



## 3<sup>rd</sup> International Symposium on Integrated Coastal Zone Management

[PP-26]

### **An Italian monitoring proposal of Underwater Noise: relationship between the EU marine strategy framework directive (MSFD) and marine spatial planning (MSP)**

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The marine environment plays a fundamental role in the climatic balance, and is a valuable and important source of economic resources, social well-being and quality of life.

In recent years, many studies have evaluated the effects of anthropogenic acoustic disturbance on marine organisms. Sounds, associated with shipping, seismic surveys, sonar, and many other anthropogenic sources, induce several types of effects in fishes and marine mammals. In this regard, the European Framework Directive 2008/56/EC (Marine Strategy) has defined underwater acoustic noise as "the intentional or accidental introduction of acoustic energy in the water column from impulsive and diffuse sources" and has expressly identified it as a form of pollution.

A recent Italian proposal has been defined with the aim to envelope a wide monitoring plan for all the sea sub-regions adopting two different sub-programs: impulsive and continuous sounds.

The objectives of the sub-programs are the implementation of a recording system for temporal-spatial information about the impulsive sound sources from anthropogenic activities. The pressure is measured evaluating the source level or suitable proxy of anthropogenic sound sources, measured over the frequency band 10 Hz to 10 kHz and until 40 kHz for cetaceans detection, that could have effects on marine organisms.

The sub-program for continuous low frequency sounds adopts trends in the ambient noise level within the 1/3 octave bands 63 and 125 Hz (centre frequency) (re 1  $\mu$ Pa RMS; average noise level in these octave bands over a year) measured by observation stations. The monitoring plan aims to obtain noise maps of sea regions improving the existent observation stations, from i.e. National Institute of Geophysics and Volcanology (INGV) and National Institute of Nuclear Physics (INFN), with other monitoring medium-long term stations for the frequency band 10 Hz-10 kHz and until 40 kHz for cetaceans detection. Moreover, this program wants to define the damages levels of underwater noise using an experimental approach in order to evaluate the impact of noise on different marine organisms.

The maritime spatial planning (MSP) and integrated coastal management will have to employ an ecosystem-based approach that ensures the protection of the natural resources that provide the basis for carrying out the various monitoring activities. This paper adopt the Italian proposal to analyse the strategic vision on the Marine Strategy Framework Directive (MSFD) and Marine Spatial Planning (MSP) to achieve the Good Environmental Status (GES) using the acoustic approach to measure the status of actuation of marine policy programs.

**Keywords:** underwater noise, marine strategy framework directive, marine spatial planning

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### **Who is responsible? - A methodology for determining marine litter sources**

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**Objective:** The increasing amount of litter in the marine environment is recognized as one of the biggest yet solvable pollution problems worldwide. For the establishment of successful management plans aiming at the reduction of marine litter the determination of the source of litter items is deemed indispensable. The classical differentiation between land-based and sea-based activities and the inclusion of whole sectors, e.g. the tourism sector, as litter source has commonly led to attribution problems. Several attempts were made to provide a methodology allowing the attribution of litter items to the established source categories. Contrarily, we propose a restructuring of the source categories to provide a simple and widely applicable method for source identification.

**Material and Methods:** For a detailed categorization of litter items, the Master List of Categories of Litter Items as provided by the European Marine Strategy Framework Directive (MSFD) was modified: Categories for region specific litter items were added and categories which did not allow an explicit attribution to one usage group were broken down into sub-categories. Sources were then identified for each litter category based on the last type of usage or activity, where an item was employed. Secondary uses were taken into consideration.

**Results:** Twelve source categories were identified: Agriculture, Construction, Domestic and Household, Fishing, General Packaging, Medical and Personal Hygiene, Industrial, Personal Use, Rapid Consumption, Recreation, Smoking, and Unclassifiable.

**Conclusion:** The proposed sources can be easily attributed to a modified version of the Master List of Categories of Litter Items of the MSFD. Hence, this classification facilitates source identification remarkably and makes it applicable on a broad spatial scale. However, regional characteristics and secondary uses of items have to be considered to achieve a thorough attribution of litter items to sources.

**Keywords:** Litter classification, Litter composition, Usage groups