



MSFD Initial Assessment: setting the baseline for GES

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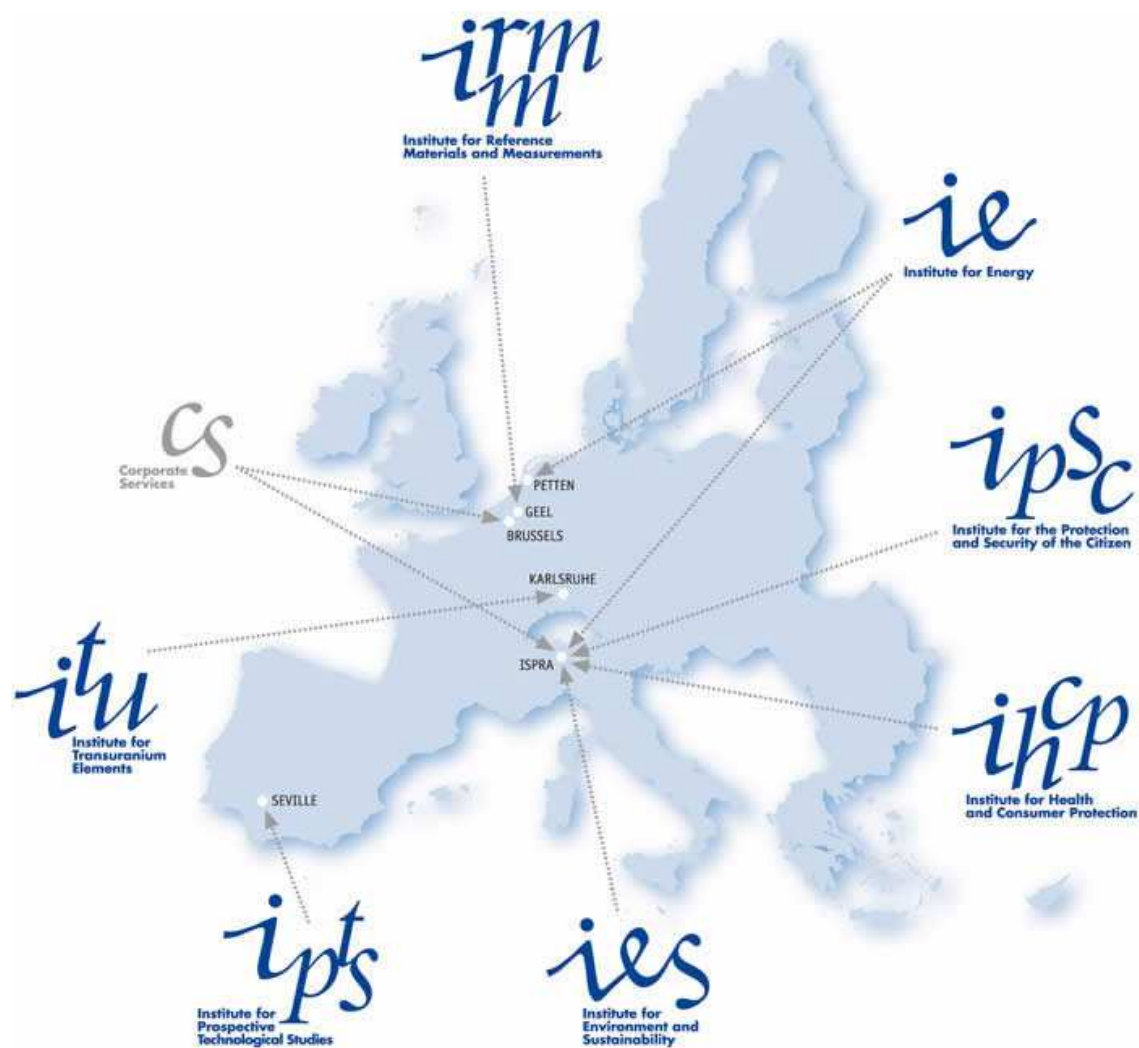


Mission of the JRC

"As the **Commission's in-house science service**, the Joint Research Centre's mission is to **provide EU policies with independent, evidence-based scientific and technical support** throughout the whole policy cycle. Working in **close cooperation with policy Directorates-General**, the JRC addresses key societal challenges while stimulating innovation through developing **new methods, tools and standards**, and sharing its know-how with the Member States, the scientific community and international partners."



European
Commission





JRC-Institute for Environment-Water Resources Unit

Since 2003 is coordinating IC for the **WFD**:

- 2009: 3 Technical reports related to the 1st IC Com Decision
- 2012-13: 3 Technical reports related to the 2nd IC Com Decision

Support to the **MSFD**:

- 2010: 10 Task Group & 1 Management Group Report – COM Decision on Criteria & Indicators
- C-chairing the TSG on Litter

Contents of the lecture

- Aims and concepts of the Initial Assessment
- Role in the MSFD implementation cycle
- Availability of data & methods for assessment
- Highlight best practices, particularly the more relevant for the Mediterranean and the Black Sea
- Gaps and open issues

Legal basis

MSFD **Article 8:**

1. In respect of **each marine region or subregion**, Member States shall make an **initial assessment** of their marine waters, taking account of **existing data** where available and comprising the following:

Regions and sub-regions

Regions	Subregions
Black Sea	
Baltic Sea	
North-East Atlantic Ocean:	
	North Sea
	Celtic Sea
	Bay of Biscay and the Iberian Coast
	Macaronesian region
Mediterranean Sea:	
	Western Mediterranean
	Adriatic Sea
	Ionian Sea and the Central Mediterranean
	Aegean-Levantine Sea.

Legal basis

(a) an analysis of the essential **features** and **characteristics**, and **current environmental status** of those waters, based on the indicative lists of elements set out in Table 1 of Annex III, and covering the physical and chemical features, the habitat types, the biological features and the hydro-morphology;

Physicochemical features

Topography and bathymetry of seabed
Sea surface & near-bottom temperature (annual and seasonal) & trends
Ice cover & trends
Salinity & trends
Current velocity, Wave exposure, Upwelling
Mixing characteristics, Residence time
Transparency & trends, Turbidity & trends
Marine acidification (levels, trends, impacts, drivers)

Predominant habitat types

Seabed habitats

- Littoral, sublittoral, bathyal (upper, lower), abyssal
- Rock, biogenic reef, coarse sediment, sand, mud, mixed

Water column habitats

- Reduced or variable salinity
- Coastal, shelf, oceanic

Ice habitats

Special habitat types

- Habitats Directive Annex I
- Lists of international conventions such as OSPAR and HELCOM
- European Nature Information System (EUNIS) habitat types
- Additional habitats which merit a particular reference

Habitats

- Trends
- Status
- Criteria & indicators used
- Threshold values for status classes for each indicator
- Baseline used= The value of state at a specific point in time, against which subsequent values of state are compared

Groups of organisms

- Phytoplankton
- Macrophytes
- Zooplankton
- Zoobenthos
- Cephalopods
- Fish
- Reptiles
- Birds
- Mammals

Species/Group of species

- Condition
- Relative abundance and/or biomass
- Other characteristics
- Pressures (present and future) acting on them
- Status & trend
- Criteria used
- Indicators used
- Threshold values for status classes for each indicator
- Baseline used



Ecosystems

- Structure
- Functioning:
 - Productivity (production per unit mass) of key species or trophic groups
 - Proportion of selected species at the top of food webs
 - Abundance/distribution of key trophic groups/species
- Status & trend
- Criteria used
- Indicators used
- Threshold values for status classes for each indicator
- Baseline used

Legal basis

(b) an analysis of the predominant **pressures** and impacts, including human activity, on the environmental status of those waters which:

(i) is based on the indicative lists of elements set out in Table 2 of Annex III, and covers the qualitative and quantitative mix of the various pressures, as well as discernible trends;

(ii) covers the main cumulative and synergetic effects; and

(iii) **takes account of the relevant assessments which have been made pursuant to existing Community legislation;**

Pressures

- Physical loss
- Physical damage
- Underwater noise
- Litter
- Contaminants
- Hydromorphological changes
- Acute pollution events
- Nutrient enrichment
- Microbial pathogens
- Non indigenous species
- Selective extraction of species

Pressures

- Level
- Environmental impacts
- Activities contributing to the pressure
- Status & trend
- Criteria used
- Indicators used
- Threshold values for status classes for each indicator
- Baseline used

Legal basis

(c) an economic and social analysis of the use of those waters and of the cost of degradation of the marine environment.

Economic & social assessment - Uses and human activities

- Characteristics (location, time)
- Trends
- Relevant socioeconomic indicators (employment, economic value)
- Pressures caused

Economic & social assessment Ecosystem services

- Name of the service
- Relevant GES descriptors or criteria
- Predominant habitats and functional groups on which the ecosystem service is dependent
- Relevant human activities that are supported by or that use this ecosystem service
- Valuation of the ecosystem service[

Legal basis

2. The analyses referred to in paragraph 1 shall take into account elements regarding coastal, transitional and territorial waters covered by relevant provisions of **existing Community legislation, in particular Directive 2000/60/EC**. They shall also take into account, or use as their basis, other relevant assessments such as those carried out jointly in the context of **Regional Sea Conventions**, so as to produce a **comprehensive assessment** of the status of the marine environment.

Legal basis

3. In preparing assessments pursuant to paragraph 1, Member States shall, by means of the coordination established pursuant to Articles 5 and 6, make every effort to ensure that:

- (a) **assessment methodologies are consistent across the marine region or subregion;**
- (b) **transboundary impacts and transboundary features are taken into account.**

Need for coherence within and across marine regions and sub-regions

MSFD Art.12: The EC will assess if the IA of Member States submitted is complete, adequate, consistent and coherent

Different status in the two sides of a national border would be questionable!

- **Work together with your neighbor/RSC**
- **Use standardized/agreed/comparable methodologies and thresholds**

In a nutshell

- In the IA in **2012** Member States should describe the current condition of their marine species, habitats and ecosystems as well as the pressures acting on them and make a judgment concerning their status (if it deviates or not significantly from the undisturbed situation)
- It will set the **baseline** against which the subsequent assessments each 6 years will be compared in order to demonstrate amelioration (or degradation)
- It will be a synthesis of existing assessments and is expected to give an overall image of the marine environment before the establishment of MSFD measures

What is needed to make an IA?

- Data
- Methods to interpret the data
- Thresholds between good and no good status (targets)

Are there enough data? Where are they?

- Water Framework Directive (WFD)
- Environmental Quality Standards Directive (EQS)
- Habitats Directive (HD)
- Birds Directive (BD)
- Common Fisheries Policy (CFP)
- The Regional Seas Conventions (RSCs)
- National legislation

Water Framework Directive (WFD)

- Good ecological status in **coastal waters** by 2015
- Phytoplankton (biomass, abundance, taxonomy, blooms)
- Macrophytes (abundance, sensitive species)
- Zoobenthos (abundance, taxonomic composition, diversity, sensitive species)

MANY GROUPS OF ORGANISMS MISSING

Environmental Quality Standards Directive (EQS)

- Certain contaminants (30+) should not exceed agreed values in **territorial waters** by 2015
- What about other contaminants?

Habitats Directive & Birds Directive

- Measures should be taken to ensure the protection of habitats and species listed, among them several marine fish, reptiles, seabirds and mammals
- Populations should be monitored
- A favorable conservation status should be ensured
- What about not listed species?

The common fisheries policy (CFP)

- Guaranteed income for fishermen
- Regular supply at reasonable prices for consumers and the processing industry
- Protection of stocks against over-fishing
- Sustainable biological, environmental and economic exploitation of living aquatic resources
- The Data Collection Framework requires data on species composition , sizes, sex, maturity on targeted as well as by catch species

The Regional Seas Conventions

- HELCOM
- OSPAR
- Barcelona
- Bucharest
- Different levels of reporting obligations and agreement

So are there really so many data?

- Not all countries may completely fulfilled their data collection and reporting obligations
- Very few data outside coastal waters
- Large species groups/pressures not covered e.g. zooplankton, alien species, noise/energy, litter

Are there assessment methods and targets (thresholds)?

JRC Scientific and Technical Reports



**Review of Methodological Standards
Related to the Marine Strategy Framework
Directive Criteria on Good Environmental
Status**

Henna Piha and Nikolaos Zampoukas



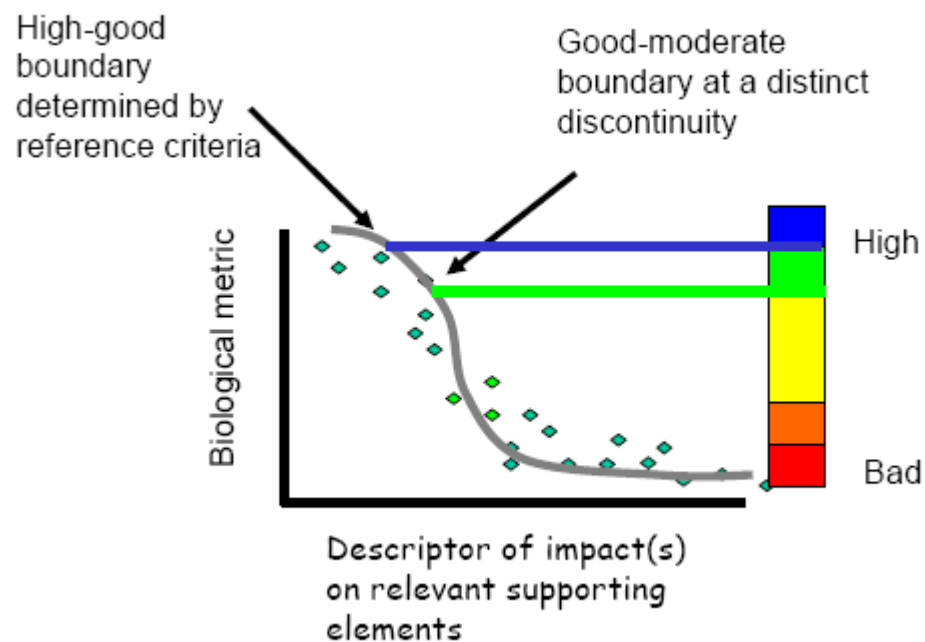
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Methodological standards =
all methods developed
and agreed in the
framework of European or
international conventions

Thresholds

A value set on the basis of an environment indicator or index at or beyond which GES has been achieved



Availability of methodological standards by MSFD GES Descriptor

	WFD	EQS Directive	Habitats Directive	Birds Directive	CFP	Regional Sea Conventions
D1 Biological diversity	X		X		X	X
D2 Non-indigenous species						X
D3 Commercial fish					X	
D4 Food webs	X					X
D5 Eutrophication	X					X
D6 Sea floor	X		X			X
D7 Alteration of hydrographical conditions	X					
D8 Contaminants and pollution effects	X	X				X
D9 Contaminants in fish and other seafood						
D10 Litter						X
D11 Energy/Noise						

D1: Biodiversity

- 1.1.1: Species distributional range
- 1.4.1: Distributional range of habitat
- 1.5.1: Habitat area
- 1.4.2: Distributional pattern of habitat
- 1.6.1: Condition of the typical species and communities of the habitat

Source	Regional Coverage		Remarks
HD explanatory notes and guidelines	NEA	BAL	Not available for all species and habitats
	MED	BS	Not always guidelines/Only some recommendations

D1: Biodiversity

1.1.3: Area covered by the species (for sessile/benthic species)

1.2.1: Population abundance and/or biomass, as appropriate

1.7.1: Composition and relative proportions of ecosystem components

Source	Regional Coverage		Remarks
HD explanatory notes and guidelines WFD methods (compilation in: http://www.wiser.eu/results/method-database)	NEA	BAL	Not available for all species
	MED	BS	Only coastal

HD explanatory notes and guidelines

Favourable reference population: Population in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the species; favourable reference value must be at least the size of the population when the Directive came into force; information on historic distribution/population may be found useful when defining the favourable reference population; 'best expert judgement' may be used to define it in absence of other data.

D1: Biodiversity

1.6.3: Physical, hydrological and chemical conditions of the habitat

Source	Regional Coverage		Remarks
WFD (Eutrophication guidance)	NEA	BAL	Only for coastal waters. No methods for hydrological conditions
	MED	BS	

D1: Biodiversity

1.3.1: Population demographic characteristics (e.g. body size or age class structure, sex ratio, fecundity rates, survival/mortality rates)

1.4.2: Distribution pattern of habitat

1.6.1: Condition of typical species and communities

1.1.2: Species distribution pattern

1.3.2: Population genetic structure

1.5.2: Habitat volume

Source	Regional Coverage		Remarks
	NEA	BAL	
	MED	BS	

D2: Alien species

2.1.1: Trends in abundance, temporal occurrence and spatial distribution

Source	Regional Coverage		Remarks
	NEA	BAL	Some databases exist that may be used for targeting monitoring and assessment activities
	MED	BS	

2.2.1: Ratio between alien and native species

2.2.2: Impacts of alien species

Source	Regional Coverage		Remarks
HELCOM (Biopollution Level)	NEA	BAL	Only Baltic/ Needs further development. At the moment it is tested for coastal waters
	MED	BS	

D3: Commercially exploited fish and shellfish

3.1.1: Fishing mortality

3.1.2: Catch/biomass ratio

3.2.1: Spawning Stock Biomass

Source	Regional Coverage		Remarks
CFP (Analytical stock assessment done by ICES, GFCM, STECF, ICCAT on data collected under DCF, 199/2008)	NEA	BAL	Analytical stock assessment is not available for all stocks and considerable differences in data availability exist between (sub)regions. Data deficiencies often result in the use of agreed approximations of FMSY rather than FMSY.
	MED	BS	

D3: Commercially exploited fish and shellfish

3.2.2: Biomass indices

3.3.1: Proportion of fish larger than the mean size of first sexual maturation

3.3.2: Mean maximum length across all species found in research vessel surveys

3.3.3: 95% percentile of the fish length distribution observed in research vessel surveys

3.3.4: Size at first sexual maturation

Source	Regional Coverage		Remarks
	NEA	BAL	No reference values with enough scientific agreement for assessment. Time series of indicators not available for all stocks.
	MED	BS	

D4: Food Webs

4.1.1: Performance of key predator species using their production per unit biomass (productivity)

Source	Regional Coverage		Remarks
OSPAR (2008) EcoQOs Grey seal pup production: Taking into account natural population dynamics and trends, there should be no decline in pup production of grey seals of $\geq 10\%$ as represented in a five-year running mean or point estimates.	NEA	BAL	Not available for all key predator species and for all marine areas.
	MED	BS	

D4: Food Webs

4.2.1 Large fish (by weight)

Source	Regional Coverage		Remarks
OSPAR (2008) EcoQO in the North Sea: Over 30% of fish by weight should be greater than 40cm in length.	NEA	BAL	Only for demersal fish
	MED	BS	

4.3.1: Abundance trends of functionally important selected groups/species

Source	Regional Coverage		Remarks
WFD methods	NEA	BAL	Only coastal/ only for some species
	MED	BS	

D5: Eutrophication

- 5.1.2 Nutrients concentration in the water column
- 5.1.2 Nutrient ratios (silica, nitrogen and phosphorus)
- 5.2.1 Chlorophyll concentration the water column
- 5.2.2 Water transparency
- 5.2.3 Abundance of opportunistic macroalgae
- 5.2.4 Species shift in floristic composition
- 5.3.1 Abundance of perennial seaweeds and seagrasses
- 5.3.2 Dissolved oxygen

D5: Eutrophication

Source	Regional Coverage	
<ul style="list-style-type: none"> • WFD Eutrophication guidance & phytoplankton methods • OSPAR EcoQOs: <ul style="list-style-type: none"> ◦ Winter concentrations of dissolved inorganic nitrogen and phosphate and Chl-a should remain below a deviation from background not exceeding 50% ◦ Species indicators of eutrophication should remain below respective nuisance and/or toxic elevated levels (and there should be no increase in the average duration of blooms) ◦ Oxygen should remain above area-specific assessment levels, ranging from 4 – 6 mg/l ◦ There should be no kills in benthic animal species as a result of oxygen deficiency and/or toxic phytoplankton species • HELCOM Eutrophication Assessment Tool : Acceptable deviation from reference conditions is set at 50% • Attempt to apply TRIX in the MED 	NEA	BAL
	MED	BS

D6: Sea floor integrity

6.1.1 Type, abundance, biomass and areal extent of relevant biogenic substrate

6.2.1 Presence of particularly sensitive and/or tolerant species

6.2.2 Multi-metric indexes assessing benthic community condition and functionality, such as species diversity and richness, proportion of opportunistic to sensitive species

Source	Regional Coverage		Remarks
HD, notes & guidelines on assessment WFD methods HELCOM: HEAT	NEA	BAL	Mostly coastal
	MED	BS	

D6: Sea floor integrity

6.1.2 Extent of the seabed significantly affected by human activities

6.2.3 Proportion of biomass or number of individuals in the macrobenthos above some specified length/size

6.2.4 Parameters describing the characteristics (shape, slope and intercept) of the size spectrum of the benthic community

Source	Regional Coverage		Remarks
	NEA	BAL	
	MED	BS	

D7: Hydrographical alterations

7.1.1 Extent of area affected by permanent alterations

7.2.1 Spatial extent of habitats affected by the permanent alteration

7.2.2 Changes in habitats, in particular the functions provided (e.g. spawning, breeding and feeding areas and migration routes of fish, birds and mammals), due to altered hydrographical conditions

Source	Regional Coverage		Remarks
	NEA	BAL	
	MED	BS	

D8: Contaminants in water and sediment

8.1.1 Concentration of the contaminants measured in the relevant matrix in a way that ensures comparability with the assessments under Directive 2000/60/EC

8.2.1 Levels of pollution effects on the ecosystem components concerned

8.2.2 Occurrence, origin, extent of significant acute pollution events and their impact on biota physically affected by this pollution

D8: Contaminants in water and sediment

Source	Regional Coverage		Remarks
<p>EQS Directive</p> <p>HELCOM EcoQO: Concentrations of hazardous substances in the Baltic Sea near background values for naturally occurring substances and close to zero for man-made substances</p> <p>OSPAR EcoQO: the average proportion of oiled common guillemots in all winter months (November to April) should be 10% or less of the total found dead or dying on beaches over period of at least five years</p>	NEA	BAL	<p>Mostly coastal</p> <p>EcoQO only in NEA & BAL</p>
	MED	BS	



Photo by Jimmy Main

D9: Contaminants in fish and seafood

9.1.1 levels of contaminants

Source	Regional Coverage		Remarks
Commission Regulation No 1881/2006	NEA	BAL	
	MED	BS	

9.1.2 Frequency of regulatory levels being exceeded

Source	Regional Coverage		Remarks
	NEA	BAL	
	MED	BS	

D10: Marine litter

10.1.1 Trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and source

10.1.2 Trends in the amount of litter in the water column (including floating at the surface) and deposited on the sea-floor, including analysis of its composition, spatial distribution and source

10.1.3 Trends in the amount, distribution and, where possible, composition of micro-particles (in particular micro-plastics)

Source	Regional Coverage	Remarks
	<div>NEA</div> <div>BAL</div> <div>MED</div> <div>BS</div>	

D10: Marine litter

10.2.1 Trends in the amount and composition of litter ingested by marine animals (e.g. stomach analysis)

Source	Regional Coverage	
OSPAR EcoQO: There should be less than 10% of Northern Fulmars having more than 0.1 gram plastic particles in the stomach in samples of 50-100 beach-washed fulmars found from each of 4 to 5 areas of the North Sea over a period of at least 5 years	NEA	BAL
	MED	BS



D11: Noise

11.1.1 Proportion of days and their distribution within a calendar year over areas of a determined surface, as well as their spatial distribution, in which anthropogenic sound sources exceed levels that are likely to entail significant impact on marine animals

11.2.1 Trends in the ambient noise level within the 1/3 octave bands 63 and 125 Hz (centre frequency) (re 1µPa RMS; average noise level in these octave bands over a year) measured by observation stations and/or with the use of models if appropriate.

Source	Regional Coverage		Remarks
	NEA	BAL	
	MED	BS	

Conclusions for IA

Detailed info on species, habitats, pressures, impacts and socioeconomics is required

Future assessments will be compared to the IA and trends will be shown

Should be based on existing info but many elements are missing- expected to be completed in the next cycle of MSFD implementation

Should be coherent within and across marine regions

There are few agreed methods and thresholds mainly in the NEA and Baltic

Consider if / how they can be adapted to your marine areas in the MED and the Black Sea!

Thank you for your attention

