

## **Local knowledge for marine spatial planning: understanding interactions between fisheries and seagrass meadows in San Simón Bay (Galicia, NW Spain) through participatory mapping processes**

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### **Summary**

San Simón Bay (NW Spain) is a shallow 2.252,06 hectares protected natural area and approximately the 96% of this Site of Community Importance (SCI) belongs to a marine environment. This bay is an example of the interactions between fisheries and seagrasses, where seagrasses play an important role in the production of finfish and shellfish and where the seagrass meadows are vulnerable in the face of the pressures relied on fishing practices.

Participatory mapping facilitates the inclusion of local knowledge in marine spatial planning processes. The identification and valuation of marine and coastal areas that are most important for humans makes it easy to understand the interactions between marine users and nature. As well as to detect synergies and trade-offs between sectorial policies.

### **Introduction**

It is well known that coastal communities provide a clear example of the interactions between societies and nature. Coastal communities across the globe rely on seagrass meadows directly for food and livelihoods. (Cullen-Unsworth et al., 2013).

Integrating social dimension can lead to a better comprehension of human-environmental interactions. Explicitly including social considerations creates the opportunity for planning to become more realistic and inclusive, clarifying the hard choices and complex trade-offs between and within conservation and other objectives (Ban et al., 2013).

A number of participatory tools have been developed to show how and where local knowledge should be incorporated into environmental decision making (see Sayer and Campbell, 2004; Lynam et al., 2007; Cowling et al., 2008; Reed, 2008; Stenseke, 2009 for reviews). These authors propose the need for a science that uses active research to identify local priorities for management; considers values at multiple scales; emphasises empowerment, equity, trust and learning, and; systematically integrates multiple knowledge systems into environmental decision-making (Raymond et al., 2009).

### **Materials and methods**

Through the participatory mapping we obtain spatial information about where human activities occur, where those activities are more valuable (intraspecific weights) and seagrass meadows distribution. Besides, complementing the participatory mapping with a semi-structured interview we identify relations between marine activities and seagrass meadows and gain understanding about the role of these plants as a coupled social-ecological system.

Participants are people with a direct relation with the Bay, those which livelihoods rely on the sea and those who go to the Bay for leisure, besides those who play a role in marine resources management. The quota sampling is non proportional, in this study to obtain a wide range of values from engaged and knowledgeable stakeholders is preferable to get a sufficiently high sample size for proportional quota

sampling (Tashakkori and Teddlie, 2003 ; Klain and Chan, 2012). For the identification of interviewees professional contacts, locals and technicians from the fishermen's associations provide recommendations and advice.

Interviews are carried out in places with a pleasant and comfortable environment and duration goes from 45 minutes to 3 hours. Every interview starts mapping marine uses, where every interviewee identify and value marine activities and the seagrasses distribution. For this, we use an orthophoto for reference (scale 1:25000, A3) and draw the spatial information in a transparent paper located over another similar orthophoto. After that, the interview goes on with questions about biodiversity, pressures, community engagement and seagrass ecosystem services to complement the spatial information with local knowledge, perceptions and opinions.

## Results and discussion

At the San Simón Bay the most important species for commercial fishing are cuttlefish, eel, sardine and for shellfishing clams and cockles. We can find three Fishermen's Associations: Arcade, Vilaboa and Redondela. Until now, five locals from the Fishermen's Association of Redondela have been interviewed (one cuttlefish fisher, one gather of shellfish a float and three gathers of shellfish by hand). In addition one recreational fisher and one windsurfer have been interviewed too.

The preliminary results based on the experience with this interviews show that orthophotos are very useful to locate coastal-marine values and make explicit the interactions between marine users and nature. Participants clearly identify where human uses occur and frequently express intraspecific weights, that is where and why one activity is consider better. At the same time, evidencing the overlap between human activities and between human activities and seagrass meadows creates the opportunity to talk about and voice the positive and negative aspects of these interactions.

All participants recognize that seagrasses are positive for cuttlefish spawning and as a consequence to cuttlefish fishing. Some of them suspect positive values of seagrasses based on observations like higher abundance of birds or the many eel fishing arts left preferentially in seagrass areas.

In the case of shellfishing by hand the answers are unclear. This activity compete with seagrasses for the same space and it is more difficult to obtain sincere answers. Participants know that they develop their activities in a protected area and the seagrasses removal or damaging is forbidden without authorization, so they are quite worry about the consequences of given some of the information request during the interview.

Participatory mapping combined with a semi-structured interview might be useful to detect synergies and trade-offs between sectorial policies.

## References

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