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PEGASEAS PROJECT



Promoting Effective Governance
of the Channel Ecosystem

Promouvoir une gouvernance efficace
de l'écosystème de la Manche

TRANS-CHANNEL FORUM PROCEEDINGS

“SCIENCE AND GOVERNANCE OF THE CHANNEL MARINE ECOSYSTEM”

2nd and 3rd July 2014

University of Caen Basse-Normandie



Organisation committee



6. Ongoing research on ecosystem health indicators for food webs in the MSFD context.

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Abstract: The Marine Strategy Framework Directive “...aims to achieve Good Environmental Status of the EU's marine waters by 2020 and to protect the resource....” This Directive is based on marine regions and relies on Regional Sea Conventions to define a list of common indicators and a shared monitoring strategy between member states. The development of ecosystem health indicators for characterizing biodiversity and more particularly the functioning of food webs is presently central in ecological research, because of the law context.

Our work in this subject is realized in the framework of two research projects and one convention between the National Center for Scientific Research (CNRS) and the French Ministry of Ecology, Sustainable Development and Energy (MEDDE). The first project is financed by the European Union and is called DEVOTES (DEVELOPMENT Of innovative TOOLS for understanding marine biodiversity and assessing good Environmental Status). Its objectives are 1) to improve understanding of human activities impacts and variations due to climate change on marine biodiversity and 2) to test the indicators proposed by the European Commission, and develop new ones for assessment at species, habitats and ecosystems level, for the status classification of marine waters.

The second project is named ANTROPOSEINE (Trophic Structure Analysis of the Seine Estuary and Contribution of its different Habitats). It relies on numerical methods for analyzing trophic networks that allows the integration of the different populations and guilds composing the ecosystem into a synthetic scheme. The project applies these numerical tools on the Seine estuary and bay in order to promote an integrative approach, based on the ecosystem functioning and to characterize: 1) the contribution of the different zones and habitats to the carrying capacity of this ecosystem, 2) the ecosystem health status, and 3) its dynamics.

Finally, in the context of the CNRS-MEDDE convention, a work is in progress on an indicator named “Marine Trophic Index” (MTI). MTI is the mean trophic level (TL) of marine predators, beyond a certain threshold. To use this indicator, methodological tests are needed to choose the most suited TL threshold (i.e. 2, 3, 3.25 and 3.5) to scientific surveys.

The work done on the English Channel area concerns the OSPAR, the regional sea convention working towards the protection of the marine environment of the North-East Atlantic. It is presently building a common list of indicators for MSFD implementation. Within the OSPAR Inter-sessional Correspondence Group on Biodiversity Monitoring and Assessment (ICG COBAM), the food-web expert group has proposed 9 indicators. These 9 indicators are presented in Figure 7. Different studies are presently being developed for testing these indicators in different OSPAR zones in connexion with the members of the Food Web Expert group. The priority for this group was to propose as well already operational indicators as new indicators under development, to promote indicators based on energy and matter flows and processes, and finally to take into account all components of the marine ecosystems. On this aspect, an important effort is positioned on the development of plankton indicators but the benthos remains poorly described with the proposed indicators.

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Among these proposed indicators, several aim at developing a holistic and functional view of the ecosystem. The indices derived from Ecological Network Analysis (i.e. recycling, omnivory, specialisation or redundancy of the flows) are based on ecosystem models. Ongoing studies are led by CNRS / Caen University. Present and future applications concern the dynamic of the Seine estuary and bay food web and the study of the environmental impact of the building and exploitation of offshore windmills and other Marine Renewable Energy devices.

FOOD WEBS code	Indicators	Leading	Status
FW1 (B3)	Reproductive success of marine birds in relation to food availability	UK	Candidate
FW2	Production of phytoplankton	FR	Candidate
FW3 (FC2)	Size composition in fish communities (LFI)	UK – NL	Common
FW4	Changes in average trophic level of marine predators (cf MTI)	FR - ES	Common (under validation)
FW5 (PH1)	Change of plankton functional types (life form) index Ratio between: Gelatinous zooplankton & Fish larvae, Copepods & Phytoplankton; Holoplankton & Meroplankton	UK	Candidate PRIORITIZED
FW6	Biomass, species composition and spatial distribution of zooplankton	SE	Candidate
FW7	Biomass and abundance of functional groups	UK – DE – ES	Candidate
FW8	Changes in the distribution of biomass and species over trophic levels and body size	FR – DE - UK	Candidate
FW9	Ecological Network Analysis indicator (e.g. trophic efficiency, flow diversity)	FR – DE - UK	Candidate

Figure 7: Indicators of food-web health, in the context of the Marine Strategy Framework Directive, proposed by the expert group “Food Web” of the OSPAR Convention (Regional Seas Convention for North East Atlantic) - Intersessional Correspondence Group on Biodiversity Monitoring and Assessment, for the list of common indicators shared between member parties. Leading member(s) for the development of these indicators. Status on the core list: those noted “Common” have been previously selected in at least one of the OSPAR zones, others are named “Candidate”, eventually with the added status “prioritized”.