiversity in Scotland is an admittedly substantial decrease in the abundance of some seabirds. But evidence of even more substantial **increases** in a much wider variety of marine species has been downplayed and largely ignored, as has evidence that Scotland's populations of whales and dolphins are stable or increasing¹¹. Also ignored is evidence of a substantial decrease in fishing pressure, although fishing is alleged to be one of the principal threats to Scotland's marine biodiversity.

There is a contradiction in that while declines in the abundances of some species are taken as evidence of 'biodiversity loss' **increases** in the abundances of other species are not interpreted as evidence of an increase in biodiversity. (Although, as noted, 'biodiversity loss' is about more than just numbers.)

Overall, the Scottish Government has not shown any evidence that biodiversity is being lost in Scotland's seas, far less that there is a 'biodiversity crisis'. Rather it appears to be focussed on creating the **impression** of a crisis to provide a justification for its policy choices.

¹¹ Scottish Government. 2021. Marine Scotland Assessment: Cetaceans. <https://marine.gov.scot/sma/assessment/cetaceans>.



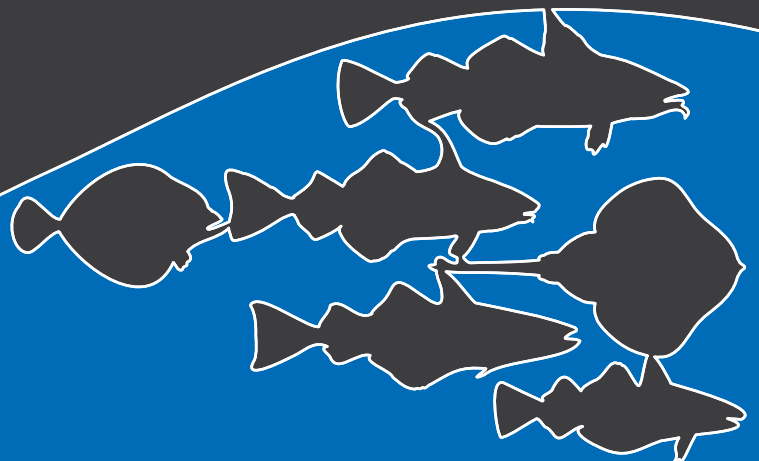


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