



Presentation of the “alternative” Fact-sheet for EO7 indicator 15

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Context:

Indicator definition

Common Indicator 15 of EO7

Location and extent of the habitats impacted directly by hydrographic alterations

Consider benthic habitats will be impacted by

→ Hydrographic alterations = **Permanent changes in hydrographic hydrographic conditions**

- Waves, Currents, Sea level
- Sediment transport, Turbidity
- Salinity, Temperature

→ Induced by permanent new structures (lasting more than 10 years)

Context:

Indicator assessment

3 steps of evaluation:

- Baseline hydrographical conditions characterization
 - Modelling of actual conditions (without structure)
- Assessment of hydrographical alterations induced by new structure
 - Comparing modelling of baseline conditions and with structure conditions
- Assessment of habitats impacted directly by hydrographic alterations
 - By crossing hydrographical alterations and habitat maps

Context:

Indicator assessment

3 steps of evaluation:

- Baseline hydrographical conditions characterization
 - Modelling of actual conditions (without structure)
- Assessment of hydrographical alterations induced by new structure
 - How to define permanent hydrographical alterations: what level of changes ?
- Assessment of habitats impacted directly by hydrographic alterations
 - What level of alterations to impact habitats ?

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

(Decision 2017/048/UE, May 2017)

- Criterion D7C1: Spatial extent and distribution of permanent alteration of hydrographical conditions
 - “Permanent alteration of hydrographical conditions includes changes in **wave action, currents, salinity and temperature**, particularly as a result of **physical loss** (a permanent change to the seabed, normally assessed by criterion D6C1)”

Links with MSFD

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

- Criterion D7C1: Spatial extent and distribution of permanent alteration of hydrographical conditions
- Criterion D7C2: Spatial extent of adverse effects on benthic habitats from permanent alteration of hydrographical conditions
 - “Threshold values should be established for the adverse effects of permanent alterations of hydrographical conditions on each habitat type”.

Links with MSFD

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

- Criterion D7C1: Spatial extent and distribution of permanent alteration of hydrographical conditions
- Criterion D7C2: Spatial extent of adverse effects on benthic habitats from permanent alteration of hydrographical conditions

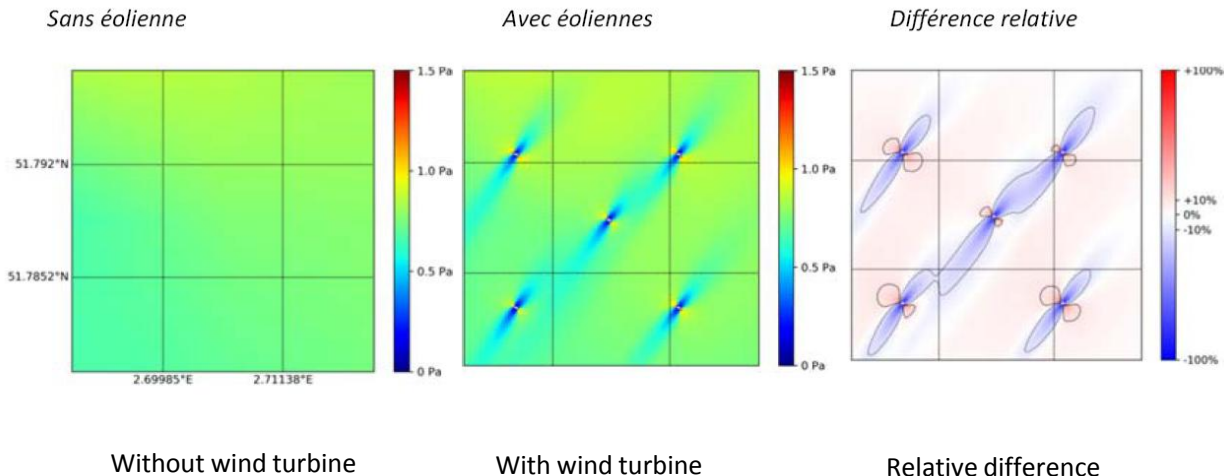
→ Common Indicator 15 is equivalent to the criterion D7C2, relatively to the permanent alteration induced (only) by new permanent structure

Links with MSFD

Belgium's D7 assessment in 2018 : D7C1

Assessment of **permanent change** of hydrographical conditions due to wind turbines by hydrodynamic modelling

- Changes in bottom shear stress averaged over a tidal cycle due to the wind turbines

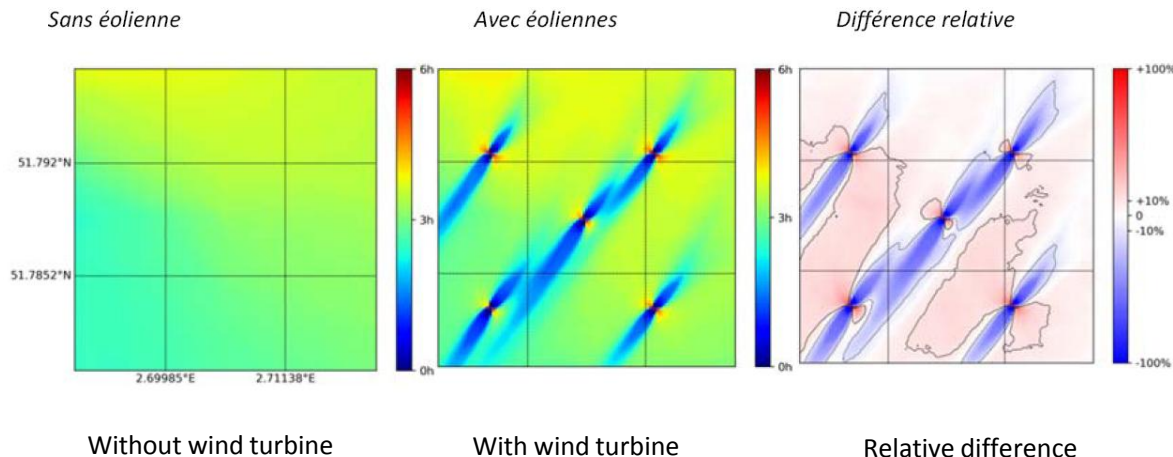


Links with MSFD

Belgium's D7 assessment in 2018 : D7C1

Assessment of **permanent change** of hydrographical conditions due to wind turbines by hydrodynamic modelling

- Changes in bottom shear stress averaged over a tidal cycle due to the wind turbines
- Changes in mean time per tidal cycle that can lead to the suspension of coarse sand ($d = 300\mu\text{m}$)



Links with MSFD

Belgium's D7 assessment in 2018 : D7C1

Assessment of **permanent change** of hydrographical conditions due to wind turbines by hydrodynamic modelling

- Changes in bottom shear stress averaged over a tidal cycle due to the wind turbines
- Changes in mean time per tidal cycle that can lead to the suspension of coarse sand ($d = 300\mu\text{m}$)

Considering a notable change (alteration) as

- A variation of more than 10% (absolute value) of the mean bottom shear stress compared with the reference conditions (more than 5% for time of suspension)

→ Extend for permanent alteration of hydrographical condition (D7C1) is evaluated as : 0,066 km² per wind turbine

Links with MSFD

Belgium's D7 assessment in 2018 : D7C2

The extent of adverse effects on benthic habitats correspond to:

- **Area of physical loss** as defined for Descriptor 6
- **Area of permanent alteration leading to change of classification of habitat** following the methodology developed for EMODnet-habitat (change of substrat, light, kinetic energy, ...)

The presence wind turbines are likely to modify locally the energy regime (in an area of about 0.015 km² per wind turbine), but these changes are not sufficient to induce any change in habitat classification

Conclusion : Extent of adverse effects on habitats is limited to the physical loss induced by the turbines (bottom footprint)

Conclusion on actual method for EO7 indicator 15 assessment

Implementation of Common indicator 15 is very complex:

- Lots of information and means needed
 - Hydrographical and benthic habitats data, at different spatial and temporal scales
 - Modelling tools and capabilities
- Lack of common understanding and standardized methodologies
 - Definition of permanent hydrographical alterations: which (5-10) % of changes ?
 - Establishment of threshold values for adverse effects (impact) on habitats
- Lack of knowledge
 - Links on pressures/impacts/responses and on cumulative impacts

But things can be done

→ Alternative factsheet for indicator 15

Alternative factsheet for indicator 15

Assessment of hydrographical alterations

3 levels of assessment:

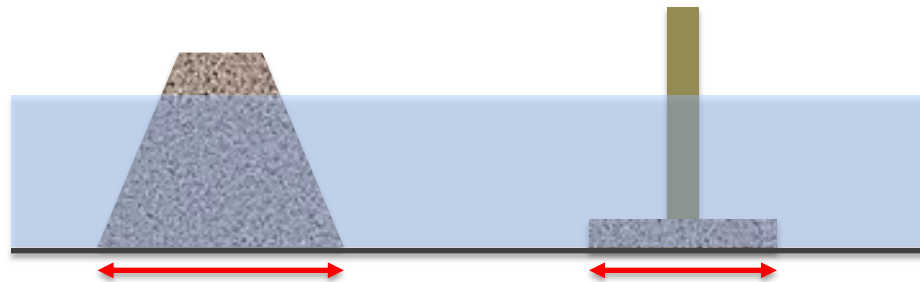
- 1. Assessment of physical loss induced by the structure itself (on sea floor)
- 2. Assessment of permanent changes in bathymetry or substrate (physical loss) due to human activities, related to the construction or the use of the structure
- 3. Assessment of hydrographical changes induced by the structure in the surrounding area

Alternative factsheet for indicator 15

Assessment of hydrographical alterations

1. Assessment of physical loss induced by the structure itself (on sea floor)

- Objective: represent by a **polygon** (GIS data) the **exact location and extend on sea floor of the expected construction**, i.e. a footprint (and not only the extent of the submerged part of the structure).
- These data can be taken from the **construction plan** of the structure, in the EIA or another planning document.



Alternative factsheet for indicator 15

Assessment of hydrographical alterations

2. Assessment of permanent changes in bathymetry due to human activities, related to the construction or the use of the structure

- Objective: represent by a **polygon** (GIS data) **the exact location and extend of dredged and disposal areas leading to permanent changes in bathymetry or substrate** (during construction: digging of basins or foundations; material disposal; channels dredging to maintain a certain depth; ...).
- These data can be taken from the EIA or can be asked to the project manager responsible for its construction or to the structure owner.

Alternative factsheet for indicator 15

Assessment of hydrographical alterations

3. Assessment of hydrographical changes induced by the structure in the surrounding area

- Objective: represent by a polygon (GIS data) the area around the structure where the main changes in hydrographic conditions are expected.
- Several approaches can be followed, using:
 - **The information provided by the EIA** (ex: attenuation of agitation in port/marina, erosion/accretion compromising the durability of the structure)
 - Other available sources of information on similar or close sites (studies on impacts of existing structures, historical evolution of the coastline, ...)
 - Expert judgment
 - Buffer zone around the structure (taken from bibliography)

Alternative factsheet for indicator 15

Assessment of hydrographical alterations

3 levels of assessment and different levels of confidence:

- 1. Physical loss induced by the structure itself (on sea floor)
→ Total and definitive alteration of hydrographical conditions
- 2. Permanent changes in bathymetry or substrate (physical loss) due to human activities
- 3. Assessment of hydrographical changes induced by the structure in the surrounding area
→ More or less uncertainty, depending on the available data, the actual knowledge and the assumptions followed

Proposition to add a level of confidence (low, medium, good) for each polygon representing hydrographical alterations

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Assessment of impacted habitats

Principle: Crossing hydrographical alterations maps with benthic habitats maps

- Under the structure itself, the habitats are permanently and definitively impacted
- Around the structure ? It depends on ...
 - The structure, its configuration and functions
 - The anthropic modifications on the seabed
 - The intensity of hydrographical changes
 - The existing habitats, their states and their sensitivity to hydrographical changes ...

→ Around the structure and after construction, monitoring is necessary to assess the habitats actually impacted

Conclusion

The implementation of the indicator 15 is complex, particularly for the modeling of hydrographic alterations „0

(requires lots of data and financial and human means)

Alternative factsheet:

- **Focus, as a first approach, on physical loss induced by the footprint of the structure**
- Then, focus on the permanent anthropic changes of bathymetry and substrate around the structure
- Finally, define a “buffer zone” around the structure where hydrographic alterations are expected (using the IEA ...)

+ Special precautions related to the presence of posidonia meadow when planning new structure



Thank you

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