

### Summary

The sustainable use of the marine ecosystems set out for example in the Marine Strategy Framework Directive (MSFD) and the Common Fisheries Policy (CFP) an improved knowledge about the processes impacting the environment is needed. Spatially explicit ecosystem models are getting increasingly important to manage the challenges of natural conservation, sustainable use and economic exploitation. They are useful for understanding marine ecosystem dynamics, disentangle the region-specific impact of various ecosystem drivers and form a powerful tool to evaluate different management options in complex systems. However, uncertainties related to process formulations of growth, respiration, mortality and regenerative production, uncertainties related to the zooplankton compartment and conceptual challenges related to trophic coupling and fish behaviour limit the applicability of state of the art 3-d ecosystem models to marine ecosystem management significantly. Further limitations for an integrative ecosystem approach to management are lacking model instruments to assess ecosystem stressors such as the advance of invasive alien species or the impact of anthropogenic pollutants throughout the various trophic levels.

SEAMAN will advance spatially explicit marine models into new management tools to address an integrated ecosystem management approach. SEAMAN will focus on currently existing ecosystem model deficiencies, namely the insufficient process oriented calibration of lower trophic level models and the lacking trophic coupling and trophic closure of current state-of-the-art ecosystem models. Therefore, SEAMAN will combine observational approaches with model development and application. This includes amongst others observation of primary and secondary production using novel methods and the analysis of various datasets on fish distribution and behaviour. Those new datasets and information will then allow for developing new and advanced modelling approaches to assess the impact of ecosystem drivers throughout the trophic levels. These developments will have significant impact beyond the pure scientific and open up for completely new and advanced approaches in marine management.

The project brings together experts from different countries in Europe, focusing on different parts of the ecosystem from the physical environment, to plankton, fish, invasive species and pollutants. Comparative approaches for the North Atlantic and Mediterranean will be performed and new insights to similarities and differences in both seas will be provided. The comparative approach will facilitate an expansion from purely regional approaches to the benefits of both scientific and societal communities in the both regions.