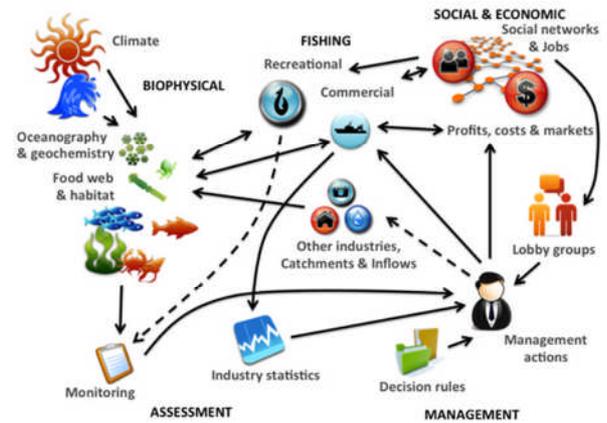


Atlantis

Model type: Atlantis is a deterministic biogeochemical whole ecosystem model that considers all components of the maritime system (biophysical, economic and social). At the core of ATLANTIS is a biophysical sub-model that tracks nutrient flows through the biological groups. The primary ecological processes modelled are consumption, production, migration, predation, recruitment, habitat dependency, and mortality. The trophic resolution is typically at the functional group level and the physical environment is represented through a series of irregular polygons. Atlantis includes a detailed exploitation model that is able to examine the impact of pollution, coastal development and broad-scale environmental change. The dynamics of multiple fishing fleets can also be examined each with its own characteristics of gear selectivity, habitat association, targeting, effort allocation, and management structures. Atlantis can be used to assess economic consequences, the result of compliance decisions, exploratory fishing and fishery management instruments including gear restrictions, days at sea, quotas, spatial and temporal zoning, discarding restrictions, size limits, bycatch mitigation, and biomass reference points. The modelling framework is very flexible and can be applied to any situation world-wide using the many alternative model formulations for each major process and model component included.



Existing Models for UK shelf seas:

Area Modelled	Includes					Spatial Scale	Quality (data used)
	M ¹	B ²	F ³	I ⁴	P ⁵		
North Sea	53 functional groups (M = 3, B = 1, F = 26, I = 16, P = 3, detritus groups = 4)					25 polygons	Parameterised with EU landings data & outputs from the hydrodynamic model ECOHAM
English Channel	40 functional groups (M = 2, B = 1, F = 18, I = 13, P = 3, detritus groups = 3)					37 polygons	Parameterised with EU landings data & outputs from the hydrodynamic model ECOMARS3D

1 M = mammals, 2 B = birds, 3 F = fish, 4 I = invertebrates, 5 P = primary producers

Existing uses:

- The North Sea model has been used to explore interactions between fisheries, windfarms, and MPAs. Calibration of the model is still ongoing.
- The English Channel model has been coupled to a fishing fleet behaviour model and used to explore interactions between fisheries (French and English) targeting sole and plaice, as well as the influence of riverine inputs.

Potential new uses:

- The North Sea model will be used to look at interactions between fishing fleets (various fishing effort scenarios), as well as the consequences of future climate change.
- The English Channel model will be used to investigate interactions between fisheries, aggregate extraction, wind-farms, MPAs and shipping traffic.

Key modelling issues:

- Parameterisation of ATLANTIS models requires significant effort including many iterations of validation, calibration and data manipulation (see Link et al. 2010¹, 2011² and [VECTORS EU Project](#)).
- Common lessons learned from the implementation and development of ATLANTIS over the past decade for systems worldwide are outlined in Fulton et al. (2011)³.
- Other European Atlantis models exist for the Norwegian Arctic, central Baltic Sea and Straits of Sicily.

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¹ Link et al. (2010). Progress in Oceanography 87, 214–234.

² Link et al. (2011). NOAA Tech Memo NMFS NE-218 247pp.

³ Fulton et al. (2011). Fish & Fisheries 12, 171–188.