

Marine environment socio-economics

The marine environment is an essential cornerstone, supporting the economy and social well-being. It provides benefits ranging from food, recreation and raw materials, to waste assimilation and remediation, climate regulation, cultural heritage and identity. PML's ecosystem approach and socio-economic research is of value to marine spatial planning and developers in the marine environment.



PML's socio-economic analysis evaluates the drivers behind historical, current and future patterns of resource use, and values the environmental impacts of this use. It provides critical information to support sustainable development.

PML is at the forefront of applying socio-economic analysis to marine ecosystems and employs a team of specialist environmental economists that work alongside natural scientists. Linking the biology and socio-economics in this way provides a unique interdisciplinary approach to understanding environmental issues and developing appropriate strategic or political solutions to environmental challenges, that invariably involve a range of stakeholders with diverse needs.

PML's expertise and skills - from local to global

- Integration of natural and social science;
- Application of the ecosystem services approach;
- Marine ecosystem valuation;
- Statistical and econometric analysis;
- Bioeconomic modelling, including fisheries;
- Fisheries management: ecological, modelled and socio-economic aspects;
- Multi-criteria analysis;
- Development of decision support systems;
- Design and distribution of questionnaire surveys;
- Organisation and facilitation of stakeholder consultation through focus groups and workshops.

Valuation of marine ecosystem goods and services
Projects include: Marine Biodiversity: An economic valuation (funded by Defra); National Ecosystem Assessment (multiple funders); Oceans 2025 (funded by NERC); COST-IMPACT, MarBEF and VECTORS (all EU funded).



Ecosystem valuation facilitates environmental management by optimising the allocation of limited resources and by raising awareness of the importance of the marine environment.

PML's integration of natural, social and economic science developed the 'Marine Goods and Service Approach' for Defra. This categorised the range of 'uses' of the marine environment and attributed values to the categories. A decline in UK marine biodiversity could result in a varying, and at present unpredictable, change in the provision of ecosystem services. This decline may cause reduced resilience and resistance to change, declining marine environmental health, diminished fisheries potential, and loss of recreational opportunities.

Building from this research, PML led the economic analysis of the UK marine and coastal margins in the National Ecosystem Assessment. This analysis was unique in investigating how the values for ecosystem services change over time (1945-2060).

Renewable Energy

UK Energy Research Centre (UKERC) funded projects and NERC funded PhD studentships.



The PML socio-economic team, in close association with the PML modelling team, is developing tools to value the environmental impact of energy exploitation in the marine environment.

This includes the assessment of offshore wind farms in providing socio-economic benefits through multiple use, added value and improved ecosystem services (e.g. habitat creation, fish stock recovery and recreational fishing).

In addition, three PhD projects are assessing:

- the impact of offshore wind farms on gas and climate regulation;
- the effects of implementing 'no take' marine protected areas around offshore wind farms, and
- evaluating the costs and benefits of tidal range energy generation.

Development and assessment of Marine Protected Areas (MPAs)

Projects range from local to global and include Lyme Bay, southern Europe and the Western Indian Ocean.

PML has several years of experience in issues of marine resource management and is currently leading the socio-economic impact assessment (funded by Defra) following the closure of Lyme Bay to scallop dredging and trawling.



Through a cost-benefit analysis of the closed area, PML is providing insights from a socio-economic perspective into the process for establishing a network of Marine Conservation Zones in the UK.

PML placed sectoral disputes within the wider context of marine spatial planning at local and regional scales and is engaging with fishermen, supporting industries, conservation groups, local marine-oriented businesses, tourism and recreational users, enforcement agencies and the wider community.

As part of the EMPAFISH project (European Marine Protected Areas as tools for Fisheries management and conservation; EU funded), PML developed a set of integrated measures and policy proposals for the implementation of MPAs in southern Europe. The result was the development of a set of guidelines for a system of MPAs that will protect the structural and functional components of biodiversity, contribute towards fisheries management, and promote human uses of the sea that are compatible with these objectives.

Ocean Acidification

Projects include the UK Ocean Acidification Research Programme (NERC/DECC/Defra funded).

PML is assessing the potential impacts of ocean acidification on commercial fisheries, shellfisheries and non-commercial ecosystem level impacts, e.g. gas and climate regulation and recreation.

Fisheries Modelling

Projects range from local to global and include Quest-Fish funded by NERC.

PML has investigated the socio-economic complexities of fishing activity applying a mathematical modelling approach, emphasizing the need to understand the motivations (economic, societal, cultural) driving exploiters' behaviour (activity, investment, response to management).



This work has a broad range: from a micro-economic vessel level simulation tool for Mediterranean small scale fisheries to investigations into how global demand for marine products may impact the sustainability of the

world's top producers in small pelagic fisheries already affected by environmental fluctuations.

This work has included investigating fishermen's responses to:

- alternative management strategies and subsequent response of fish stocks dynamics to these;
- future prospects for fish production from aquaculture and marine ecosystems in a global environmental change context, and
- the trade of fishmeal and small pelagic fisheries.

About PML Applications Ltd



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