

Exploring ecosystem dynamics through trophic level analysis in the Aegean Sea

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Table S1. Species synthesis of functional groups in the ECOTROPH model of the Aegean Sea ecosystem. For further details on species composition parameters, the reader may refer to Keramidas *et al.* (2022).

Functional Group	Taxa
1. Phytoplankton	Diatoma, Dinoflagellata
2. Micro/Mesozooplankton	Copepoda
3. Macrozooplankton	Euphasiids, Mysids
4. Benthic invertebrates	Anthozoa, Echinodermata, Gastropoda, Porifera, Sipuncula, Tunicata
5. Polychaetes	
6. Benthic small crustaceans	Amphipoda, Cumacea, Isopoda
7. Jellyfish	<i>Aequorea forskalea</i> , <i>Cotylorhiza tuberculata</i> , <i>Mnemiopsis leidyi</i> , <i>Pelagia noctiluca</i> , <i>Rhizostoma pulmo</i> , <i>Rhopilema nomadica</i>
8. Shelf crabs	<i>Calappa granulata</i> , <i>Calappa pelii</i> , <i>Dromia personata</i> , <i>Eriphia verrucosa</i> , <i>Ethusa mascarone</i> , <i>Goneplax rhomboides</i> , <i>Liocarcinus corrugatus</i> , <i>Liocarcinus depurator</i> , <i>Maja crispata</i> , <i>Maja squinado</i> , <i>Medorippe lanata</i> , <i>Pagurus</i> spp., <i>Pilumnus spinifer</i> , <i>Pilumnus villosissimus</i> , <i>Pisa armata</i> , <i>Pisa</i> spp.
9. Slope crabs	<i>Bathynectes maravigna</i> , <i>Homola barbata</i> , <i>Inachus communissimus</i> , <i>Inachus dorsettensis</i> , <i>Inachus</i> spp., <i>Inachus thoracicus</i> , <i>Latreillia elegans</i> , <i>Macropipus tuberculatus</i> , <i>Macropodia longipes</i> , <i>Monodaeus couchii</i> , <i>Parthenopoides massena</i> , <i>Spinolambrus macrocheloides</i>
10. Shrimps	<i>Aristaeomorpha foliacea</i> , <i>Aristeus antennatus</i> , <i>Chlorotocus crassicornis</i> , <i>Eusergestes arcticus</i> , <i>Gennadas elegans</i> , <i>Lysmata seticaudata</i> , <i>Parapenaeus longirostris</i> , <i>Pasiphaea multidentata</i> , <i>Pasiphaea sivado</i> , <i>Penaeus kerathurus</i> , <i>Plesionika acanthonotus</i> , <i>Plesionika antigai</i> , <i>Plesionika edwardsii</i> , <i>Plesionika gigliolii</i> , <i>Plesionika heterocarpus</i> , <i>Plesionika martia</i> , <i>Plesionika narval</i> , <i>Pontophilus spinosus</i> , <i>Processa canaliculata</i> , <i>Processa nouveli</i> , <i>Sergia robusta</i> , <i>Solenocera membranacea</i>
11. Lobsters	<i>Aegaeon cataphractus</i> , <i>Aegaeon lacazei</i> , <i>Alpheus glaber</i> , <i>Athanas nitescens</i> , <i>Crangon crangon</i> , <i>Homarus Gammarus</i> , <i>Galathea dispersa</i> , <i>Munida curvimana</i> , <i>Munida rutllanti</i> , <i>Munida tenuimana</i> , <i>Palinurus elephas</i> , <i>Polychelus typhlops</i> , <i>Rissoides pallidus</i> , <i>Scyllarus pygmaeus</i> , <i>Squilla mantis</i> , <i>Synalpheus gambarelloides</i>
12. Norway lobster	<i>Nephrops norvegicus</i>
13. Octopus and cuttlefish	<i>Bathypolypus sponsalis</i> , <i>Eledone cirrhosa</i> , <i>Eledone moschata</i> , <i>Macrotritopus defilippi</i> , <i>Octopus salutii</i> , <i>Octopus vulgaris</i> , <i>Pteroctopus tetracirrhus</i> , <i>Scaevargus unicolor</i> , <i>Sepia elegans</i> , <i>Sepia officinalis</i> , <i>Sepia orbignyana</i>
14. Squids	<i>Aburria veranyi</i> , <i>Alloteuthis media</i> , <i>Alloteuthis subulata</i> , <i>Heteroteuthis dispar</i> , <i>Histioteuthis bonnellii</i> , <i>Histioteuthis reversa</i> , <i>Illex coindetii</i> , <i>Loligo forbesii</i> , <i>Loligo vulgaris</i> , <i>Neorossia caroli</i> , <i>Pyroteuthis margaritifera</i> , <i>Rondeletiola minor</i> , <i>Rossia macrosoma</i> , <i>Sepietta neglecta</i> , <i>Sepietta oweniana</i> , <i>Sepioida intermedia</i> , <i>Sepioida ligulata</i> , <i>Todarodes sagittatus</i> , <i>Todaropsis eblanae</i>
15. European anchovy	<i>Engraulis encrasicolus</i>

Continued

Table S1 continued

Functional Group	Taxa
16. European pilchard	<i>Sardina pilchardus</i>
17. Other small pelagics	<i>Aphia minuta</i> , <i>Belone belone</i> , <i>Caranx rhonchus</i> , <i>Centracanthus cirrus</i> , <i>Chelon auratus</i> , <i>Chelon ramada</i> , <i>Sardinella aurita</i> , <i>Scomberesox saurus</i> , <i>Sphyrnaena sphyrnaena</i> , <i>Sprattus sprattus</i>
18. Picarels and bogue	<i>Boops boops</i> , <i>Spicara flexuosa</i> , <i>Spicara maena</i> , <i>Spicara smaris</i>
19. Mackerels	<i>Scomber colias</i> , <i>Scomber scombrus</i>
20. Horse mackerels	<i>Trachurus mediterraneus</i> , <i>Trachurus picturatus</i> , <i>Trachurus trachurus</i>
21. Medium pelagics	<i>Auxis thazard</i> , <i>Euthynnus alletteratus</i> , <i>Coryphaena hippurus</i> , <i>Katsuwonus pelamis</i> , <i>Pomatomus saltatrix</i> , <i>Sarda sarda</i> , <i>Seriola dumerili</i> , <i>Thunnus alalunga</i>
22. Large pelagics	<i>Thunnus thynnus</i> , <i>Xiphias gladius</i>
23. Anglerfish	<i>Lophius budegassa</i> , <i>Lophius piscatorius</i>
24. Flatfishes	<i>Arnoglossus imperialis</i> , <i>Arnoglossus kessleri</i> , <i>Arnoglossus laterna</i> , <i>Arnoglossus rueppelii</i> , <i>Arnoglossus thori</i> , <i>Bothus podas</i> , <i>Citharus linguatula</i> , <i>Lepidorhombus boscii</i> , <i>Lepidorhombus whiffiagonis</i> , <i>Microchirus ocellatus</i> , <i>Microchirus variegatus</i> , <i>Monochirus hispidus</i> , <i>Platichthys flesus</i> , <i>Scophthalmus maximus</i> , <i>Scophthalmus rhombus</i> , <i>Solea solea</i> , <i>Symphurus nigrescens</i> , <i>Synapturichthys kleinii</i>
25. European hake	<i>Merluccius merluccius</i>
26. Other gadiforms	<i>Gadella maraldi</i> , <i>Gadiculus argenteus</i> , <i>Gaidropsarus biscayensis</i> , <i>Gaidropsarus mediterraneus</i> , <i>Merlangius merlangus</i> , <i>Micromesistius poutassou</i> , <i>Molva dypterygia</i> , <i>Molva molva</i> , <i>Mora moro</i> , <i>Phycis blennoides</i> , <i>Phycis phycis</i> , <i>Trisopterus capellanus</i>
27. Gurnards	<i>Chelidonichthys cuculus</i> , <i>Chelidonichthys lastoviza</i> , <i>Chelidonichthys lucerna</i> , <i>Chelidonichthys obscurus</i> , <i>Eutrigla gurnardus</i> , <i>Lepidotrigla cavillone</i> , <i>Lepidotrigla dieuzeidei</i> , <i>Trigla lyra</i> , <i>Peristedion cataphractum</i>
28. Red mullets	<i>Mullus barbatus</i> , <i>Mullus surmuletus</i>
29. Rockfish	<i>Helicolenus dactylopterus</i> , <i>Scorpaena elongata</i> , <i>Scorpaena maderensis</i> , <i>Scorpaena notata</i> , <i>Scorpaena porcus</i> , <i>Scorpaena scrofa</i>
30. Small demersals 1	<i>Acantholabrus palloni</i> , <i>Capros aper</i> , <i>Cepola macrophthalma</i> , <i>Diplodus annularis</i> , <i>Labrus mixtus</i> , <i>Lappanella fasciata</i> , <i>Macroramphosus scolopax</i> , <i>Spondyllosoma cantharus</i> , <i>Symphodus cinereus</i> , <i>Symphodus mediterraneus</i> , <i>Xyrichtys novacula</i>
31. Small demersals 2	<i>Carapus acus</i> , <i>Echelus myrus</i> , <i>Gnathophis mystax</i> , <i>Gymnammodytes cicereus</i> , <i>Hippocampus hippocampus</i> , <i>Ophidion barbatum</i> , <i>Pagellus acarne</i> , <i>Pagellus erythrinus</i> , <i>Sarpa salpa</i> , <i>Serranus hepatus</i> , <i>Serranus scriba</i> , <i>Siganus rivulatus</i> , <i>Stephanolepis diaspros</i> , <i>Symphodus tinca</i> , <i>Syngnathus acus</i> , <i>Syngnathus taeniotus</i> , <i>Syngnathus typhle</i> , <i>Umbrina cirrosa</i> , <i>Uranoscopus scaber</i>
32. Small demersals 3	<i>Anthias anthias</i> , <i>Aulopus filamentosus</i> , <i>Blennius ocellaris</i> , <i>Callanthias ruber</i> , <i>Callionymus lyra</i> , <i>Callionymus maculatus</i> , <i>Callionymus risso</i> , <i>Callionymus spp.</i> , <i>Deltentosteus collo-nianus</i> , <i>Deltentosteus quadrimaculatus</i> , <i>Diplodus vulgaris</i> , <i>Gobius niger</i> , <i>Gobius paganel-lus</i> , <i>Gobius spp.</i> , <i>Lagocephalus lagocephalus</i> , <i>Lesueurigobius friesii</i> , <i>Lesueurigobius suerii</i> , <i>Oblada melanura</i> , <i>Synchiropus phaeton</i>
33. Medium-large demersals 1	<i>Dentex dentex</i> , <i>Dentex gibbosus</i> , <i>Dentex macrophthalmus</i> , <i>Dentex maroccanus</i> , <i>Ophichthus rufus</i> , <i>Pagellus bogaraveo</i> , <i>Serranus cabrilla</i> , <i>Synodus saurus</i> , <i>Trachinus araneus</i> , <i>Trachinus draco</i> , <i>Trachinus radiatus</i>
34. Medium-large demersals 2	<i>Anguilla anguilla</i> , <i>Conger conger</i> , <i>Dicentrarchus labrax</i> , <i>Diplodus puntazzo</i> , <i>Diplodus sar-gus</i> , <i>Epinephelus aeneus</i> , <i>Epinephelus marginatus</i> , <i>Lithognathus mormyrus</i> , <i>Muraena helena</i> , <i>Pagrus pagrus</i> , <i>Polypriion americanus</i> , <i>Sparus aurata</i> , <i>Zeus faber</i>

Continued

Table S1 continued

Functional Group	Taxa
35. Planktivorous deep sea fish	<i>Argentina sphyraena</i> , <i>Argyropelecus hemigymnus</i> , <i>Bathypterois dubius</i> , <i>Bellottia apoda</i> , <i>Benthocometes robustus</i> , <i>Benthoosema glaciale</i> , <i>Chlorophthalmus agassizi</i> , <i>Diaphus holti</i> , <i>Diaphus metopoclampus</i> , <i>Diaphus rafinesquii</i> , <i>Diaphus</i> spp., <i>Electrona risso</i> , <i>Epigonus constanciae</i> , <i>Epigonus denticulatus</i> , <i>Epigonus telescopus</i> , <i>Gonichthys cocco</i> , <i>Hygophum benoiti</i> , <i>Hygophum hygomii</i> , <i>Hygophum</i> spp., <i>Lobianchia dofleini</i> , <i>Lobianchia gemellarii</i> , <i>Mauroliscus muelleri</i> , <i>Myctophum punctatum</i> , <i>Myctophum</i> spp., <i>Nezumia sclerorhynchus</i> , <i>Notacanthus bonaparte</i> , <i>Notoscopelus elongatus</i> , <i>Symbolophorus veranyi</i> , <i>Vinciguerria attenuata</i>
36. Piscivorous deep sea fish	<i>Ceratoscopelus maderensis</i> , <i>Chauliodus sloani</i> , <i>Coelorhynchus caelorhynchus</i> , <i>Evermannella balbo</i> , <i>Hoplostethus atlanticus</i> , <i>Hoplostethus mediterraneus</i> , <i>Hymenocephalus italicus</i> , <i>Lampanyctus crocodilus</i> , <i>Lampanyctus pusillus</i> , <i>Lepidopus caudatus</i> , <i>Lestidiops sphyrenoides</i> , <i>Nettastoma melanurum</i> , <i>Physiculus dalwigki</i> , <i>Stomias boa</i> , <i>Trachipterus trachipterus</i>
37. Rays and skates	<i>Dasyatis pastinaca</i> , <i>Dipturus oxyrinchus</i> , <i>Leucoraja circularis</i> , <i>Leucoraja naevus</i> , <i>Myliobatis aquila</i> , <i>Raja asterias</i> , <i>Raja brachyura</i> , <i>Raja clavata</i> , <i>Raja miraletus</i> , <i>Raja montagui</i> , <i>Raja polystigma</i> , <i>Raja radula</i> , <i>Raja undulata</i> , <i>Rostroraja alba</i> , <i>Tetronarce nobiliana</i> , <i>Torpedo marmorata</i> , <i>Torpedo torpedo</i>
38. Sharks	<i>Centrophorus granulosus</i> , <i>Chimaera monstrosa</i> , <i>Dalatias licha</i> , <i>Etmopterus spinax</i> , <i>Galeus melastomus</i> , <i>Heptranchias perlo</i> , <i>Mustelus mustelus</i> , <i>Oxynotus centrina</i> , <i>Scyliorhinus canicula</i> , <i>Scyliorhinus stellaris</i> , <i>Squalus acanthias</i> , <i>Squalus blainville</i> , <i>Squatina aculeata</i> , <i>Squatina oculata</i>
39. Sea turtles	<i>Dermochelys coriacea</i> , <i>Caretta caretta</i> , <i>Chelonia mydas</i>
40. Seabirds	<i>Calonectris diomedea</i> , <i>Hydrobates pelagicus</i> , <i>Ichthyophaga audouinii</i> , <i>Ichthyophaga melanocephalus</i> , <i>Larus michahellis</i> , <i>Phalacrocorax aristotelis</i> , <i>Puffinus yelkouan</i>
41. Dolphins	<i>Delphinus delphis</i> , <i>Phocoena phocoena</i> , <i>Stenella coeruleoalba</i> , <i>Tursiops truncatus</i>
42. Monk seal	<i>Monachus monachus</i>
43. Discards	
44. Detritus	

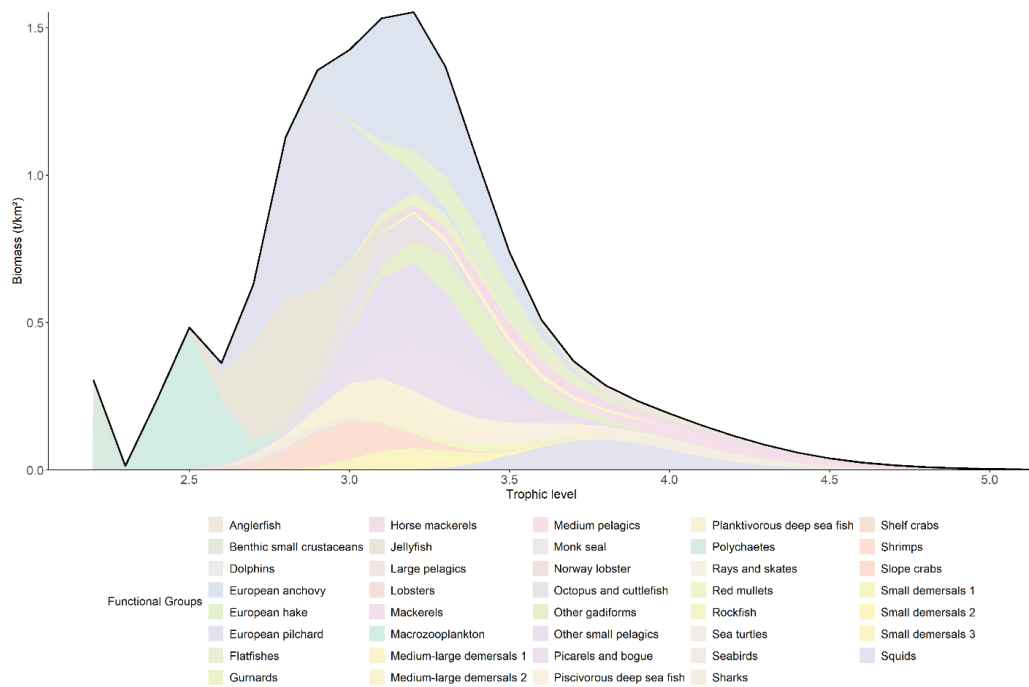


Fig. S1: The biomass trophic spectrum of the Aegean Sea EcoTroph model by functional group. The black line represents the total biomass. For a clearer graphical illustration, some functional groups (i.e., Benthic invertebrates, Detritus, Micro/Mesozooplankton, Phytoplankton) were excluded.

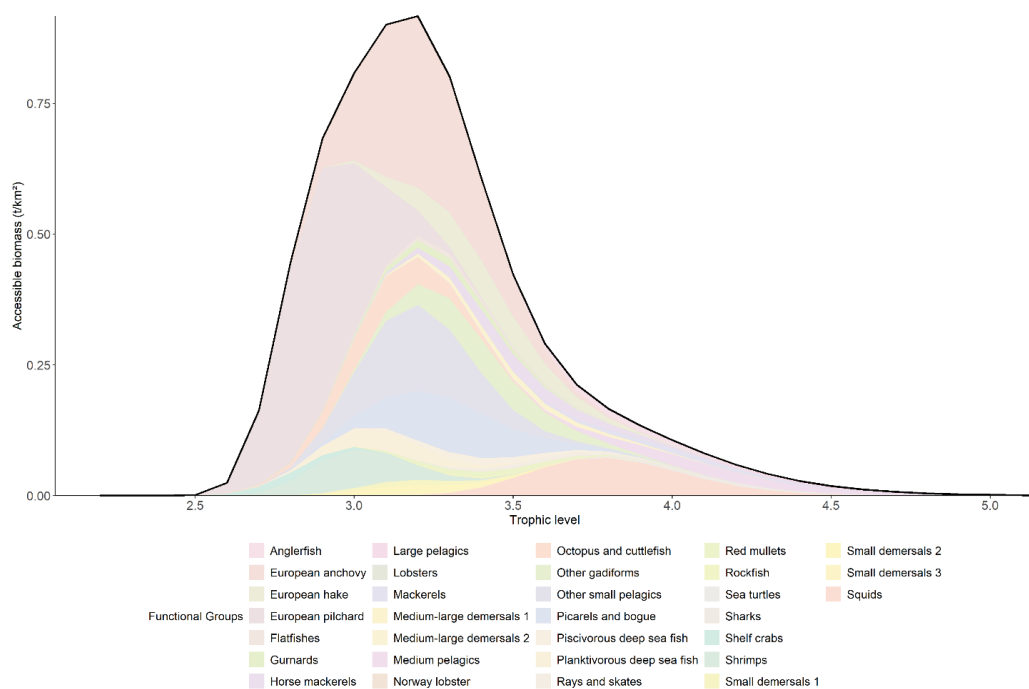


Fig. S2: The trophic spectrum of the biomass accessible to fisheries for the Aegean Sea EcoTroph model, by functional group. The black line represents total accessible biomass.

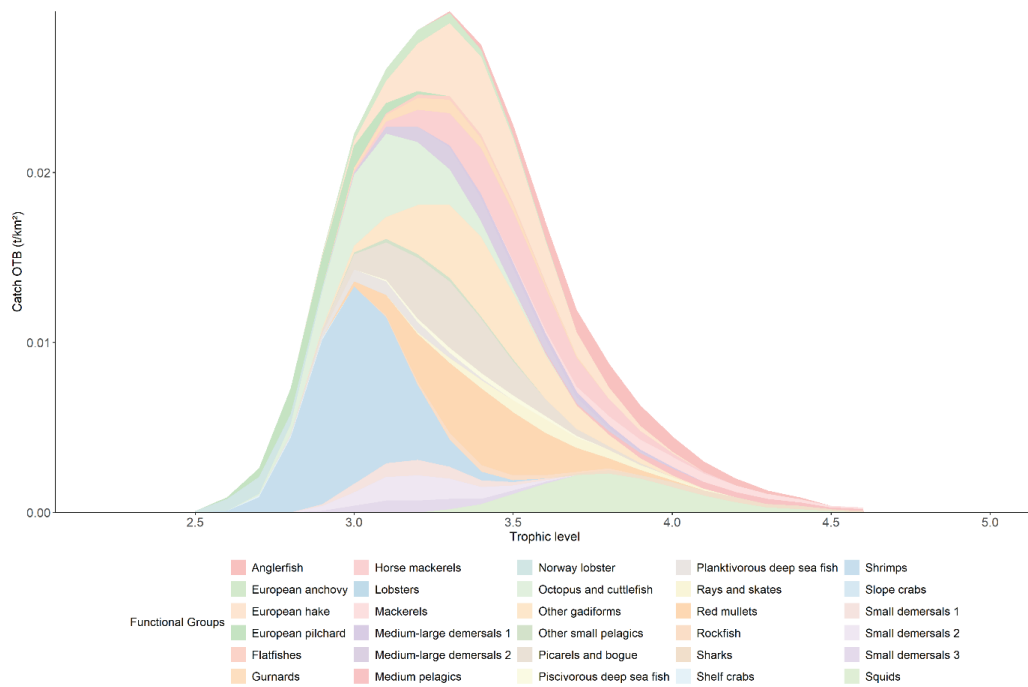


Fig. S3: The bottom trawling (OTB) catch trophic spectrum of the Aegean Sea EcoTroph model by functional group. For a clearer graphical illustration, trophic spectra lower than TL 2.5 were excluded.

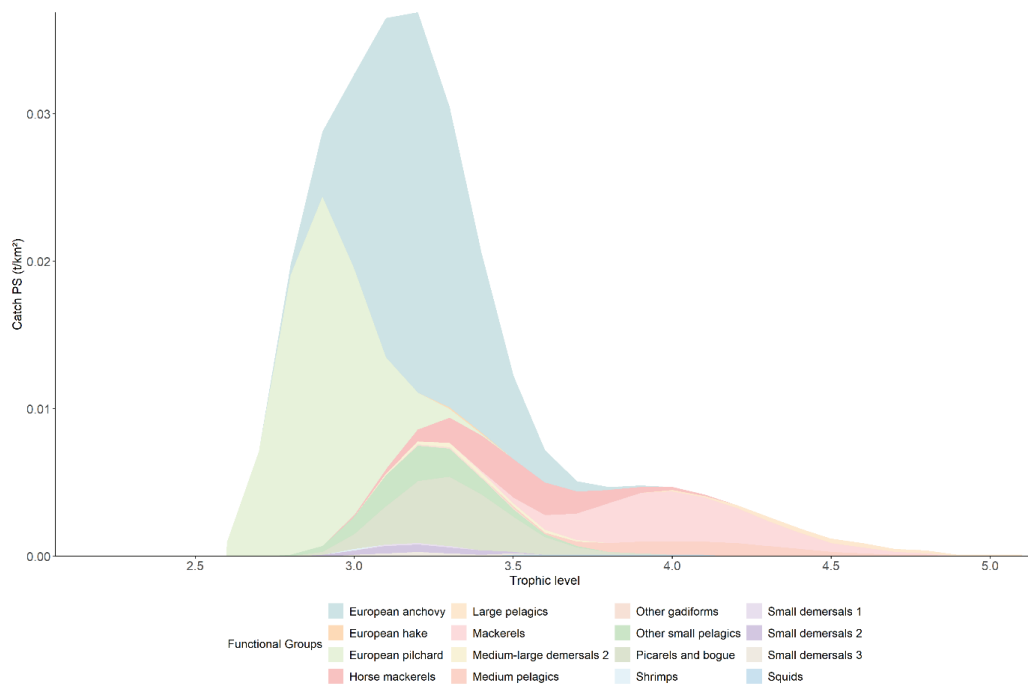


Fig. S4: The purse seining (PS) catch trophic spectrum of the Aegean Sea EcoTroph model by functional group. For a clearer graphical illustration, trophic spectra lower than TL 2.5 were excluded.

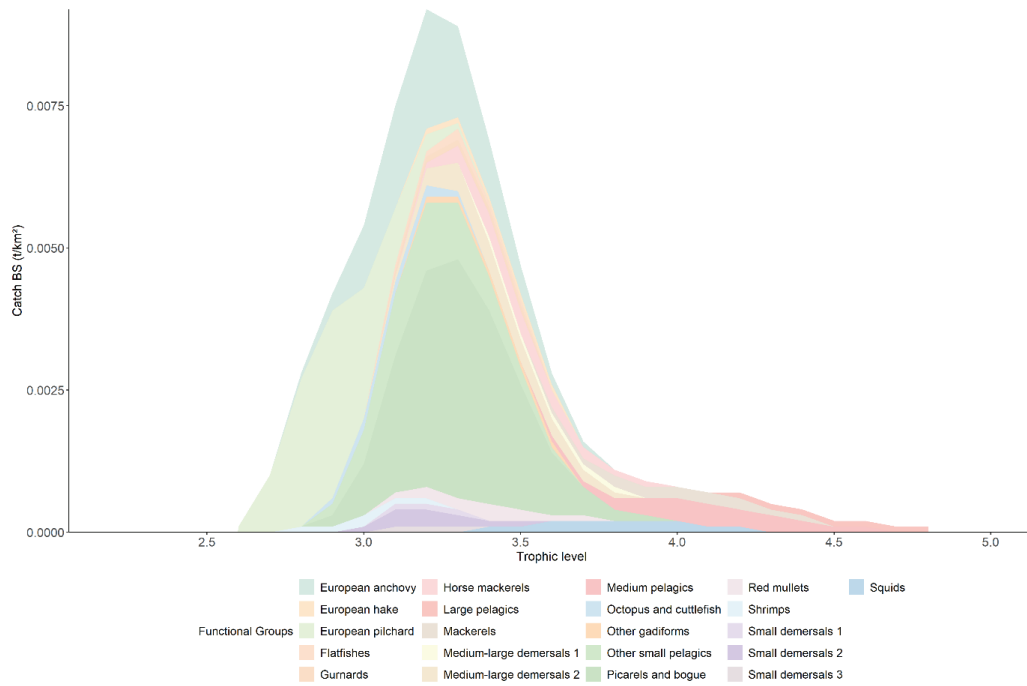


Fig. S5: The beach seining (BS) catch trophic spectrum of the Aegean Sea EcoTroph model by functional group. For a clearer graphical illustration, trophic spectra lower than TL 2.5 were excluded.

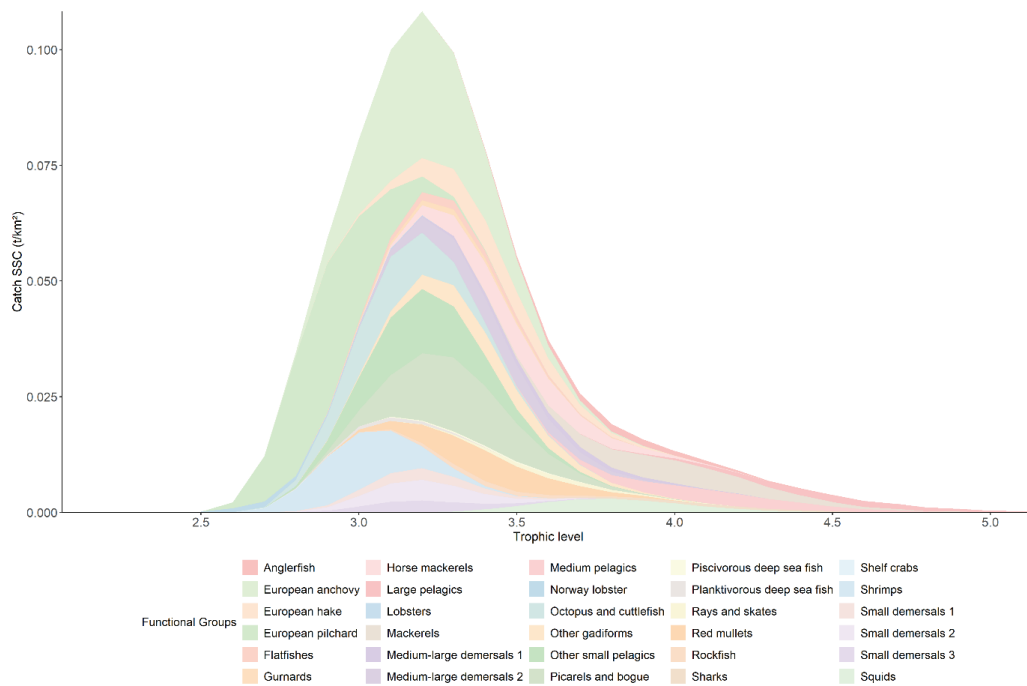


Fig. S6: The small-scale coastal fisheries (SSC) catch trophic spectrum of the Aegean Sea EcoTroph model by functional group. For a clearer graphical illustration, trophic spectra lower than TL 2.5 were excluded.

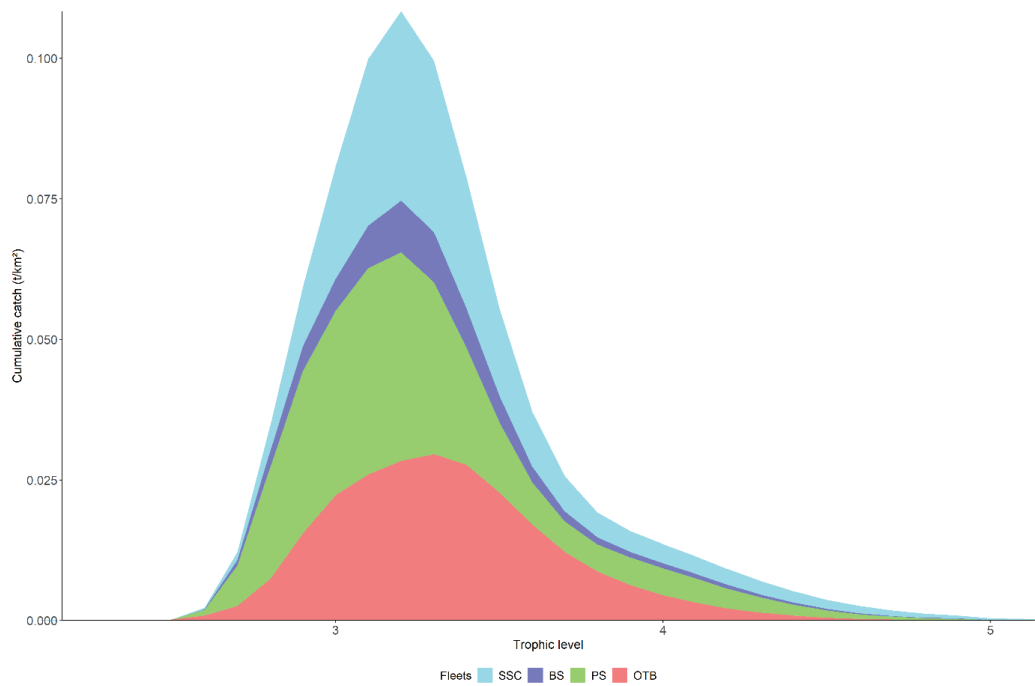


Fig. S7: The cumulative catch by fleet trophic spectrum of the Aegean Sea EcoTroph model. The black line represents total catch. For a clearer graphical illustration, trophic spectra lower than TL 2.5 were excluded.

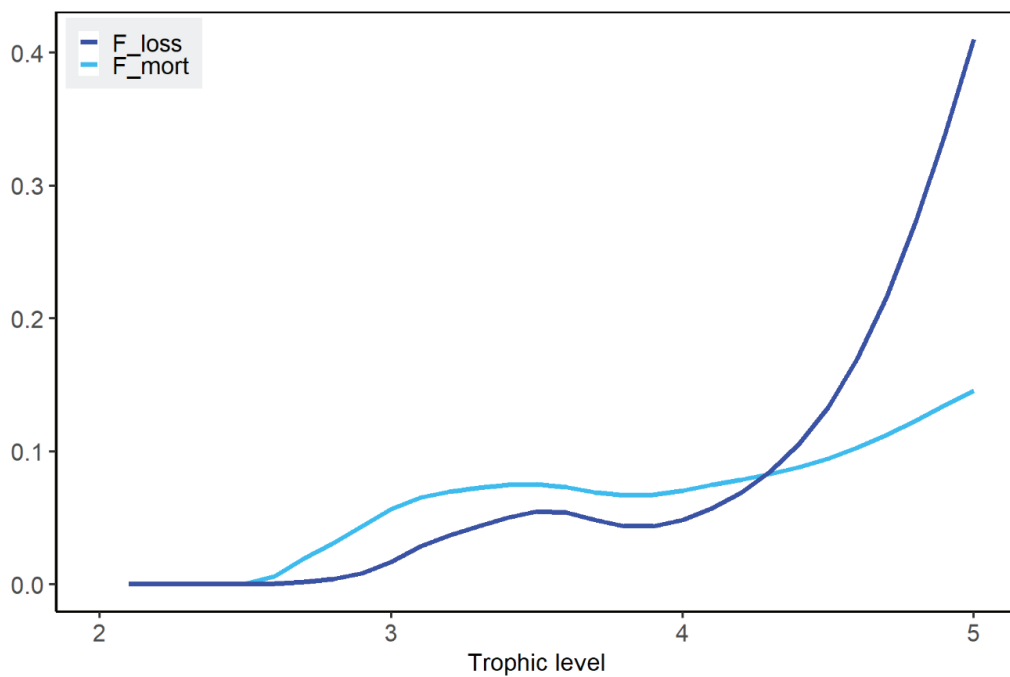


Fig. S8: The trophic spectra of fishing mortality and fishing loss rate of the Aegean Sea EcoTroph model.