Adaptive Management of European Kelp Forests

Recommendations of a workshop held in Porto (Portugal) on May 8-9th 2013, in the framework of FP7 Project Biodiversity Knowledge

---

Workshop participants:

Juliet Brodie (Natural History Museum, UK), Consolación Fernández (University of Oviedo, Spain), Joao Nuno Franco (CIIMAR, Portugal), Nova Mieszkowska (Marine Biodiversity & Climate Change, UK) , Araceli Puente (IH Cantabria, Spain), Jose M. Rico (University of Oviedo, Spain), Eli Rinde (NIVA, Norway), Paulo Santos (FAPAS, Portugal), Isabel Sousa Pinto (CIIMAR, Portugal), Elisabeth Strain (University of Bologna, Italy). Facilitators: Pablo Fernández Méndez, Luis Santamaría (IMEDEA, Spain)

For questions or inquiries contact:

Isabel Sousa Pinto, CIIMAR, University of Porto, Portugal. Email: ispinto@ciimar.up.pt

Luis Santamaría Galdón, IMEDEA (CSIC-UIB), Esporles, Spain. Email: lsantamariamedea.uib-csic.es

Background

Kelp forests are key components of coastal Atlantic ecosystems that contribute greatly to ecosystem structure and function and provide key ecosystem services. They are highly productive ecosystem engineers of rocky cold- and temperate-water marine coastlines, hosting a high diversity of species that includes fish, mammals, invertebrates, other seaweeds and epibiota. In particular, numerous species of fishes use kelp forests as feeding sites, nursery areas and shelter from predators. However, direct harvest of kelps, overfishing, pollution, diseases and climate-related factors may be causing the decline of kelp forests in several parts of Europe. While the conservation and sustainable management of kelp forest ecosystems may be a cornerstone for the fulfillment of EU policy obligations, such as the conservation and "good environmental status" guidelines provided by the Water Framework Directive, Marine Strategy Framework Directive and Habitats Directive, knowledge gaps and uncertainties currently limit our ability to optimize the management of these ecosystems.

In such situations, Collaborative Adaptive Management approaches offer a particularly valid alternative to traditional approaches. By providing an active interface between policy/management and research, in which policies and interventions are designed as experiments from which to learn, adaptive management facilitates robust decision-making and eliminates the need to wait for the independent accumulation of scientific evidence. During the workshop, the participants reviewed the existing evidence concerning the status, trends and ecological functions of kelp forests; developed collaborative models of the main policy/management actions required to achieve a commonly-agreed goal (the sustainable management of kelp forests); identified the main knowledge gaps and uncertainties under which current policy/management regimes must operate; and suggested a number of recommendations for future action. The section below summarizes such recommendations.

Policy and management recommentations

Monitoring and conservation of European kelpforests

1. Establish a **network of kelp forest sites** for coordinated monitoring and research, including a representation of those subjected to harvesting. Such a network could relate to existing initiatives, such as ILTER, MPA, WFD and/or MSFD.
2. Agree upon a **selection of causal variables** (socioeconomic and environmental) to be included in the monitoring of kelp forests (particularly inrelation to point 1). Such variables should reflect the main impacts/pressures acting upon European kelpbeds.
3. Develop criteria to identify **key conservation sites** for European kelps and foster their consideration for the identification of future MPAs.

Socio-economic importance of kelp forests

4. Establish a coherent system to **record harvest effort and yield** at different sites across Europe, with the purpose of monitoring complience with local regulations / codes of conduct and providing a standarized system of monitoring their status and trends.
5. Undertake a **valuation of kelp ecosystem's goods and services** that incorporates economic and non-economic values. Such valuation could build on existing initiatives and experience, such as TEEB.

6. Establish **procedures for balancing contrasting interests and property issues** among stakeholders.

Outreach and public awareness

7. Develop monitoring programs based on **citizen science**, and document their design, implementation and the lessons learned.
8. Establish **open access databases** for distribution and monitoring data collected by public agencies or citizens (such as described in points for 1,2 and 7).
9. Develop **outreach and public awareness** initiatives to foster the conservation and wise use of kelp forests across Europe. The citizen science program describe in point 7 could be a strong element of such initiatives.

Adaptive management

10. Approach the regulation and management of **kelp harvest** using an experimental approach, in which different harvest regimes are set to evaluate the effect of different extraction methods, rotation periods, spatial arrangements and/or kelp species. Nearby MPAs could be set or used as reference sites. Actual or proposed harvesting areas in the Noregian coast could represent an optimal site for a pilot test of this desing.
11. Make use of the opportunity offered by the establishment of pilot **kelp farms** to evaluate their effects on neighboring populations (e.g., genetic contamination), ecosystems (e.g., nutrient uptake, biological invasions, fisheries) and kelp harvesting pressure. Such designs could also be used to evaluate potential complementarities with restoration efforst and/or other types of marine farms (e.g., aquaculture, wind farms).
12. In order to both address the impact and assess the importance of different potential drivers of kelp forest degradation, introduce a strategically-designed **program of pilot management actions** targetting in a selected set of populations across Europe. Such program should address, for the different populations, different (combinations of) management measures (such as the reduction of harvest, fishing, pollution and/or sea urchin harvest, solely or in combination) linked to relevant controls. Such a program could be explicitly linked to the network of sites proposed in point 1 and/or to MPA networks.
13. Introduce **participatory decission-making** in the implementation of regulations for kelp harvest and fishing in key kelp forest areas. Develop demonstration cases in different countries and mechanisms for sharing the experiences and codes of conduct developed in such cases.
14. Foster **awareness about the knowledge gaps, uncertainties and complexities** involved in the management of kelp forest among European practitioners and decission makers.