

SENSITIVITY MAPPING OF THE FRENCH MEDITERRANEAN COASTAL ENVIRONMENT

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Abstract

In case of any accidental marine pollution, the vulnerability of coastal zone not only depends on the extent and type of pollution, but also on the environmental and socio-economic characteristics. Therefore, to allow decision makers and experts to assess their decisions on synthetic and operational information, an atlas of sensitivity for French Mediterranean coastal environments is produced. The estimated sensitivity, defined for each delimited section of the coast, is based on many physical, ecological and socio-economical criteria.

Keywords: Coastal Systems, Gis, Pollution, Economic valuation

Introduction

Today, about 30% of the international maritime traffic concern Mediterranean harbours or are on transit and estimated 50% of the transported merchandises are supposed to present a risk (Aprin et al. 2008). An accidental release of hydrocarbons or chemicals is rendering the marine and coastal zones vulnerable. In order to face such accidental marine pollutions and their consequences, specifically adapted coastal management strategies and decision making processes are needed. Within this context, the project CLARA II (Calculs Liés Aux Rejets Accidentels en Méditerranée; <http://clara2.ema.fr>) aims to provide a decision support tool focussing on the French Mediterranean. Among other things, this tool will provide a sensitivity atlas of the French Mediterranean coast. Produced sensitivity maps are used to support decision makers and experts to prepare the interventions and to first estimate the consequences in case of pollution.

Methodology

In order to establish the respective sensitivity maps, the French Mediterranean coast (including Corsica) has been divided in zones. Taking into account main environmental characteristics as well as requirements to management and decision making processes in case of an accident, 32 zones have been distinguished. Seawards they are limited by four miles and/or 50 meters depth. The collection embraces information and data on the various environmental (physical, dynamical and biological) and socio-economic characteristics. Face to any marine pollution, these stakes presence and importance will contribute to increase or decrease the vulnerability of a zone. Therefore, we consider them as sensitivity factors. Their individual values are evaluated on a sensitivity scale from 1 (less sensitive) to 5 (very sensitive), which translates their relative importance. For instance, south Corsica zones present a high sensitivity considering risk on protected areas (see Figure 1). While distinguishing the summer and winter season, this will be done fore each of the 32 zones and for each type of pollutant studied. On this basis, a "global" index (encompassing the environmental and economical indices) is calculated for each of the zones and the two seasons. This step of the study is accompanied by a multi-criteria study, based on different point of view to give a relative weight to each factor. In order to homogenise and treat the spatial data we use a Geographic Information System (Arc GIS9 ESRI).

Results and Conclusions

Sensitivity indices are attributed to all selected and collected data: Environmental factors (e.g. biodiversity, protected areas, cost morphology), and socio-economical factors (e.g. fisheries and aquaculture as well as tourist and recreational activities). While distinguishing the summer and winter season, this is done fore each of the 32 zones and for each type of pollutant studied. The resulting sensitivity maps aim to geographically represent the sensitivity indices of one zone relative to another zone. A correspondence to so-called absolute values is not intended.

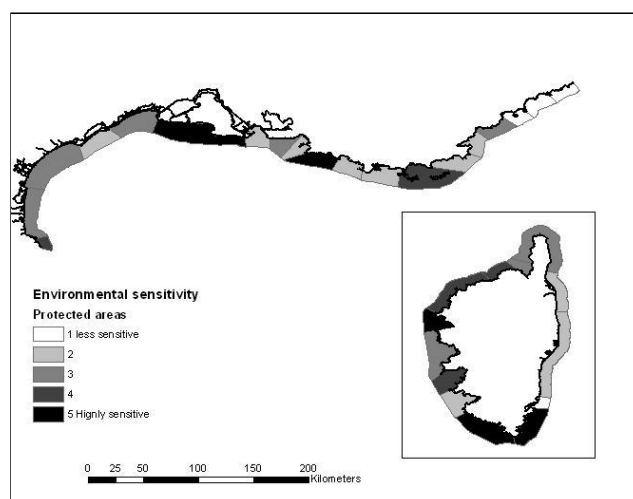


Fig. 1. French Mediterranean Sensitivity relative to existing protected areas

Firstly dedicated to the French Mediterranean coast, moreover, the concept aims to create standardized tools which make it possible to represent and compare the sensitivity of various coastal environments. Our preliminary results underline the potential to transfer the approach, and encourage the possibility for an application beyond the immediate objectives of the project CLARA II.

References

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