

{rokbox title=|Flow diagram of Balearic Islands model :: Image: Authors|
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[**Trophic structure and fishing impacts on an oligotrophic ecosystem in the Western Mediterranean: the Balearic Islands**](#)

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Abstract: Within the context of the ecosystem approach to fisheries management, an ecosystem model was developed for the Balearic Islands in the early 2000s, covering from 0 to 800 m of depth. The aim of the study was to describe the structure and functioning of the ecosystem together with the fishing impacts. The results show that the biomass of the primary producers (PP), mainly dominated by *Posidonia oceanica* meadows and red algae beds, represented a high percentage of the biomass (39.20%) in the ecosystem. Most of the trophic flows occurred between PP (mostly benthic) and trophic level II. The mixed trophic impact analysis also highlighted a positive impact of the functional groups (FGs) at the base of the food web. Besides, there were important trophic flows between several demersal FGs, and many groups of the pelagic compartment, confirming the importance of the benthopelagic coupling previously reported. The mean trophic level of the catch ($mTL_c=2.76$) was lower than those reported in adjacent areas due to the discard of benthic producers. By excluding benthic PP, the Balearic Islands showed the highest mTL_c (3.44) among all the Mediterranean areas modelled, probably due to differences in the trophic structure, lower fisheries exploitation levels and lower development of the purse seine fleet targeting small pelagic fishes. The mean transfer efficiency (21.80%) was double than the global average (10%), which highlights the oligotrophy of the system, the importance of demersal production which has lower rates of transfer through the food web, and a more efficient use of nutrients in the ecosystem. Sponges, one of the most important groups of benthic invertebrates in the Balearic Archipelago, are known to recycle dissolved organic matter, which is reintroduced into the food web similar to the microbial loop, but the magnitude of this and other processes remains still unknown in this area. The present

study is a first step to develop spatio-temporal simulations under different exploitation scenarios and to calculate ecological indicators to assess the state of the marine environment in this region.

Keywords: Balearic Islands, ecopath model, food web, trophic flows, fishing impacts, comparative model approach