Fisheries research and provision of advice on sustainable management

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Content

Fish stock assessment

- Background and principals
- Short-term forecasts
- Long-term projections and reference points

Advice on fisheries management

- From science to fishing quota
- Sustainability criteria and policy requirements

The role of ICES

- Who is ICES?
- Who is advised and how?

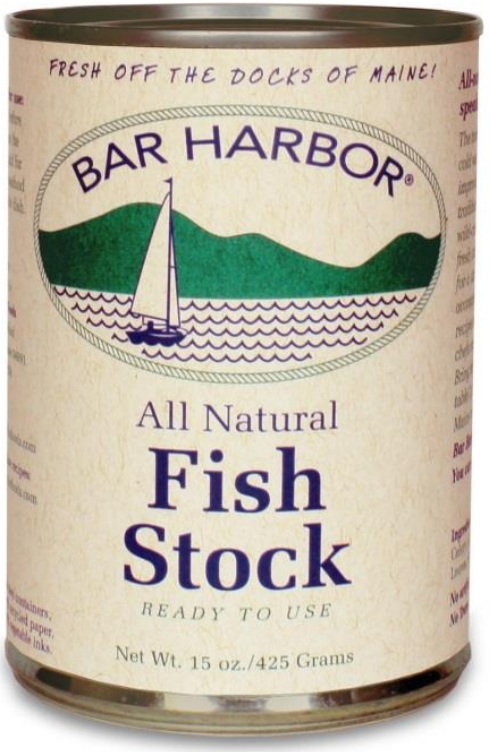
Things to come

Some definitions

What is a fish stock?

Population of fish belonging to a specific species, forming an independent reproductive unit, i.e. having a common gene pool

➡ **Once defined, fixed!**



What is fish stock assessment?

"*A scientific construct that integrates all relevant information and data with the important biological and ecological processes.*"

Terrance Quinn (2013)

What is a process?

"*A continuous action, operation or series of changes taking place in a definite manner*"

Webster's Encyclopedic Dictionary

➡ **Biological processes make nature dynamic**

Fish stock dynamics

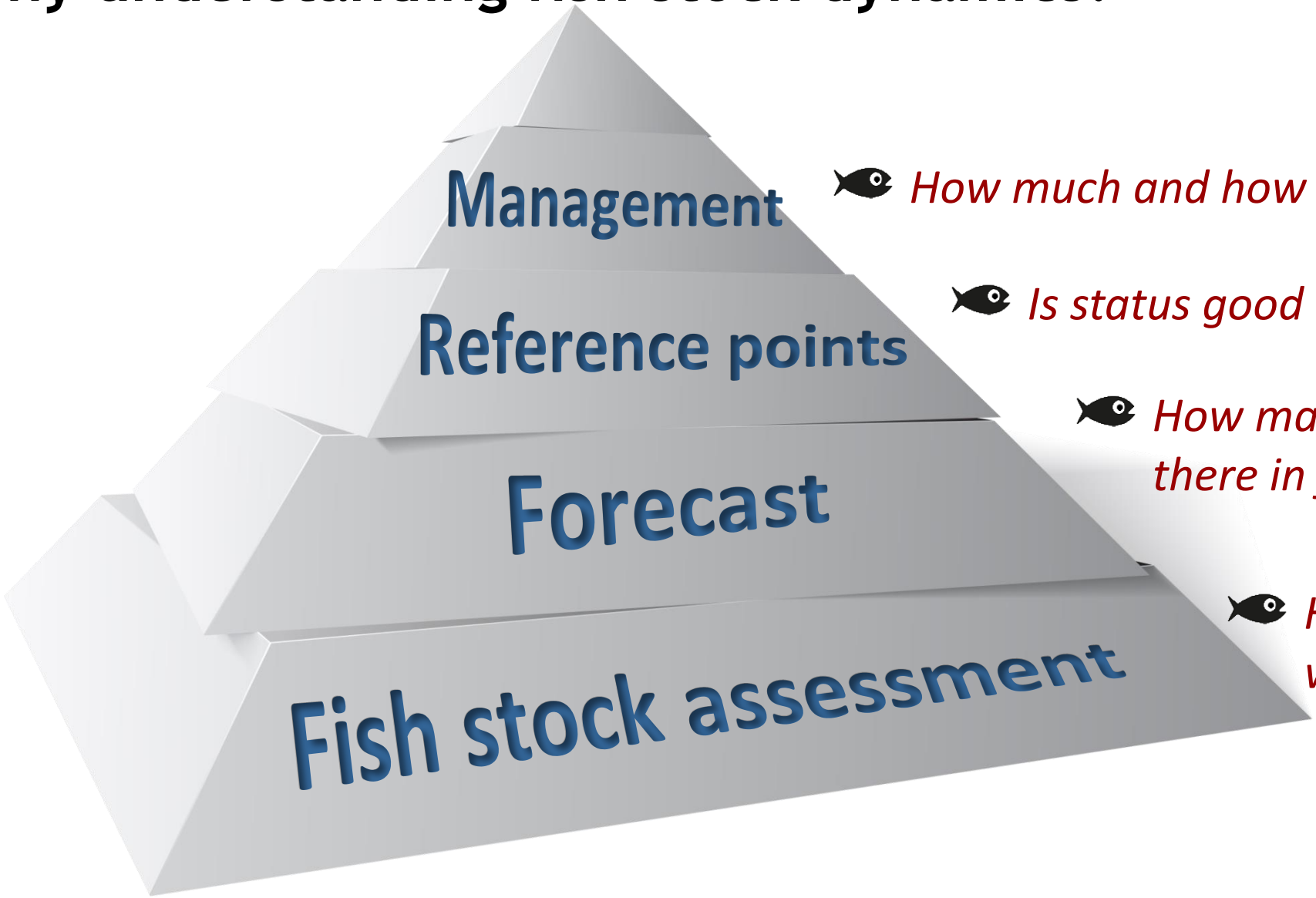
Human impacts etc.

Ecosystem interactions

Climate impacts

Physiology

Why understanding fish stock dynamics?



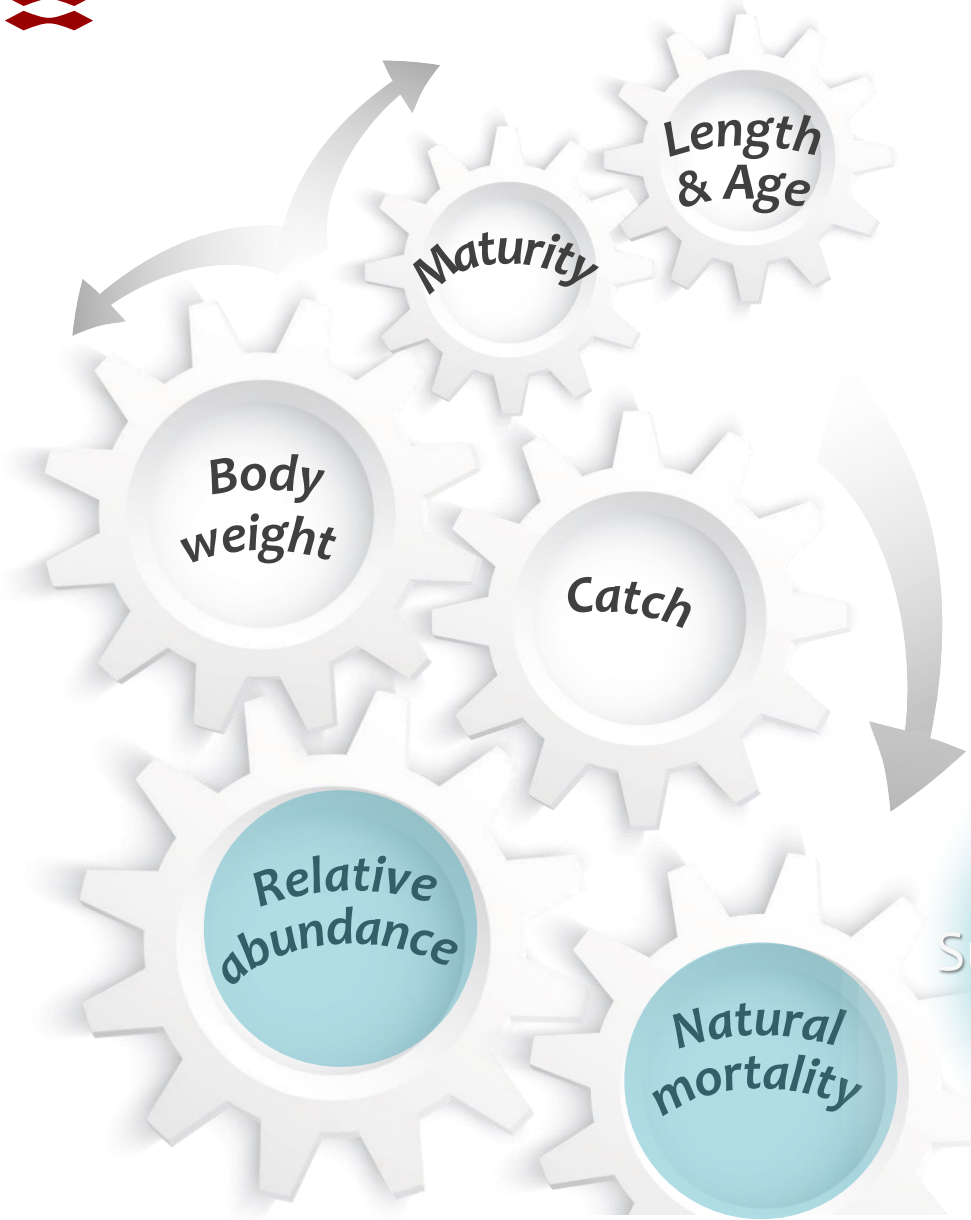
How much and how can we catch?

Is status good or bad?

How many fish will be there in future ?

How many fish are / were there?

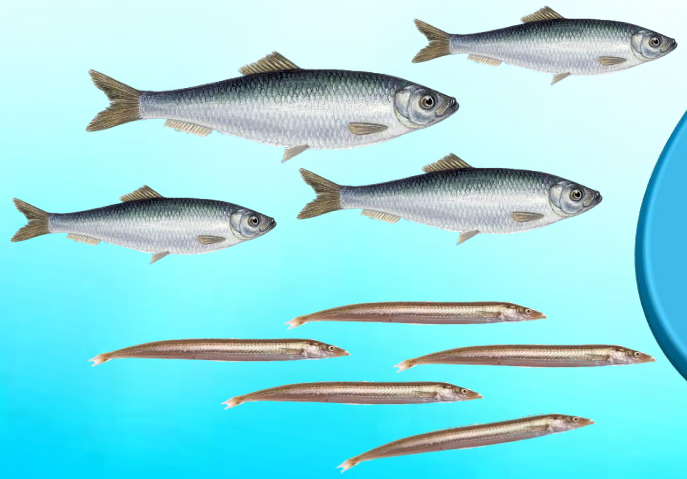
Fish stock assessment



SHORTCUT:
Survey catchability often constant

Short-term forecast

Present stock size ***Current years assessment*** ***Next years stock size***



CONSTANT

Natural mortality

Maturity

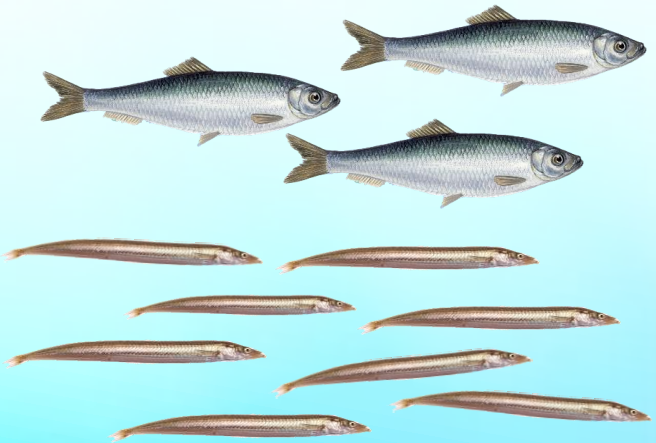
Growth

OBSERVED

Recruitment

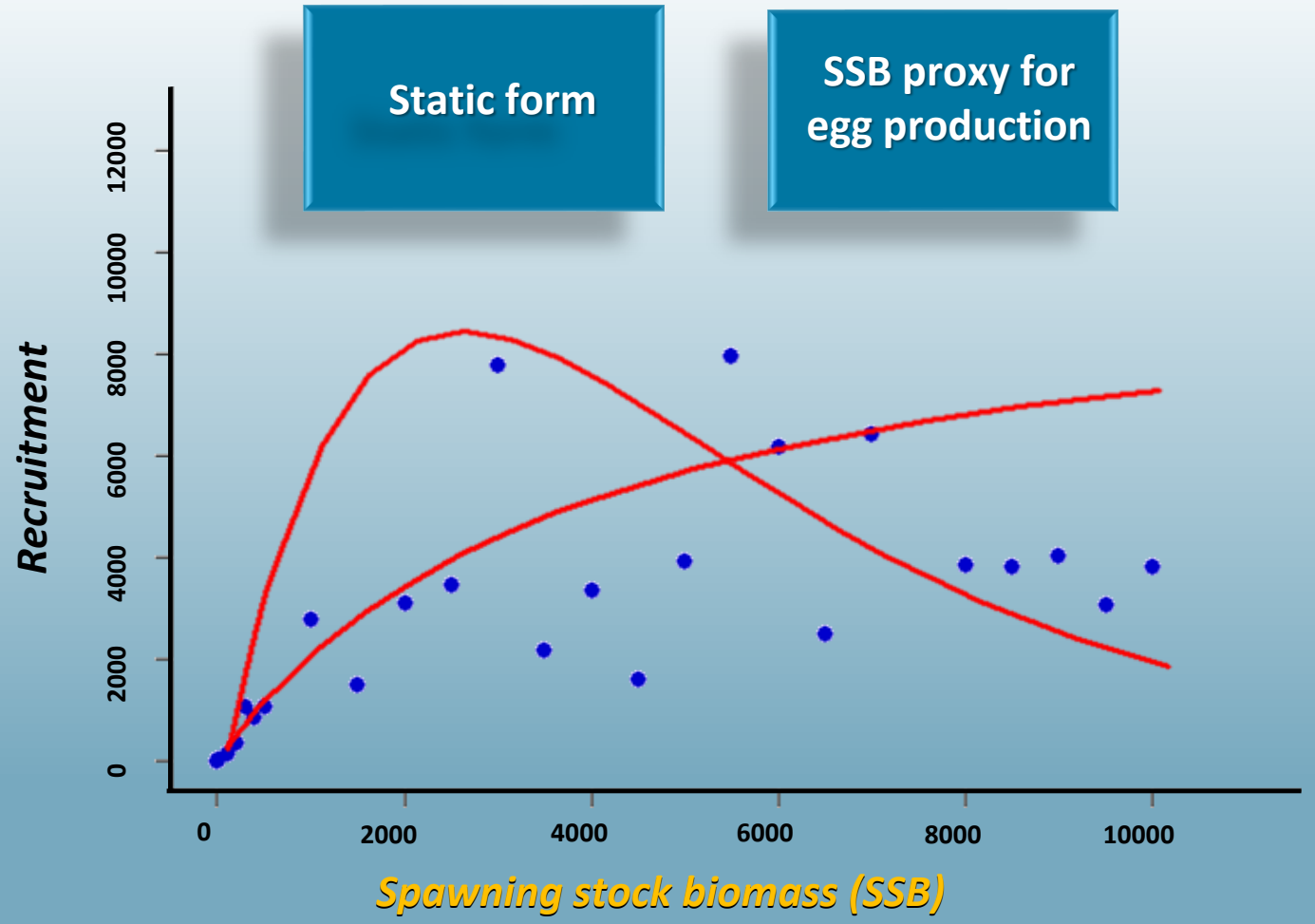
Fishing mortality

ASSUMED

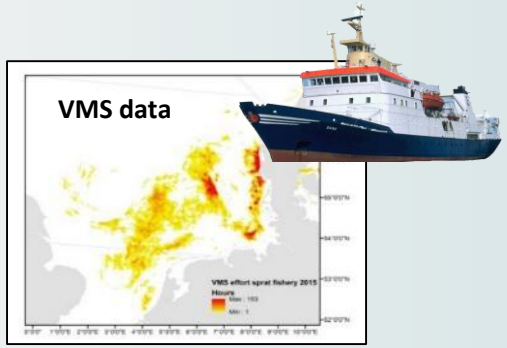


Long-term projections & reference points

Stock-Recruitment relationships



From science to fishing quota



ICES
CIEM

STECF

Biology + Models + Fisheries

Monitoring + Fisheries data

Sock assessments + Benchmarks

Advice

Management

Fisheries → Fisheries data

Context of advice on fisheries management

International agreements and policies:

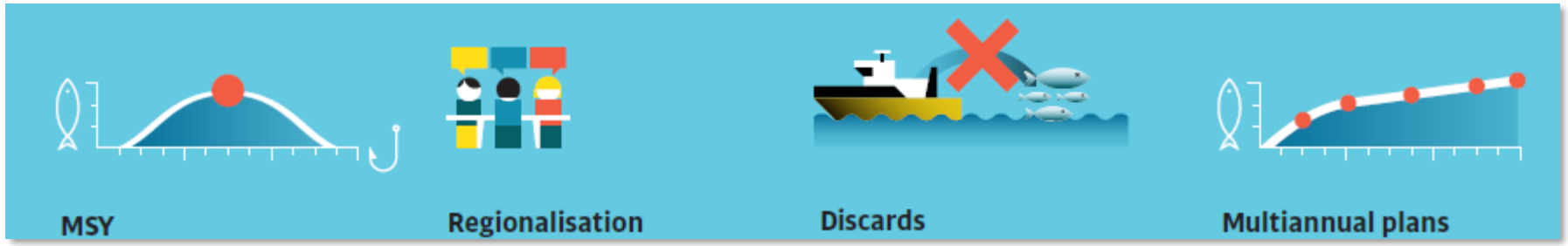
- ***United Nations Convention on the Law of the Sea*** - UNCLOS (UN 1982): **Maximum Sustainable Yield (MSY)**
- ***United Nations Conference on Environment and Development*** - UNCED (UN1992): **Precautionary approach**, specified in United Nations Straddling Fish Stocks Agreement – UNFSA (UN 1995) and Code of Conduct for Responsible Fisheries (FAO, 1995)
- ***Convention on Biological Diversity*** - CBD (UN, 1992b): Conservation of biological diversity through **ecosystem approach**
- ***Johannesburg Declaration of the World Summit on Sustainable Development*** – WSSD (UN 2002): **Ecosystem approach** and **rebuilding fisheries to MSY**
- ***New York declaration on support of Sustainable Development Goal 14*** (UN 2017): Specifically Target 14.4 implement science based **management plans**

Context of advice on fisheries management

Responsive to policy needs of Member Countries and EU, e.g. Common Fisheries Policy

*"The objective of the CFP should be to provide for **sustainable exploitation** of living aquatic resources and of aquaculture in the context of sustainable development, **taking account of the environmental, economic and social aspects in a balanced manner**." (Council regulation 2371/2002).*

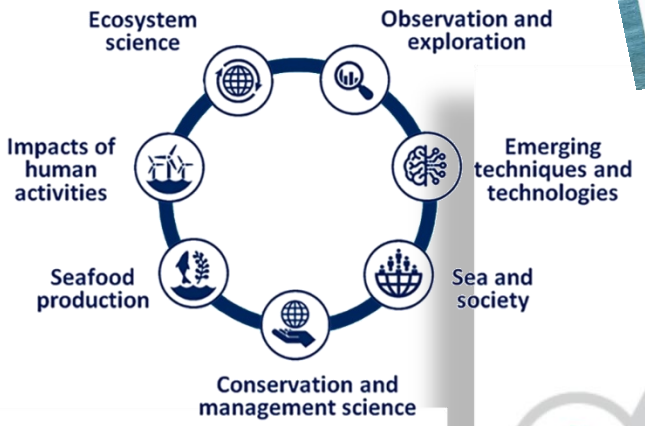
CFP objectives (Council regulation 1380/2013)



Contributing to the **ecosystem approach** to marine management within the Marine Strategy Framework Directive (MSFD).

Who is ICES & how it works

Mission: To advance and share scientific understanding of marine ecosystems and the services they provide and to use this knowledge to generate state-of-the-art advice for meeting conservation, management, and sustainability goals.



ICES is an intergovernmental organization with 20 member countries:

Belgium, Canada, Denmark, Estonia, Finland, France, Germany, Iceland, Ireland, Latvia, Lithuania, the Netherlands, Norway, Poland, Portugal, Russian Federation, Spain, Sweden, United Kingdom, and United States of America.

Through strategic partnerships our work in the Atlantic Ocean, and specifically the North Atlantic, extends into the Arctic, the Mediterranean, the Black Sea, and the North Pacific.

Where ICES works

How ICES works:

Who is advised and how?

Clients (not all) ask for recurrent scientific advice:

European Commission, NEAFC, OSPAR COMMISSION (Protecting and conserving the North-East Atlantic and its resources), NASCO, HELCOM

Cooperative agreements:

http://www.ices.dk/explore-us/how-we-work/Pages/Cooperation-agreements.aspx

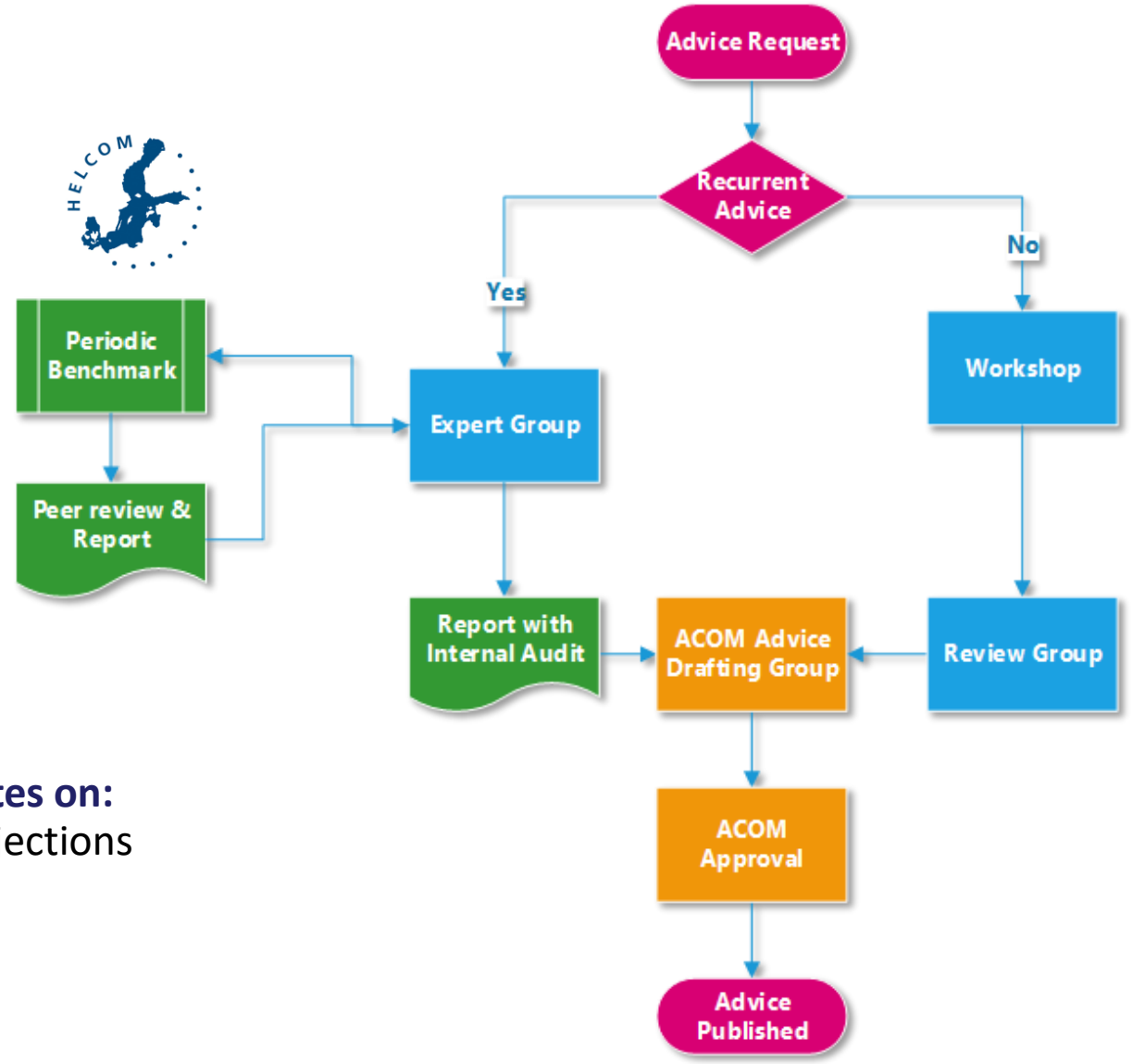
Recurrent advice is given on:

- fishing opportunities for ca. 250 stocks;
- ecosystem impacts of fishing activities;
- ecoregion specific Ecosystem and Fisheries Overviews

Clients determine catch options and format of advice

Special advice is requested from clients and member states on:

- methodological aspects of stock assessments and projections
- technical measures
- management plans and management strategies
- impact of fisheries;
- impacts of climate change etc.



Things to come?

From single species to ecosystem assessment and ecosystem based management

direct interactions ⟷ direct + indirect interactions

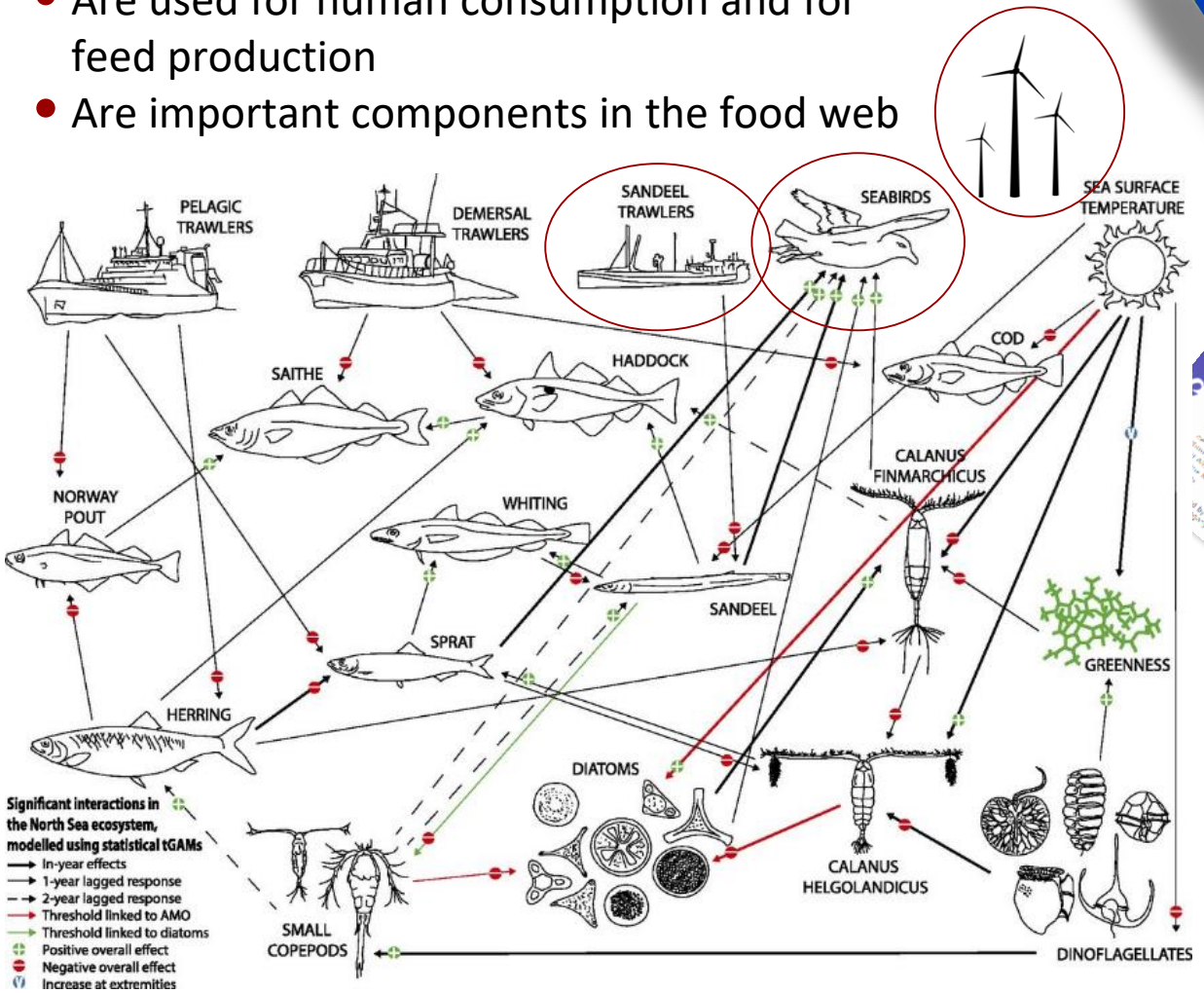
Thank you for your attention

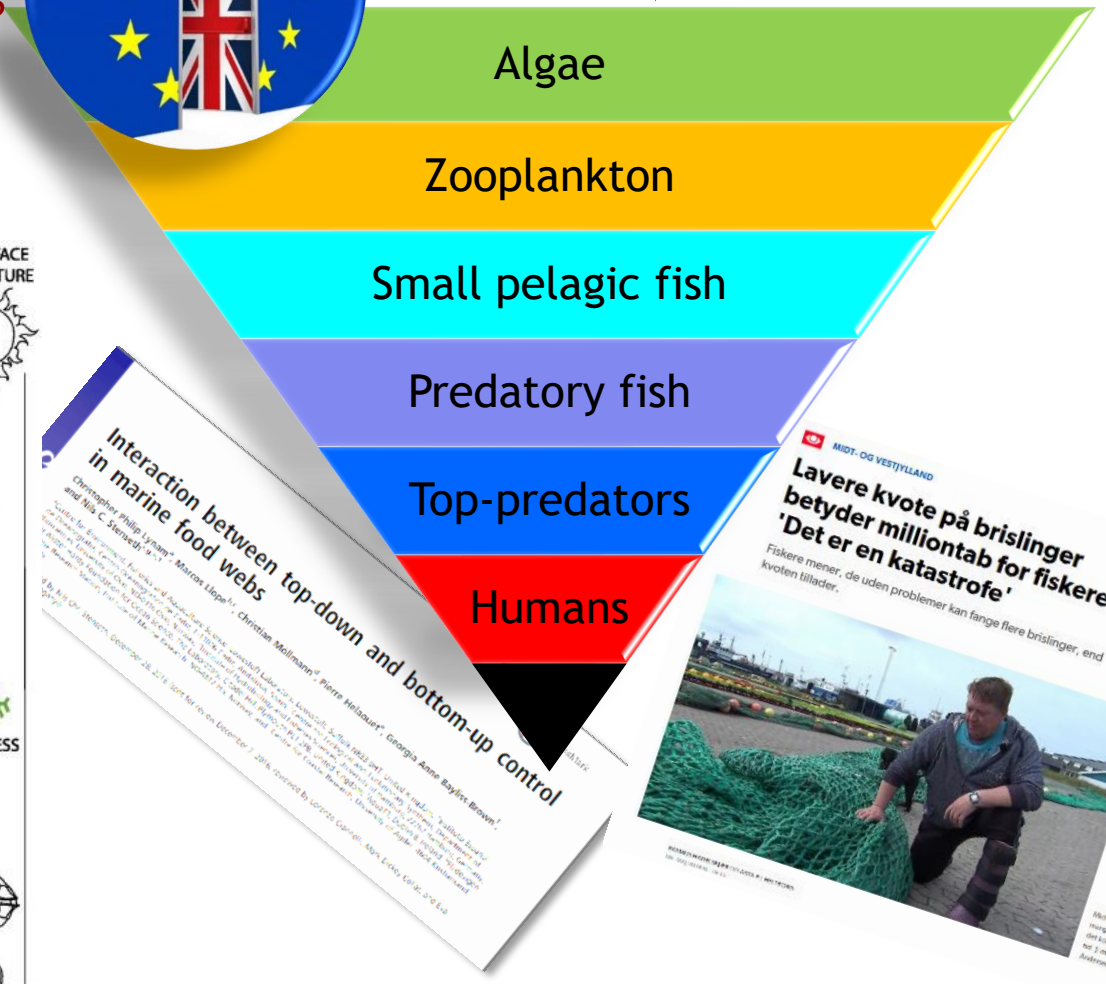
Ecosystem based management

Small pelagic fish

- Are used for human consumption and for feed production
- Are important components in the food web

Who is winning?





How to manage small pelagic fisheries in future?

Which criteria are used in recurrent advice?

Category	Stocks with
1	full quantitative analytical assessments & forecasts
2	analytical assessments & forecasts indicative of trends
3	survey-based assessments indicate of trends
4	only reliable catch data, which can be used to approximate MSY
5	only landings, for some stocks also MSY proxies
6	negligible landings or caught in minor amounts as bycatch

- Management plans require a category 1 or 2, for others precautionary approach with limit fishing and biomass reference points is used.
- If plan consistent with precautionary approach and accepted by all parties, advice is given accordingly, if a condition is not met, the MSY approach is used.
- If clients request, different catch options are given.