

Cumulative Effects Assessment using DESEASION In the Var County area, France Western Mediterranean

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Supporting Implementation of Maritime Spatial Planning in the
Western Mediterranean region



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1. Test the use of DESEASION tool for MSP issues

The knowledge of the marine environment is a baseline for the implementation of Maritime Spatial Planning. It is of major importance to understand the complex interactions between activities and environment, and within activities, in order to organize activities while taking into account the needs of an economical development, and of a good ecological status.

The use of the decision tool named “DESEASION” was tested during the project SIMWESTMED, in the Var Case Study, to implement and spatialize a rules-based system based on pressures and impacts models. DESEASION tool is a hosting platform integrating GIS functions, in which scientific can implement evaluation models.

As the tool is in a development phase, the main challenge was to confront it to a real case study. Topics and related data used came from Holon *et al.*, 2015 and are taken from www.medtrix.com. In this first attempt and facing to the difficulty of dataset collection, this study case is limited to 3 anthropogenic pressures (agriculture, anchoring, urbanization) occurring in the Var region in France and 1 ecosystem (*Posidonia* seagrass), in GIS format files. Two preliminary steps were done.

2. Experts and scientific pressures modelling

Two preliminary steps were done. First, each pressure was mapped according to its distribution model, with a decrease between 100 to 0% from the origin of sources by creation of buffers (test based on the paper of Holon *et al.*, 2015). Bathymetry is also taken into account in the computation of buffer values .

Second, these resulting pressures maps have been crossed with *Posidonia* habitat maps (addressing the presence or absence information).

3. Cumulative impacts evaluation

Two approaches were tested using DESEASION in order to make an evaluation map of the area.

The first one consisted in applying a cumulative impacts model, where pressures were normalized and weighted (Halpern *et al.*,2008).

The second one was based on the definition of pressures-impacts rules through a learning algorithm : using expert’s statements on some selected areas and each individual pressure maps, the learning algorithm simulated the expert’s reports and thus calculated the weighting value of each pressure, before to produce the aggregated impacts of the overall area.

4. Decision aid

The cumulative map was, in fact, a spatial synthesis of the knowledge of this marine area. Although synthetic, this map remained complex to be interpreted by a decision maker in a maritime spatial planning process. To make easier the visual display of results, impacts were classified in 5 categories. This synthetic map can be used as a decision map as far as the categories identify a maximal tolerance threshold for a given objective.

The tool can adapt to various scales and can accept a diversity of data types and resolution. In this example, we used raster data (converted in shape format inside the tool), shape maps and data point information (extended with buffers inside the tool). All the geometries of the data sources are kept throughout the process. For example in this study case, the GIS functions of the tool analyze the overlaps between bathymetric information and pressure map in order to create a new integrated map: crossing a pressure indicator shape with an isobath divides it in 2 areas keeping the content and the resolution of each data sources.

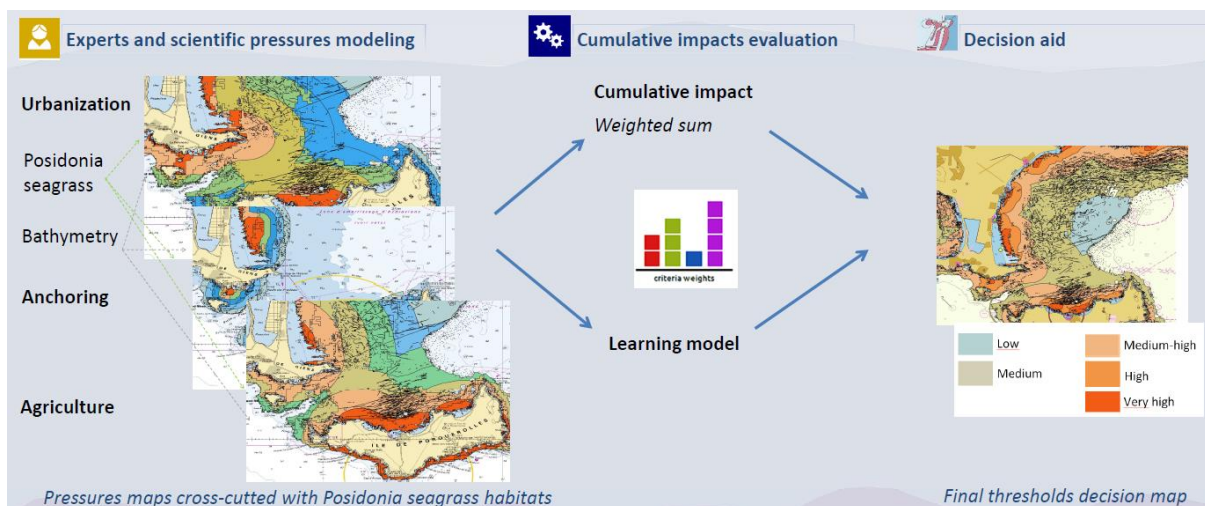


Figure: Cumulative impacts assessment process using DESEASION

About DESEASION

DESEASION is developed within the framework of a scientific french collaboration between IMT Atlantique and Shom (license EUPL v1.1)

More information available at <http://recherche.imt-atlantique.fr/deseasion/>