12.2 ICES ecosystem overviews

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Introduction

The ecosystem overviews (EOs) have been developed through a system of workshops and reviewed by ICES integrated ecosystem assessment groups, based on information provided by expert groups that specialize in state descriptors and using automated data products and GIS layers from accepted legitimate sources. The ecosystem overviews were completed by an advice drafting group and approved by ICES Advisory Committee, ACOM.

The audience for the overviews includes client commissions and stakeholders as well as the ICES community and networks. Owing to the range of audiences, the overviews will be evolving documents, driven by top–down processes (advisory requests and ICES decisions about strategic direction) and bottom–up processes (information streams highlighting "new" issues from the ICES community and network). The ecosystem overviews will increase ICES capacity to provide the integrated advice that is expected to meet the future needs of client commissions.

The aim of this process is to have an overview for each ICES ecoregion (Figure 12.2.1).

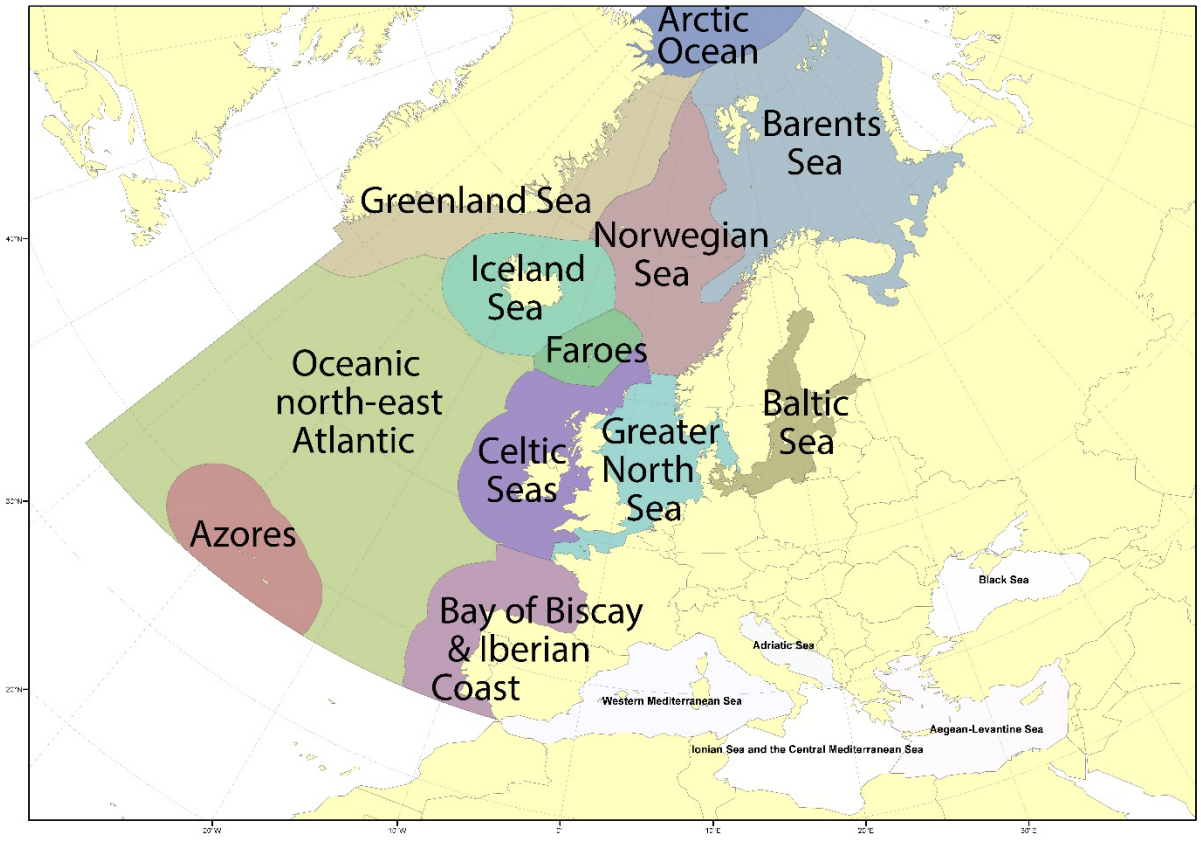

Figure 12.2.1 ICES ecoregions.

The purposes of the ecosystem overviews in the ICES advice are to:

a) describe the location, scale, and the management and assessment boundaries of the ecoregion;
b) describe the distribution of human activities and resultant pressures (in space and time) on the environment and ecosystem; and
c) describe the state of the ecosystem (in space and time) and to comment on pressures accounting for changes in state.

The overviews focus on regionally manageable pressures and describe the implications of variability in the system. They summarize the trends in the predominant pressures and human impacts that affect living resources. Also, as the environment and ecosystems vary over time, sometimes with a trend and sometimes with a step change, the overviews provide those preparing the advice and those receiving it with information on natural variability, trends, and step changes in the dynamics of their respective ecosystems. The information will be based on the best available evidence. The overviews are expected to materially influence the advice.

The overviews are structured around four sections.

1. **Ecoregion description** – Maps and text showing boundaries of ecosystem and depth contours, relevant management and assessment regions, human usage, catchment areas, and designated areas (i.e. Natura 2000 areas). Appropriate subregions should be described.
2. **Key signals within the environment and ecosystem** – Focus only on changes on time and space scales that have consequences for advice. The major trends and shifts that are required to provide advice should be described.
3. **Activity and pressure** – Identify regional priorities, listing the predominant pressures in the ecoregion, with an indicative list of activities. It is the ambition to assess cumulative pressure from multiple activities.
4. **State** – Short concise descriptions of the main state of the ecosystem components within each ecoregion, linking the selected pressures to the state of the ecosystem.

Current methodology to develop pressure–state relationships in ecosystem overviews

The core of the EOs are figures that relate the main regional pressures with a) the activities that most directly impose these pressures, and b) the ecosystem components that are most impacted by these pressures (Figure 12.2.2, an example from the Celtic Seas EO). Generally, expert judgment (a panel of experts, across the pressures, and ecosystem components) is required in order to make these relationships explicit, as in many cases there is very little or no quantitative information available on a given activity–pressure–ecosystem component pathway. The following methodology is suggested for documenting how the pressures are selected for each region:

1. List all identifiable main pressures of the ecoregion (see Pressure Glossary for Ecosystem Overviews) of pressures, modified from the Options for Delivering Ecosystem-Based Marine Management [ODEMM] project (www.emodnet-seabedhabitats.eu).
2. Consider the "risk" each individual pressure poses in the region (Table 12.2.1) in terms of:
   a) Probability of occurrence (1 = not likely to occur, to 3 = frequent or recurrent),
   b) Magnitude of the pressure, i.e. in space and/or severity of impact (1 = low, to 3 = high).
3. Choose the top (five) pressures from a management perspective. Evaluate if these five pressures are of real importance for the region; accompanying text can accommodate less important pressures.
4. For each pressure:
   a) Determine the main human activities contributing to these pressures, i.e. what can be managed locally and are ODEMM activities visible? Note that climate change issues will have a short separate section within the OEs. Evaluate the relationship between pressure and activity (Table 12.2.2; 1 = weak link, to 3 = strong link).
   b) Evaluate the main relationships between the ecosystem components and each of the five pressures (Table 12.2.3; 1 = weak link, to 3 = strong link). Remember that ecosystem components are fixed.
5. Do any sources support these links? This is not an essential requirement since expert judgment is used, but important to underpin the links or to highlight the need for research. Such sources also include reports and national impact assessments, etc.
6. Document the selection criteria if other methods have been followed (i.e. one of NOAA's Integrated Ecosystem Management methodologies such as ODEMM, Ocean Health Index, Integrated Trend Analyses, Bayesian Belief Network, or Ecological Risk Assessment).

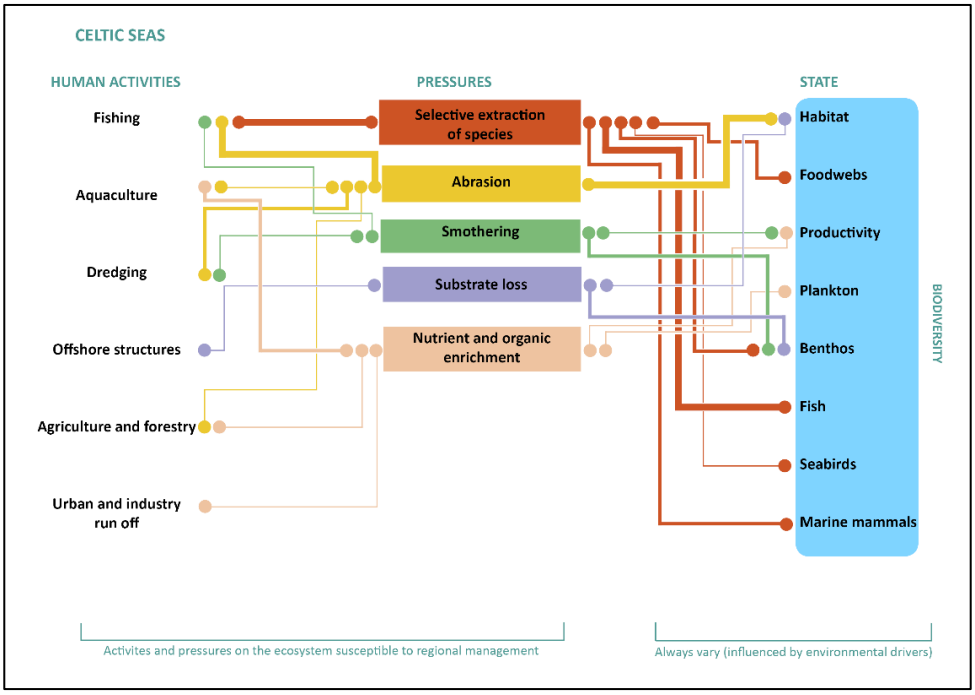

Figure 12.2.2 Main regional pressures. An example from the Celtic Seas EO.

Table 12.2.1 Example of a table to record pressure selection.

Pressure	Probability of occurrence	Magnitude (low = 1, high = 3)	Total
Selective extraction of species	3	3	6
Abrasion	2	5	6
Underwater noise	2	1	3
Other	…	…	…

Table 12.2.2 Example of a table defining the relationship between pressure and main human activities.

Pressure	Human activity	Strength of link
Selective extraction of species	fishing	3
	aquaculture	1
	dredging	2
	forestry…	1
Abrasion	…	
Smothering	…	
Other	…	

Table 12.2.3 Example of a table defining the relationship between pressure and the state of the ecosystem.

Pressure	Ecosystem component	Strength of link	Examples of literature
Selective extraction of species	foodwebs	2	reference
	benthos	2	Substrate maps. EU EMODNET seabed habitats; www.emodnet-seabedhabitats.eu
	fish	3	ICES, 2016
	seabirds	1	Strategic Environmental Assessment for MSFD
	marine mammals	2	…
Abrasion	…		
Smothering	…		
Other	…		

Ecosystem overview guidelines

The guidelines below apply to the production of ecosystem overviews:

- Non-changing elements such as geography should not be described in any detail, nor should key attributes of systems that are very well known to the expected readership.
- Any ecosystem state information should identify links back to pressures and drivers.
- Visual tools should be used to describe the dominant pressures and interactions, simplified to a degree so that results are intelligible and useful.
- Though systems are complex in reality, simplification is a necessity. Use either the top impacts or those pressures most amenable to management controls.
- Different regions should reflect different pressures/ecosystem drivers, with the differing interactions between pressures/drivers and ecosystem state being identified for the various regions. The reports will be written for the region as a whole; any important differences within the region should be reflected in a few brief subregion bullets.
- The text should be assertive and use specific language, without too many qualifications, stating what are facts and what are not.
- Where data from an area is partial, e.g. if three out of four countries are providing data for a region, it was agreed to use a pragmatic approach by assessing whether the available data may be considered to give a reliable impression of trends/pressures, etc., across that region.
- Where particular pressures, such as contamination, reflect a series of localized datasets, a set of time-series from these differing locations is deemed as possibly misleading rather than useful.
- Data and knowledge sources must be cited.
- Where possible, production should be automated using GIS methods and open databases.