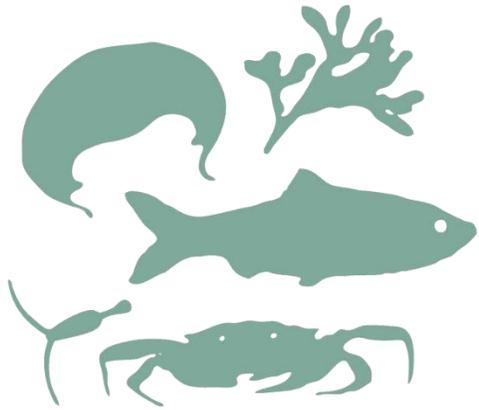


Science & Management 3:

ICES – Who Do They Think They Are?

International Council for the Exploration of the Sea (ICES)

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



Geographic scope

- 20 member countries
- Strategic partnerships globally

A global scientific community

- **5000** scientists from nearly **60** countries
- **1600** active experts annually in over **100** Expert Groups



ICES provides scientific advice on request to:



Helsinki Commission
Baltic Marine Environment Protection Commission



ICES Member Countries

Advisory deliverables

- **Catch advice for app. 250 stocks.**
- **Response to app. 30 special requests annually.**

Policy Objectives – fisheries management

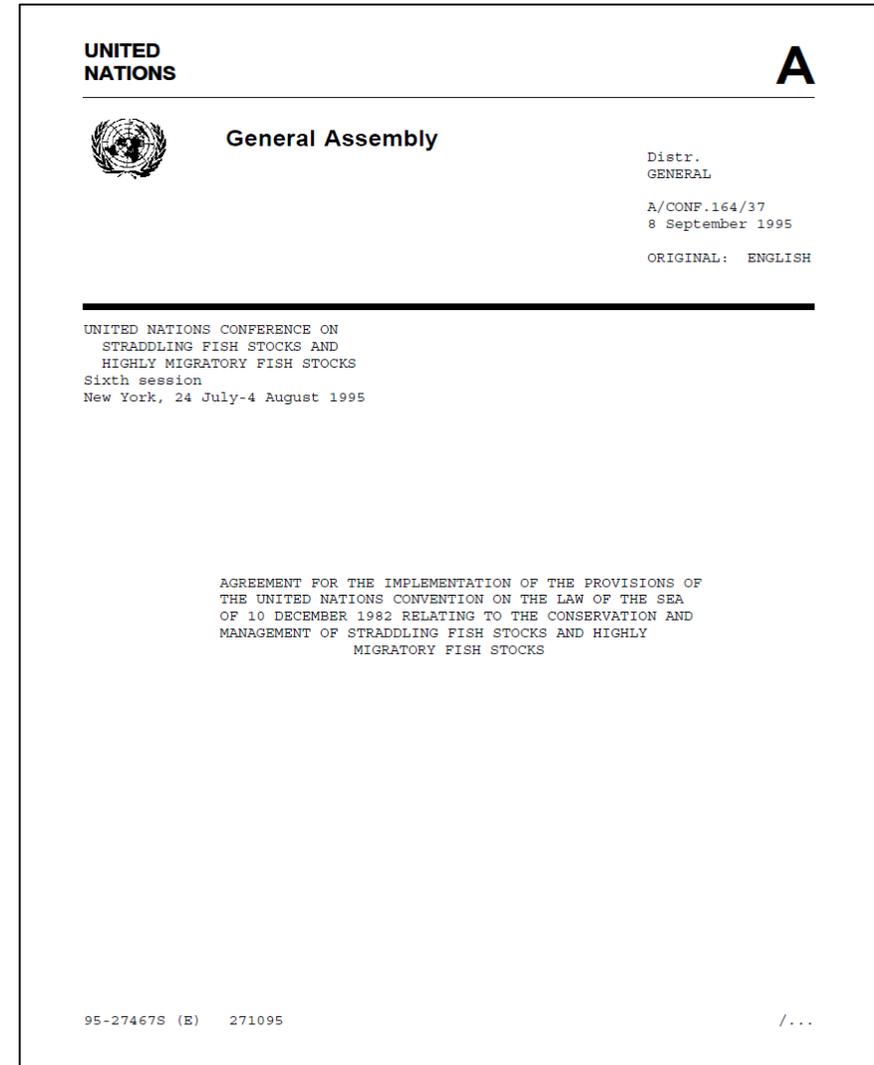
- **Precautionary approach (PA)**
- **Maximum sustainable yield (MSY)**
- **Ecosystem-based approach**

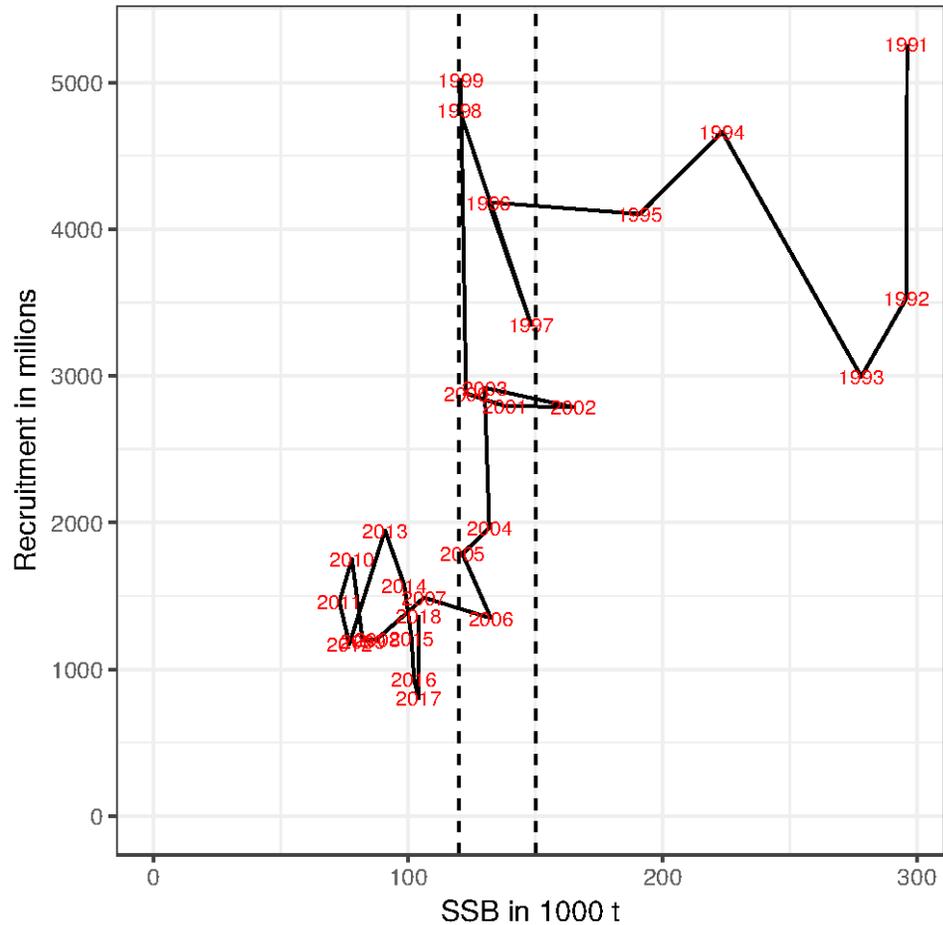
ICES Precautionary Approach

UN Straddling Fish Stocks Agreement

Reference points

- Conservation or limit, reference points - boundaries intended to constrain harvesting within safe biological limits.
- Management, or target, reference points - intended to meet management objectives.

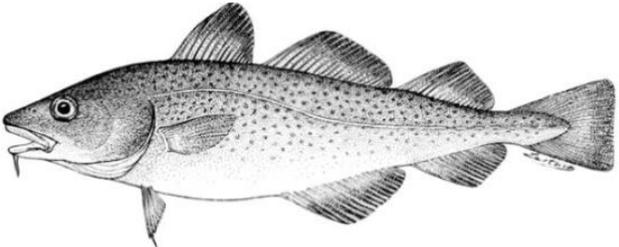




ICES Precautionary Approach aims at keeping a low risk that the spawning biomass may fall below a minimum limit Blim (the biomass limit reference point).

Blim is set based on historical data, such that below it, there is a high risk that recruitment will 'be impaired' (seriously decline).

Fishing mortality



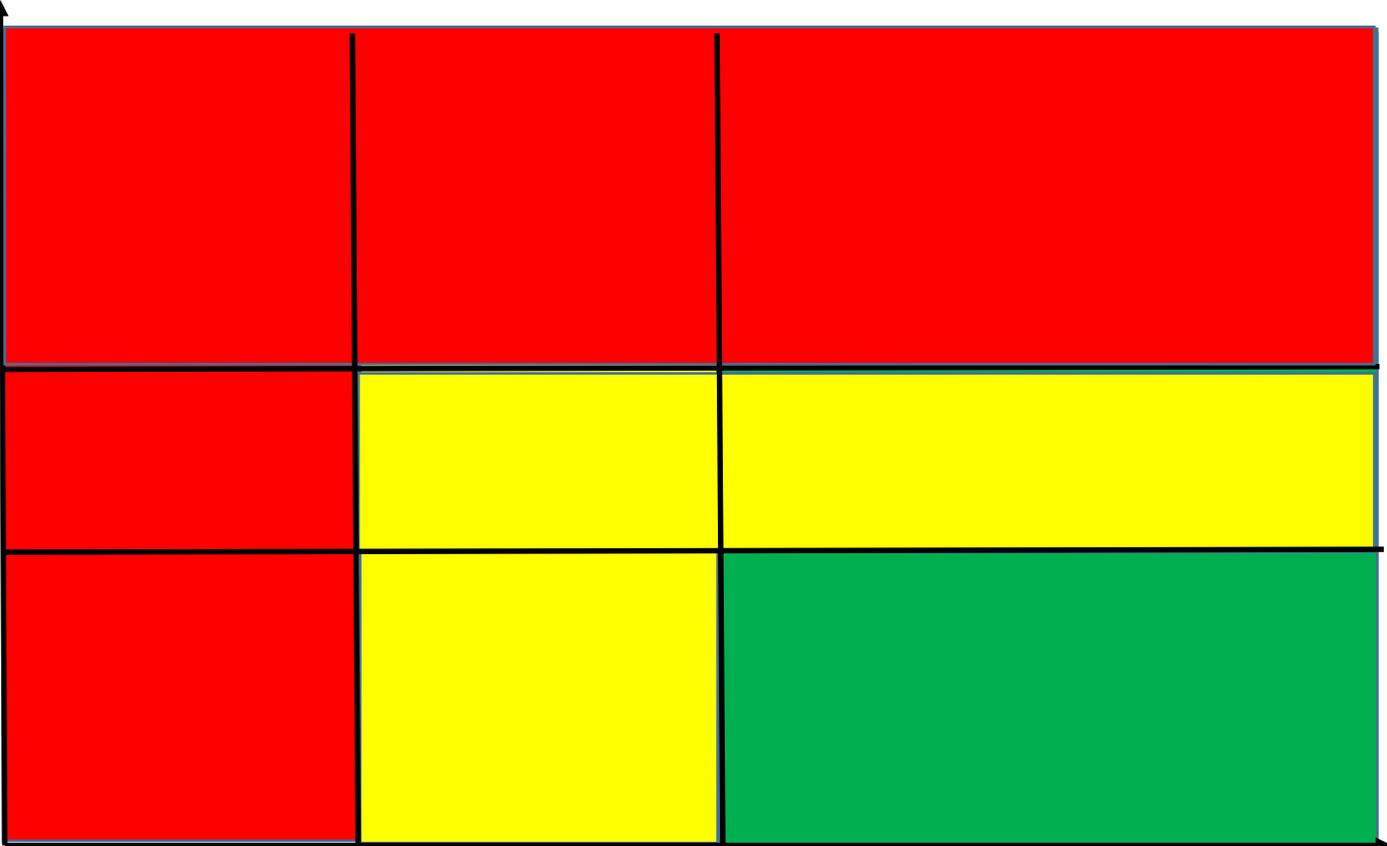
Flim

Fpa

Blim

Bpa

Stock size



ICES Precautionary Approach

Advice on fishing opportunities that maintain the stock above B_{pa} and result in a fishing mortality at or below F_{pa}

Policy Objectives – fisheries management

- **Precautionary approach (PA)**
- **Maximum sustainable yield (MSY)**
- **Ecosystem-based approach**

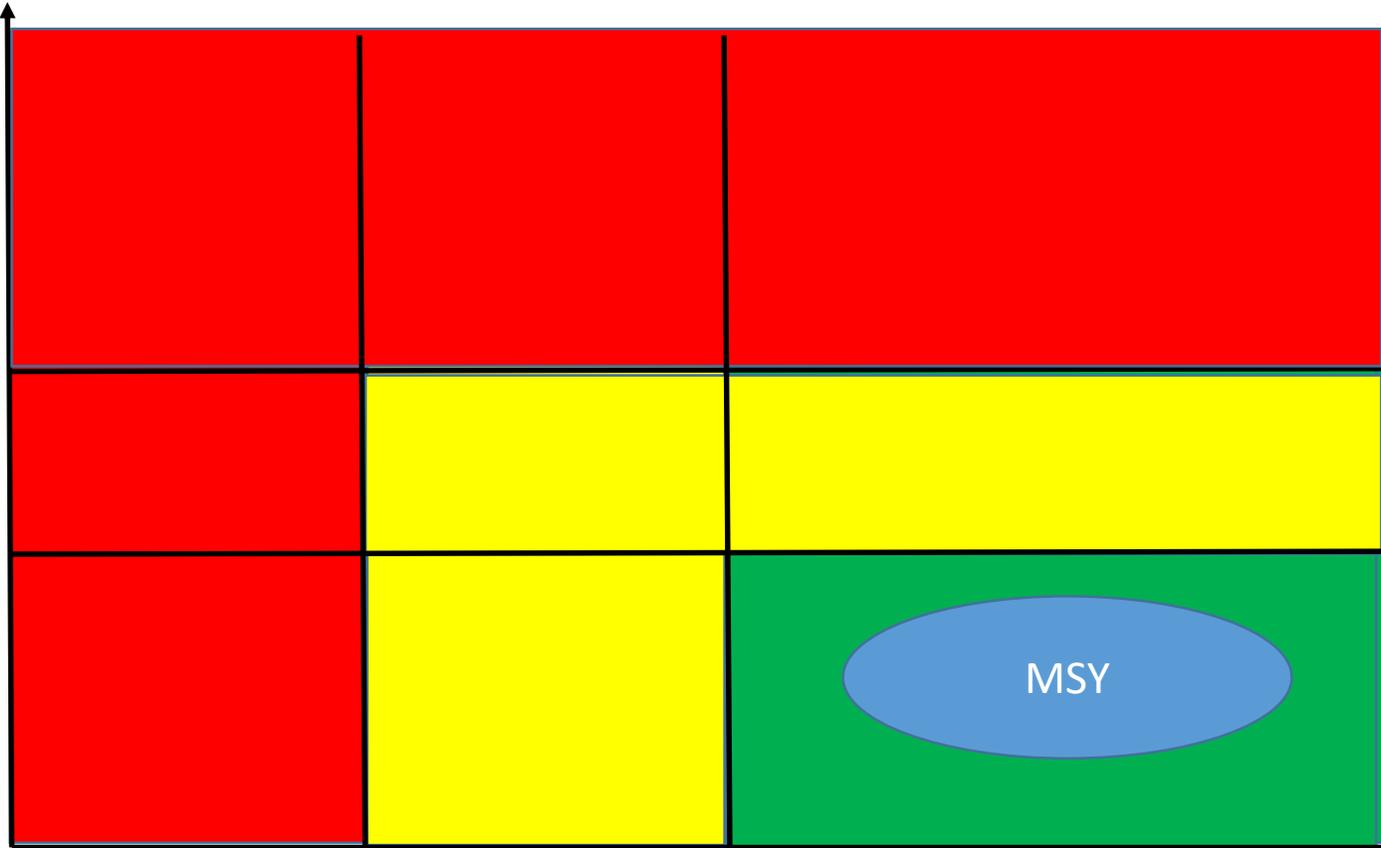
**ICES Maximum Sustainable Yield Approach
(MSY)**

MSY

Fishing mortality

Flim

Fpa



B_{lim}

B_{pa}

Stock size

Tasks:

Find the fishing mortality/harvest rate that gives maximum yield and is precautionary,

and

Ensure that SSB is maintained at levels which can produce the maximum sustainable yield

Tasks:

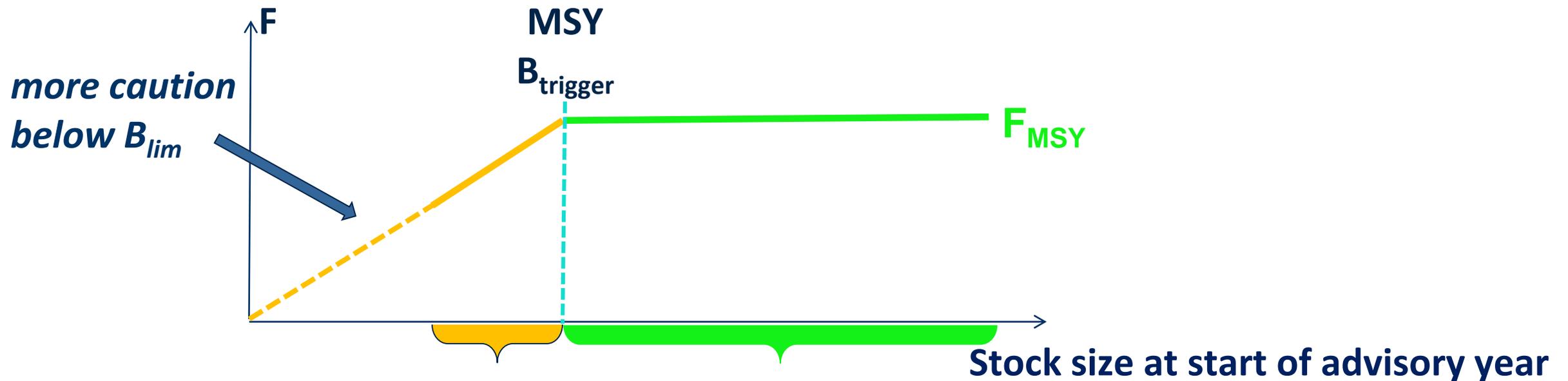
Find the fishing mortality/harvest rate that gives maximum yield and is precautionary, and

Ensure that SSB is maintained at levels which can produce the maximum sustainable yield

MSY Reference point	Purpose	Basis
F_{MSY}	The F expected to give maximum sustainable yield in the long term.	F is constrained so that the long-term probability of SSB < B_{lim} is $\leq 5\%$. Never set above F_{pa}
MSY $B_{trigger}$	A lower bound to the biomass for MSY exploitation.	MSY $B_{trigger}$ is the 5th percentile on the distribution of SSB when fishing at F_{MSY} , however never set below B_{pa}

ICES MSY approach - Advice on catch corresponding to the fishing mortality following from the advice rule

- ✓ Maximize long term average yield
- ✓ Safeguard against low SSB
- ✓ Stay within precautionary boundaries



F ranges

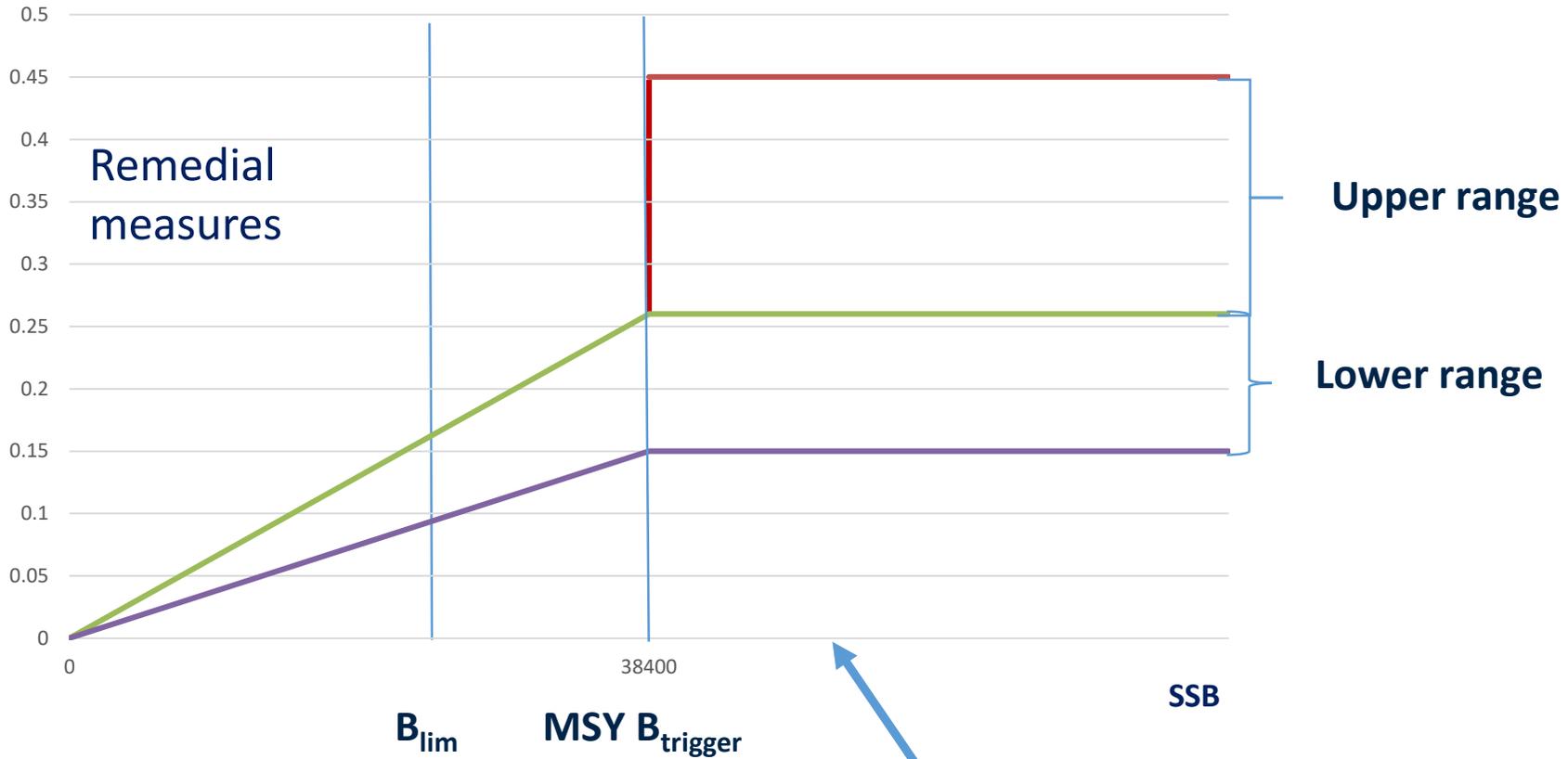
ICES has, on request from the EU, provided advice on plausible values around F_{MSY} (range for F_{MSY}).

The F_{MSY} ranges [Flower, Fupper] provided are derived to:

- deliver no more than a 5% reduction in long-term yield compared with MSY, and
- be consistent with the ICES precautionary approach by capping Fupper so that the probability of $SSB < Blim$ is no more than 5%.

EU Multiannual Plans.

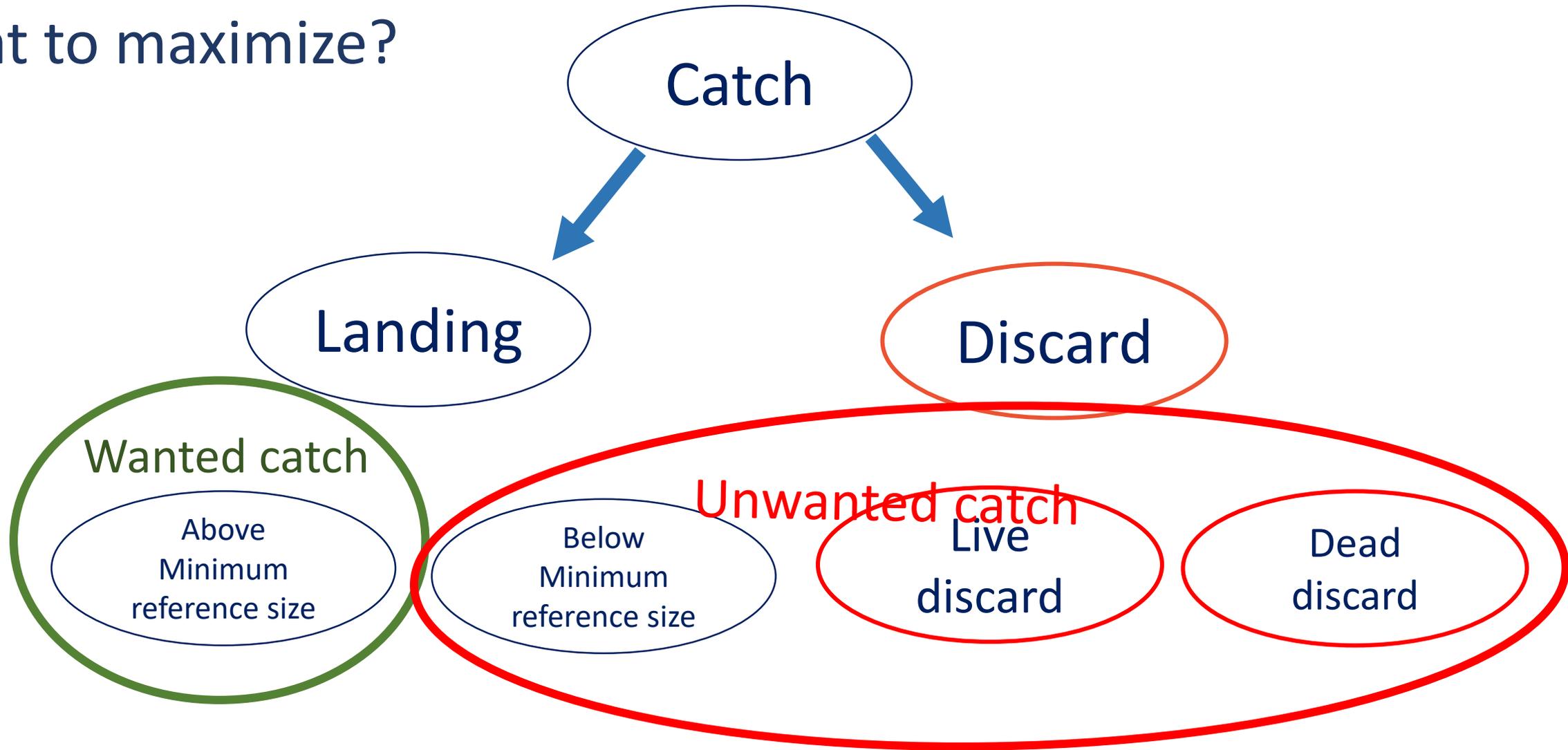
F_{target}

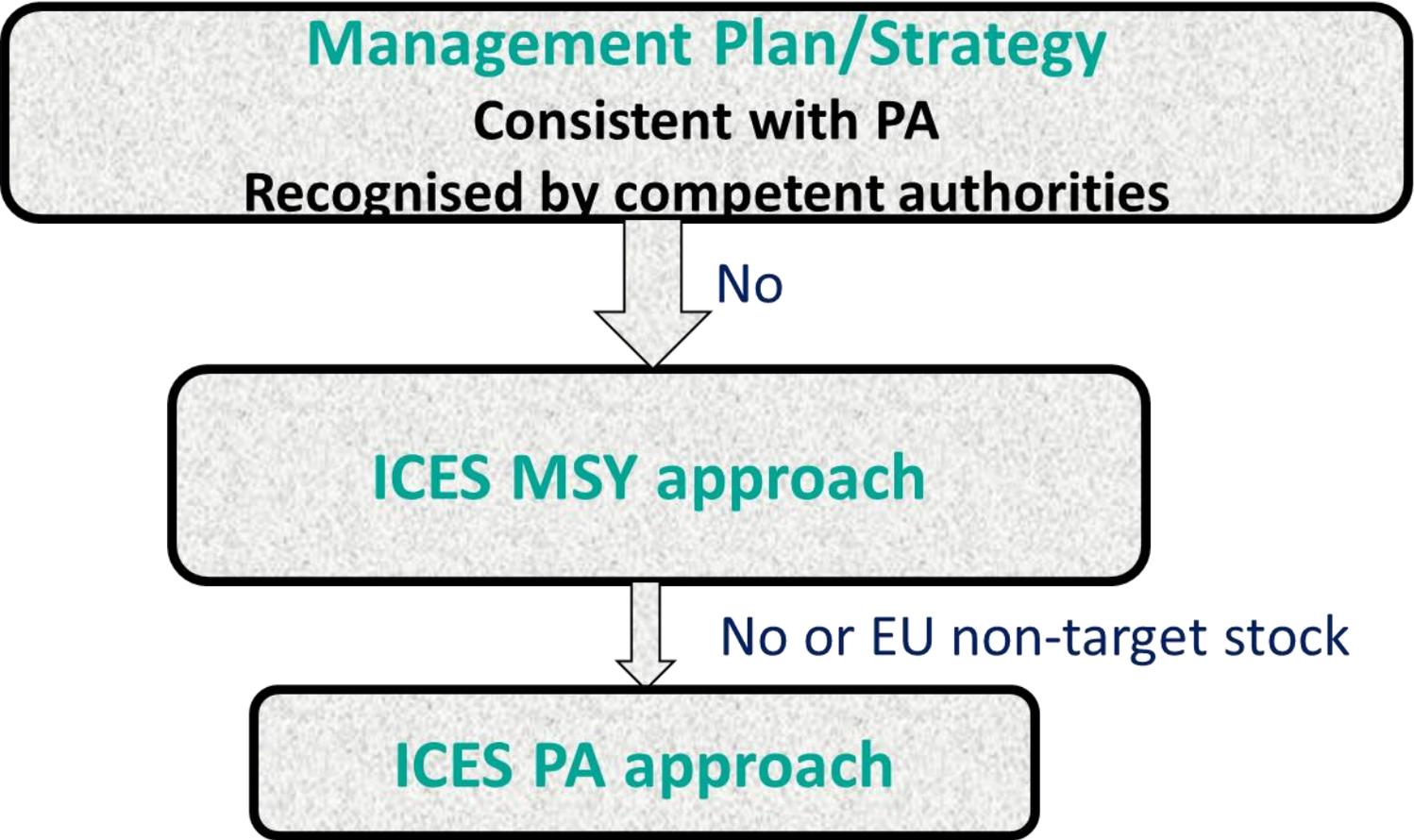


Western Baltic cod

SSB 2019

What to maximize?





Policy Objectives – fisheries management

- **Precautionary approach (PA)**
- **Maximum sustainable yield (MSY)**
- **Ecosystem-based approach**

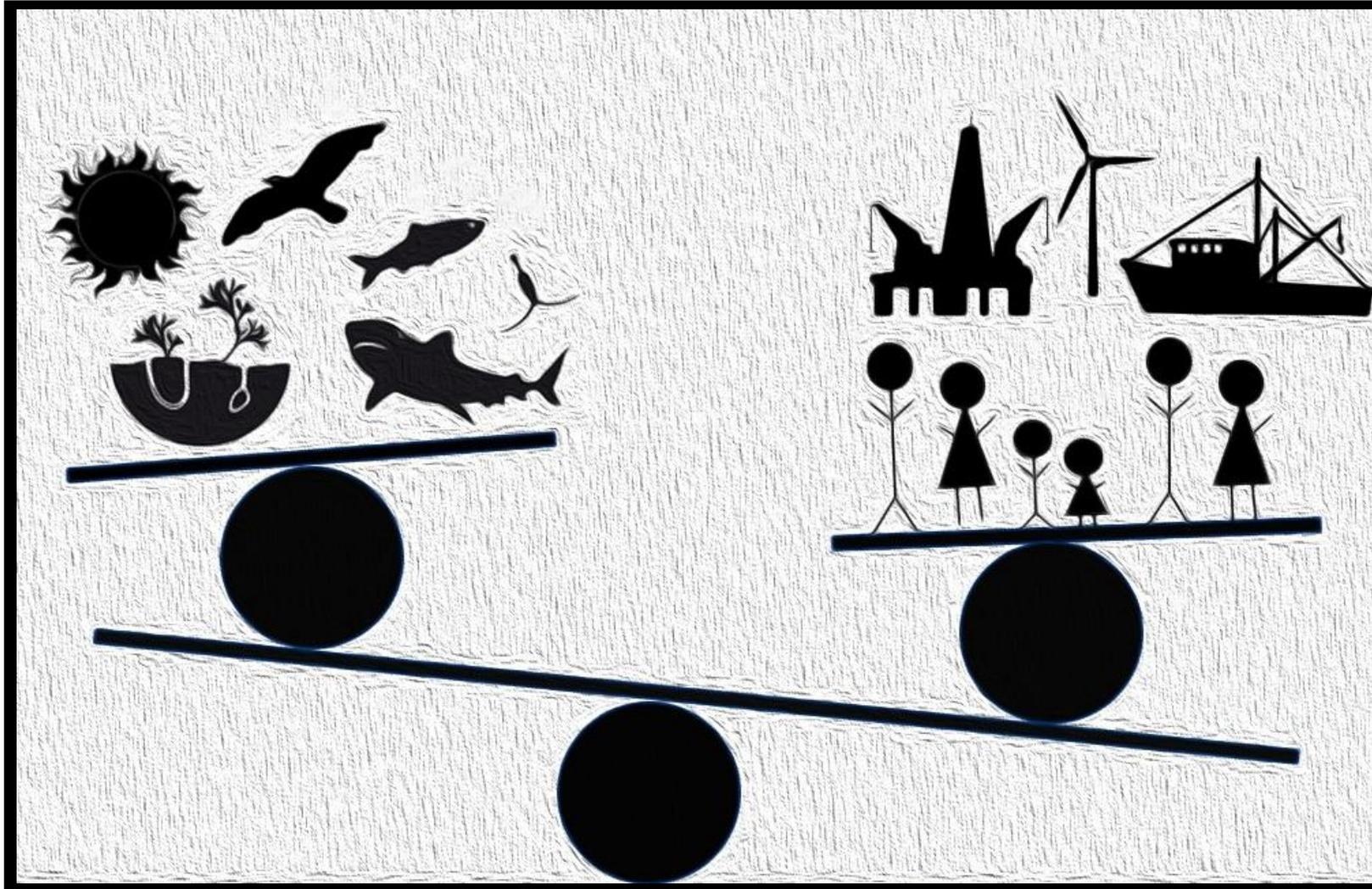
Ecosystem-based management

Ecosystem-based Management

ICES sees Ecosystem-based Management (EBM) as the primary way of managing human activities affecting marine ecosystems.

ICES role is to provide the evidence for ecosystem-based decision making for the management of fisheries and other sectors in the ICES area.

Knowledge for Pragmatic Ecosystem Based Management



Providing a robust, relevant, credible and legitimate knowledge base for EBM in the North Atlantic

CFP, MSFD, Habitats & Birds directives etc

ICES Advisory Process

Advice Quality – Fitness for purposes

Best available knowledge (data and science)

Quality assured

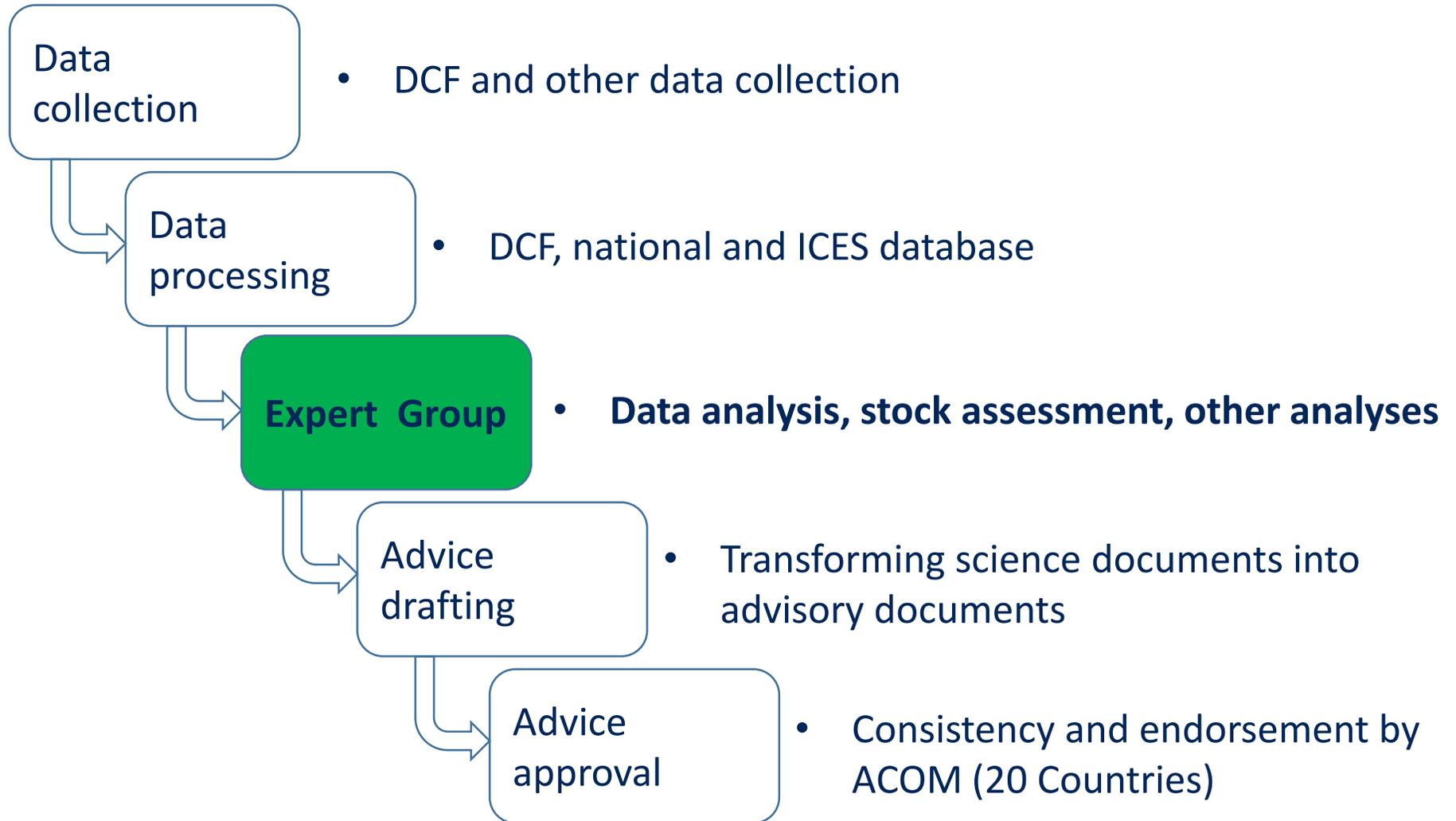
Transparent process: documented and open to observers

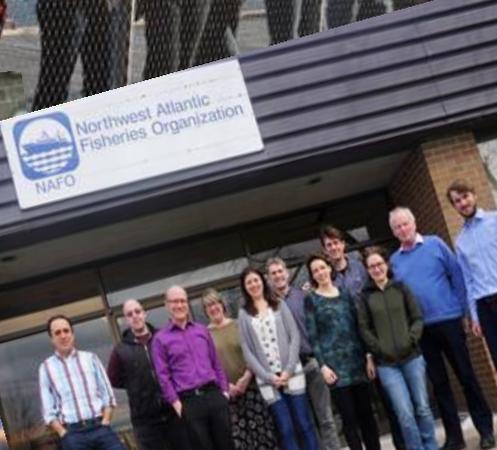
Unbiased and non-political: considered legitimate by governments and stakeholders

Relevant – meets the needs of the client

Timely

Advisory process: Roadmap

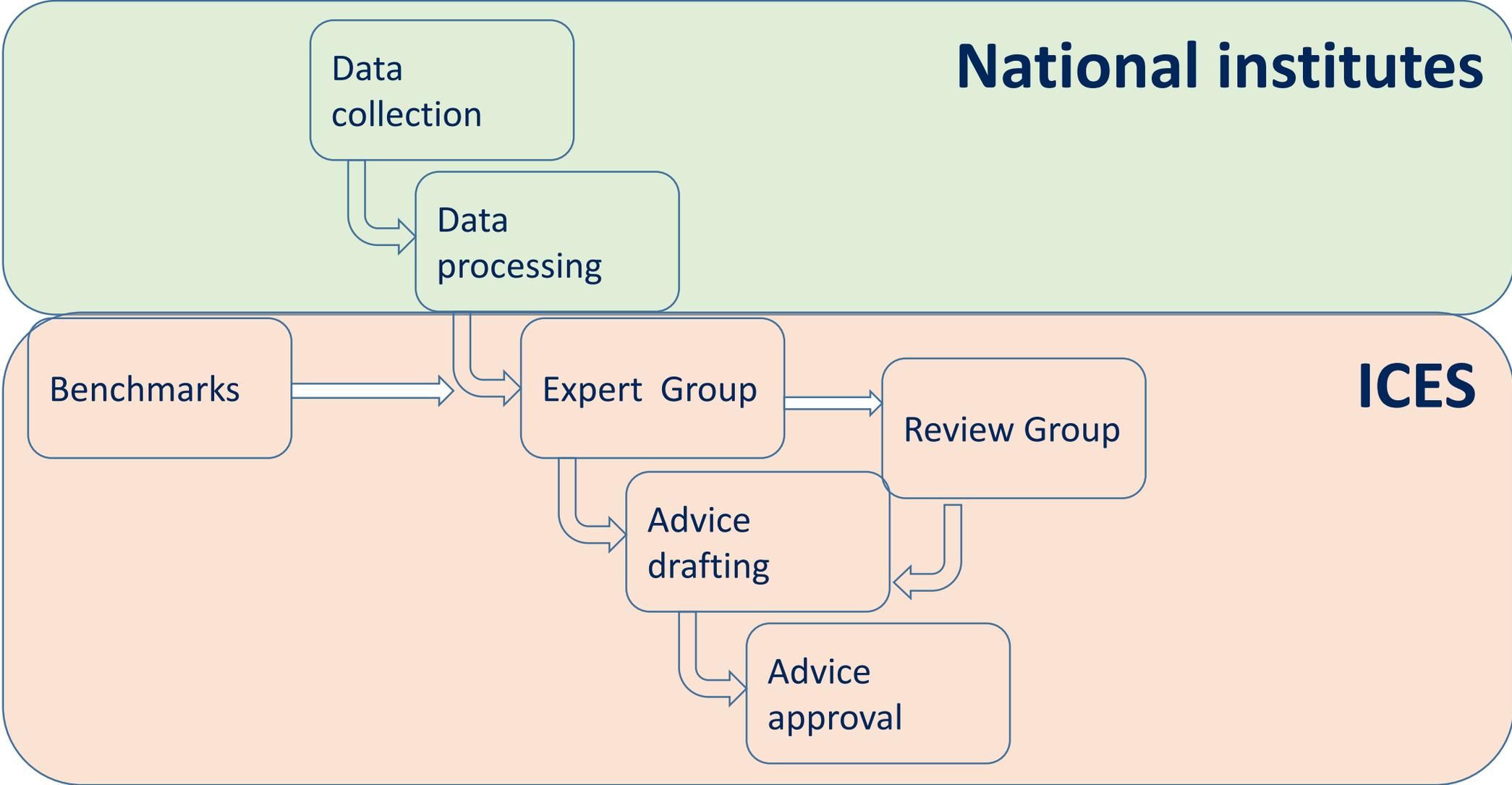




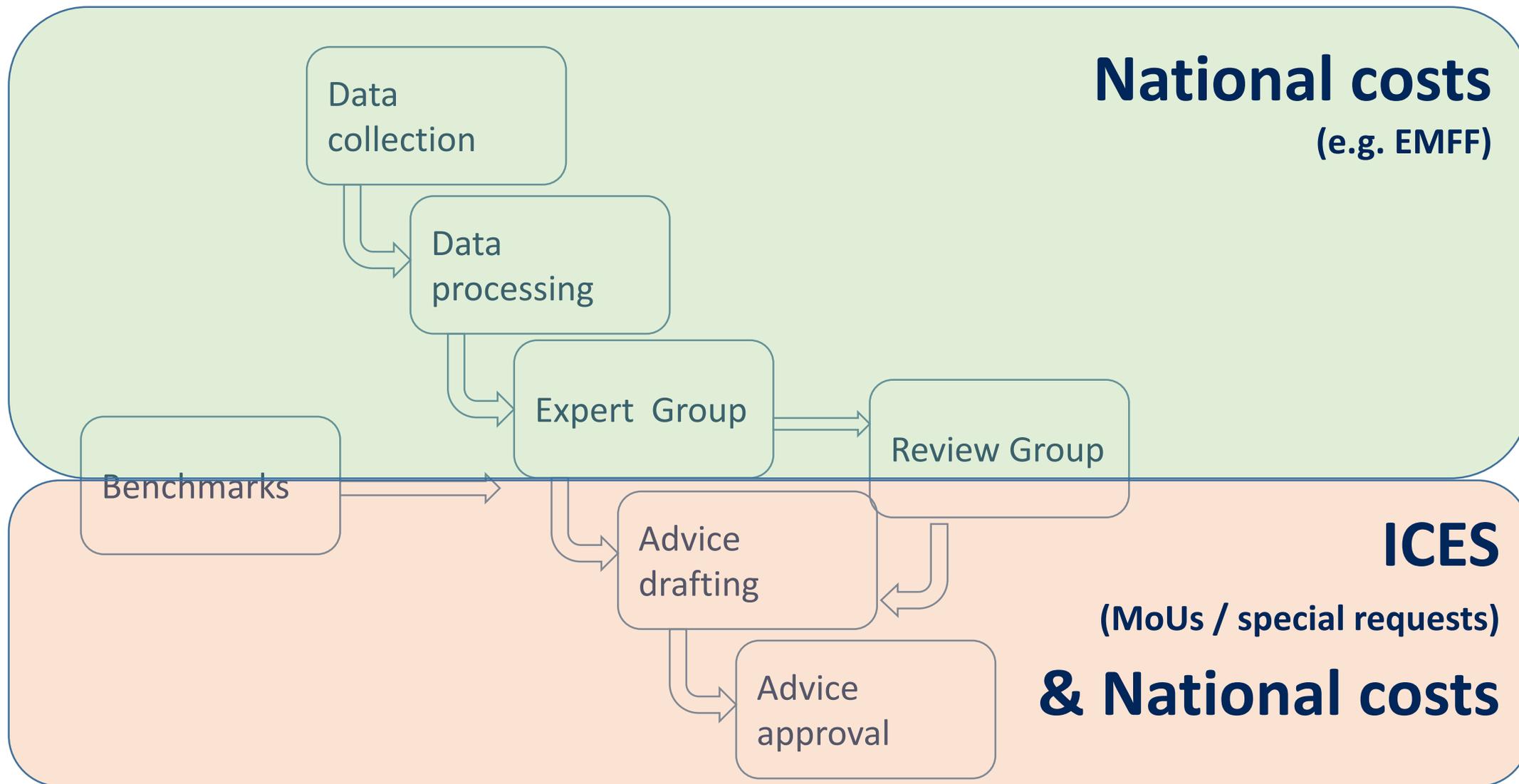
Advisory process: Roadmap



Advisory process: Responsibilities



Advisory process: Financing



Advisory process: Transparency



