

GES Descriptors – what we know and don't know Outcomes of the Reading Workshop

**Bernadette Eldridge
Kathy Kennedy**



Introduction

- **Based on a 1 day workshop (5th November 2008) at the Reading Innovation Centre**
- **Supported by recent outcomes of ICES / JRC Task Groups**
- **Purpose: first understanding of descriptors of Good Environmental Status (GES) in Annex 1 of the EU Marine Strategy Framework Directive (MSFD)**
- **Begin to understand issues related to spatial scale**
- **Identify areas for further monitoring and applied science**
- **Identify the UK position on where we set the level for GES**
- **Implications for different UK marine stakeholders**

Context

- **Preliminary findings - workshop held at a very early stage of developing an understanding of GES**
- **Generally a wide range of views on what GES in the marine environment might look like in practice**
- **Uncertainty over interpretation of GES descriptors and measures needed to achieve it, the benefits, costs and practicalities of doing so**
- **Understood that the definition of GES should be based on sustainable use**
- **Must understand needs and perspectives of commercial, environmental and scientific stakeholders**
- **Must understand relationships with/lessons to learn from other associated Directives (e.g. Habitats Directive, Water Framework Directive).**

Key findings for each descriptor

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

- Three main attributes; Maintenance of habitat diversity, species diversity, and diversity within species.
- Assessment and management of key pressures – ensure strong connections made between pressure & state (monitoring)
- Almost any activity in the marine environment might affect this descriptor – scale important
- Current pressures – fishing, cumulative impacts of small scale activities, oil & gas production and renewable energy
- **Main message – complicated, challenging & interesting – potentially very significant economic implications**

2 - Non-Indigenous Species introduced by human activities are at levels that do not adversely alter the ecosystem

- Attributes; Numbers of NIS, abundance and range in a Region (overlap with D1).
- Are there any impacts on ecosystem functioning?
- Pressures – shipping, aquaculture (transfer of species), release of species into the wild
- Knowledge base to achieve this descriptor mixed – particularly wrt impacts caused by NIS
- UK waters already have NIS (can't turn clock back). Therefore need to develop management measures to prevent further introductions where possible (ballast water treatment)
- Main message – good risk management measures required not monitoring to measure abundance of NIS**

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

- Exploited sustainably consistent with high long-term yield (low F), full reproductive capacity ($SSB > SSB_{pa}$), and healthy age and size distribution.
- Broad understanding that single-species assessment targets cannot be achieved for all stocks simultaneously – use %age threshold?
- For non-assessed stocks (Black Sea, Med) use trends in ratio catch/biomass, abundance etc.,
- Pressures - e.g. damage to spawning grounds; fishing and climate change
- Knowledge base for this descriptor is generally good particularly when compared to other descriptors.
- **Main message; The Common Fisheries Policy has competence, and will supply basis for assessment.**

4. **All elements of the marine food web, 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**
- Attributes; Energy flows in food webs, and food web structure (size ratio / abundance)
 - Rather than aim to be comprehensive, assessment should include (i) biological groups with fast turnover rates (e.g. phytoplankton, zooplankton, bacteria) responding quickly to change; (ii) groups targeted by fisheries; (iii) habitat-defining groups; and (iv) charismatic or sensitive groups
 - To address spatial scale, monitoring should cover significant proportion of Region or sub-Region.
 - Knowledge base for this descriptor was felt to be low
 - **Main message; big challenge to translate it into smart management measures so must retain focus on key components**

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

- Well-established approaches in place for this descriptor e.g; the OPSAR Comprehensive Procedure Assessments; WFD Assessments; the Nitrates & Urban Waste Water Directives and the Habitats Directive
- Pressures - nutrient and organic enrichment and climate or environmental change
- Good knowledge base for this descriptor. Current monitoring programmes adequate and improving. Offshore monitoring programmes will need to be tested for fitness for purpose and adequacy. Trans-boundary issues remain an area for continued consideration
- **Main message; progress towards compliance with this descriptor is in hand and improving**

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

- Important attributes include organism structure and function, substrate, bioturbators, etc. Strong links with D1 (biodiv), D2 (NIS), D3 (fish) and D4 (food webs). Targetted sea bed mapping of sediment type and habitats and species in existence might be required.
- Significant implications for monitoring until specific Criteria established
- Pressures - physical loss / damage from dredging or smothering; biological disturbance e.g. fishing and nutrient enrichment – sewage, although this is addressed through the WFD.
- Knowledge base - much to do to improve the standard of UK information
- **Main message – strong links to other descriptors. Start with what is known and move forward with assessment**

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

- Descriptor poorly understood, possibly relates to major offshore developments.
- Hydrographic processes operate at a range of scales; including across and within different regional seas, therefore important issues of scale - unlikely that this can be assessed only at a regional level.
- Renewables (tide / wind) take energy from ecosystem causing potential impacts.
- Pressures - potential for changes in salinity and also permanent damage from siltation, physical loss from maintenance dredging, possible interference with hydrological processes, etc
- Knowledge base – good for changes in hydrographical conditions specifically for tides, currents and salinity, less for impacts from coastal / offshore development
- **Main message - further consideration should be given to the impact of the growth of marine renewables**

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

- Good understanding for coastal waters exists but less offshore
 - Knowledge on compliance available through OSPAR and WFD assessment criteria
 - More work needed to assimilate information on the biological and cumulative effects of contaminants, and development of indicators
 - Pressures - contamination by hazardous substances and systematic and/or intentional release of hazardous substances
 - Knowledge base – reasonable, OSPAR and the WFD require the monitoring of a number of contaminants with specific concentration limits which must be adhered to, particularly within coastal and inshore areas
- Main message - good system in OSPAR with potential for further use. Measurement of concentrations versus effects needs to be resolved. Scale of contamination remains an issue**

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

- Legislation already exists (Shellfish Hygiene Directive, also controls on contamination in fish by chemicals, biotoxins, microbiology and radioactivity)
- Pressures - contamination by Hazardous Substances; systematic and/or intentional releases; dredged materials; biological disturbance and microbial pathogens
- Knowledge base - addressed through biotoxins and molecular biology data, suggested that the Food Standards Agency's programme of contaminants required a review.

Main message - scope of contaminant definition needs to be clarified and priority needs must be put in perspective. Unclear how biotoxins are considered in this descriptor. The suitability of current monitoring also needs to be assessed

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

- Main attributes are harmful effects of litter, the amount of macro-litter and micro-plastic.
- Significant gap with respect to what is known about the impact of litter on the marine environment - no coherent programme to monitor this issue, particularly offshore.
- Marine litter is an evolving concern, focused on aesthetic effects, litter consumption by higher predators, but above all should be risk-based.
- Some data are available but problems with data quality control and a lack of analysis of trends

**Main message – must assess harm from litter not just presence.
Much more information is needed**

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

- Focus on impacts of noise but scope potentially wide and could include issues such as light, heat, vibration and electromagnetism. Other factors for consideration - chemical energy, rising sea temperatures and wave energy.
 - Pressures - physical disturbance and changes in thermal regime
 - Knowledge base – immature, possibly inadequate resources attributed to gathering data for the impact of underwater noise on the marine environment
 - Developing indicators for low frequency impulsive sound (pile driving, seismic) and continuous sound.
 - Also high frequency impulsive sound (sonar).
- Main message – sensible focus on u/w noise, careful development of indicators to avoid high costs of monitoring**

Conclusions

- Spatial scale and trans-boundary concerns remain
- Must make an equitable and meaningful assessment of each descriptor at the Regional Seas level.
- Must consider how impacts associated with climate change will be included in MSFD implementation process.
- Thresholds on indicators to achieve 'sustainable development' are critical
- Should consider interaction between descriptors and process for aggregation to describe 'GES'

