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Recent MSFD assessment for the commercial (D3) and fish & cephalopods species (D1): Conclusions for the bay of Biscay

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Introduction

The Marine Strategy Framework Directive (MSFD) requires that Member States achieve or maintain a good environmental status (GES) of their marine waters by 2020. The definition of the GES is described by 11 descriptors, including descriptors assessing commercial species (D3) and fish and cephalopods biodiversity (D1). The French assessment of the GES was conducted in 2018 for the bay of Biscay marine sub-region (MSR) (Brind'Amour *et al.*, 2018; Foucher *et al.*, 2018).

Descriptor 1: *biological diversity is maintained*. Five criteria define the GES. The ecosystem component of fish and cephalopods is divided in 6 groups: coastal fish, pelagic shelf fish, demersal shelf fish, deep-sea fish, coastal/shelf cephalopods and deep-sea cephalopods. A quantitative approach is developed for criteria D1C2 of the demersal shelf fish group. Others groups and criteria are assessed using a qualitative approach.

Descriptor 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. Three criteria define the GES. The evaluation concerns fish stocks with quantitative assessment and associated threshold values defined using the "maximum sustainable yield" approach (MSY).

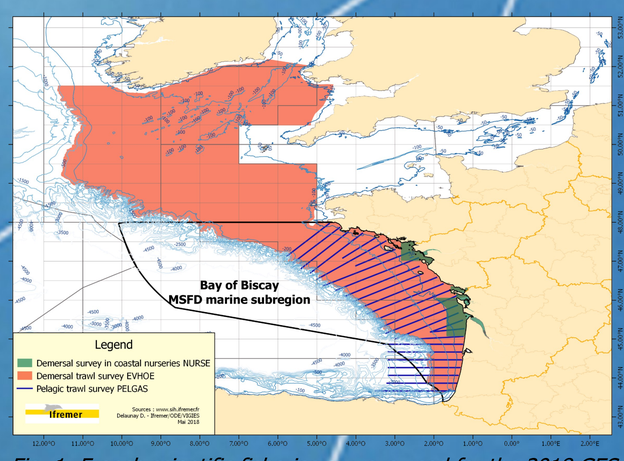


Fig. 1: French scientific fisheries surveys used for the 2018 GES assessment in the Bay of Biscay

Methods

D1 Fish and cephalopods species

Criteria of GES are not operationnal due to lack of data, indicator or threshold, except for the D1C2. A qualitative approach, not detailed, presents the progress of scientific knowledge since the last MSFD assessment in 2012.

D1C1 - Mortality rate per species from by-catch
D1C2* - Population abundance of species group
D1C3 - Population demographic characteristics
D1C4 - Species distributional range
D1C5 - Habitat extent and conditions

D1C2* - Quantitative assessment of population abundance only for the demersal fish group

1. Selection of species sensitive to fishing pressure regarding life-history traits (ICES, 2016)
2. Availability of data from the French scientific survey EVHOE (1997-2015)

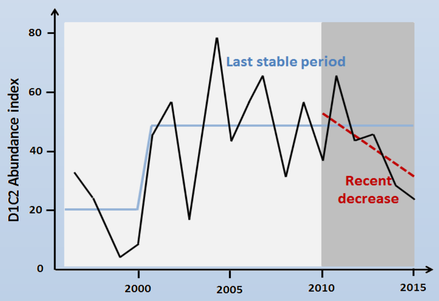


Fig. 2: Example of a species abundance time-series with the results of the breakpoint analysis (blue line) and the recent trend analysis (red line). In that example, the species is considered achieving the GES.

3. Assessment geographical unit: EVHOE coverage (*Fig. 1*)
4. Calculation of an annual abundance index for the sensitive species

5. Population approach: breakpoint– and trend-analysis on species abundance time-series to define long term and recent benchmarks (Probst et *al.*, 2015). If no breakpoint found, a linear regression is fitted to assess the presence of a general trend. GES is achieved when recent abundance is higher than historic abundance or when a general trend is found positive. A six-years trend analysis is also conducted to verify recent evolution of species abundance (*Fig. 2*).

6. Community approach: Percentile 75 of abundance index is defined as a GES threshold for each population. Proportion of species above is calculated per year and breakpoint– and trend- analysis is realised to evaluate GES.

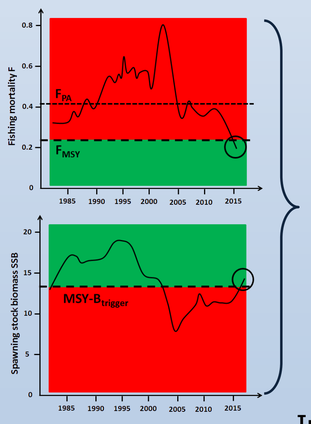
D3 Commercial species

Selection of stocks partially or totally present in the MSR and assessed by scientific authorities (ICES, ICCAT) using 2 indicators: fishing mortality and spawning stock biomass, corresponding to the criteria D3C1 and D3C2.

Reference year : 2015 (or latest evaluation available)

D3C1
Level of pressure of the fishing activity

D3C2
Reproductive capacity of the stock



"One-out-all-out" integration method to evaluate GES

D3C3
Population age and size distribution → Indicators are not operationnal (ICES, 2017)

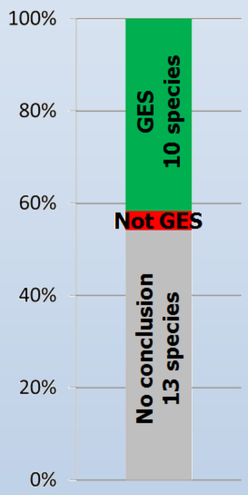
Results

D1 Fish and cephalopods species

D1C1 Not assessed

D1C2 273 species of fish, elasmobranchs and cephalopods are identified during EVHOE. For the demersal fish group, 93 species are considered sensitive to fishing pressure but data are sufficient for 24 sensitive species.

Population approach



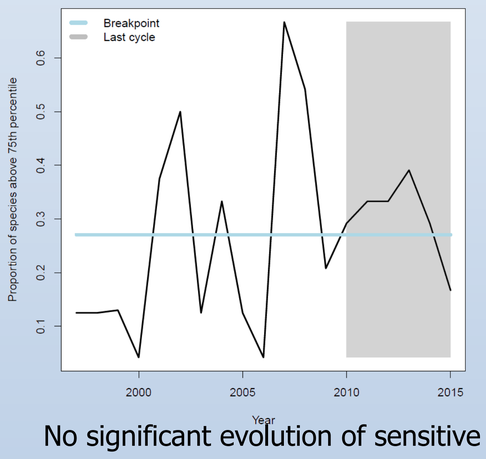
Chelidonichthys cuculus, Conger conger, Eutrigla gurnadus, Galeus melastomus, Helicolenus dactylopterus, Lophius bude-gassa, Lophius piscatorius, Scyliorhinus canicula, Trachinus draco, Zeus faber

Leucoraja fullonica

Argentina sp., Dipturus batis, Echiichthys vipera, Gadus morhua, Lepidorhombus boscii, Leucoraja naevus, Merluccius mer-luccius, Molva molva, Raja clavata, Phycis blennoides, Scophthalmus maximus, Squalus acanthias

Abundance of *Leucoraja fullonica* decreases by 62%. No trend for *Argentina sp.* and *Lepidorhombus boscii* but signs of recent deterioration.

Community approach



No significant evolution of sensitive fish in GES during the time period assessed but great inter-annual variability.

D1C3 Not assessed

D1C4 Not assessed

D1C5 Not assessed

D3 Commercial species

D3C1

D3C2

56 stocks identified in the Bay of Biscay

GES - 3 stocks
Merluccius merluccius, Thunnus thynnus, Xiphias gladius

46 stocks not assessed

Not GES - 7 stocks
Lepidorhombus whiffiagonis, Solea solea, Trachurus tra-churus, Scomber scombrus, Micromesistius poutassou, Squalus acanthias, Thunnus alalunga

D3C3 Not assessed

Note: *Engraulis encrasicolus* stock has no reference points but the assessment methods are robusts. **Anchovy is in GES**.

Conclusion

In the Bay of Biscay, the evaluation of D3 is based on 18% of the stocks assessed by the EU. Thirty percent of those stocks are estimated in GES (*i.e.* defined by the MSY) whereas 70% are not. For the D1, the evaluation is done on 10% of the diversity of the demersal fish species of the continental shelf. Forty one percent of the populations are estimated in GES, whereas 10% are not. Nearly 50% of assessed population displays no evolution during the studied period. Overall, the demersal community seems stable in the bay of Biscay. Qualitative assessments for the other groups of species (*e.g.* pelagic species, coastal and deep-sea species) give general information on the global diversity patterns, distribution of species essential habitats, and general trends in species abundance or biomass evolutions.

Literature cited

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