



**MSFD / ICES advice**

**North Sea RAC EXCOM  
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# Ecosystem approach : Not EAF but EAMM

- **An ecosystem approach cannot be implemented through one sector policy**
- **Different sector policies must all contribute to a cross-sectoral ecosystem approach to marine management**
- **The issue is therefore not an ecosystem approach to fisheries (EAF) but the contribution of the fisheries policy to an ecosystem approach to marine management (EAMM)**
- **Benefits to fisheries as EAMM addresses the interaction both ways:**
  - **The impacts OF fisheries on marine ecosystems**
  - **The impact ON fisheries from other sectors – pollution, mineral extraction etc**

# Cross sector ecosystem approach -Marine Strategy FD

Transport EA

Fisheries EA

Energy EA

Agriculture EA

Etc EA

Cross sector integration and within-sector contributions are needed

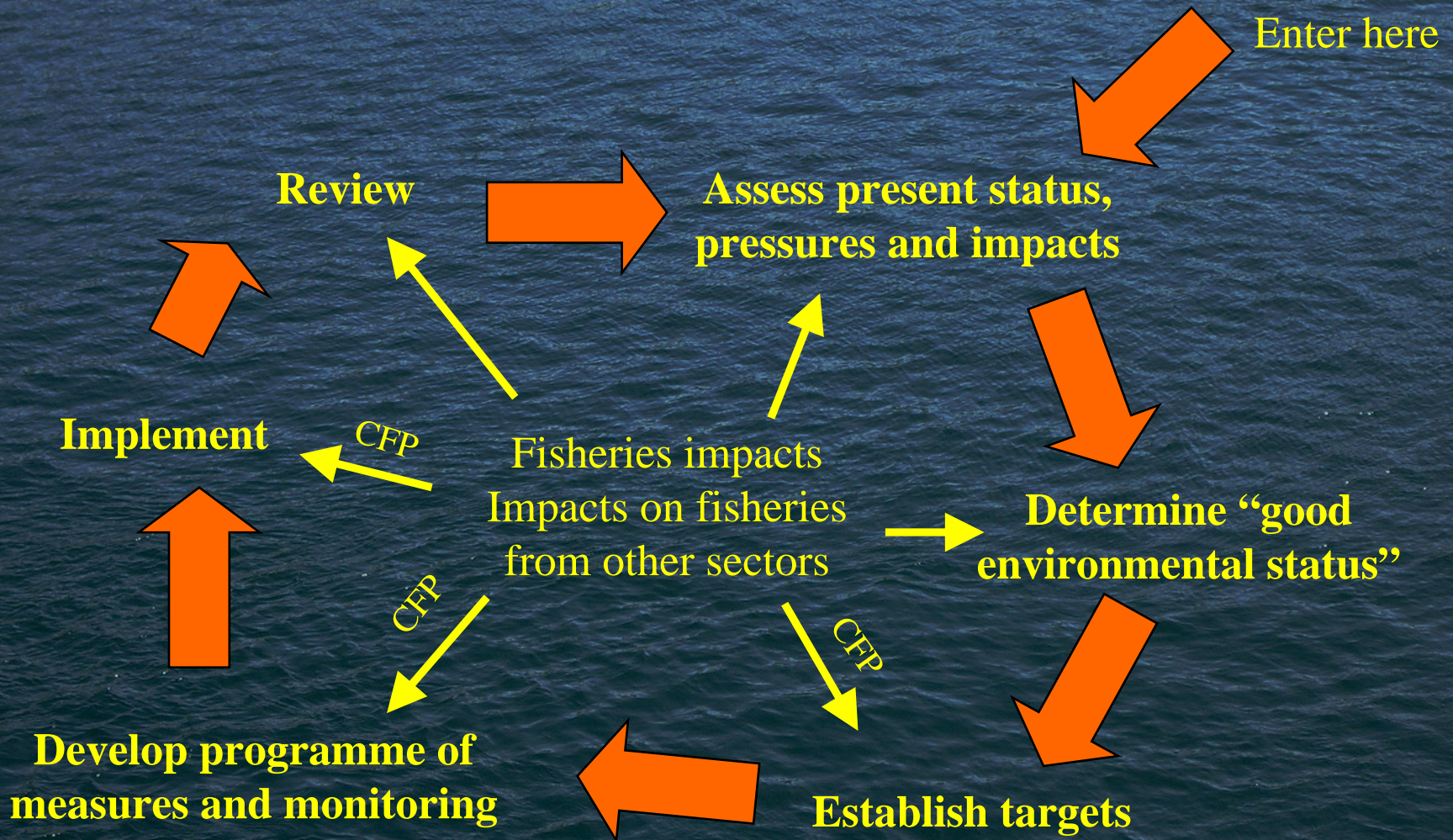
# Marine strategy objectives

- **Achieve or maintain good environmental status in the marine environment by the year 2020 at the latest**
- **"good environmental status":**
  - **Healthy ecosystems: ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions**
  - **Sustainable use: the use of the marine environment is at a level that is sustainable, safeguarding the potential for uses and activities by current and future generations**

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- **"good environmental status":**
  - **Healthy ecosystems: ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions**
  - **Sustainable use: the use of the marine environment is at a level that is sustainable, safeguarding the potential for uses and activities by current and future generations**
  - **Specifically fish stocks: populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock**

# Marine strategy implementation



# Protection of habitats – habitat directive

- **Natura 2000 – network of representative habitats**
- **CFP instruments to be used to help achieving objectives of each Natura 2000 area**

- (1) **Biological diversity** is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
- (2) **Non-indigenous species** introduced by human activities are at levels that do not adversely alter the ecosystems.
- (3) Populations of all **commercially exploited fish and shellfish** are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
- (4) All elements of the marine **food webs**, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive Capacity.
- (5) Human-induced **eutrophication** is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.
- (6) **Sea-floor integrity** is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.
- (7) Permanent alteration of **hydrographical conditions** does not adversely affect marine ecosystems.
- (8) Concentrations of **contaminants** are at levels not giving rise to pollution effects.
- (9) **Contaminants in fish and other seafood for human consumption** do not exceed levels established by Community legislation or other relevant standards.
- (10) Properties and quantities of **marine litter** do not cause harm to the coastal and marine environment.
- (11) Introduction of **energy, including underwater noise**, is at levels that do not adversely affect the marine environment.



# ICES- JRC Task Groups developing criteria and methodological standards for MSFD descriptors

JRC Scientific and Technical Reports

## MARINE STRATEGY FRAMEWORK DIRECTIVE Task Group 1 Report Biological diversity

APRIL 2010

S.K.J. Cochrane, D.W. Connor, P. Nilsson, I. Mitchell, J. Reker, J. Franco, V. Valavanis, S. Moncheva, J. Ekeboom, K. Nygaard, R. Serrão Santos, I. Naberhaus, T. Packeiser, W. van de Bund & A.C. Cardoso

Joint Report

Prepared under the Administrative Arrangement between JRC and DG ENV (no 31210 - 2009/2010), the Memorandum of Understanding between the European Commission and ICES managed by DG MARE, and JRC's own institutional funding

Editor: N. Zampoukas

EUR 24337 EN - 2010



JRC Scientific and Technical Reports

## MARINE STRATEGY FRAMEWORK DIRECTIVE Task Group 2 Report Non-indigenous species

APRIL 2010

Olenin, F. Alemany, A. C. Cardoso, S. Gollasch, P. Goulletquer, M. Lehtiniemi, McCollin, D. Minchin, L. Miossec, A. Occhipinti Ambrogi, H. Ojaveer, K. Rose Jensen, M. Stankiewicz, I. Wallentinus & B. Aleksandrov

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Available at ICES website

## Good Environmental status - important fisheries impacts

1. Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.
3. Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.
4. All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive Capacity.
6. Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

**Biological diversity is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.**

Level	Criteria to assess the descriptor	Indicators to be measured
<b>Species</b>	<b>Species distribution</b>  <b>Population size</b> <b>Population condition</b>	<b>Range</b> <b>Pattern</b> <b>Area</b> <b>Abundance and/or biomass</b> <b>Demographic characteristics</b> <b>Genetic structure</b>
<b>Habitat</b>	<b>Distribution</b>  <b>Extent</b> <b>Condition</b>	<b>Range</b> <b>Pattern</b> <b>Area (volume)</b> <b>Condition of typical species</b> <b>Relative abundance/biomass</b> <b>Physical, hydrological, chemical composition</b>
<b>Ecosystem</b>	<b>Ecosystem structure</b>	<b>Condition and relative proportion of habitats and species</b>

# Biodiversity – fisheries measures

**Biological diversity** is maintained. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions.

- **Rebuild populations of commercially exploited fish populations**
- **Reduce or eliminate by-catches of non-target fish species, seabirds and sea mammals**
- **”in line with prevailing conditions” ?????**

## 2 Non-indigenous species

**Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems**

**In some cases (aquaculture) managed separately on community level**

### 3. Commercially exploited fish and shellfish populations

Populations of all commercially exploited fish and shellfish are **within safe biological limits**, exhibiting a population age and size distribution that is indicative of a healthy stock.

# Changing concept of fisheries sustainability

- **From avoiding something bad**
  - **Precautionary approach – safe biological limits**
- **To avoiding something bad AND rebuild marine ecosystems**
  - **Maximum Sustainable Yield (MSY) with precaution about population sizes**

# Precautionary approach

**Do not reduce the population to  
a level where reproduction may  
be impaired**

**Safe Biological Limits**

# Maximum Sustainable Yield

- **Maintaining (or rebuilding) stocks at high productivity**
  - **Rebuilding marine ecosystems (from a state of overexploitation)**
  - **Delivering services to society (food and economic benefits)**

# Precautionary boundaries - MSY limits

- Precautionary approach: MSY limited by limit stock size
- Ecosystem approach: MSY limited by unacceptable ecosystem impacts (biodiversity, habitats, ecosystem health as described in MSFD criteria)

### 3. Commercially exploited fish and shellfish populations

Populations of all **commercially exploited fish and shellfish** are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.

Criteria	Indicators to be measured
Level of pressure of the fishing activity	Fishing mortality (F equal to or lower than $F_{MSY}$ ) If F not available: ratio catch/biomass
Reproductive capacity	Spawning stock biomass at or larger than $SSB_{MSY}$ (or biomass indices if not available)
Age and size composition	Proportion of fish larger than size of first maturity Mean maximum length across all species found in research vessel surveys 95% percentile of fish length distribution observed in research vessel surveys Secondary: size at first sexual maturity (genetic effects)

# Commercially exploited fish and shellfish populations – fisheries measures

Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.

- Reduce or maintain fishing mortality at or below  $F_{MSY}$  and stock size above precautionary limits
- By – management plans leading to  $F_{MSY}$  at the latest in 2015

# Biomass targets?

- **GES descriptor: Spawning stock biomass at or larger than  $SSB_{MSY}$  (or biomass indices if not available)**
- **Presently we have no estimates of  $SSB_{MSY}$** 
  - no historical data from low exploitation.
  - Straight projections give unrealistically high  $SSB_{MSY}$  estimates.
  - Species interactions and density dependence will kick in as stocks rebuild
- **$SSB_{MSY}$  is not a natural constant – dependent on ecosystem productivity and food web dynamics**
- **Possible solution:**
  - reduce and keep  $F$  at  $F_{MSY}$ , let stocks rebuild and vary with ecosystem changes
  - Take precautionary steps and reduce  $F$  at low stock size

# ICES MSY approach

- **After consultations with clients of ICES advice ICES developed approach for ICES advice to reach FMSY:**
- 
- **To reduce F to FMSY by 2015 in equal steps from 2010 (WSSD 2002)**
- **Take precautionary action by reduce F further at low stocks sizes**

All elements of the marine **food webs**, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive Capacity.

Criteria to assess the descriptor	Indicators to be measured
Productivity of key species or groups	Performance of key predator species (production/biomass)
Proportion of selected species at the top of food webs	Proportion of large fish
Abundance/distribution of key trophic groups/species	<p>Abundance of functionally important groups/species</p> <ul style="list-style-type: none"> <li>-Early warning indicators/fast turnover groups</li> <li>-Affected by human activities</li> <li>-Habitat defining</li> <li>-Top of food web</li> <li>-Migratory</li> <li>-Species tightly linked to species at other trophic level</li> </ul>

# Food webs – fisheries measures

All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive Capacity.

- **Avoid by-catches of non-target sealife**
- **Maintain minimum stock of fish low in food chain**
- **Ecosystem engineering - "balanced fishing" ????**
  - **Is there such a thing as "normal" abundance and diversity?**

**Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.**

## 6. Sea floor integrity

**Sea-floor integrity** is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

Criteria	Indicators to be measured
<p><b>Physical damage having regard to substrate characteristics</b></p>	<p><b>Type, abundance and areal extent of biogenic substrate</b></p> <p><b>Extent of seabed affected by human activities for different substrate types</b></p>
<p><b>Condition of benthic community</b></p>	<p><b>Presence of particularly sensitive or tolerant species</b></p> <p><b>Indexes assessing benthic community function and functionality (diversity, richness, proportion of opportunistic or sensitive species)</b></p> <p><b>Proportion of biomass or individuals in macrobenthos above some specified size</b></p> <p><b>Parameters describing characteristics of size spectrum of benthic community</b></p>

# Sea floor integrity – fisheries measures

**Sea-floor integrity** is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected.

- **Low-impact (low-contact) fishing gear**

**Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems.**

## 8 Concentrations of contaminants

**Concentrations of contaminants are at levels not giving rise to pollution effects.**

**Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards.**

**Properties and quantities of marine litter do not cause harm to the coastal and marine environment.**

**Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.**

# Measurement of indicators

Data are collected with research vessels, from commercial vessels, bouys and from satellites

Most comprehensive European data collection framework – Data Collection Framework Regulation to support CFP implementation

# Data



## Fisheries

- Discards and landings
- Effort in time and space

## Cruises with R/V

- Abundance of fish/shellfish species
- Population structure size/age
- Biological parameters
- Hydrography



# Data outputs

Abundance of fish and shellfish species

Size and age distributions

Spatial distributions

Hydrographic data

Indicators of fisheries impacts on marine ecosystems:

- Conservation status of fish species
- Proportion of large fish
- Mean maximum length of fishes
- Size at maturation of exploited fish species
- Distribution of fishing activities
- Aggregation of fishing activities
- Areas not impacted by mobile gears
- Discarding rates of commercially exploited species
- Fuel efficiency of fish capture

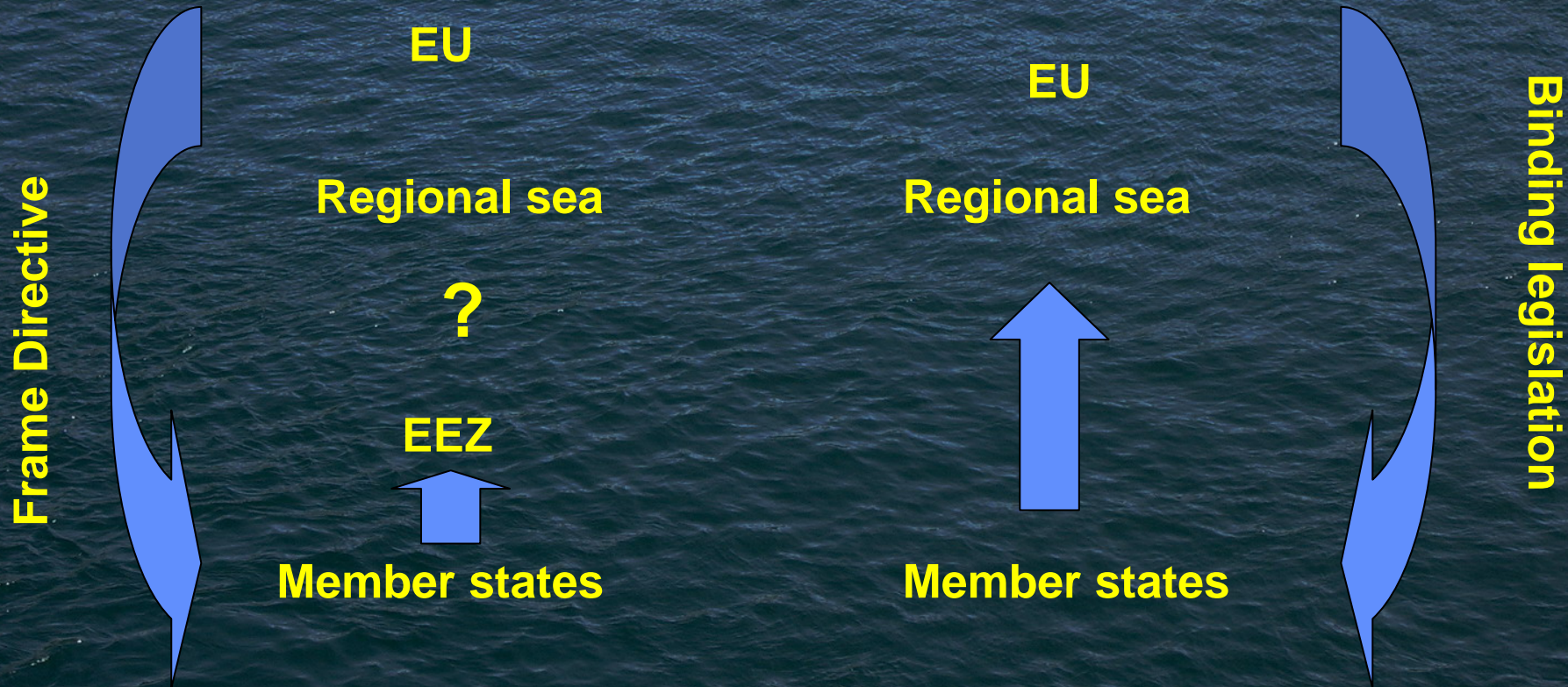
# Tensions of scale and competence

**Environment**

**Fisheries**

**MSFD, Habitats**

**CFP**



# Regional resolution

**Environment**

**Fisheries**

**MSFD, Habitats**

**CFP**

**EU**

**EU**

**Binding principles**

**Regional sea**

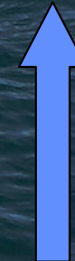
**Regional sea**

**EEZ**

**Regional MS coord.**

**Regional MS body**

**Frame Directive**



**Member states**

**Member states**

**Implementation plans**



# MSFD – CFP coherence?

**Environment**

**Fisheries**

**MSFD, Habitats**

**CFP**

**EU**

**EU**

**Binding principles**

**Regional sea**

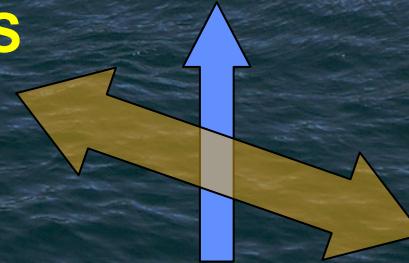
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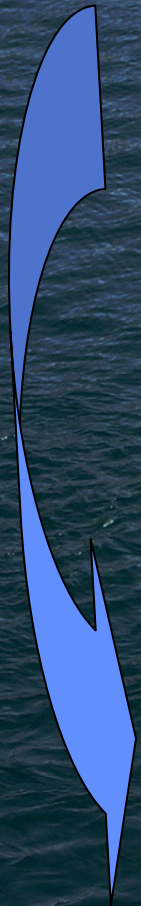
**Regional MS body**



**Member states**

**Member states**

**Implementation plans**



# MSFD timeline

- **MSFD 2008-06-17**
- **ICES – JRC task groups on descriptors – 2010**
- **COM decision on GES descriptors 2010-09-01**
- **MS to deliver 2012-07-15:**
  - **Assessments of environment and human impacts**
  - **Determination of GES**
  - **Environmental targets and indicators**
- **MS to deliver 2014-07-15: monitoring programmes**
- **MS by 2016 at the latest: programme of measures (developed in 2015 at latest)**
- **Achieve or maintain Good Environmental Status by 2020 at the latest**

# Approach and challenges

- **Keep it simple**
  - Focus on main overall fisheries impact – reduce overall fishing pressure to MSY within precautionary limits
  - Supplement where necessary with specific measures to protect biodiversity, food webs and bottom habitats
- **Develop regional cooperation to**
  - Develop and implement coherent approach to MSFD
  - Develop CFP implementation platform
  - Ensure that fisheries measures required to meet MSFD objectives are decided and implemented through the CFP
- **Based on best available science and data**
- **In dialogue across region between authorities and stakeholders**

