

Bringing the ecosystem services concept into marine management decisions.

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Summary

The interdisciplinary project “Cooperative participatory assessment of the impact of renewable technology on ecosystem services: CORPORATES” developed a process to promote more integrated decision making using Ecosystem Service (ES) concepts in marine management. Marine renewable energy industry and regulatory/advisory partners were brought together with a range of stakeholders, including fishers, NGOs, recreationalists, and local government. The process involved knowledge exchange about ecological processes underpinning ES, mapping of different types of activities and ES benefits, participatory system modelling, and deliberation on future policy impacts on different sectors, including fishing. This process built a shared understanding between developing industries and existing stakeholders, such as fishers, of interlinkages and interactions between different ES, benefits, activities, and economic and cultural values, reducing risk of conflict and facilitating planning of marine spaces in the face of uncertainties.

Introduction

The marine environment is under increasing use, putting pressure on ecosystems and intensifying competition for space amongst maritime activities, such as fishing and tourism. New activities, e.g. renewable energy developments, may change biodiversity–ES relationships that society and businesses utilise from coastal and marine systems. A process is required which integrates ecological assessment of changes with stakeholder perceptions and valuation of ES, and balance ease of application with the ability to deal with complex social-economic-ecological issues.

Methods

Two workshops took place, 3 months apart, attended by marine renewable energy industry, regulatory/advisory partners and a range of stakeholders, including fishers, NGOs, recreationalists, and local government. The workshops worked through a process of introducing the concept of ES, and linking these to the activities of, and benefits derived by, all stakeholders. During the workshops:

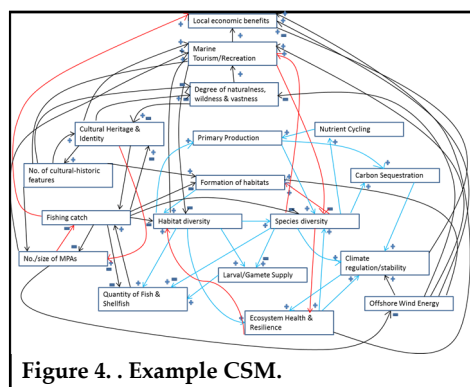
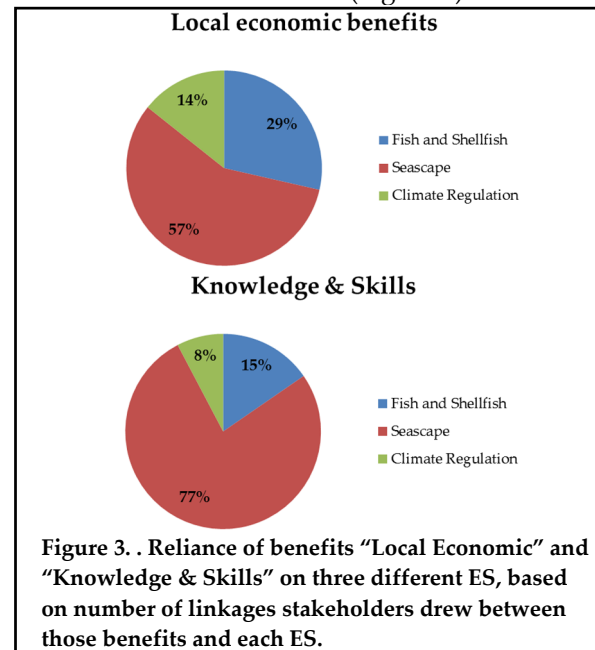
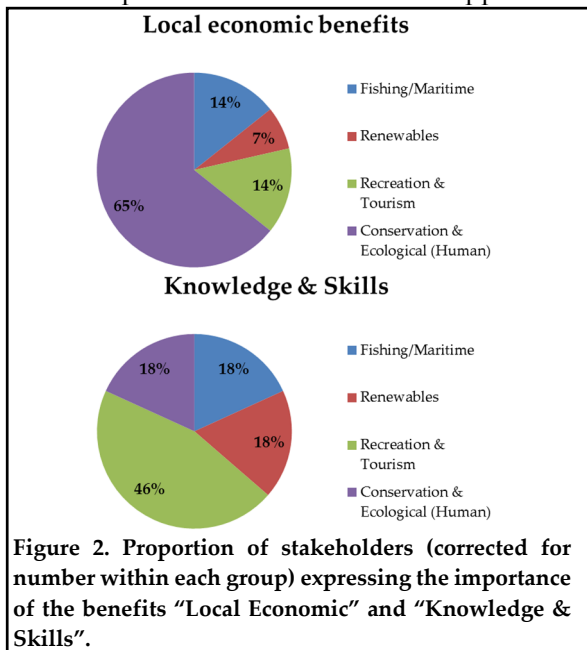
- Activities were mapped by sectoral groups, then shared across sectors, allowing everyone using the environment to show their areas of interest.
- Benefits derived from mapped activities were brainstormed by sectoral groups, and linked back to the environment.
- Interludes on ecology, law and policy were used to create a shared baseline of knowledge.
- ES linkages from generated benefits were ‘mapped’ onto the three ES most important for this region (Fish & Shellfish, Climate Regulation, Seascape) by mixed sector groups of stakeholders.
- Conceptual Systems Models (CSM) were built by mixed sector groups, in order to explore interactions and feedbacks between ecological processes, ES, features, benefits and activities/actions.
- Impacts of activities, climate change and policy options were explored, based on the CSM.
- Written narratives allowed individuals to anonymously express opinions and beliefs regarding possible future changes to ES-benefits-activities.



Figure 1. Mapping activities and derived benefits, by sector.

Results & Discussion

The CORPORATES study is a pilot study exploring the use of the concept of ES to build dialogue between marine sectors and stakeholders, and allow evaluation of trade-offs between ecological, economic and cultural values from a shared perspective as part of the regulatory process. The initial mapping activities, in sectoral groups (Fishing/Maritime, Recreation & Tourism, Conservation & Ecological, Renewables), provided two uses: identifying spatial usages in the region which were then shared across sectors, and allowing participants to be immediately actively involved in the process. Structured introductions (interludes) of underlying ecological processes and marine law and policies allowed cross-sector appreciation of the possible interactions with the range of stakeholder activities. In Workshop 1, interactive ‘conversations’ between stakeholders within cross-sectoral groups on benefits and ES exposed similarities in benefits experienced by each sector (Figure 1), building rapport between sectors. Following on from this, linking benefits to the most important regional ES in Workshop 2 allowed stakeholders to appreciate common reliance on different ES (Figure 2).



The CSM network mapping (Figure 3) cemented concepts introduced during the interludes, and built upon the benefits & ES conversations, further improving knowledge of the mechanisms of ES. It was the base upon which the impacts of activities, climate change and policy options were explored by mixed sector groups, further reinforcing the concept of ES and their reliance on a healthy, functioning ecosystem. Finally, written narratives allowed individual stakeholders to express views and concerns about future changes to ES, and to benefits and activities relying on ES. This allowed for anonymous expression of points a stakeholder may have felt

had not been adequately dealt with within the workshop.

Attendees found the workshops’ format and content useful to sharing knowledge (>90% agreed), and although some were familiar with the concept of ES before Workshop 1, the majority felt the activities contributed to their knowledge (75%). Many stakeholders commented that mixing of sectors was a new experience. Using the concept of ES in mixed sector groups created synergy, producing new insights into possible trade-offs between activities and ES, and highlighting cross-sector concerns. The useful outcomes of these workshops have led us to the conclusion that the use of these methods will provide an ES-based decision-support model for exchanging societal-ecological knowledge and providing stakeholder interaction in marine planning.