



# A holistic impact assessment



## The French approach for applying the European Marine Strategy Framework Directive (MSFD)

Jérôme Paillet, Sophie Beauvais, Frédéric Quemmerais-Amice,  
Aurélie Blanck (French Marine Protected Area Agency)

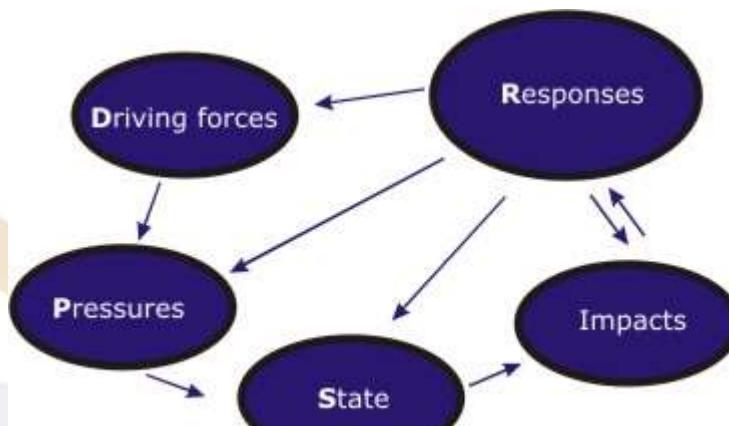
Patrick Camus, Jérôme Baudrier (Ifremer)

... and many, many other contributors from scientific institutions and  
government services



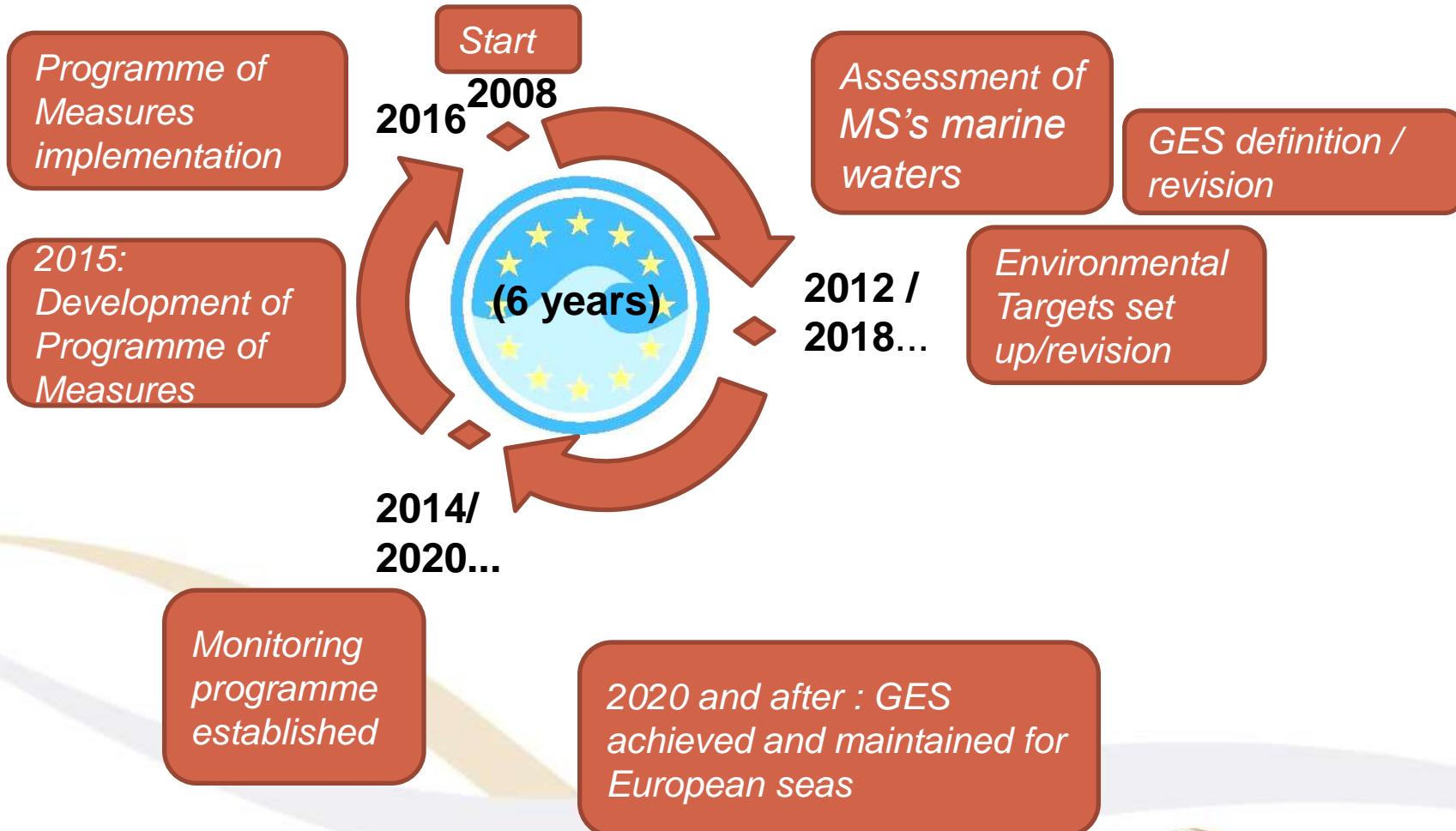
## Context : the Marine Strategy Framework Directive

- Directive 2008/56/EC published in the EU Official Journal
  - Entry into force 15 July 2008
- establishes a framework within which EU Member States shall take the necessary measures to achieve or maintain good environmental status in the marine environment by the year 2020 at the latest
- A "DPSIR" based approach

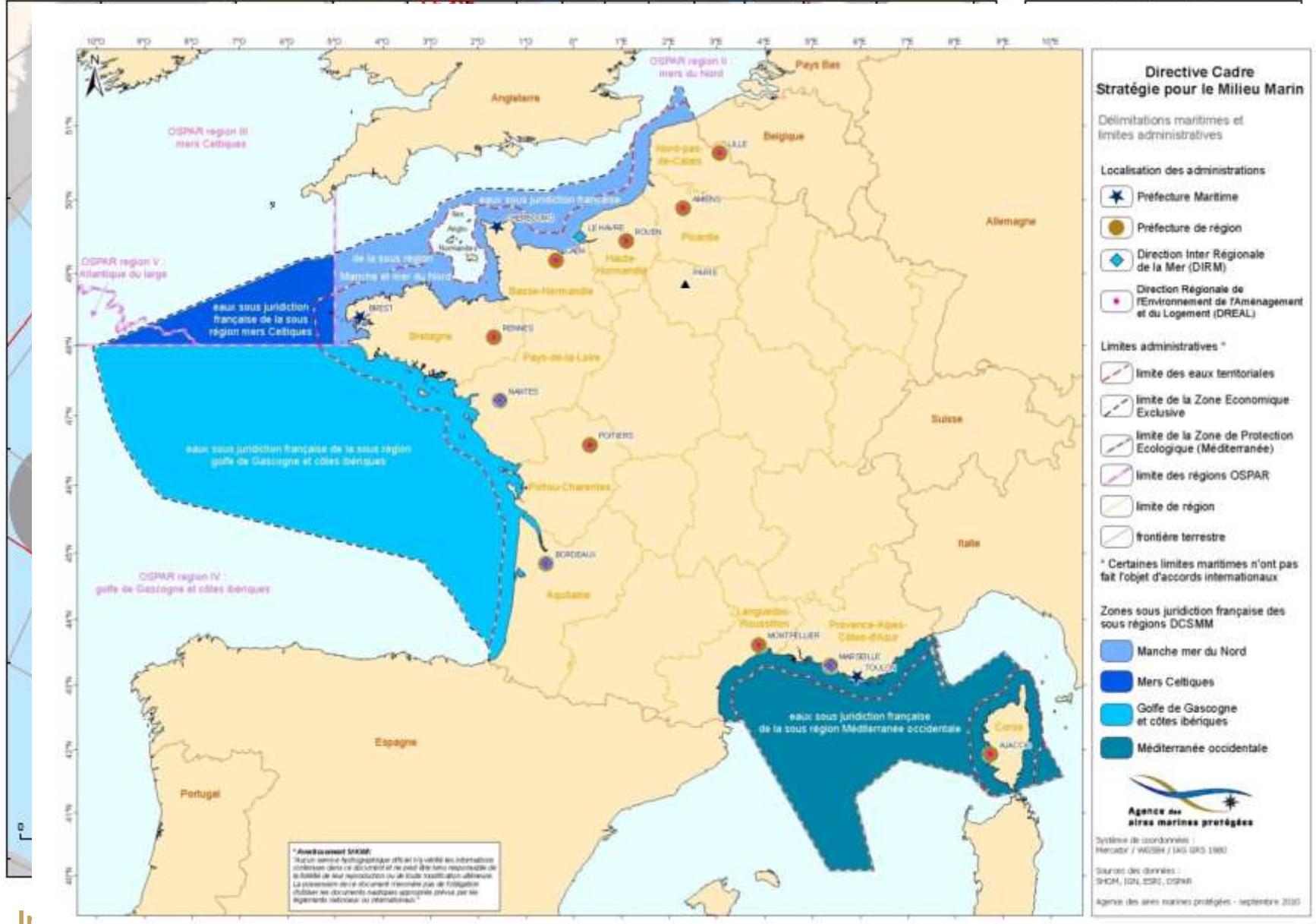




## MSFD Timescale and cycle



# Where? Marine regions / subregions





# Initial assessment (2010-2012)

- Ecological features (based on MSFD Annex III, table 1);
- Pressures and impacts (based on MSFD Annex III, table 2);
  - physical, chemical, biological pressures
  - Pressures ≠ Activities : activities are « sources of pressures »
  - Impacts : « environmental » impacts only ;
  - Includes cumulative/synergetic impacts...
- Economic and social analysis
  - Uses of our waters
  - cost of degradation of the marine environment



# Pressure/Impact table of content (1):

B	PRESSURES AND IMPACTS
1	PHYSICAL LOSS
1.1	Smothering
1.2	Sealing
2	PHYSICAL DAMAGE
2.1	Abrasion
2.2	Selective extraction
2.3	Changes in turbidity and in type of sediment
2.4	Cumulative biological impacts from physical damage
3	OTHER PHYSICAL DISTURBANCES
3.1	Underwater noise (e.g. from shipping, underwater acoustic equipment)
3.2	Marine litter (on the shore, in the ocean, microplastics, impacts)
3.3	Disturbance of wildlife
4	INTERFERENCE WITH HYDROLOGICAL PROCESSES
4.1	Thermal inputs
4.2	Changes in salinity regime
4.3	Changes in current patterns
5	CONTAMINATION BY HAZARDOUS SUBSTANCES
5.1	Introduction of chemical substances (synthetic, non-synthetic and biologically actives substances) : direct and chronic, accidental and illegal, atmospheric, from dredging and dumping
5.2	Introduction of radionuclides
5.3	Impacts from hazardous substances on the ecosystem



# P/I table of content (2):

7	NUTRIENT AND ORGANIC MATTER ENRICHMENT
7.1	Introduction of nutrients and organic matter : direct and chronic, riverine fluxes, atmospheric fluxes
7.2	Impact of excessive inputs of nutrients and organic matter - eutrophication
8	BIOLOGICAL DISTURBANCES
8.1	Introduction of microbial pathogens (for humans, for aquaculture species, for wild species)
8.2	1. Introduction, and impact, of non-indigenous species
8.3	Selective extraction of species, including discards and accidental by-catches.
8.4	Impacts of selective extraction of species on populations, communities, food webs
9.	SYNTHESIS
9.1	synthesis of impacts per ecosystem components
9.2	Cumulative and synergetic impacts on an exploited specie : <i>Solea solea</i>
9.3	Excess mortality episodes and beachings of marine mammals

**For each topic**

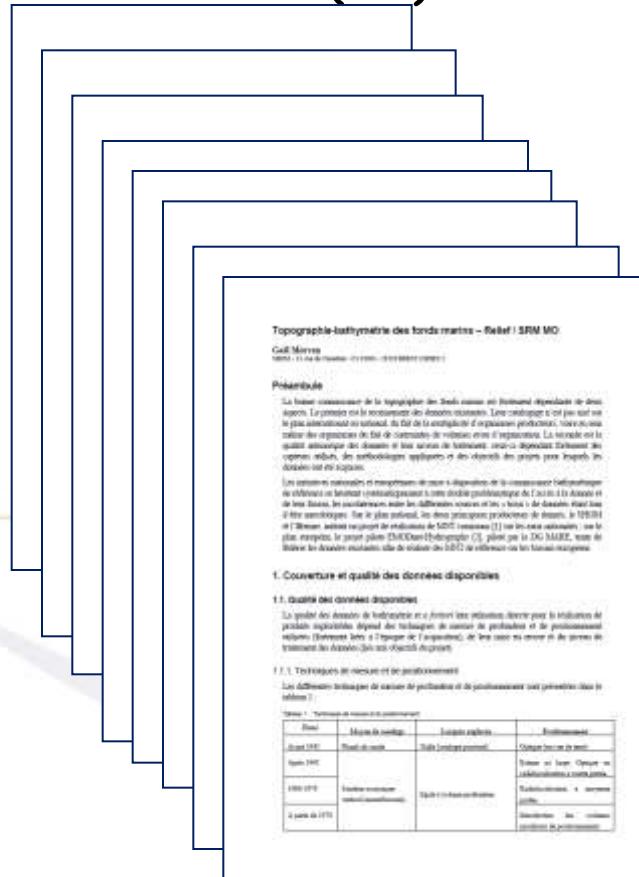
- Find expert(s)
- Have them write a 5 pages analysis per subregion
- Re-read, validate, compile...



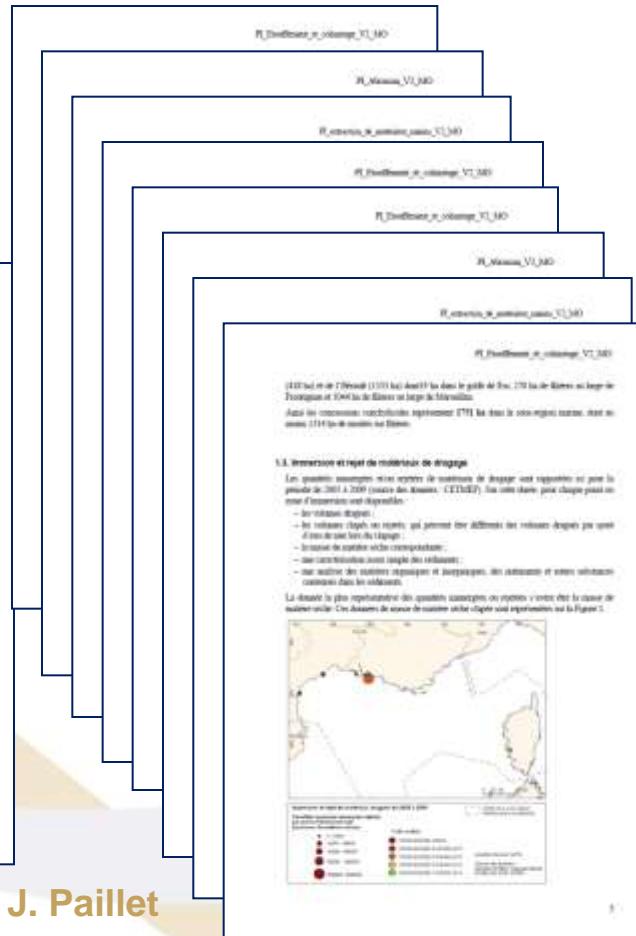
# **Initial assessment process (technical coordination AAMP- Ifremer)**

## 1/ expert contributions:

## Ecological features (36)



# Pressures and impacts (39)



# Economic and social analysis (34)



Impact assessment - IMPAC 3 - J. Paillet



## Initial assessment process

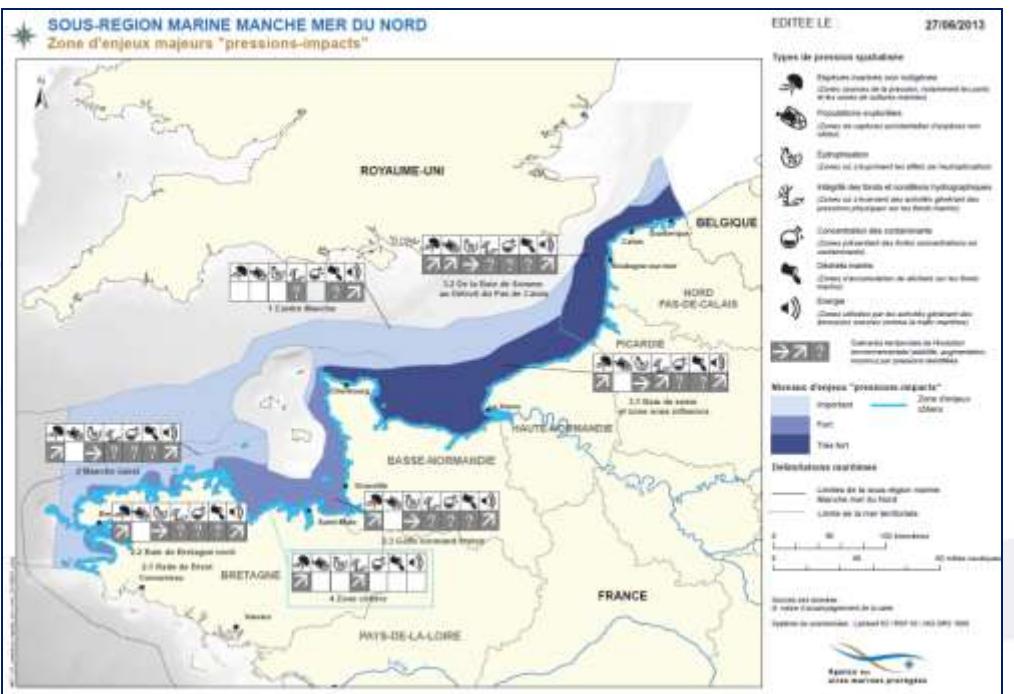
### 1bis: lacks at that stage....

- No global view on activities → pressures
- What about cumulative impacts of different types of pressures?
- What about relative strength of impacts, and prioritization?
- How to set-up « environmental targets » with all that information?



# Synthetic elements

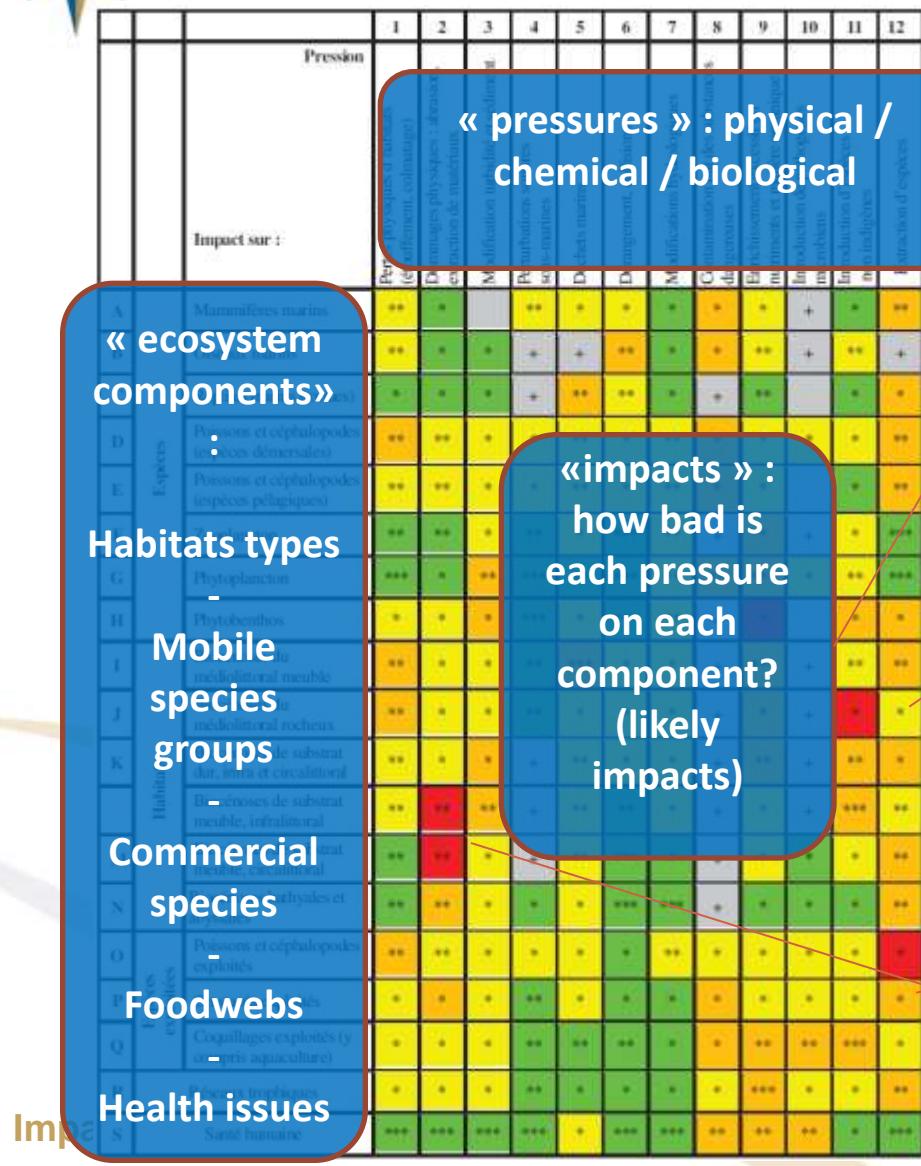
- Activities/pressure matrices
  - Impact matrices : degree of impact of pressures, per ecosystem component
  - Maps of the main ecological issues



	per- tes phys- iques	Domma- ges physiques	Autres perturba- tions physiques	Interfé- rence avec hydrologie	Introductio- n de substances danger- euses	Enrichis- s' par nutri- ments et MO	Perturba- tions biologiques										
Activités	Pressions	Etouffement	Colmatage	Modification solimen- tarité	Extraction sélective (minéraux)	Perurbation sonore sous marine	Déchets marins	Dérangement faune, collision	Modif régime thermique	Modif régime salinité	Introduction com- poudés synthétiques	Introduction substances non synthétiques	Enrichissement en nutriments	Enrichissement et matière organique	Introduction de pathogènes	Introduction espèces indigènes	Extraction - mortali- té d'espèces
Transport maritime			X	X	X	X	X				X	X	X	X	X		
Travaux publics maritimes	X	X	X		X	X	X	X			X	X				X	
Dragage / clapage			X	X	X	X					X	X				X	
Génie civil fluvial, barrages			X								X						
Posé de câbles		X	X	X		X		X									
Extraction de matériaux pour rechargeement plages	X		X	X	X	X											
Production électrique littorale																	
Exploitation éolienne offshore						(X)	(X)									(o)	
Exploration pétrolière ou gazière																	
Exploitation pétrolière offshore	(X)				(X)	(X)	(X)			(X)	(X)	(X)					
Peche pro par engins trainants de fond		X	X		X	X=0					X		X			X	
Autre pêche professionnelle			X		X								X			X	
Pisciculture	X	X				X						X	X	X	X		
Conchyliculture	X	X				X						o	X	X	X		
Agriculture												V	V				



# The « impact matrix » :



Red	High impact / high risk
Yellow	Significant impact /risk
Light Yellow	Low impact / risk
Green	No d'impact (interaction, or absence of pressure)no
Grey	Interaction exists, but impact unknown
Light Grey	Unknown Interaction, unknown impact

*	Low confidence in the assessment
**	Medium confidence
***	High confidence

Case	Couleur	Explication (pour la sous-région marine mers celtiques)
A12	Yellow	Les captures et mortalités accidentelles de mammifères marins liées à la pêche sont significatives pour les petits cétacés (marsouins et dauphins communs).
D12	Yellow	Les poissons démersaux, sont les cibles principales des pêcheries sur le secteur mers celtiques. Pour les espèces non ciblées, les rejets sont importants et le stock de plie est surexploité. Le stock non évalué de baudroie est en baisse.
J12	Yellow	Les activités de pêche de loisir impactent les communautés des fonds rocheux du médiolittoral.
K12	Yellow	Les activités de pêche et de prélevements des laminaires impactent les biocénoses des substrats durs infra et circalittoraux.
M2	Red	Les biocénoses de substrats meubles circalittoraux sont impactées par l'abrasion par les engins de pêche sur l'ensemble du secteur.



# The « impact matrix » process:

# **draft by the coordination team**



## Expert workshop (60 experts... with post-its)



# Revised Matrices & comments

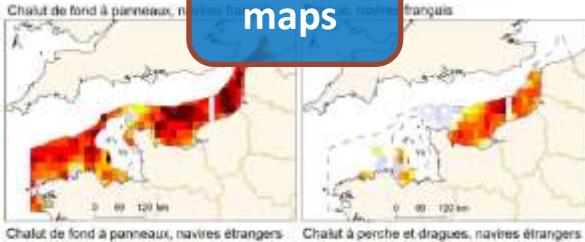
## Final adoption

# Regional stakeholders consultation

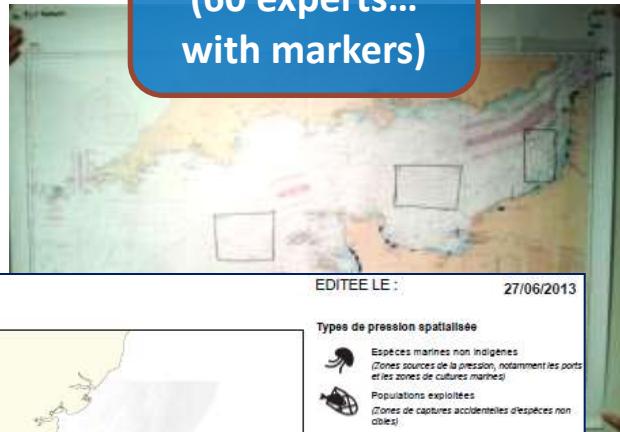


# A spatial analysis of « likely impacts »

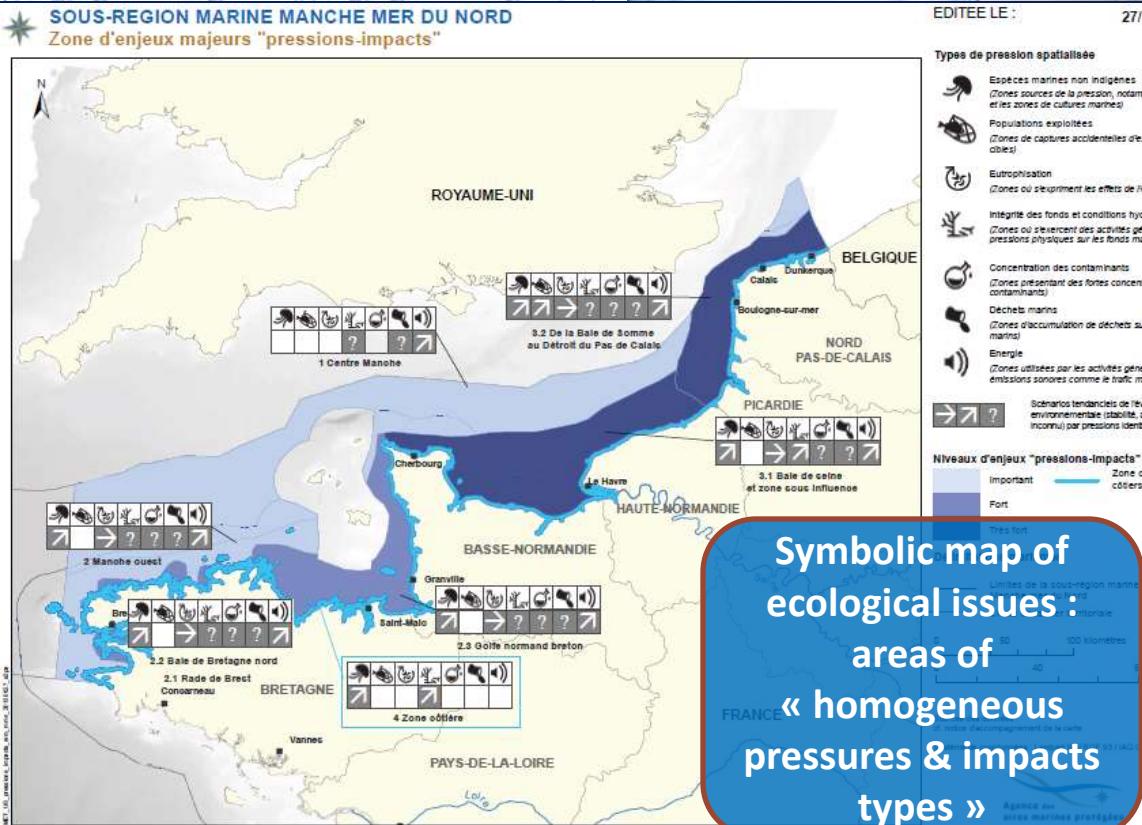
Pressure maps



Expert workshop  
(60 experts...  
with markers)

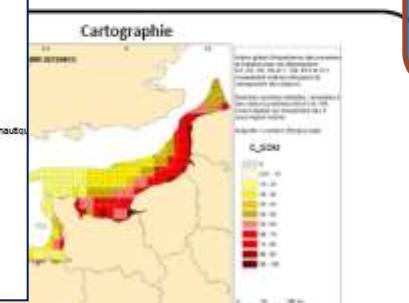
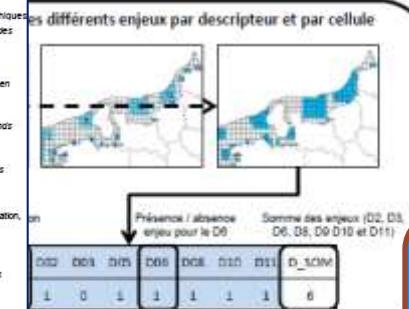


« likely impacts »  
maps for each  
pressure family



Symbolic map of ecological issues:  
areas of  
« homogeneous  
pressures & impacts  
types »

Fusion of all  
pressure





# After one year of stakeholders involvement & public consultation : ... the "Plans D'Actions pour le Milieu Marin"





## Conclusions:

- MSFD sets a frame for strategic environmental assessment in Europe ;
- It requires an ecosystemic approach and a holistic impact assessment ;
- That frame could be applied to (large) MPA management ;
- Progress remains to be done ... in many ways... and notably in international homogeneity!

Thank you!