| WP4. Multi-scale tools, methods and models for integrated assessment<br>Task 4.5. Economic Assessment Tools | Tool Fact Sheet N°XX |
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# Tool: Costs of Ecosystem Degradation (Costs Based Approach)

This Factsheet gives an overview of a cost based approach to assess the degradation costs of coastal and marine ecosystems.

## Background and objectives

Ecosystems are degraded by over-use. There's then a need to remediate to this degradation in order to sustain commons ecosystem services supporting economic welfare and social wellbeing. Then there are non-paid costs still needed to remediate ecosystem degradation. In the lack of remediation, ecosystem capital is depreciated similarly to any infrastructure (investment costs to balance depreciation).

"Usually" or today, the approach to assess the degradation of ecosystem capital is based on assets values (difference in Net Present Value of ecosystems services assessed through monetary valuation) as underlined by the following figure (Figure 1).

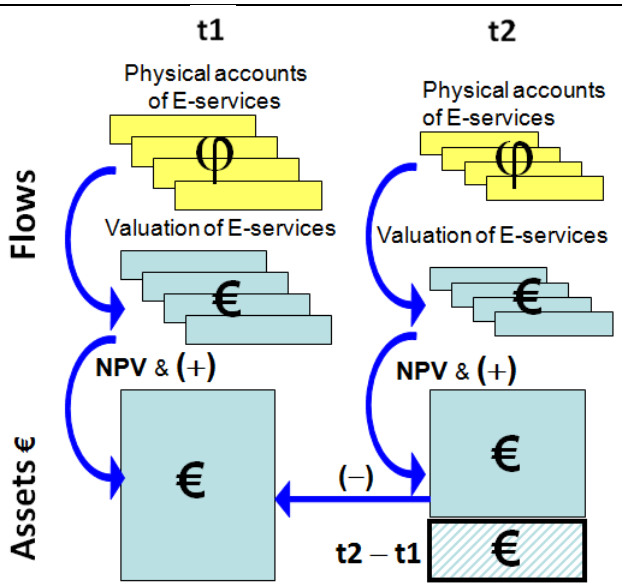


Figure 1 Estimation of ecosystem capital depreciation – J-L Weber (EEA) 2011

This first way, based on monetary valuation of ecosystem services (E-services) through CBA (Costs Benefits Analysis) and the concept of Total Economic Value (TEV) including non market goods and services, raises a number of issues: reliability, aggregation issues, misinterpreting results and analyses (value from surrogate markets), lack of references for marine transfer values, CASES capacity to implement such approach…

Economists are working **on changes** and then value of changes. In the PEGASO approach this will lead to further consider analyses of values as well as focusing on the interface of values and decision making. Instead of using CBA as a decision-making tool it can be used in a much more heuristic manner, where sensitivity analysis is employed in order to explore elements of the analysis which may be uncertain or controversial.

Under such context, I/O and Green I/O as well as cost based approaches (restoration costs, remediation costs, replacement, …) seem to better fit with other PEGASO tools (especially LEAC) and the spatial dimension. This is the purpose of the second way to estimate ecosystem capital depreciation (Figure 2).

In a Pressure Impact framework, difference in terms of physical assets leads to this depreciation of ecosystem capital. Present remediation costs to balance this depreciation are then assessed by accounting pressures responsible for degradation. Their aggregation according to their type gives an overview and an estimation of ecosystem capital depreciation (Figure 2).


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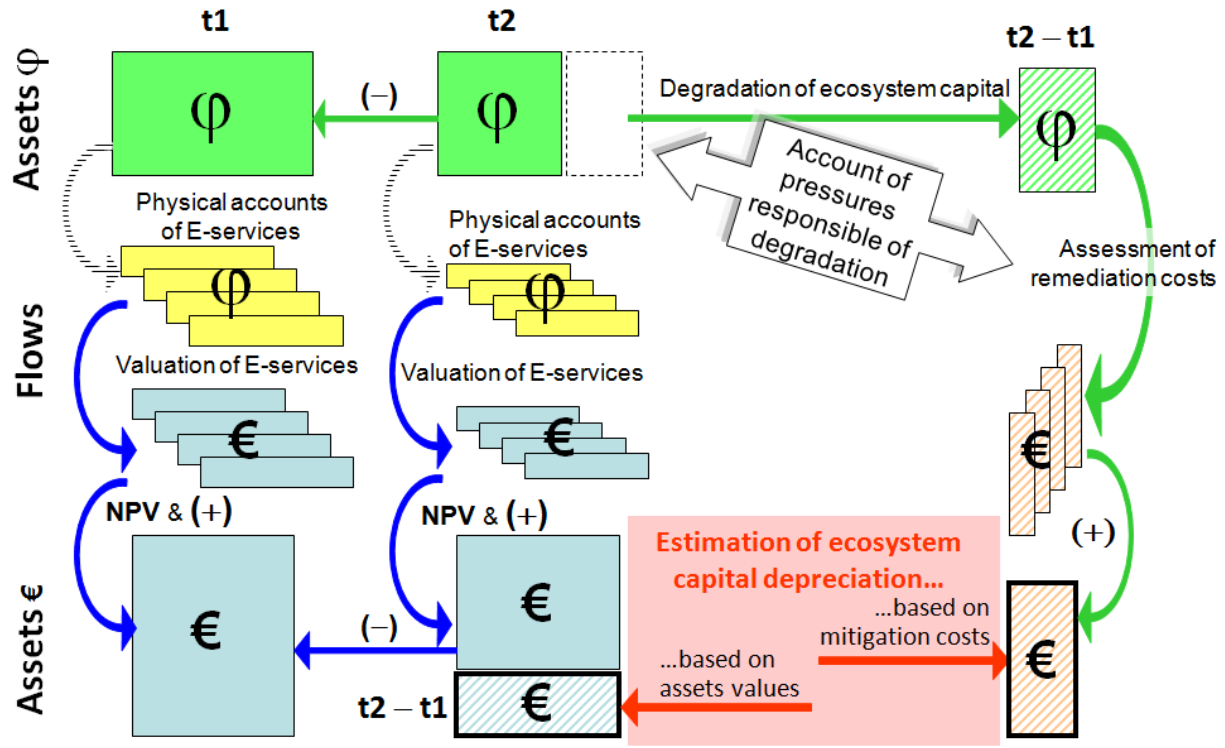


Figure 2 Estimation of ecosystem capital depreciation: 2 ways
From J-L Weber, *Recapping on ecosystem accounting*, EEA, Copenhagen, March 2011

To undertake this cost based approach, it is proposed to implement a framework develop for the social and economic analysis of the MSFD (Marine Strategy Framework Directive) in the frame of the initial assessment.

## Framework from the social and economic analysis of MSFD

According to availability of data and knowledge, the analysis focuses on direct use value (value allocated to goods and services effectively used in the present or future). Costs assessed will be related to past, present or potential degradation.

An approach in terms of degradation thematic is selected amongst several potential organization options. It relies on the main pressures (listed at the Annex III of the MSFD) and descriptors of GES (Good Environmental Status):

- Marine litters - Macro Wastes
- Micro pollutants (contaminants)
- Microbial pathogens organisms
- Accidental and operational oil spill
- Eutrophication
- Invasive species
- Degradation of exploited biological resources (fisheries, aquaculture)
- Loss of sea floor integrity, biodiversity and degraded marine food webs
- Degradation related to introduction of energy and alteration of hydrological conditions

Additional to fit with PEGASO issues: erosion…

Costs typology:

1. Monitoring and Information costs
2. Costs of positive actions/measures in support to the environment (costs related to prevention and avoidance of degradation)
3. Mitigation and remediation costs
4. Costs related to residual impacts (related to losses of market and non market benefits); including qualitative and non monetary assessment.

## Implementation Process

STEP 1. Define degradation thematic

STEP 2. Identify and quantify costs related to monitoring and information, mitigation costs and positive actions costs required for the improvement of marine environment.

STEP 3. Document residual impacts costs on human wellbeing through multi-criteria (see MCA tool factsheet), qualitatively or quantitatively if any. State of reference from which costs are assessed has to be detailed.

Assessment can be restricted to some thematic at the CASES level, according to the issues addressed and intrinsic properties of the study site.

The social and economic analysis of the degradation cost of marine and coastal ecosystem can be advantageously completed with a sector analysis where activity sectors are described, using outputs from the Environmental Territorial Diagnosis tool implementation (see ETD factsheet).

## Data

Public statistics and surveys (opinions, qualitative and quantitative), professional organizations… Some of them already identified in the EDT tool if implemented).

## Needs and requirement

For each of the thematic it is assessed 1 to 2 months of two knowledgeable persons from the thematic, knowing that it can exist potential scale economies with other thematic.

For more information on Costs of Ecosystem Degradation tool and a list of publications, handbook and/or guidelines visit: http://www.pegasoproject.eu/xxxxxxx.htm

Authors: University of Brest UMR AMURE IFREMER Agence des aires marines protégées


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