

Short description of the Ecosystem Services Assessment (ESAT) Tool

The Ecosystem Services Assessment Tool is a new approach and methodology for the assessment of marine ES, focusing on coastal and transitional waters.

The main aim of the tool is the assessment of changes in ES provision over time. Defining an initial status, referring to a point in time marked by good ecological conditions, we compare it with a present status representing actual ecological conditions. We then through indicators classify changes in a scale from -5 to 5 representing decreases, no changes and increases in services provision over time.

The tool is built as Microsoft Excel spreadsheet file intending to be an easy to apply tool, enabling a fast assessment with low use of resources.

Within the tool there is an explanation of the approach, as well as, the workflow of the assessment, through an intuitive and comprehensive guided process.

Ecosystem Services Assessment Tool (ESAT) Framework

Definition of the study area (following guidelines of Water Framework Directive)

Step 1 – Definition of study area

The definition of the study are follow the guidelines of the document “Guidance Document n°5 “Transitional and Coastal Waters – Typology, Reference Conditions and Classification Systems” (EC,2000) of the WFD. This document proposes the classification of coastal waters into water body types and sub-types based on physical and chemical parameters (such as temperature, salinity, tidal range).

Definition of two time periods representing different ecological status

Initial Status
(good ecological conditions)

Present Status
(actual ecological conditions)

Step 2 – Definition two time periods representing different ecological status

- **Initial status:** The initial status is defined to represent a point in time where the good ecological conditions of the water body defined in Step 1 are present. The GES can be derived following the approach of WFD, where each MS had to define reference had to define a high environmental status, the so-called reference conditions, for all their coastal and transitional waters types. Based on biological quality elements and following EU recommendations and the approach by Schernewski et al. (2015) a GES can be derived by adding 50% to the nutrient concentration (TP and TN) of the reference conditions. So it will be a point in time where nutrient concentrations where 50% higher than the ones observed in the reference conditions. The initial status takes into consideration 5 year time span.
- **Present status:** The present status refers to a time period representing the actual ecological conditions of the same water body defined in step 1. It is recomended to take a time period of 5 years back counting from the year of the assessment.

31 Ecosystem Services (Provisioning, Regulating & Maintenance, Cultural Services)

Reliability score:

- 1 – Very high
- 2 – High
- 3 – Moderate
- 4 – Low

54 Indicators

Data documentation:

- Type of data
- Observational
- Literature
- Other (Modeling)
- Expert
- Source
- Year

Initial Status

≠

Present Status

< 1/4.1	1/2.5 to 1/4.1	1/1.7 to 1/2.5	1/1.3 to 1/1.7	1/1.1 to 1/1.3	Initial Status	1.1 to 1.3	1.3 to 1.7	1.7 to 2.5	2.5 to 4.1	> 4.1
lower ES provision			no change	higher ES provision						
-5	-4	-3	-2	-1	0	1	2	3	4	5

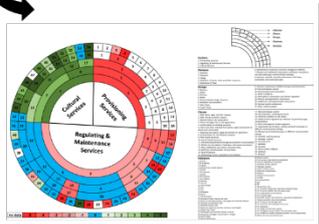
Step 3 – Assessment of ecosystem services for the Initial and Present statuses

The third step is the actual assessment of ecosystem services and it is divided into 3 sub-steps:

3.1 – In this sub-step the user has do go trough the list of the 31 ES and decide which services are relevant for the study area or not. This may be based on a literature review or trough a round or expert interview. The output is an updated list of ES to be considered for the assessment.

3.2 – Once relevant ES are defined, then the user has to look for data to assess the respective indicators corresponding to each service. This has to be fone for he initial and for the present status. At this stage, after acquiring information for each indicator considered, the user has to document the type of data was used, source and year. Furthermore, aiming at reducing the subjectivity of the assessment, the user has to provide a reliability score for each indicator. This score is achieved based on guidelines provided by the tool for each combination of type of data and reliability score (ANNEX X)

3.3 – The last sub-step is the allocation of the indicators and services into a category of change, based on a numerical scale. The categories of change are calculated based on the indicator value for the initial status. Each category has two borders. The user has to choose the category of change in the present status by comparing the value with the initial status. In the middle lies the initial status, wich a correspondig category 0, representing no change in ES provision over time. To the left are the negative categories, representing an increasing decrease in ES provision. On the contrary to the right side and positive categories, it represent an increasing provision of ES over time.



Step 4 – Visualization of results

The last step of the assessment if the visualization of results. Since the tool was developed to be computer aided, once the user provides the required input, all result outputs are done automatically.

The results outpus provided are:

- Horizontal bar-chart showing the category of change for ES
- Aggregated results to Sections of ES
- Detailed doughnut chart showing all levels of CICES classification
- Metrics about the indicators used, type of data used and reliability

Framework of ESAT

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