The EU Marine Strategy Framework Directive and ICES

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MSFD

Environmental pillar of Integrated Maritime Policy for Europe

• Published June 2008 (Directive 2008/56/EC)

• Overall goal - provide mechanisms for Member States to:

- achieve (or maintain) good environmental status (GES) across all European waters by 2020

• GES defined: "*the overall state of the environment in marine waters provides ecologically diverse and dynamic oceans and seas which are healthy and productive*"

MSFD

"*Use of the marine environment must be kept at a sustainable level that safeguards potential uses and activities by current and future generations. This means the structure, functions and processes of marine ecosystems have to be fully considered, marine species and habitats must be protected and human-induced decline of biodiversity prevented*"

- Aims to enable sustainable use of marine goods and services

    … by effectively managing human activities and pressures

    … through an ecosystem-based approach

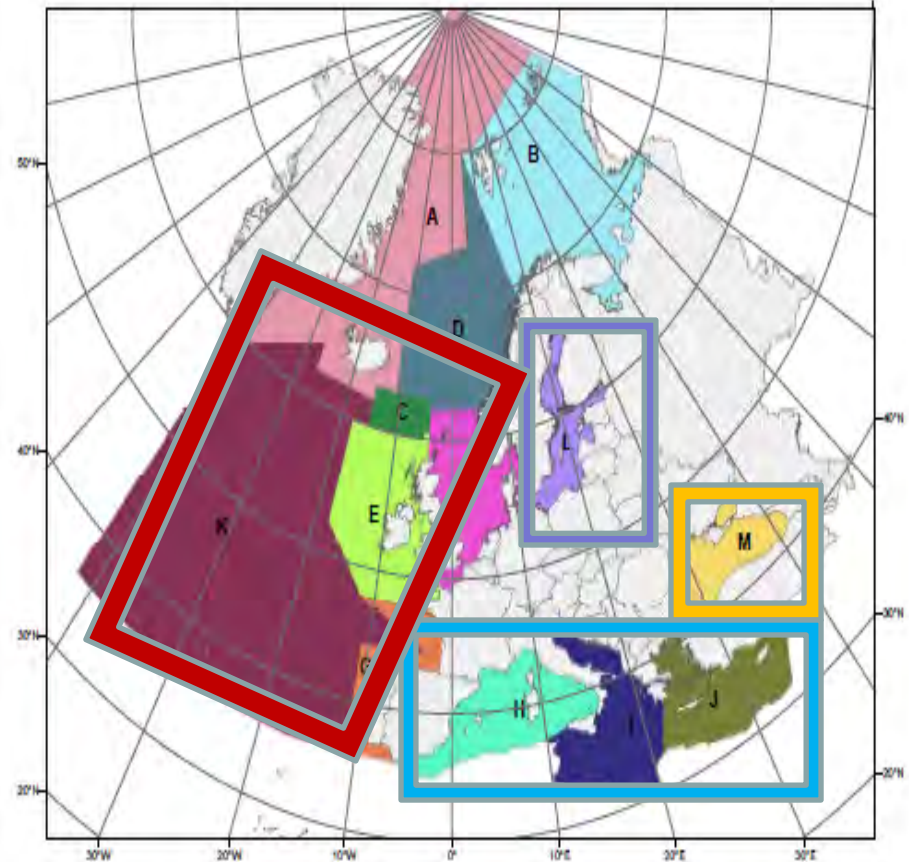- Specifically refers to conserving biodiversity

MSFD - Requirements

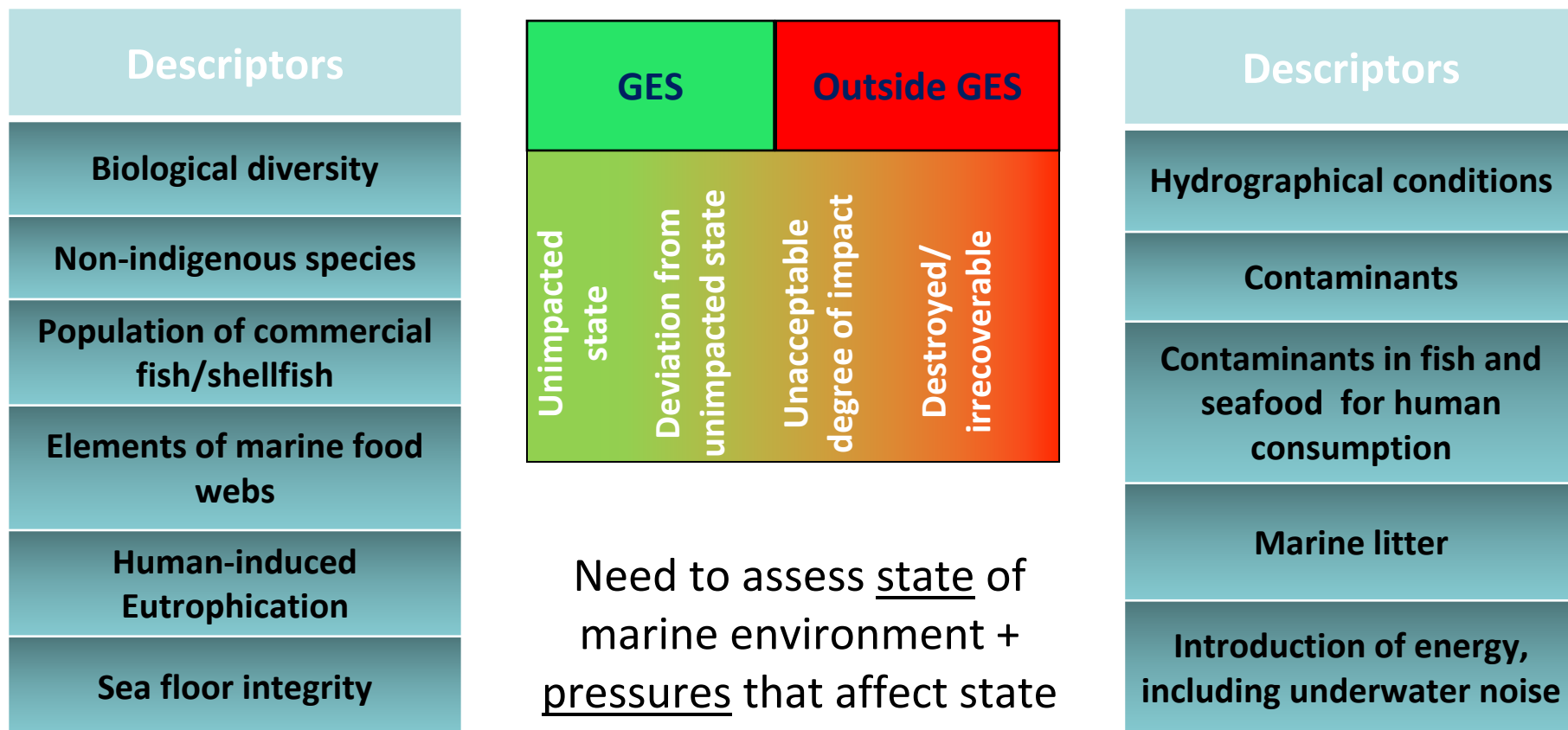Member States must develop and implement <u>Marine Strategies</u> to:

a) <u>protect and preserve</u> the marine environment: prevent environmental deterioration or, where practicable, restore adversely affected ecosystems;

b)   <u>prevent/reduce inputs</u> to marine environment, phase out pollution: ensure no significant impacts on/risks to marine biodiversity, ecosystems, human health or legitimate uses of the sea

Marine Regions

- Baltic Sea, NE Atlantic Ocean, Black Sea, Mediterranean Sea

- Member States (MS) required to cooperate with other MS + non-EU countries in a region

- In cooperation with existing Regional Seas Conventions (OSPAR, HELCOM, Barcelona and *Bucharest* Conventions)

www.helcom.fi   www.ospar.org

ICES
CIEM

Good Environmental Status

Descriptors

Biological diversity

Non-indigenous species

Population of commercial fish/shellfish

Elements of marine food webs

Human-induced Eutrophication

Sea floor integrity

GES	Outside GES

Unimpacted state | Deviation from unimpacted state | Unacceptable degree of impact | Destroyed/irrecoverable

Need to assess <u>state</u> of marine environment + <u>pressures</u> that affect state

Descriptors

Hydrographical conditions

Contaminants

Contaminants in fish and seafood for human consumption

Marine litter

Introduction of energy, including underwater noise

Descriptors need <u>indicators</u> to summarise information for management

Criteria for a 'good indicator' as defined by ICES (EcoQ)

- Easy to understand by managers and policy-makers
- Sensitive to a manageable human activity
- Relatively tightly linked in time to that activity
- Easily and accurately measured, with a low error rate
- Responsive specific to a human activity (low responsiveness to other causes of change)
- Ideally based on an existing body or time series of data to allow a realistic setting of objectives

D1- <u>Biological diversity is maintained</u>. Quality + occurrence of habitats and the distribution + abundance of species are in line with prevailing physiographic, geographic and climate conditions

L1- Species	L2- Habitats	L3- Ecosystems
C1- Distribution I1- Range I2-Pattern I3-Area covered **C2- Pop. size** I1- Abundance and/or biomass **C3- Pop. condition** I1- Demographic char. I2-Genetic structure	**C1- Distribution** I1- Range I2-Pattern **C2- Extent** I1- Area I2-Volume **C3- Condition** I1- Condition of typical spp I2-Rel. abundance and/or biomass I3-Physical, hydrological and chemical conditions	**C1- Structure** I1- Composition and relative proportions of ecosystem components (habitats and species)

www.ices.dk/projects/MSFD/TG1.pdf

Biodiversity

"variety, quantity and distribution of life, encompassing genetic, species and habitat (assemblage + ecosystem diversity)"

- 'Biodiversity' has many facets: we need <u>multiple metrics</u> to be developed for use as indicators, e.g. <u>species-specific, multi-species</u>

- Species-specific approaches include:

  - "threatened" &/or "declining" (e.g. HELCOM, OSPAR, IUCN, CITES, various national wildlife legislation).

  - "charismatic" and "flagship" species

Species Indicators: cetaceans (ICES WGMME)

- 1 pressure indicator currently in operation: fishery bycatch (most important anthropogenic impact on small cetaceans)

- 1 ecosystem structure and function indicator: bottlenose dolphin abundance and area usage in relation to SACs.

- Potential new pressure indicators: synthetic and non-synthetic pollutants, underwater noise, climate change (All require validation prior to implementation)

- Sampling requirements could be met by current monitoring (additional analytical work will be required)

- But needs better harmonisation and coordination at EU level

D1- Biodiversity (as proposed by ICES WKMARBIO)

Type	Class	Level / scale	Specification / type of property
State/ structure	Diversity	Community	Structure
	Diversity	Community	Functional diversity
	Population	Species or stock	Size, Range, Composition
	Population	PET, invasive, charismatic, highly migratory, bioengineers, forage species	Size, Range, Composition
	Genetic Diversity	Species (other levels in specific cases)	Structure
	Habitat	Multiple scales	Size, Range, Composition
	Habitat	Multiple scales	Usage – population / community use of available habitat
	Habitat	Multiple scales	Proportion of suitable conditions where habitat is present
	Habitat	Species/ Community	Patchiness and connectivity
State/ Function	Strategic	Community/ Ecosystem	Marine trophic index (MTI), other trophic indicators from models or community data
	Strategic	Community/ Ecosystem	Ratios of functional groups
	Strategic	Community/ Ecosystem	Flow/length of food chain, etc
	Strategic	Community, ecosystem (Population)	Resilience
Pressure	Magnitude/ extent of activity; trend	Multiple scales/ Ecosystem	Inherently pressure-specific
	Accumulated effects	Species/ Community	Pollution, contamination
	Environmental forcing	Community/ Ecosystem	Physical and chemical variables; community abundance of characteristic species / groups

D3- Population sizes of commercial fish/shellfish within safe biological limits, age / size distribution consistent with healthy stock

C1- Level of pressure	C2- Stock reproductive capacity	C3- Pop. age + size distribution
I1- Fishing mortality ($F \leq F_{MSY}$) I2-Catch/Biomass ratio	I1- SSB > SSB_{MSY} or SSB_{PA} I2-Biomass indexes	I1- Proportion of fish larger than mean size of first sexual maturation I2- Mean maximum length across all species found in research vessel surveys I3- 95 percentile of fish length distribution observed in research vessel surveys I4- Size at first sexual maturation

www.ices.dk/projects/MSFD/TG3.pdf

Commercial fish/shellfish

- Goal: adjust or maintain $F \leq F_{MSY}$ and SSB > precautionary limits

- Achievement facilitated because Member States have already subscribed to MSY target by 2015 (under reform of the Common Fisheries Policy)

- But fishing mortality 2-3 times F_{MSY} for many EU stocks

- Presently we have no estimates of SSB_{MSY}

- SSB_{MSY} is not a constant – dependent on ecosystem productivity and food web dynamics ($\rightarrow$ focus on F)

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D4- <u>All elements of marine food webs occur at normal abundance + diversity,</u> at levels capable of ensuring the long-term abundance + full reproductive capacity

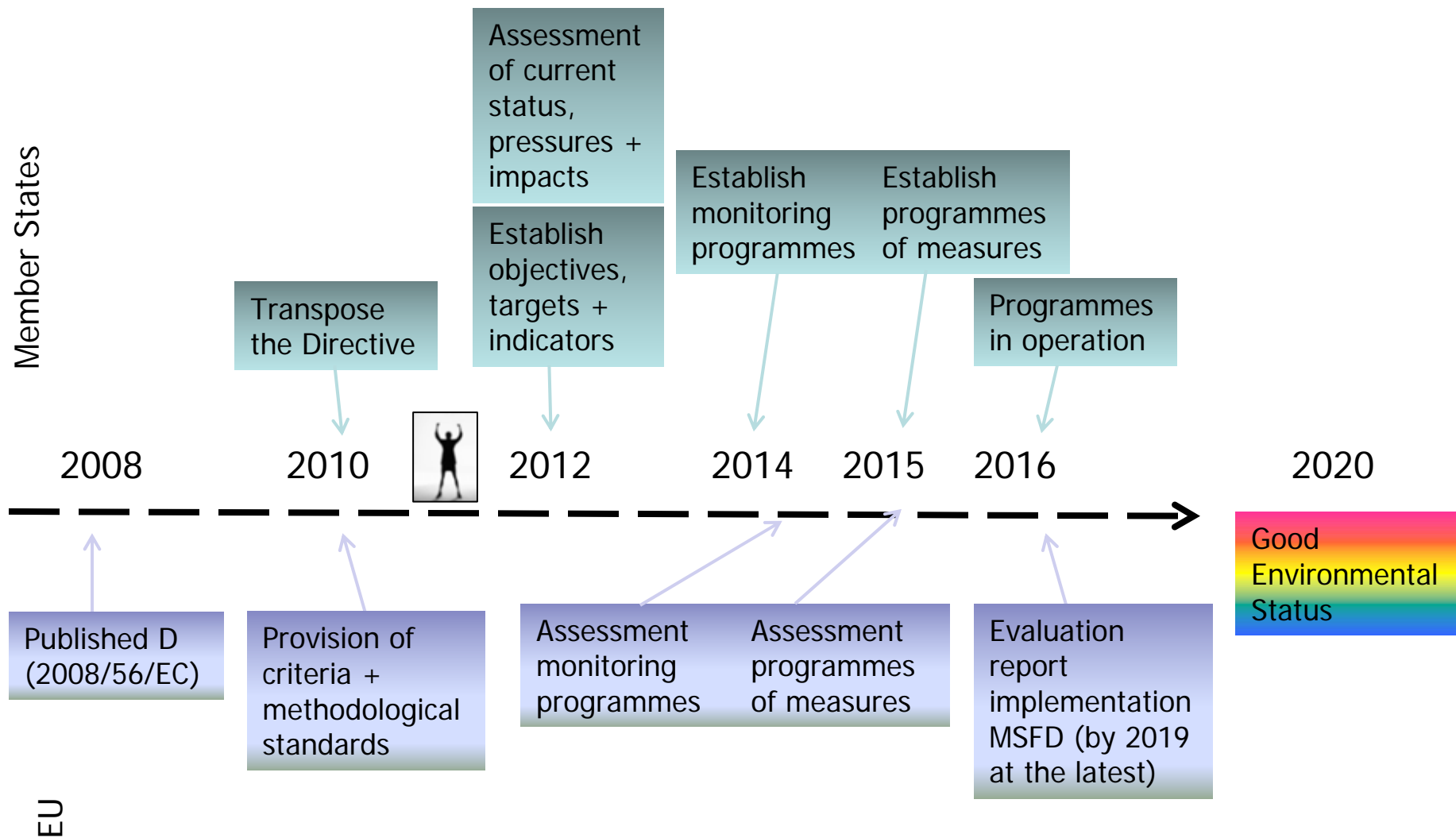| C1- Productivity of key species or trophic groups	C2- Proportion of selected species at the top of food webs	C3- Abund/distribution key trophic groups/spp
I1- Performance of key predator species (production per unit biomass)	I1- Large fish (by weight)	I1- Abundance trends of functionally important I2- Fast turnover rate (early warning indicators) I3- Affected by human activities I4- Habitat-defining I5- Top of the food web I6- Long-distance migrating I7- Tightly linked to groups /spp at other trophic level

www.ices.dk/projects/MSFD/TG4.pdf

MSFD Implementation

Member States

Assessment of current status, pressures + impacts

Establish objectives, targets + indicators

Transpose the Directive

Establish monitoring programmes

Establish programmes of measures

Programmes in operation

2008   2010   2012   2014   2015   2016   2020

Published D (2008/56/EC)

Provision of criteria + methodological standards

Assessment monitoring programmes

Assessment programmes of measures

Evaluation report implementation MSFD (by 2019 at the latest)

Good Environmental Status

EU

2012- Member States: Initial Assessment

Characteristics
Physical and chemical features
Habitat types
Biological features
Other features (e.g. chemicals and specific characteristics)

- Analysis of essential features + characteristics

- Current environmental status

- Analysis of pressures + impacts

- Economic + social analysis

- Definition of environmental targets + associated indicators

Pressures + impacts
Physical loss
Physical damage
Other physical disturbance
Interference with hydrological processes
Contamination by hazardous substances
Systematic and/or intentional release of substances
Nutrient and organic matter enrichment

The big challenges: short-term

- MS are producing (independently) a wide range of Indicators + Reference Points at national/regional scales, based on existing, often limited, data

- Available national data / monitoring influence selection of indicators and GES targets (lack of data and high cost of initiating new data series limits choice of new indicators)

- Some criteria + indicators fully developed and operational but others require further refinement

The big challenges: long-term

- Need consistency in
  - criteria + methodological standards for selection of indicators
  - way in which MS are interpreting them
  - GES targets + reference points

- Need to understand activity-pressure-state relationships

- Need to consider
  - Reducing anthropogenic pressures
  - Linking of targets and indicators to management instruments
  - Implementing management recommendations, e.g. through co-management measures

ICES role

- <u>EC JRC – ICES Task Groups</u> developed criteria & methodological standards for the 11 GES descriptors

- <u>Ensure continued capability</u> to support reliable data collection

- Provide <u>expert guidance</u> to MS on best practice, e.g. through relevant Expert Groups, Best Practice documents, etc

- Evaluate new methods/technologies as they become available

- <u>Quality Assurance</u> throughout the process: choice of data, indicator species, composite indicators of ecosystem status + trends, analytical methods to consolidate indicators

Acknowledgements

- ICES and its Expert Groups

Thanks!

Marine Ecosystem Indicators in Europe 1