Data Article

Dataset and species aggregation method applied to food-web models in the Northern Ionian Sea (Central Mediterranean Sea)

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\textbf{A B S T R A C T}

The ecological roles of the species in the food web are studied through the Ecopath with Ecosim modelling approach. In this modelling approach, the food web is described by means of functional groups, each representing a species, a life stage of a species, or a group of species with similar trophic, ecological and physiological features. Links between the groups are formally described by a set of linear equations, informed with ecological and fishing data. Here, the data input collected to implement 3 Ecopath models in the Northern Ionian Sea (Central Mediterranean Sea) from 1995 to 2015 are reported. This dataset applied to study the ecological roles of the demersal Chondrichthyes in the study area could be useful to explore different fishing management scenarios. A large dataset of over 300 taxa is shown detailing the ecological inputs, such as Biomass (kg km\textsuperscript{-2}), Production and Consumption rates (y\textsuperscript{-1}), Diet information (weight in %), and fishing data represented by Landings and Discards (t km\textsuperscript{-2} y\textsuperscript{-1}). In particular, the fishery data described the catches of trawls, longlines, passive nets, other gears and purse seine. In
addition, a description of the aggregation method of the species is shown.

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Specifications Table

| Subject | Ecological Modelling |
|---------|----------------------|
| Specific subject area | Food-web modelling applied to marine biodiversity to explore the ecological traits and fishery interactions according Ecopath approach. |
| Type of data | Table |
| How data were acquired | Digitalization of data collected from scientific literature, online databases and technical reports. |
| Data format | Data are in Mixed (raw and pre-processed) format. Excel files with data have been uploaded. |
| Parameters for data collection | Data input were collected from multiple sources, such as experimental surveys, online database and grey and scientific literature. The selection criteria of data collection were based on the proximity of data source to the study area. Thus, local data were preferred to those from neighbouring Mediterranean areas. Similar approach was adopted for the temporal scale searching the higher overlap among the data time series. |
| Description of data collection | Data collection concerns the input parameters for each taxa considered in the food web model. The parameters are Biomass, Diet, Production and Consumption rates, Fishery Landings and Discard (detailed in the fishing gears selected in the model). |
| Data source location | Calabrian Ionian area from Punta Alice (Crotone) to Capo Spartivento (Reggio Calabria) within the Geographical Sub Area (GSA) 19, Northern Ionian Sea (Central Mediterranean Sea). Coordinates: Punta Alice, 39°24′04.1″N 17°09′20.57″E; Capo Spartivento, 37°55′05″N 16°03′07″E. Sample/data: Biomass and traits of taxa extracted by experimental surveys (MEDITS) Data extracted from FishBase https://www.fishbase.in/search.php Data: Diet, Production and Consumption rates Data extracted from OBIS-SEAMAP https://seamap.env.duke.edu/ Data: abundances of Marine mammals and Sea Turtles |
| Data accessibility | With the article |
| Related research article | P. Ricci, L. Sion, F. Capezzuto, G. Cipriano, G. D’Onghia, S. Libralato, P. Maiorano, A. Tursi, R. Carlucci, Modelling the trophic roles of the demersal Chondrichthyes in the Northern Ionian Sea (Central Mediterranean Sea). Ecological Modelling 444,109,468 (2021). https://doi.org/10.1016/j.ecolmodel.2021.109468. |

Value of the Data

- These data represent a detailed collection of ecological information related to over 300 marine taxa distributed in the Northern Ionian Sea, an area poorly investigated at the ecosystem scale.
- Marine research institutions involved in the management and conservation of biodiversity can benefit from this information to develop quantitative approaches for the analysis of marine ecosystem impacts and management.
- This data collection is a basal dataset useful to build time- and space-explicit simulations required for producing scenarios of ecosystem change induced by environmental and anthropogenic pressures.
- The data could be used to explore the trophic role of the top-predators in other Mediterranean areas, in order to identify their ecological importance and develop a shared strategy of conservation of biodiversity and fishing management.
• The data could be used to investigate and compare the trophic structures of different Mediterranean areas, in order to deepen the ecological knowledge of the functioning of marine ecosystems.

1. Data Description

The data collection concerns the ecological traits of the demersal, benthic, pelagic and planktonic taxa as well as the fishing activities operating in the south-western Calabrian area of the Northern Ionian Sea (Central Mediterranean Sea) that covers an area of 3469 km² in a 10–800 m depth range. The information was used to implement 3 food web models by means the Ecopath with Ecosim approach [1], in order to investigate the ecological roles of the demersal Chondrichthyes and their interactions with fishing activities. The data collection covers a time span from 1995 to 2015 [2]. The taxa included in the food web models are aggregated in 57 functional groups (Table 1).

The data related to the ecological traits of the functional groups are represented by the Biomass, Production and Consumption rates and by the diets information (when available) of each taxa considered in the food web model (Appendix A, Table A1). Biomass data of demersal taxa were collected by the “MEDiterranean International Trawl Survey” (MEDIT) program [3] conducted in the Northern Ionian Sea (GSA 19) [4,5]. The fishing data were obtained from the Fisheries and Aquaculture Economic Research for the Ministry of Agricultural Food and Forestry Policies (MIPAAF), and consist of landing and discard data for each functional group in each investigated time periods (Tables 2 and 3). These data are detailed by 5 fishing gears: Trawl, Longline, Passive Nets, Other gears and Purse Seine.

The diet matrices (predator x preys) adopted in each investigated period are reported in Table A2-A4 (see Appendix A, Excel files). The entire dataset has been realized using Excel 2010 Plus.

2. Experimental Design, Materials and Methods

The data collection were used to implement three different Ecopath models describing the condition of the ecosystem trophic structure in the Calabrian area during the periods 1995–1997, 2003–2005 and 2013–2015. Food webs are described by means of Functional Groups (FGs), each representing a species, a life stage of a species, or a group of species with similar trophic, ecological and physiological features. Links between FGs are formally described by a set of linear equations [6]. In the first one, the biological production of a functional group is equal to the sum of fishing mortality, predation mortality, net migration, biomass accumulation, and other unexplained mortality (Eq. (1)):

\[
\left(\frac{P}{B}\right) B_i = Y_i + \sum_j B_j \left(\frac{Q}{B}\right) DC_{ji} + E_i + BA_i + \left(\frac{P}{B}\right) B_i \left(1 - EE_i\right)
\]

where \((P/B)\) is the production to biomass ratio for a certain functional group \((i)\), \(B_i\) is the biomass of a group \((i)\), \(Y_i\) the total fishery catch rate of group \((i)\), \((Q/B)_j\) is the consumption to biomass ratio for each predator \((j)\), \(DC_{ji}\) is the proportion of the group \((i)\) in the diet of predator \((j)\), \(E_i\) is the net migration rate (emigration-immigration), \(BA_i\) is the biomass accumulation rate for the group \((i)\), \(EE_i\) is the ecotrophic efficiency, and \((1 - EE_i)\) represents mortality other than predation and fishing.

In the second equation (see Eq. (2)), the consumption of a functional group is equal to the sum of production, respiration and unassimilated food.

\[
\text{Consumption} = \text{production} + \text{respiration} + \text{unassimilated food}
\]

The assumption of this modelling approach is that the production and consumption in the food web are mass-balanced, thus Ecopath uses and solves a system of linear equations (one for
Table 1
Functional groups (FGs) in the Ecopath Calabrian food web model. The mean Centre Of Gravity values (COG, a bathymetric position index expressed in metres) are reported for several FGs. For the species aggregated in the FGs see Table A1 in Appendix A.

| N. | FG                                                   | COG (m) | COG Variance |
|----|------------------------------------------------------|---------|--------------|
| 1  | Odontocetes                                          | –       | –            |
| 2  | Fin whales                                           | –       | –            |
| 3  | Turtles                                              | –       | –            |
| 4  | Seabirds                                             | –       | –            |
| 5  | Large pelagic fishes                                 | –       | –            |
| 6  | Slope Sharks, Rays Chimeras benthic-feeders          | 552     | 101          |
| 7  | Shelf-Break Elasmobranchs                           | 171     | 28           |
| 8  | Shelf Elasmobranchs                                 | 29      | 47           |
| 9  | Slope Elasmobranchs fish-feeders                    | 570     | 58           |
| 10 | Kitefin shark                                        | 644     | 78           |
| 11 | Velvet belly lanternshark                            | 544     | 125          |
| 12 | Blackmouth catshark                                  | 546     | 135          |
| 13 | Demersal opportunistic fishes                        | 597     | 154          |
| 14 | Slope Demersal fishes generalist-feeders            | 204     | 179          |
| 15 | Shelf-Break Demersal fishes generalist-feeders       | 64      | 47           |
| 16 | Shelf-Break Demersal fishes fish-feeders             | 86      | 57           |
| 17 | Slope Bathypelagic fishes fish-feeders               | 520     | 104          |
| 18 | Slope Demersal fishes Decapods-feeders               | 388     | 121          |
| 19 | Slope fishes crustaceans-feeders                     | 488     | 137          |
| 20 | Shelf-Break fishes crustaceans-feeders               | 229     | 100          |
| 21 | Shelf Demersal fishes benthic crustaceans-feeders    | 77      | 40           |
| 22 | Shelf Demersal fishes benthic invertebrates-feeders  | 65      | 40           |
| 23 | Slope fishes planktivorous                           | 556     | 107          |
| 24 | Shelf-Break fishes planktivorous                     | 90      | 60           |
| 25 | Small pelagic fishes                                 | 48      | 29           |
| 26 | Medium pelagic fishes                                | 92      | 76           |
| 27 | Macrourids                                           | 519     | 119          |
| 28 | Myctophids                                           | 431     | 123          |
| 29 | Red mullet                                           | 38      | 49           |
| 30 | Hake                                                 | 131     | 176          |
| 31 | Anglers                                              | 232     | 196          |
| 32 | Slope Squids                                         | 545     | 85           |
| 33 | Shelf-Break Squids                                  | 121     | 85           |
| 34 | Shelf Cephalopods                                    | 77      | 64           |
| 35 | Slope Cephalopods                                    | 430     | 133          |
| 36 | Shelf-Break Bobtail Squids                          | 232     | 98           |
| 37 | Benthopelagic Shrimps                                | 446     | 93           |
| 38 | Slope Decapods scavengers                           | 433     | 104          |
| 39 | Slope Crabs                                          | 295     | 87           |
| 40 | Shelf Crabs                                          | 60      | 55           |
| 41 | Deep-water Rose Shrimp                               | 252     | 96           |
| 42 | Red Giant shrimp                                     | 436     | 152          |
| 43 | Red and Blue shrimp                                  | 545     | 126          |
| 44 | Polychaetes                                          | –       | –            |
| 45 | Macro benthic invertebrates                          | –       | –            |
| 46 | Gelatinous plankton                                  | –       | –            |
| 47 | Sup benthic crustaceans                              | –       | –            |
| 48 | Macrzooplankton                                     | –       | –            |
| 49 | Mesozooplankton                                     | –       | –            |
| 50 | Microzooplankton                                    | –       | –            |
| 51 | Bacterioplankton                                    | –       | –            |
| 52 | Seagrasses and algae                                 | –       | –            |
| 53 | Large phytoplankton                                 | –       | –            |
| 54 | Small phytoplankton                                 | –       | –            |
| 55 | Marine Snow                                          | –       | –            |
| 56 | Discards                                             | –       | –            |
| 57 | Benthic Detritus                                     | –       | –            |
Table 2
Landings (t km\(^{-2}\) y\(^{-1}\)) in 1995, 2005 and 2015 by the trawl (OTB), long line (LL), passive nets (GND), other gears (MIX) and purse seine (PS).

| FG | OTB 1995 | OTB 2005 | OTB 2015 | LL 1995 | LL 2005 | LL 2015 | GND 1995 | GND 2005 | GND 2015 | MIX 1995 | MIX 2005 | MIX 2015 | PS 1995 | PS 2005 | PS 2015 |
|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 3  |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 4  |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 5  | 0.0015  | 0.002   | 0.0027  | 0.0058  | 0.0073  | 0.0141  | 0.0010  |         |         |         |         |         |         |         |         |
| 6  |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 7  | 0.0006  |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 8  | 0.0005  | 0.001   | 0.0001  | 0.0005  | 0.0005  | 0.015   | 0.0015  |         |         |         |         |         |         |         |         |
| 9  |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 10 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 11 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 12 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 13 | 0.0002  | 0.004   | 0.0032  | 0.004   | 0.0021  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  | 0.0003  |
| 14 | 0.0204  | 0.005   | 0.0008  | 0.028   | 0.005   | 0.0002  | 0.02    | 0.02    | 0.02    | 0.02    | 0.02    | 0.02    | 0.02    | 0.02    | 0.02    |
| 15 | 0.0079  | 0.002   | 0.008   |         | 0.0017  | 0.0229  |         |         |         |         |         |         |         |         |         |
| 16 | 0.1008  | 0.0460  | 0.017   | 0.0049  | 0.0148  | 0.0008  | 0.0008  | 0.0008  | 0.0008  | 0.0008  | 0.0008  | 0.0008  | 0.0008  | 0.0008  | 0.0008  |
| 17 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 18 | 0.0002  | 0.001   | 0.0008  |         | 0.001   | 0.0008  |         |         |         |         |         |         |         |         |         |
| 19 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 20 | 0.03    | 0.026   | 0.0082  | 0.0060  | 0.0368  | 0.0052  | 0.0001  | 0.0011  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  | 0.0001  |
| 21 | 0.0205  | 0.026   | 0.0321  | 0.002   | 0.0443  | 0.0677  | 0.0311  | 0.0032  | 0.0111  | 0.0007  | 0.0043  | 0.0154  | 0.0077  | 0.0043  | 0.0154  |
| 22 | 0.0088  | 0.002   | 0.0057  |         | 0.0027  | 0.0004  | 0.04    | 0.0007  | 0.0019  |         |         |         |         |         |         |
| 23 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 24 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 25 | 0.0063  | 0.002   | 0.0151  |         | 0.0004  | 0.0111  | 0.0004  | 0.0009  | 0.017   | 0.0073  | 0.0265  | 0.0322  | 0.0622  | 0.0265  | 0.0322  |
| 26 | 0.0516  | 0.0695  | 0.04    | 0.0002  | 0.0025  | 0.0008  | 0.4     | 0.0117  | 0.0076  | 0.0278  | 0.0059  | 0.0336  | 0.0328  | 0.0059  | 0.0336  |
| 27 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 28 |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |
| 29 | 0.0273  | 0.026   | 0.0444  |         | 0.0007  | 0.025   | 0.0296  | 0.0002  | 0.001   |         |         |         |         |         |         |
| 30 | 0.0243  | 0.0186  | 0.01    | 0.0019  | 0.0027  | 0.001   | 0.0005  | 0.0008  | 0.0071  |         |         |         |         |         |         |
| 31 | 0.0057  | 0.0161  | 0.0031  |         | 0.0003  | 0.0001  | 0.001   |         |         |         |         |         |         |         |         |

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Table 2 (continued)

| FG | OTB 1995 | OTB 2005 | OTB 2015 | LL 1995 | LL 2005 | LL 2015 | GND 1995 | GND 2005 | GND 2015 | MIX 1995 | MIX 2005 | MIX 2015 | PS 1995 | PS 2005 | PS 2015 |
|----|----------|----------|----------|---------|---------|---------|----------|---------|---------|----------|---------|---------|---------|---------|---------|
| 32 | 0.0040   | 0.002    | 0.0168   | 0.0000  | 0.0005  | 0.0115  | 0.0002   | 0.0209  | 0.0343  | 0.0009   | 0.005   | 0.0066  |         |         |         |
| 33 | 0.0857   | 0.11     | 0.0224   | 0.0     | 0       | 0       | 0.0115   | 0.0209  | 0.0343  | 0.0009   | 0.005   | 0.0066  |         |         |         |
| 34 | 0.01     | 0.03     | 0.002    |         |         |         |         |         |         |         |         |         |         |         |         |
| 35 | 0.0263   | 0.003    | 0.002    |         |         |         |         |         |         |         |         |         |         |         |         |
| 36 | 0.0691   | 0.008    | 0.0156   |         |         |         |         |         |         |         |         |         |         |         |         |
| 37 | 0.1734   | 0.2359   | 0.1096   |         |         |         |         |         |         |         |         |         |         |         |         |
| 38 | 0.0435   | 0.0847   | 0.104    |         |         |         |         |         |         |         |         |         |         |         |         |
| 39 | 0.0592   | 0.0286   | 0.033    |         |         |         |         |         |         |         |         |         |         |         |         |
Table 3
Discard (t km⁻² y⁻¹) in 1995, 2005 and 2015 by the trawl (OTB), long line (LL), passive nets (GND), other gears (MIX) and purse seine (PS).

| FG | OTB 1995 | OTB 2005 | OTB 2015 | LL 1995 | LL 2005 | LL 2015 | GND 1995 | GND 2005 | GND 2015 | MIX 1995 | MIX 2005 | MIX 2015 | PS 1995 | PS 2005 | PS 2015 |
|----|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 3  | 0.0001   | 0.0001   |          |          |          |          | 0.0009   | 0.0002   |          |          |          |          |          |          |          |
| 4  |          |          |          |          |          |          | 0.0000   |          |          |          |          |          |          |          |          |
| 5  |          |          |          |          |          |          | 0.0000   |          |          |          |          |          | 0.0005   |          |          |
| 6  | 0.0001   | 0.0002   | 0.0003   | 0.0000   | 0.0000   | 0.0001   |          |          |          |          |          |          |          |          |          |
| 7  | 0.0005   | 0.0001   | 0.0001   | 0.0000   |          |          |          |          |          |          |          |          |          |          |          |
| 8  | 0.036    | 0.0016   | 0.0022   | 0.0006   | 0.0003   | 0.0009   | 0.0009   | 0.0004   |          |          |          |          |          |          |          |
| 9  | 0.0011   | 0.0003   | 0.0001   | 0.0000   |          |          |          |          |          |          |          |          |          |          |          |
| 10 | 0.0021   | 0.0025   | 0.0012   | 0.0000   |          |          |          |          |          |          |          |          |          |          |          |
| 11 | 0.0041   | 0.0059   | 0.0043   | 0.0000   |          |          |          |          |          |          |          |          |          |          |          |
| 12 | 0.0086   | 0.013    | 0.0156   | 0.0000   |          |          |          | 0.0006   | 0.0002   |          |          |          |          |          |          |
| 13 | 0.0035   | 0.001    | 0.0024   | 0.0000   | 0.0000   | 0.0001   |          |          |          |          |          |          | 0.0006   | 0.0002   |          |
| 14 | 0.0024   | 0.0008   | 0.0011   | 0.0001   | 0.0001   |          | 0.0048   | 0.005    | 0.0002   | 0.0002   | 0.0002   | 0.0001   |          |          |          |
| 15 | 0.0129   | 0.0029   | 0.0031   | 0.0002   | 0.0001   |          | 0.0045   | 0.0042   | 0.0002   |          |          |          |          |          |          |
| 16 | 0.0001   | 0.0073   | 0.0005   | 0.0000   | 0.0001   |          | 0.0003   | 0.0007   |          |          |          |          |          |          |          |
| 17 | 0.0331   | 0.005    | 0.001    |          |          |          |          |          |          |          |          |          |          |          |          |
| 18 | 0.0713   | 0.0161   | 0.0289   | 0.0000   | 0.0001   |          |          |          |          |          |          |          |          |          |          |
| 19 | 0.0061   | 0.0006   | 0.0001   |          |          |          |          |          |          |          |          |          |          |          |          |
| 20 | 0.0500   | 0.12     | 0.0923   |          |          |          |          |          |          |          |          |          |          |          |          |
| 21 | 0.0609   | 0.0401   | 0.01     | 0.0000   | 0.0001   | 0.0030   | 0.003    | 0.0001   | 0.0003   | 0.0001   | 0.0007   |          |          |          |          |
| 22 | 0.0023   | 0.0023   | 0.0007   | 0.0003   | 0.0003   | 0.0001   | 0.0012   | 0.0012   | 0.0001   |          |          |          |          |          |          |
| 23 |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 24 | 0.0439   | 0.0112   | 0.01     |          |          |          |          |          |          | 0.0047   | 0.0048   | 0.0001   |          |          |          |
| 25 | 0.0063   | 0.005    | 0.0089   | 0.0016   | 0.0016   | 0.0001   | 0.0001   |          | 0.0013   | 0.0001   |          |          |          |          |          |
| 26 | 0.0007   | 0.0075   | 0.008    | 0.0000   |          |          | 0.0006   |          | 0.0001   | 0.0000   | 0.001    |          |          |          |          |
| 27 | 0.0250   | 0.0201   | 0.01     |          |          |          |          | 0.0000   |          |          |          |          |          |          |          |
| 28 | 0.0003   | 0.003    | 0.0001   |          |          |          |          |          |          |          |          |          |          |          |          |
| 29 |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| 30 |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |

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|   | OTB | LL   | GND | MIX | PS   |
|---|-----|------|-----|-----|------|
| FG | 1995 | 2005 | 2015 | 1995 | 2005 | 2015 | 1995 | 2005 | 2015 | 1995 | 2005 | 2015 |
| 31 | 0.0040 | 0.003 | 0.0015 | 0.0006 | 0.0006 | 0.0000 | 0.0001 | 0.0001 |
| 32 | 0.0014 | 0.0018 | 0.0013 | 0.003 | 0.0032 | 0.0001 | 0.0000 | 0.0001 |
| 33 | 0.0007 | 0.0006 | 0.0005 | 0.0006 | 0.0006 | 0.0000 | 0.0001 | 0.0001 |
| 34 | 0.0011 | 0.002 | 0.0016 | 0.0006 | 0.0006 | 0.0000 | 0.0001 | 0.0001 |
| 35 | 0.0000 | 0.0001 | 0.0001 | 0.0006 | 0.0006 | 0.0000 | 0.0001 | 0.0001 |
| 36 | 0.0415 | 0.0138 | 0.0144 | 0.003 | 0.0032 | 0.0001 | 0.0000 | 0.0001 |
| 37 | 0.07 | 0.06 | 0.05 | 0.003 | 0.0032 | 0.0001 | 0.0000 | 0.0001 |
| 38 | 0.029 | 0.0079 | 0.0045 | 0.0006 | 0.0006 | 0.0000 | 0.0001 | 0.0001 |
| 39 | 0.0278 | 0.0107 | 0.013 | 0.003 | 0.0032 | 0.0001 | 0.0000 | 0.0001 |
| 40 | 0.0127 | 0.0132 | 0.0001 | 0.0007 | 0.0007 | 0.0000 | 0.0001 | 0.0001 |
each functional group present in the system) estimating missing parameters [7]. Therefore, the input parameters (B, P/B, Q/B, and DC) are entered first, and then the mass-balance in the model is ensured.

The aggregation of the species in the FGs was performed by means of a Reiterative Aggregation Method based on the trophic similarity and the bathymetric distribution of species [8]. In particular, the bathymetric distribution indicator of the species biomass was the Centre Of Gravity (COG) [9], a synthetic measure that indicates the depth to which a species shows the highest biomass concentration with a value of variance indicating the displacement of biomass species between bathymetric layers (Table 1). It is expressed as:

$$\text{COG} = (X - 1 + 2X_2 + 3X_3 + 4X_4 + \ldots + nX_n)/\sum X_i$$

where X represents the value of the average biomass of the species in the layer i. In particular, 8 bathymetric layers of 100 m were identified between 10 and 800 m depth.

The quantitative information on diet preferences (in weight) was collected for 129 species out of a total of 276 species sampled in the benthopelagic and demersal assemblages of study areas, through the scientific published and grey literature of both local and nearby geographical areas. In particular, the data were obtained from the literature and the Fishbase dataset (www.fishbase.org) [10]. The analysis of diet data was carried out by implementing a bi-clustering on the matrix of prey-predator relationships, also using the vector of weighting factor [COG], implemented by means of a Microsoft Visual Basic routine. Species lacking in diet information were successively grouped according to the life-history traits and habitat preferences [5]. Biomass data (kg km$^{-1}$) of demersal and benthopelagic species were collected during MEDITS surveys carried out annually on the soft bottoms of the Northern Ionian Sea (GSA 19), in the depth range 10–800 m according to a random stratified sampling design [3]. The MEDITS data collection covers the time period 1995–2015. Biomass data of Odontocetes, Fin whale, and Loggerhead turtle were estimated by density data (N/km$^{-2}$) obtained from the OBIS SEAMAP [11] and by the mean individual weight used in other models [12,13]. Biomass data of Large Pelagics were estimated by the close areas of the Eastern Ionian Sea [14] and of the Strait of Sicily [15].

The Production rate (P/B) for each species was obtained from empirical equations used to estimate the total mortality (Z) or from other models. In particular, Z can be assumed equal to the production rate of a species [16]. The estimation of Z was carried out by the equations

$$Z = M + F,$$

where M is the natural mortality and F is the fishing mortality [17]. The Consumption rate (Q/B) was estimated by means empirical equations [6] or obtained from the local existing model or literature. The FG values were calculated as weighted averages of the values for the species belonging to the group, where the proportion of species biomass within the group was used as a weighting factor [18].

The diet information (DC expressed as weight percentage) were derived from several Mediterranean areas preferring the information close to the study area when available.

Data referring to annual commercial landings were provided from the Fisheries and Aquaculture Economic Research for the Ministry of Agricultural Food and Forestry Policies (MIPAAF) for the period 2006–2015 and they were processed in order to reconstruct disaggregated landings for trawls, long lines, nets, other gears, and purse seines in the period 1995–2005. Discards of the trawl fishery by species with commercial value (undersize individuals) were calculated using the discard rate estimated by [19]. The discard fraction for species or functional groups of no commercial value caught by the trawl was calculated on the basis of the proportion of commercial and no commercial discard in MEDITS data and local references [20]. Discard for others gears was obtained from the scientific literature relative to neighbouring Mediterranean areas [21] eventually correcting discard rate on the basis of the knowledge and experience of local experts.

**Ethics Statement**

Not applicable.
CRediT Author Statement

**R. Carlucci, S. Libralato, P. Ricci, and L. Sion:** Conceptualization, Supervision and Validation; **F. Capezzuto, R. Carlucci, G. Cipriano, G. D’Onghia, S. Libralato, P. Maiorano, P. Ricci, L. Sion, and A. Tursi:** Data curation, Methodology, Visualization, Writing-Original draft preparation and Writing-Review & Editing; **P. Ricci:** formal analysis.

Declaration of Competing Interest

The Authors declare that they have no known competing financial interests or personal relationships which have, or could be perceived to have, influenced the work reported in this article.

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Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.dib.2021.106964.

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