Celtic Seas ecoregion Ecosystem Overview

Henn Ojaveer
ICES Advisory Committee vice-chair

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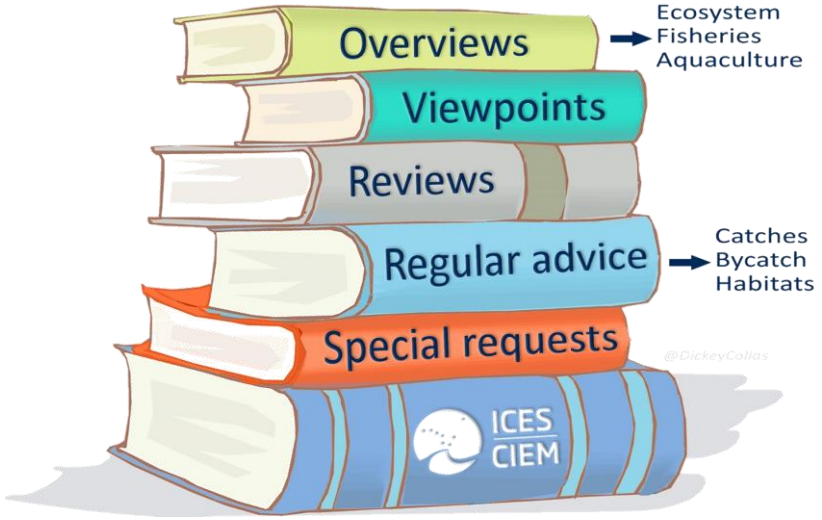
ICES Ecosystem Overviews

- ✓ Key products to support EBM
- ✓ Provide science-based statements (*not a catalogue of all available information on an ecoregion*)
- ✓ Complement other types of advice
- ✓ Integrated ecosystem-informed advice



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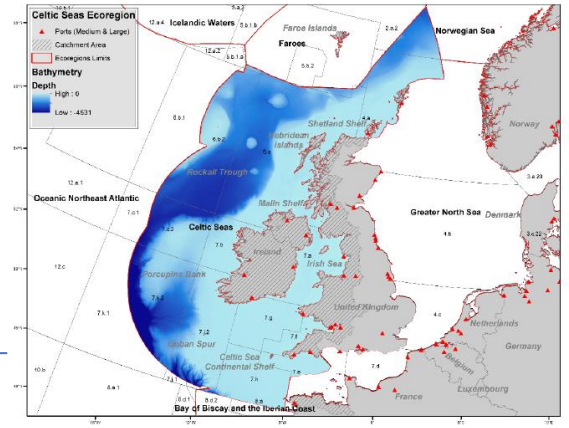

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Celtic Seas ecoregion
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7.1 Celtic Seas ecoregion – Ecosystem Overview

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Key signals: *human activities and their pressures*

- ✓ Fishing is the main human activity. Reduction in fishing likely to improve the status of the ecosystem.
- ✓ Land-based industry and wastewater continue to be important causes of pressures like marine litter, nutrient enrichment, and the introduction of contaminants from riverine run-off.
- ✓ Tourism and recreation also contribute to marine litter.

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Key signals: *state of the ecosystem*

- ✓ Changes in plankton in coastal areas, likely implications to harmful algal blooms
- ✓ Invertebrate benthic biomass decreased by 59% in offshore mud and 5% in sandy areas due to fishing-caused seabed disturbance (> 80% decrease in the most heavily fished areas).
- ✓ The stock sizes of most groups of commercial species are now overall above MSY.
- ✓ Seabird abundance is declining, likely related to prey availability and contaminant loads.
- ✓ Grey seal abundance is stable. Information on harbour seals and cetaceans abundance is a knowledge gap.

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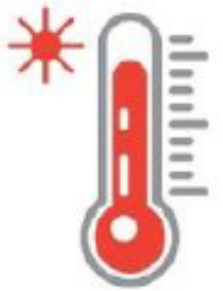
Key signals: *climate change*

- ✓ Warming of surface water temperature in shallow shelf regions, resulting in seasonal stratification and nutrient limitation.



- ✓ Changed spatial distribution of several plankton and fish species.
- ✓ Cascading effects with consequences on the spatial distribution of fisheries.
- ✓ Marine spatial planning as a tool for planning infrastructure such as wind farms or implementing marine protected areas.

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Key signals: *environmental and socio-economic context*

- ✓ Decrease of fishing with bottom-towed gears is likely to result in a further reduction of the extraction of demersal fish and disturbance of seabed habitats
- ✓ Potential shift toward less fuel-intensive fisheries likely to result in increased bycatch risk of seabirds and marine mammals. This is a major concern for seabirds, which abundance is declining.

- ✓ Small-scale coastal fisheries contribute less than 10% of total landings but have high importance in terms of employment (22% FTE) and 14% of total fisheries revenue.

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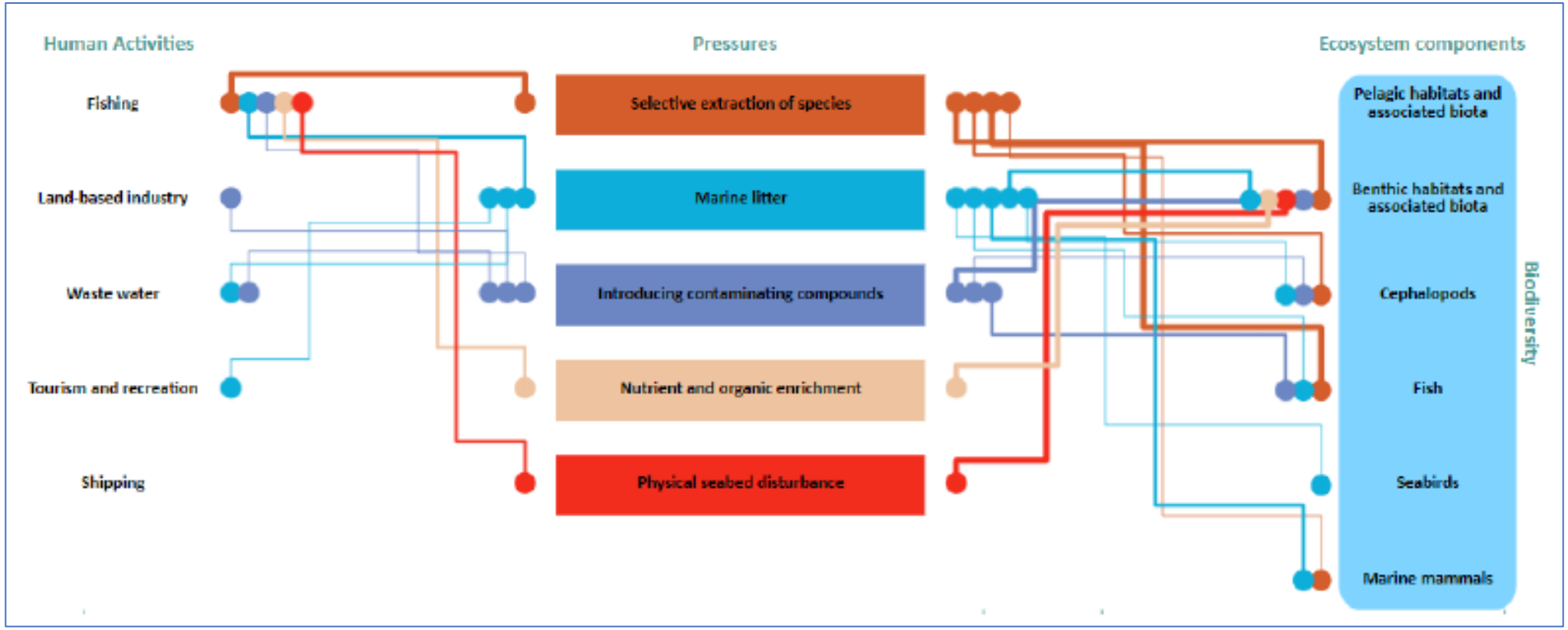
The “wire” diagram linking human activities, pressures and ecosystem state components



17 human activities and 17 pressures relevant to the Celtic Seas ecoregion were evaluated

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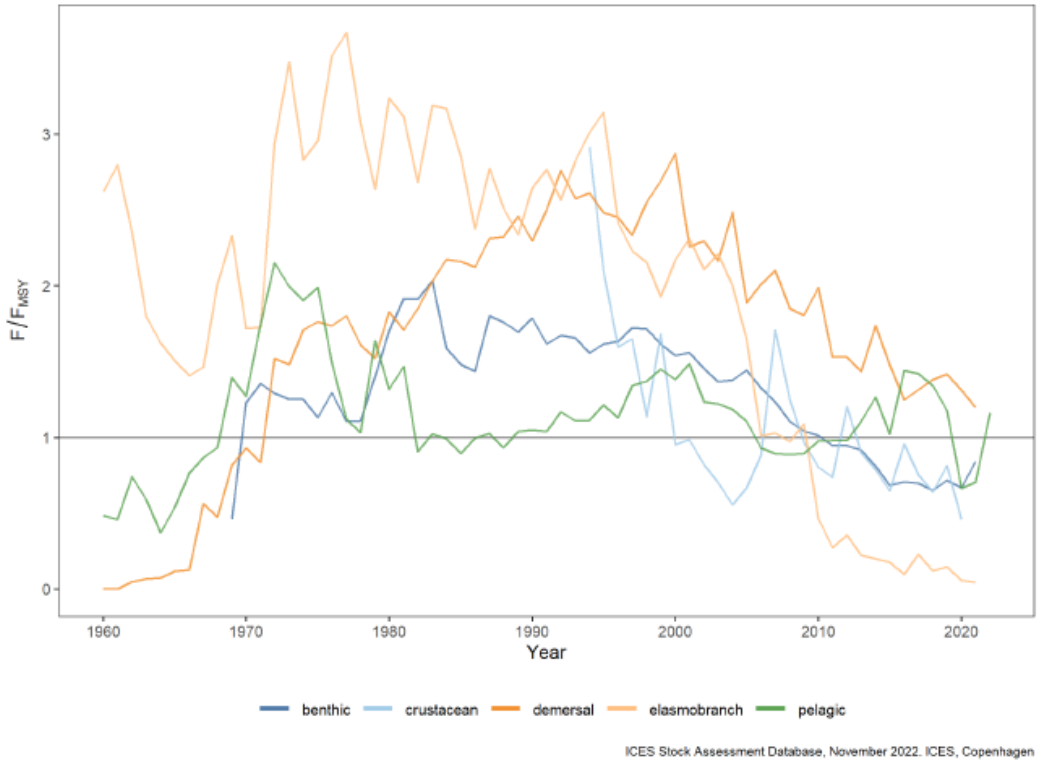
Priority pressure: selective extraction of species (I)

- ✓ Most fish stocks are now fished at or below FMSY.
- ✓ Average fishing mortality for shellfish, demersal, and pelagic fish stocks reduced since 1990s.
- ✓ Pelagic stocks are above the reference point.
- ✓ 33 stocks (out of 43 evaluated) are now fished at or below FMSY.



Time-series of annual relative fishing mortality (F to FMSY ratio) by fisheries guild for benthic, crustacean, demersal and pelagic stocks.

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Priority pressure: selective extraction of species (II)

- ✓ High bycatch rates of some elasmobranchs (e.g. porbeagle, angel shark, spurdog, thorny skate, thornback ray, the common skate complex, and deep-water sharks) in trawl gears and nets.
- ✓ Longline fisheries pose the greatest risk of bycatch to seabirds offshore, and net fisheries inshore areas.
- ✓ Discards of benthic fisheries around 10%, but can be very high for some species: plaice around 60% of tonnage and whiting 17–99% of tonnage.
- ✓ Recreational fishing targets wide range of species from a variety of platforms with significant total stock removals (around 27% of seabass and 42% of pollack).

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Priority pressure: marine litter

- ✓ Marine litter can be everywhere (surface, water column, seabed, in sediment).
- ✓ The most common beach litter items are plastic fragments, food and drink packaging, fishing-related litter, cotton buds, cigarette butts, rubber balloons, and shotgun cartridges.
- ✓ Presence of microplastic in 35 demersal fish and invertebrate species, and 16 species of seabirds and apex predators probably via the food-web.
- ✓ Marine litter impacts organisms and habitats through entanglement and ingestion.
- ✓ The effects of marine litter are poorly known.

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Priority pressure: introduction of contaminating compounds

- ✓ Contamination is derived from industrial, urban (coastal and wastewater), and agricultural run-off as well as atmospheric deposition, shipping, fisheries, tourism and recreation, oil and gas extraction, aquaculture, and renewable energy instalments.
- ✓ High prevalence – many sectors introduce various synthetic and non-synthetic compounds.
- ✓ Many contaminants are persistent; nearly all habitats are affected.
- ✓ Contamination is typically below adverse effects levels.
- ✓ Acute and chronic effects include toxicity to marine organisms and food-webs.

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Priority pressure: nutrient and organic enrichment

- ✓ The most important nutrient sources are shipping, urban wastewater, aquaculture, agriculture, land-based industry, and atmospheric deposition.
- ✓ Atmospheric deposition of nitrogen is provides about 1/3 of all inputs of nitrogen ´with shipping as a major contributor.
- ✓ Total inputs of nitrogen and phosphorous significantly reduced since 1990.
- ✓ The primary contribution of organic matter is via discarding of unwanted catch and offal from fisheries.
- ✓ Eutrophication limited to inlets, estuaries, and harbours.

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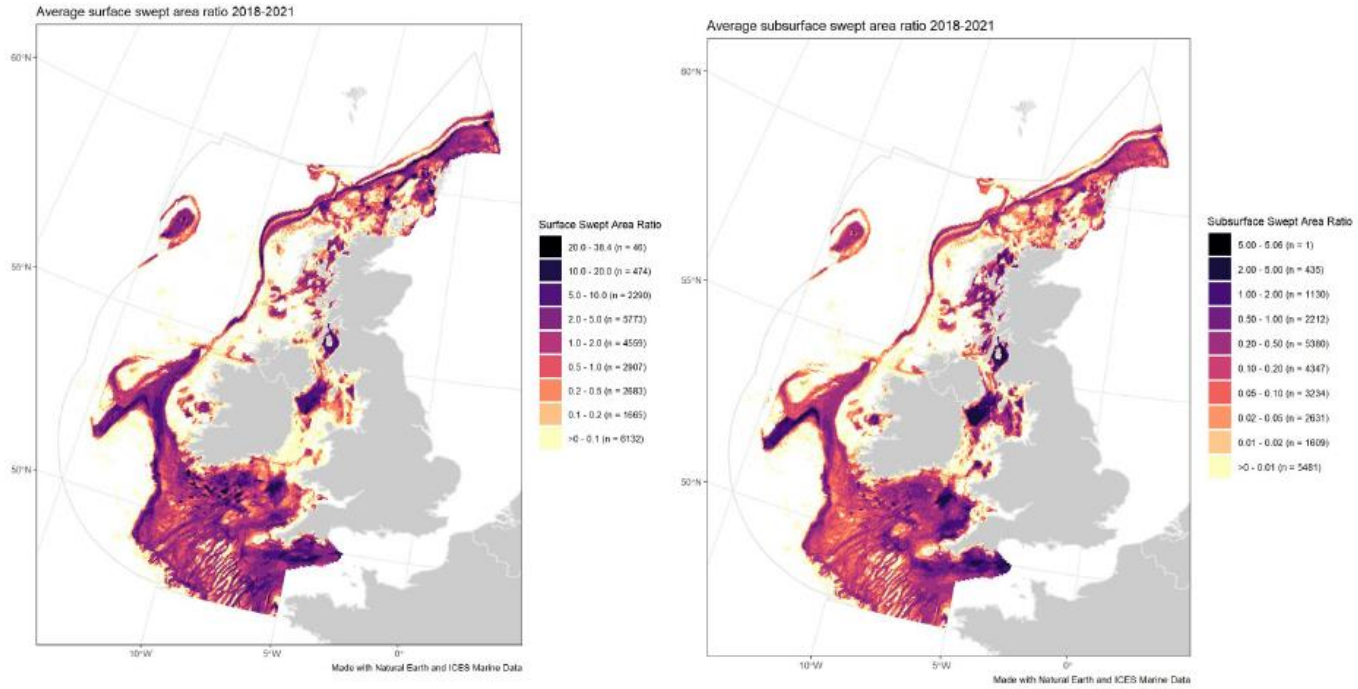
Priority pressure: physical seabed disturbance

52% (480 700 km^2) of the ecoregion fished

fishing effort of bottom mobile gears decreased by 35% in 2003-2014

fishing footprint covers 88% of the 400-800 m depth

95% of areas with known VME occurrence or likely occurrence fished between 2009 and 2011



Average annual surface (left) and subsurface (right) disturbance by mobile bottom-contacting fishing gear (bottom otter trawls, bottom seines, dredges, beam trawls) in the Celtic Seas during 2017–2021 (with available data), expressed as average swept area ratios (SAR).

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Thank you

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