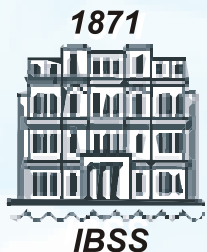




# OPTIONS FOR DELIVERING ECOSYSTEM-BASED MARINE MANAGEMENT (ODEMM PROJECT): CURRENT STATE AND RISK TO ACHIEVING GES IN THE BLACK SEA

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# Odemm project,

coordinated by Leonie Robinson,  
University of Liverpool, UK  
2010-2013

The Marine Strategy Framework Directive (MSFD) is aimed to promote clean, healthy, biologically diverse and sustainable seas. European Marine policy currently focuses on achieving Good Environmental Status (GES) by 2020.

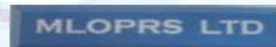
Sustainable exploitation of the European seas requires developing of ecosystem-based management taking into account current state of the regional seas and effect of human activities on their ecosystem.

## **Overall aim of ODEMM**

To develop a set of fully-costed ecosystem management options that would deliver the objectives of the Marine Strategy Framework Directive, the Habitats Directive, the European Commission Blue Book and the Guidelines for the Integrated Approach to Maritime Policy.

# ODEMM main objectives:

- Objective 1: To provide a comprehensive knowledge base to support policy for the development of sustainable and integrated management of European marine ecosystems. [WPs 1 & 2]
- - Objective 2: To develop Operational Objectives to achieve the High-Level Policy Objectives set by the Marine Strategy Framework Directive and the Habitats Directive, and with reference to the proposed Maritime Policy. [WP 3]
- - Objective 3: To identify Management Options (individual management tools and combinations of tools) to meet the Operational Objectives. [WP 4]
- - Objective 4: To provide a risk assessment framework for the evaluation of Management Options and to assess the risk associated with the different options. [WP 5]
- - Objective 5: To conduct a cost-benefit analysis of a range of Management Options using appropriate techniques. [WP 6]
- - Objective 6: To identify stakeholder opinions on the creation of governance structures directed towards implementation of the ecosystem approach and to elaborate different scenarios for changing governance structures and legislation to facilitate a gradual transition from the current fragmented management approach towards fully integrated ecosystem management. [WP 7]
- - Objective 7: To document the steps necessary for the transition from the current fragmented management scheme to a mature and integrated approach, and to provide a toolkit that could be used to evaluate options for delivering ecosystem-based management. [WP 8]
- - Objective 8: To communicate and consult on the outcomes of the project effectively with policy makers and other relevant user groups. [WP 9]





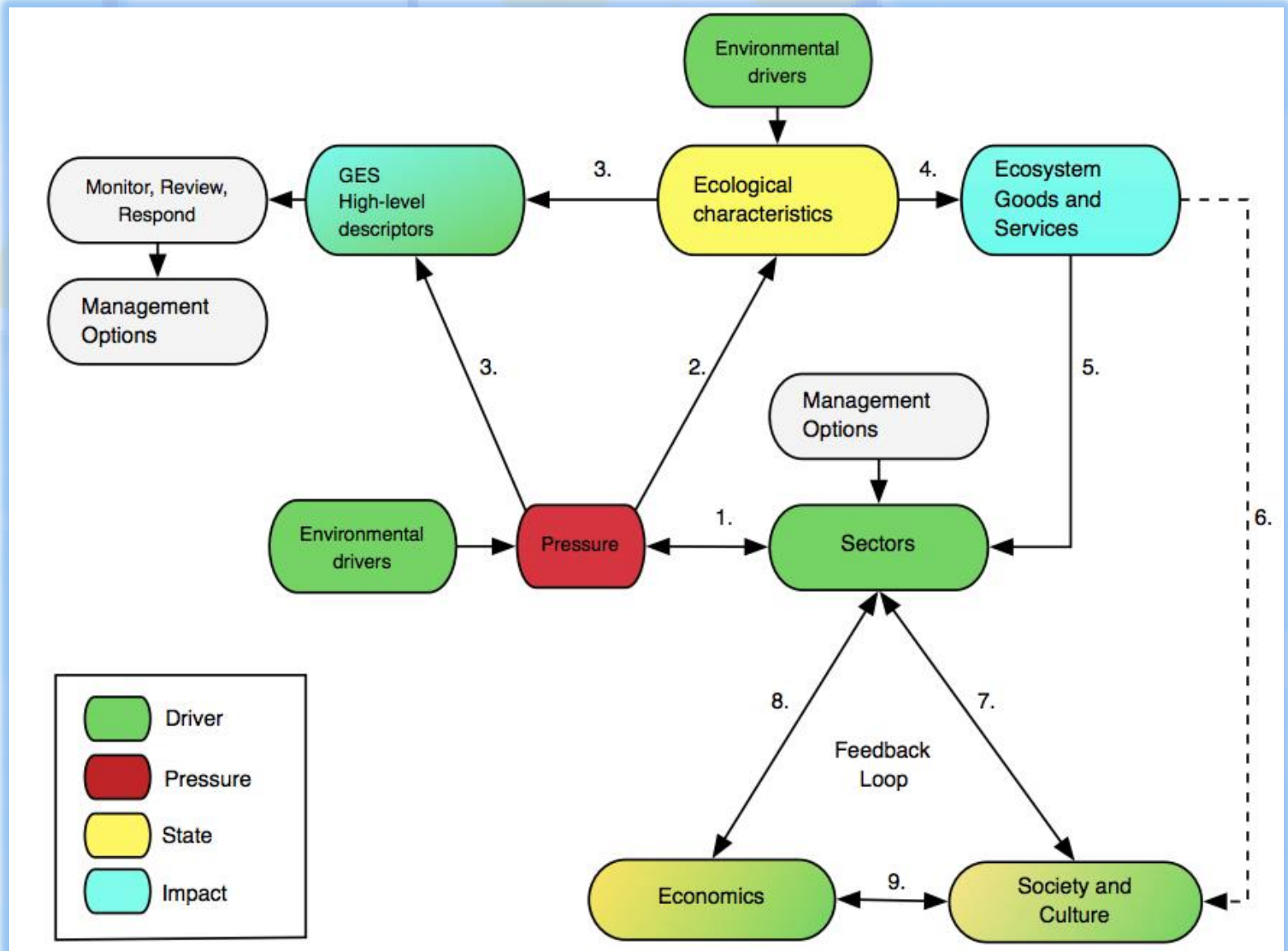
# EBM implementation

Meeting the objectives of an environmental policy is a three step-process :

1. Evaluate the **current state** of the objective indicator (e.g. relevant for particular ecological component) and develop realistic **target** of the states;
2. Identify **factors** that have either the potential to, or currently do **affect** indicator state and an evaluation of how each factor affects the state indicators ( i.e. what change in state is caused by the factors); and
3. Implement measures that ( effectively) mitigate the impact of those factors so that the target state is met

# ODEMM Ecosystem Framework

using DPSIR (Driver-Pressure-State-Impact-Response) approach



# **Risk assessment approach developed by the ODEMM project**

(Breen et al., 2011)

**Aimed to :** to determine the likelihood of failure to achieve GES under present conditions

**RA** – used the results of **Status** and **trends** of ecological characteristics **assessment**

**Risk criteria**, in conjunction with a working definition of GES, were developed by the ODEMM project, providing an approach to compare risk among descriptors and regional seas

# Risk assessment

In the Black Sea 5 GES descriptors were classified as currently being at high risk of failure to reach GES :

- D2 - Introduction of non-indigenous species
- D3 - Commercial fish and shellfish,
- D4 – Foodwebs,
- D5 - Seafloor integrity,
- D10 - Marine litter.

Non-indigenous species (NIS)	Two NIS species, <i>Rapana venosa</i> and <i>Mnemiopsis leidyi</i> have historically caused widespread problems in the region. Despite a reduction in <i>Mnemiopsis leidyi</i> abundance, the density and distribution of the species continue to cause impacts in the region
Commercial fish and shellfish	Destructive fishing practices and over-exploitation has led to the decline of many benthic and pelagic fish species with stocks collapsing in the 1980s. Stocks have been slow to recovery with several species under threat
Food webs	Commercial fishing led to mass destabilization of the marine food web with removal of important top predator fish species. This was a factor in the rapid expansion of the invasive ctenophore, <i>Mnemiopsis leidyi</i> and reductions in native plankton species
Seafloor Integrity	Human activities such as agriculture, coastal infrastructure, fishing, shipping, tourism and recreation, and waste water treatment have detrimental effects on seafloor integrity
Marine Litter	Several human activities including coastal infrastructure, fishing, land-based industry and shipping introduce commonly introduce litter throughout the region



# **Pressure assessment approach developed by the ODEMM project**

(Robinson and Knights 2011)

**Aim:**

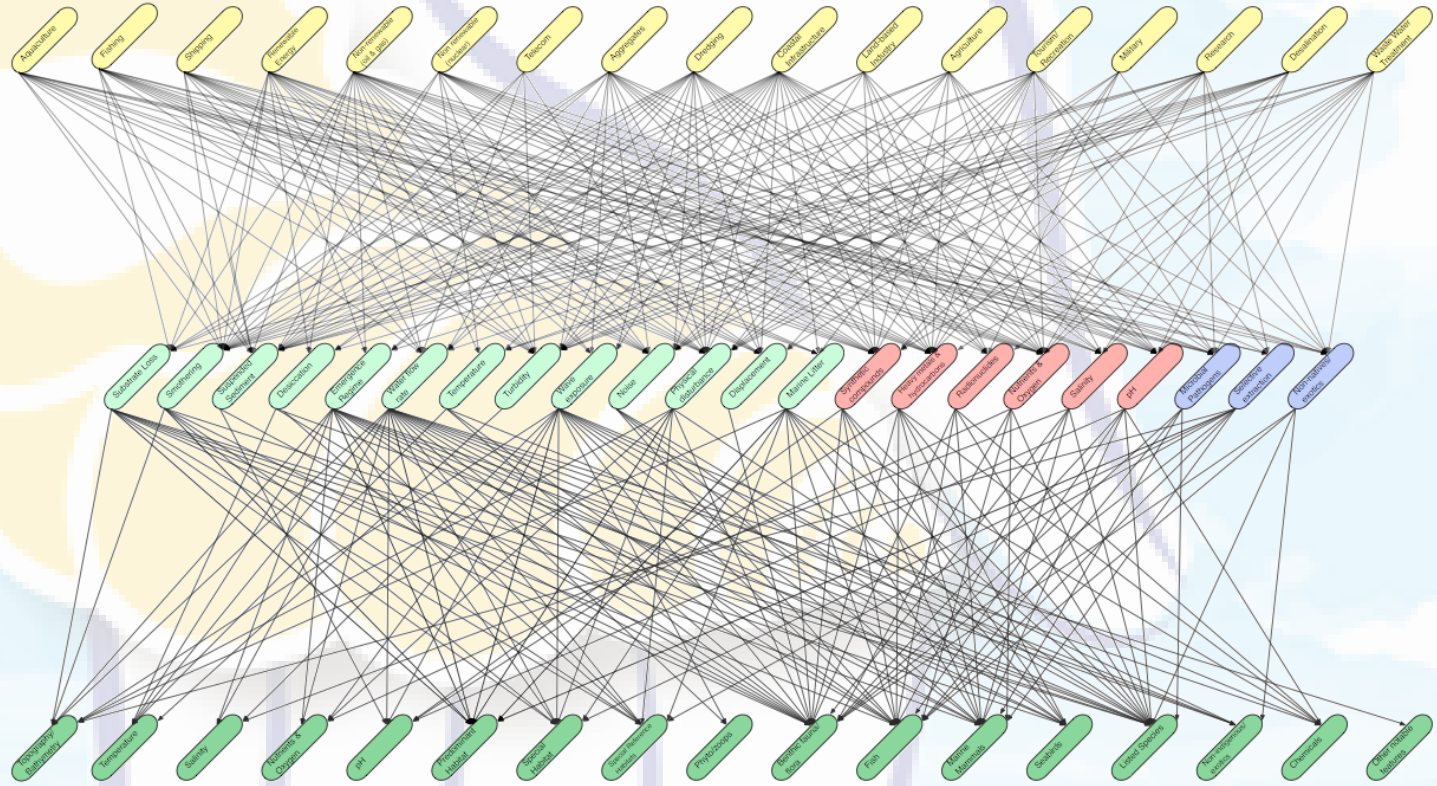
**Identification of the sources of risk associated  
with meeting High-level Objectives (HLOs)**

# Sector-Pressure-EC links

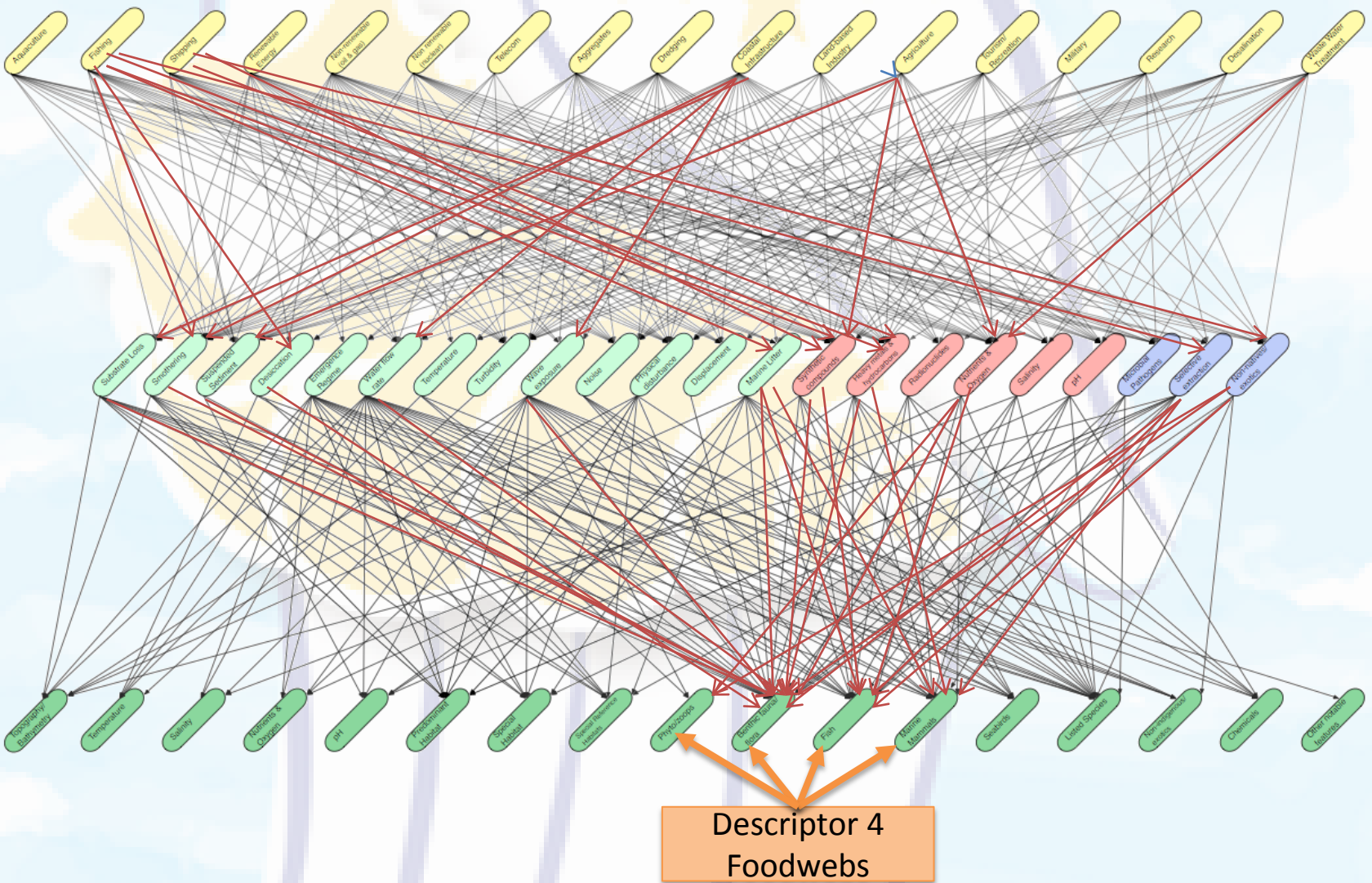
Sectors

Pressures

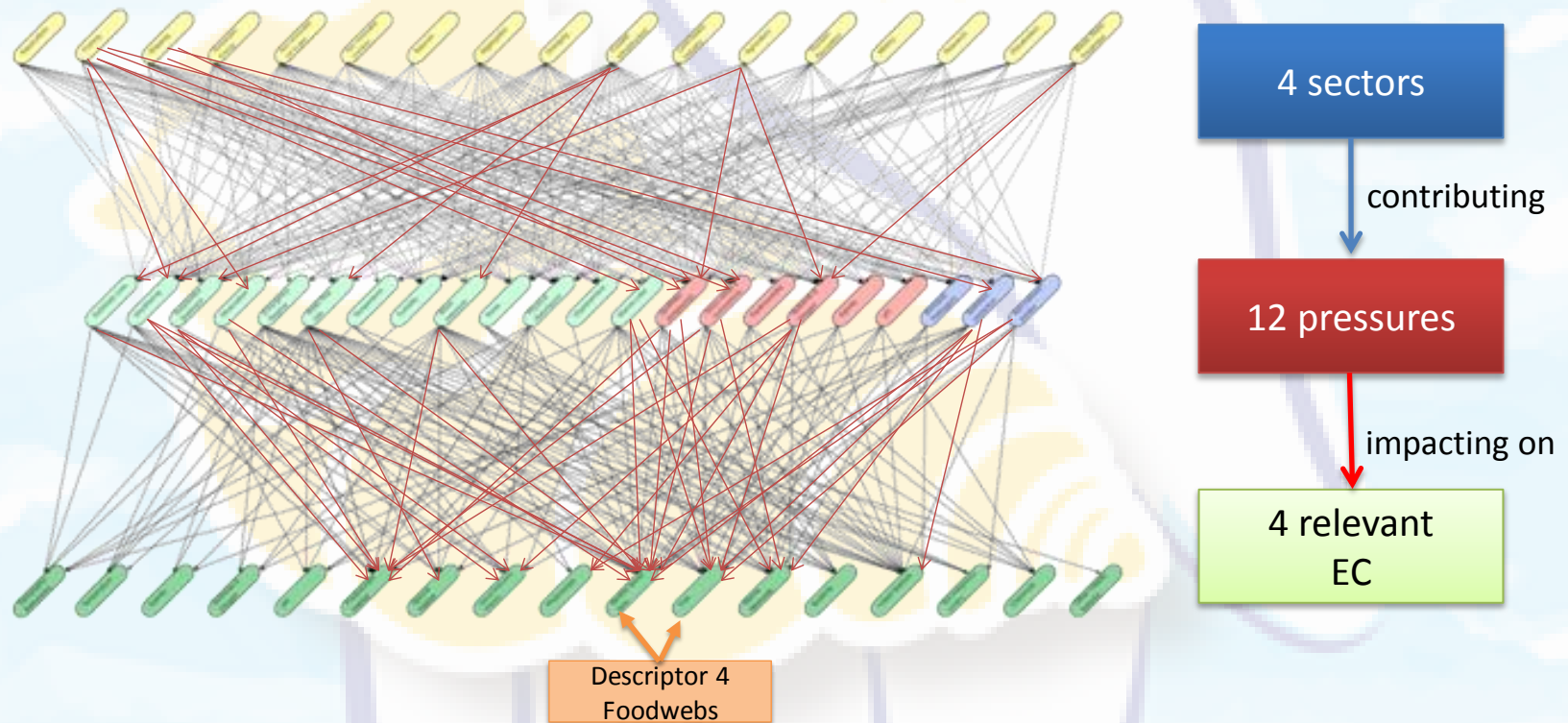
Ecosystem



# Linkage Networks: to identify threats



# Applying the ODEMM Impact Chain Framework for the Black Sea D4 Foodwebs



The PA showed that in the Black Sea key deteriorating human activities are related with four sectors:

- Fishing;
- Shipping;
- Agriculture,
- Coastal infrastructure,

# Pressure assessment the Black Sea Food web case study

*Aim - to define high threat pressure-  
impact combinations*

- **Function of:**

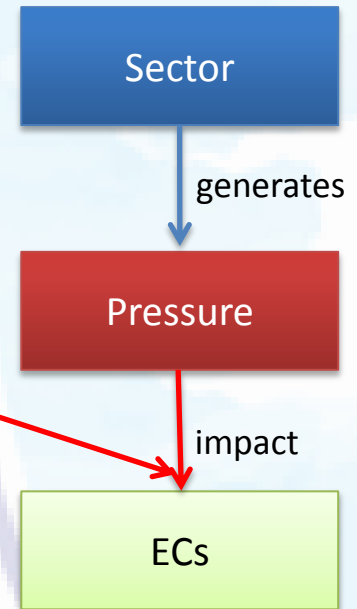
Degree of  
Impact (DOI)

Spatial  
extent

Frequency

Persistence

Resilience



ECs

Impact was considered as a change in the state of ECs

The degree of impact = type of response of the EC to the pressure (change in the state of ECs)

Overlap of the pressures and ecological characteristics was evaluated by comparison of the spatial extent/distribution (6 possible categories);

Persistent - time of response after particular activity disappear;

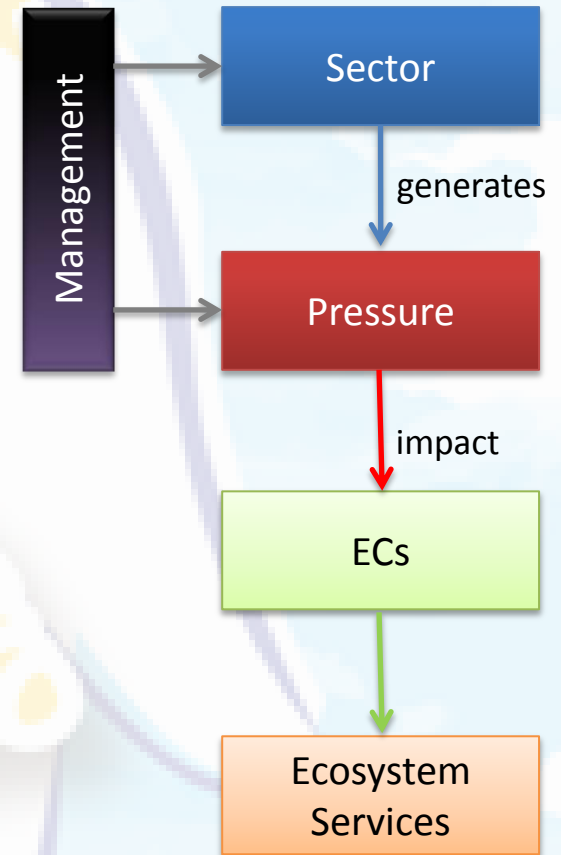
Resilience -categorized based on recovery times














Next step  
evaluating of management measures  
to work toward  
Good Environmental Status

# EVALUATING MANAGEMENT

- the high threat sectors/pressures - **current** management ( how managed?)
- How does management affect state of the ecological characteristics?
- Is management likely to improve state of the ecological characteristics by 2020? (and thus move toward GES)
- If not, what **additional management measures** could be implemented?
- What are the likely **costs** (e.g. resources) and **benefits** (in terms of ecosystem services) of this additional management?



## Cost – benefit analysis

Management option	Direction of state change (by 2020)*	Associated costs	Change in ecosystem services (benefits)
Current	Not considered to achieve GES		
Option 1			
Option 2			
Option 3			

\* precautionary assessment



# ODEMM Toolkits

1. **Linkage Frameworks and Network Simplification** - Ecosystem structure (mechanisms) and decision support
2. **Risk Assessment Frameworks** – Qualitative and Quantitative approaches; decision support tool
3. **Pressure Assessment** – Threat evaluation (current and future scenarios)
4. **Management Strategy Evaluation (MSE)** – decision support tool (measure performance [environmental change])
5. **Ecosystem service Cost-Benefit Analysis** – decision support tool (society and economy)
6. **Stakeholder Consultation Toolkit and Governance Decision Support Tools** – quantitative and qualitative techniques



**THANK YOU FOR ATTENTION**

