Annex IV
Southern Adriatic Sea (GSA 18)

Summary

4.4.1 Introduction

Based on the results of Fast-scan and interactions with stakeholders, the ten UoAs listed in Table 4.1.1 were identified in the GSA 18. In this list the UoAs using bottom otter trawl nets (OTB) target mainly two different types of target species:

- demersal fish (DEF);

- mixed group of demersal species and deep water species (MDD).

These types were aggregated together in Tables 4.4.1.1 and 4.4.3.1, both in terms of landed volume and value. Considering trawlers landings, about 90% come from boats targeting demersal fish.

Table 4.4.1.1 – List of the UoAs selected for Deeper-mapping in the GSA 18

Italian name	English name	Scientific name	Gear	Group of target species	Mean landing in weight 2015-2016 (Ton)	Mean landing in vaslue 2015-2016 (k Euro)	UoA Identified during the consultation
Alici	European anchovy	*Engraulis encrasicolus*	Purse seine	SPF	1,601	2,226	X
Gamberi bianchi o rosa	Deep-water rose shrimp	*Parapenaeus longirostris*	Bottom otter trawl	DEF+MDD	823	4,075	X
Moscardino bianco	Horned octopus	*Eledone cirrhosa*	Bottom otter trawl	DEF+MDD	462	3,886	X
Nasello	European hake	*Merluccius merluccius*	Fixed longline	DEF	1,642	11,366	
Nasello	European hake	*Merluccius merluccius*	Bottom otter trawl	DEF+MDD	459	2,940	
Pannocchie	Spottail mantis squillid	*Squilla mantis*	Bottom otter trawl	DEF+MDD	935	4,591	
Scampi	Norway lobster	*Nephrops norvegicus*	Bottom otter trawl	DEF+MDD	419	9,074	X
Seppia mediterranea o comune	Common cuttlefish	*Sepia officinalis*	Trammel net	DEF	248	2,602	X
Seppia mediterranea o comune	Common cuttlefish	*Sepia officinalis*	Bottom otter trawl	DEF+MDD	459	2,940	X
Triglie di fango	Red mullet	*Mullus barbatus*	Bottom otter trawl	DEF+MDD	1,485	8,462	

– DEF: Demersal fish.
– MDD: Mixed group of demersal species and deep water species.
– SPF: Small pelagic fish

Source: estimates from MIPAAFT/National Fisheries Data Collection Programme

From the data shown in Table 4.4.1.1 it is possible to note that the selected UoAs are made up of 4 types of fishing gears: the purse seine for small pelagic fishes, the bottom otter trawl, the fixed longline and the trammel net.

Purse seine activity is mainly carried out by large vessels (from 24 to 40 meters of LFT), present in the ports of Barletta and Molfetta, which mainly fish in the Gulf of Manfredonia and in some cases are also pushed into the GSA 17 (MIPAAFT, 2016). The trawl activity is carried out by both medium and large boats that are distributed in the main fishing ports of Puglia. Figure 3.4.1 shows the maps of the fishing activity of trawlers (OTB, period 2013 -2015) within the GSA 18, estimated from the Vessel Monitoring System (VMS) data. The analyzes were performed with VMS base (Russo et al., 2014) using a grid with 5km side cells and the values represent the total annual fishing hours per cell of all trawl boats aggregated also in terms of target species . In the GSA 18, the trawling activity is mainly concentrated in the Italian coastal area, even if we observe fishing activities in the slope areas near the Albanian and Montenegrin national waters (Figure 4.4.1.1). On the Italian side, it is possible to

observe a greater fishing intensity in the northern area compared to the southern one of the GSA. Starting from 2014 there is a reduction in the spatial extent of fishing activity, in fact there seem to be fewer cells affected by fishing events, especially in areas of slope near the Albanian coasts and in general a reduction in intensity in the Italian coastal area (MIPAAFT, 2017).

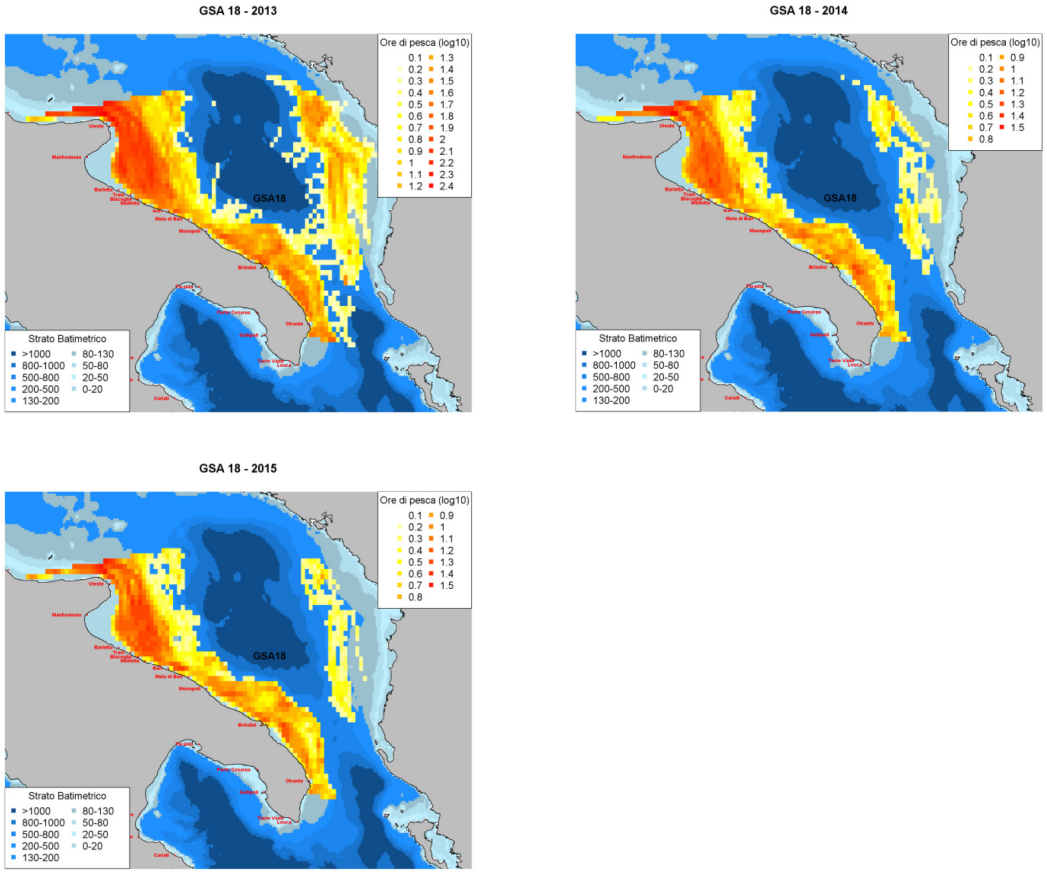


Figure 4.4.1.1 – Fishing activities of the trawling fleet in the GSA18. The values represent the average fishing hours per cell, calculated from the monthly hours for the years 2013 to 2015 (MIPAAFT, 2017).

The fleet of boats using fixed long lines is mainly found in the fishing ports of Bari and Brindisi and consists of medium-sized boats (12 to 18 meters LFT). Their activity takes place in deep waters (about 200-300 meters) and these boats can move near both the Pomo pit and the Albanian waters. Finally, boats that use passive gears such as trammel net are generally small and distributed throughout the Apulian coast. These boats operate near the coast and target demersal species.

Regarding the management, at various levels, of the resources involved in the activities selected fisheries (UoA) - international (ICCAT), regional (GFCM), Community (EU / EC) and national (MIPAAF) - see Chapter 3.

4.4.2 Status of the target stocks exploited by the selected UoAs

Euroepan anchovy (*Engraulis encrasicolus*)

The European anchovy is caught in the southern Adriatic Sea mainly with the purse seine and the pelagic pair trawl, even if in this GSA the selected UoA is only the one constituted by the fishing with the purse seine (PS) for small pelagic fish. In particular, it has been reported that many catches of anchovies are made in the GSA 17 and landed in the GSA 18 by boats belonging to this area (MIPAAFT, 2016).

In terms of the status of the resource, the evaluation is carried out with an analytical model (SAM model, GFCM, 2017) combining the biological information, fishing statistics and ecosurvey abundance indices of the GSA 17 and 18. In accordance with the last available evaluation, fishing mortality shows a growing trend and in 2016 is higher than the reference value (FMSY; Figure 4.4.2.1). The spawning stock biomass (SSB) shows an inverse pattern with the biomass of 2016 below the precautionary biomass (BPA) but higher than the biomass limit (Blim; Figure 4.4.2.1). Recruitment also shows a negative trend over the last decade.

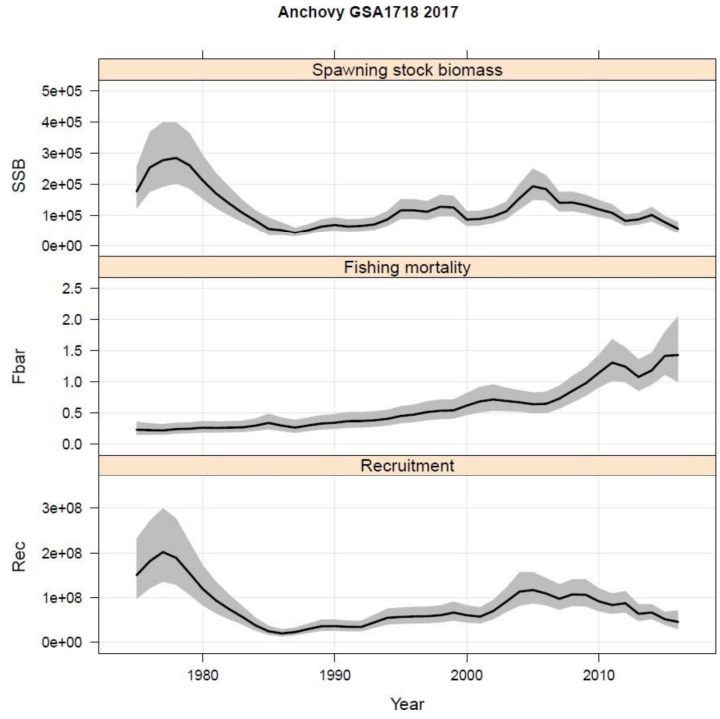


Figure 4.4.2.1 – Results of the evaluation of the European anchovy (*Engraulis encrasicolus*) in GSA 17 e 18 (GFCM, 2017).

Deep-water rose shrimp (*Parapenaeus longirostris*)

The deep-water rose shrimp is fished in the southern Adriatic Sea mainly with trawl nets having as target group demersal fish (DEF: 90%). 668/5000

This stock was evaluated by combining the capture, biological and abundance data from trailing surveys of the GSAs 17, 18 and 19, using an analytical model (a4a, STECF 2017 °). The results of this processing show a fishing mortality that is constant and higher than the reference level (F0.1; Figure 3.4.1.2). The spawning stock biomass (SSB) showed an increase over time and is estimated at about 3,266 t in

2016, well above the average along the time series of 1,171 t (Figure 4.4.2.2). Recruitment has shown a strong increase in recent years and in 2016 was estimated well above the average of the entire series (Figure 4.4.2.2).

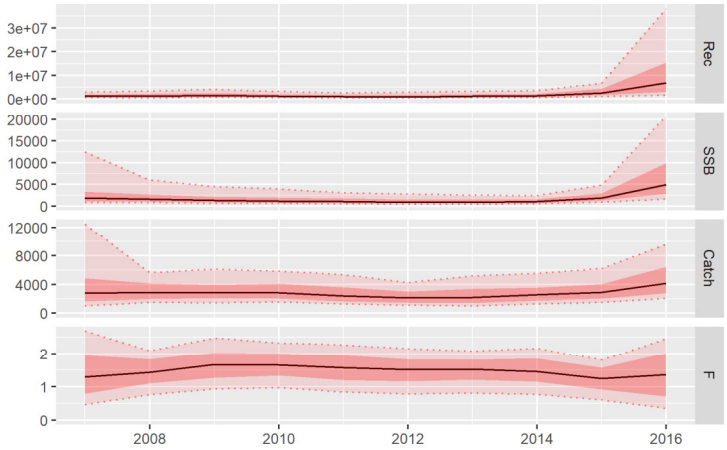


Figure 4.4.2.2 – Results of the evaluation of the Deep-water rose shrimp (*Parapenaeus longirostris*) in GSA 17-18-19 (STECF, 2017a).

Horned octopus (*Eledone cirrhosa*)

The horned octopus is fished in the southern Adriatic mainly with trawl nets having as target group demersal fish (DEF: 96%). The species is not currently subject to an analytical evaluation, nor are empirical reference points available that can be used to evaluate their exploitation status. The biomass index for this species, estimated as part of the MEDITS trawling campaign, shows clear fluctuations in the period 1996-2009, followed by a decreasing trend (MIPAAFT, 2017; Figure 4.4.2.3).

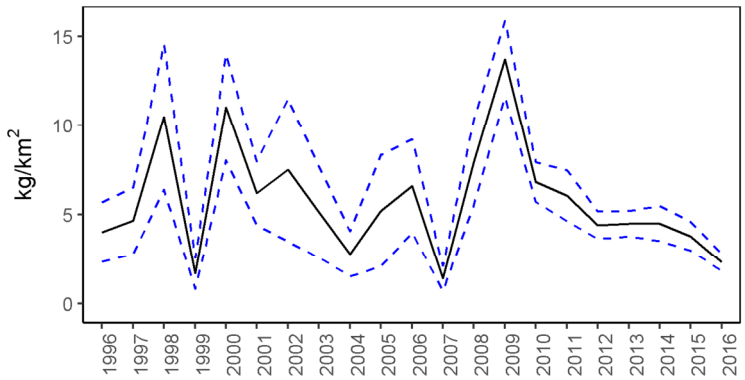


Figure 4.4.2.3 – Biomass index trend of the horned octopus (*Eledone cirrhosa*) in GSA18. MEDITS data for the period 1994-2015 (MIPAAFT, 2017).

European hake (*Merluccius merluccius*)

The European hake is fished in the southern Adriatic mainly with trawl nets having demersal fish as group of target species and with long lines, in fact this stock is present in two UoA (OTB and LLS). The evaluation is performed by combining the data

of the GSA 17 and 18 together and using an analytical model (SS3; GFCM, 2017). The exploitation status in terms of fishing mortality shows a peak of 0.41 in 2013, in 2016 the value of F is equal to 0.33; therefore greater than the reference value estimated as 0.21 (FMSY = F0.1; GFCM, 2017; Figure 4.4.2.4). Recruitment shows a general decreasing trend with the highest observed in 2004, followed by a general decline until 2016 (Figure 4.4.2.4). Spawning stack biomass (SSB) showed a continuous decreasing trend throughout the historical series (Figure 4.4.2.4).

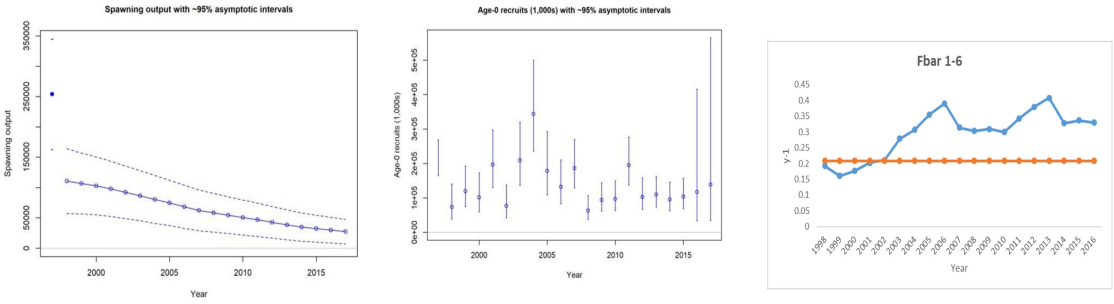


Figure 4.4.2.4 – Results of the evaluation of the European hake (Merluccius merluccius) in GSA 17-18 (GFCM, 2017).

Norway lobster (*Nephrops norvegicus*)

Norway lobster is caught in southern Adriatic mainly by trawlers with demersal fish (DEF: 94%) as target group. The stock was assessed by combining the catches and abundance survey data (MEDITS) of the GSA 17 with the GSA 18, although there is no scientific evidence justifying the union of the two areas. The method used for the evaluation is based on a production model (SpiCT, STECF 2017a). The assessment of the stock shows that the relative biomass (B / BMSY) has been continuously decreasing since the '60s, remaining below BMSY (6.616 t) in the last ten years (Figure 4.4.2.5). Fishing mortality has increased since the mid-1980s with an estimated F higher than FMSY = 0.37 in the last ten years (F2016 / FMSY = 1.38).

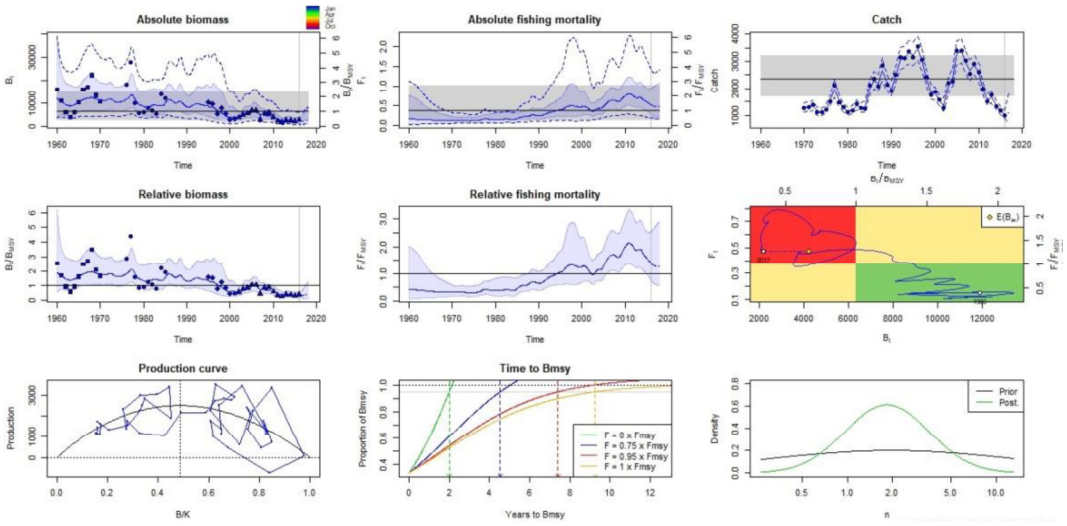


Figure 4.4.2.5 – Results of the evaluation of the Norway lobster (*Nephrops norvegicus*)in GSA 17-18 (STECF, 2017a).

Spottail mantis shrimp (*Squilla mantis*)

The spottail mantis shrimp in the southern Adriatic is fished mainly with trawlers having as a group of target species demersal fish (DEF: 94%). The evaluation of this species is carried out by combining the GSAs 17 and 18, even if there is no scientific evidence that the stock is unique in the two GSAs. The results of the last evaluation available and made with an analytical method (XSA, STECF, 2017a) show a fishing mortality that has been decreasing in the last three years but with an F of 0.65 in 2016, which is higher than the reference level (F0.1 = 0.38), chosen as the proxy of FMSY (Figure 3.4.1.6). According to the results of the evaluation, moreover, SSB shows a decreasing trend in the period 2008-2012 followed by a substantial increase of 14,071 tons in 2016 (Figure 4.4.2.6). Recruitment showed a decline in the data series during the first three years, reaching the minimum value in 2010, followed by a growing trend (Figure 4.4.2.6).

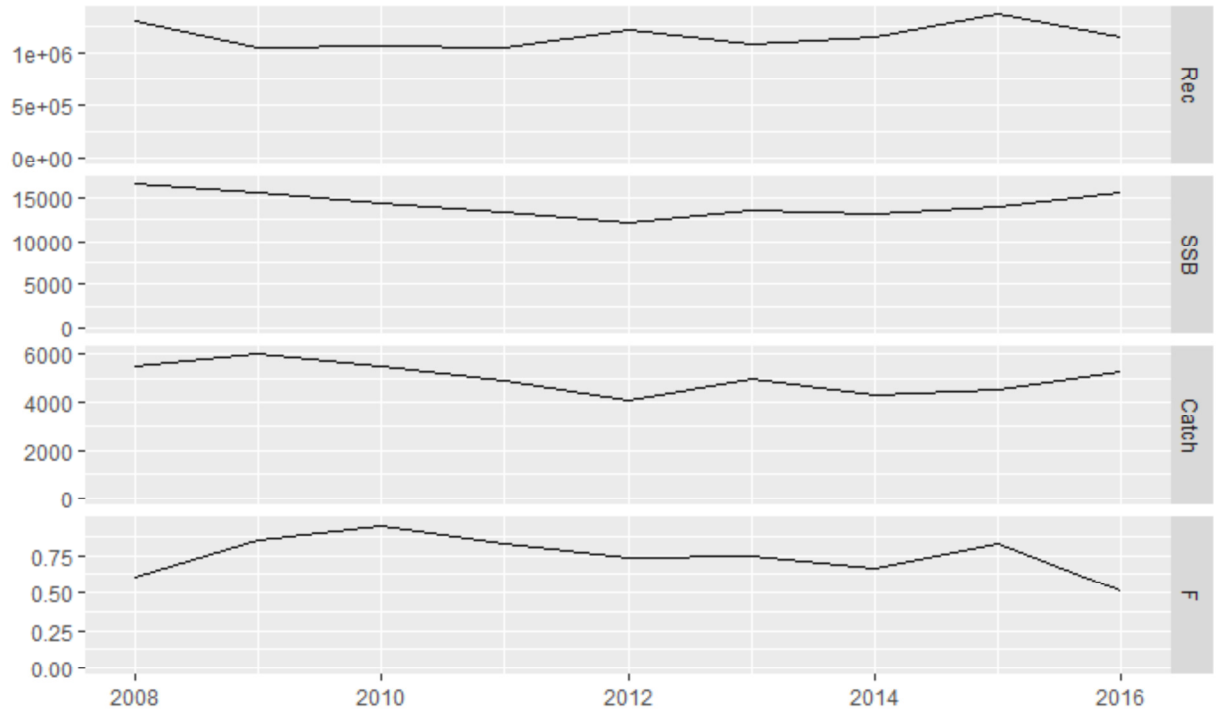


Figure 4.4.2.6 – Results of the evaluation of the spattail mantis shrimp (*Squilla mantis*) in GSA 17-18 (STECF, 2017a).

Common cuttlefish (*Sepia officinalis*)

The common cuttlefish in the southern Adriatic is mainly exploited by the trawl having as a group of target species the demersal fish (DEF: 97%) and by passive gears as the trammel net, in fact this stock is present in two UoA (OTB and GTR). An attempt to assess the status of the resource was made by combining the GSAs 17 and 18, although there is no scientific evidence that the stock is unique in the two areas. The results of this attempt show an F/FMSY ratio greater than 1 and a B/BMSY ratio lower than 1, presenting a state of over-exploitation and a relatively low biomass (Figure

4.4.2.7). Despite this, it is important to clarify that it is not possible to provide management information due to the poor quality of the data (e.g. the lack of Albanian catches), the high uncertainty of the estimates of biological parameters and the lack of a reliable abundance index (STECF, 2017a).

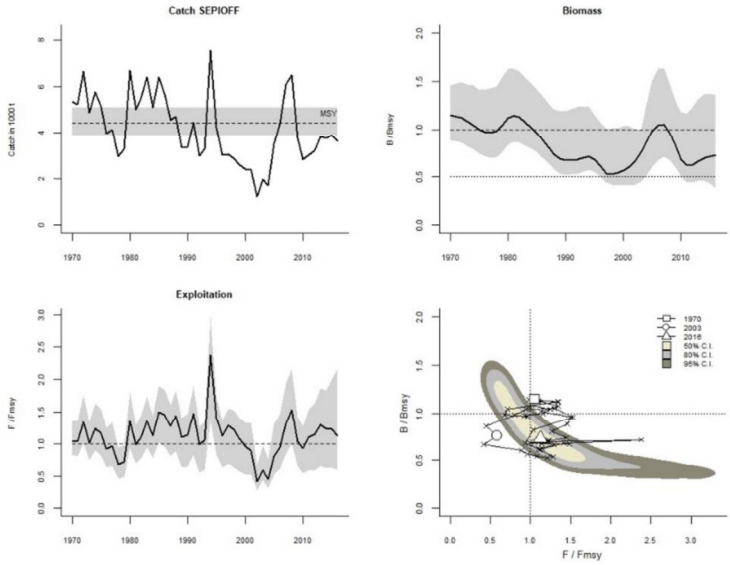


Figure 4.4.2.7 – Results of the evaluation of the common cuttlefish (*Sepia officinalis*) in GSA 17-18 (STECF, 2017a).

Red mullet (*Mullus barbatus*)

The red mullet the southern Adriatic is fished mainly with trawl nets with demersal fish (DEF: 98%) as group of target species. The evaluation of this species is carried out by combining the GSAs 17 and 18 and using an analytical method (SS3, GFCM 2017). The results of the last available evaluation show a decreasing fishing mortality with the value of 2016 lower than F0.1 (0.51), chosen as FMSY proxy (Figure 4.4.2.8). Furthermore, according to the results of the evaluation, SSB shows an increasing trend in the period 2013-2016 (Figure 4.4.2.8). Recruitment showed a decline in the data series during the first five years, reaching the minimum value in 2007, followed by a growing trend and an extremely high value in 2016 (Figure 4.4.2.8).

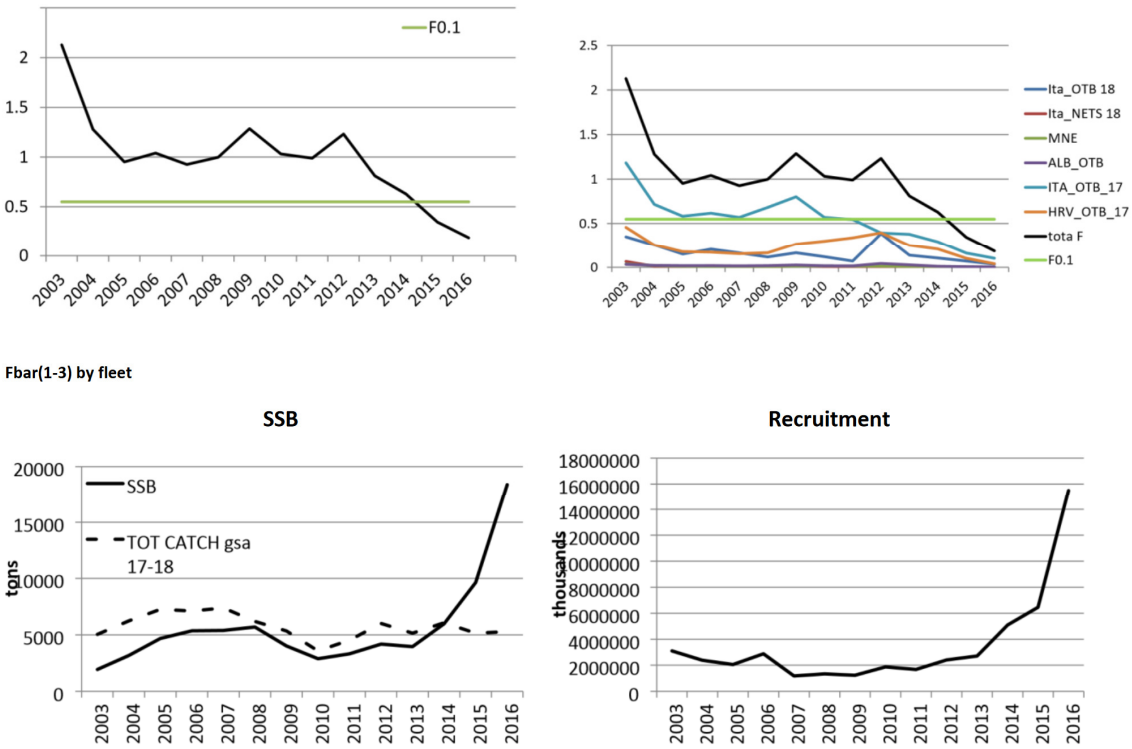


Figure 4.4.2.8 – Results of the evaluation of the red mullet (*Mullus barbatus*) in GSA 17-18 (GFCM, 2017).

4.4.3 Lists of species exploited by the selected UoAs

This section contains the lists of species or groups of species that result in the capture of a specific fishing gear for the respective UoAs selected in GSA 18. Specifically:

Table 4.4.3.1 shows the list of species or groups of species detected for the UoA using the bottom trawl (OTB) operating in the GSA 18.

Table 4.4.3.2 shows the list of species or groups of species detected for the UoAs using the (PS) circulation for small pelagic fish (SPF) operating in GSA 18.

Table 4.4.3.3 shows the list of species or groups of species detected for UoAs using fixed longlines (LLS) openned in GSA 18.

Table 4.4.3.4 shows the list of species or groups of species detected for the UoA using the trefoil (GTR) operating in the GSA 18.

Table 4.4.3.1 – List of species detected for the UoA using bottom otter trawl (OTB) in the GSA 18. The species underlined are the species detected for the selected UoA.

Italian name	English name	Scientific name	Mean landing in weight 2015-2016 (Ton)	Percentage (%)
Nasello	European hake	*Merluccius merluccius*	1642.702	15.696
Triglie di fango	Red mullet	*Mullus barbatus*	1484.833	14.188
Pannocchie	Spottail mantis squillid	*Squilla mantis*	935.117	8.935
Gamberi bianchi o rosa	Deep-water rose shrimp	*Parapenaeus longirostris*	823.827	7.872

Italian name	English name	Scientific name	Mean landing in weight 2015-2016 (Ton)	Percentage (%)
Sugarello o suro	Atlantic horse mackerel	*Trachurus trachurus*	546.266	5.220
Seppia mediterranea o comune	Common cuttlefish	*Sepia officinalis*	529.397	5.058
Moscardino muschiato	Musky octopus	*Eledone moschata*	521.335	4.981
Moscardino bianco	Horned octopus	*Eledone cirrhosa*	478.280	4.570
Scampi	Norway lobster	*Nephrops norvegicus*	418.914	4.003
Totano comune	Broadtail shortfin squid	*Illex coindetii*	408.820	3.906
Calamaro mediterraneo	European squid	*Loligo vulgaris*	359.984	3.440
Mazzancolle	Caramote prawn	*Penaeus kerathurus*	331.300	3.166
Budego	Blackbellied angler	*Lophius budegassa*	197.937	1.891
Sogliola comune	Common sole	*Solea solea*	176.356	1.685
Gronghi	European conger	*Conger conger*	150.804	1.441
Sugarello maggiore	Mediterranean horse mackerel	*Trachurus mediterraneus*	136.546	1.305
Zanchetta	Mediterranean scaldfish	*Arnoglossus laterna*	115.057	1.099
Lanzardo	Chub mackerel	*Scomber japonicus*	113.955	1.089
Pagello fragolino	Common pandora	*Pagellus erythrinus*	110.389	1.055
Boghe	Bogue	*Boops boops*	110.203	1.053
Lanzardo atlantico	Atlantic chub mackerel	*Scomber colias*	91.955	0.879
Sgombro	Atlantic mackerel	*Scomber scombrus*	87.180	0.833
Orate	Gilthead seabream	*Sparus aurata*	80.860	0.773
Gallinella o cappone	Tub gurnard	*Chelidonichthys lucerna*	75.761	0.724
Spigole	European seabass	*Dicentrarchus labrax*	71.912	0.687
Polpo comune o di scoglio	Common octopus	*Octopus vulgaris*	68.155	0.651
Altri pesci	Marine fishes nei	*Osteichthyes*	52.945	0.506
Dentici	Common dentex	*Dentex dentex*	47.280	0.452
Cefali altri	Mullets nei	*Mugilidae*	34.400	0.329
Totano viola	European flying squid	*Todarodes sagittatus*	29.368	0.281
Cappellano	Poor cod	*Trisopterus minutus*	28.943	0.277
Rana pescatrice	Angler(=Monk)	*Lophius piscatorius*	25.348	0.242
Razza stellata	Mediterranean starry ray	*Raja asterias*	18.555	0.177
Razza quattrocchi	Brown ray	*Raja miraletus*	16.715	0.160
Melu' o potassolo	Blue whiting(=Poutassou)	*Micromesistius poutassou*	16.047	0.153
Razza chiodata	Thornback ray	*Raja clavata*	15.489	0.148
Gambero viola	Blue and red shrimp	*Aristeus antennatus*	13.614	0.130
Gamberi rossi	Giant red shrimp	*Aristaeomorpha foliacea*	11.638	0.111
Scorfani di fondale	Blackbelly rosefish	*Helicolenus dactylopterus*	11.493	0.110
Altri crostacei	Marine crustaceans nei	*Crustacea*	11.434	0.109
Capone	Grey gurnard	*Eutrigla gurnardus*	9.243	0.088
Molluschi	Marine molluscs nei	*Mollusca*	9.240	0.088
Merlano	Whiting	*Merlangius merlangus*	8.487	0.081
Scorfano rosso	Red scorpionfish	*Scorpaena scrofa*	5.951	0.057
Alici	European anchovy	*Engraulis encrasicolus*	4.917	0.047
Capone coccio	Red gurnard	*Aspitrigla cuculus*	4.696	0.045
Argentine	Argentines	*Argentina spp*	3.865	0.037
Cefalo dorato	Golden grey mullet	*Liza aurata*	3.132	0.030

Italian name	English name	Scientific name	Mean landing in weight 2015-2016 (Ton)	Percentage (%)
Ghiozzi	Gobies nei	*Gobiidae*	2.658	0.025
Sardine	European pilchard(=Sardine)	*Sardina pilchardus*	1.404	0.013
Razze altre	Raja rays nei	*Raja spp*	1.266	0.012
Rombi altri	Turbots nei	*Scophthalmidae*	1.108	0.011
Pesce san pietro	John dory	*Zeus faber*	1.059	0.010
Palamita	Atlantic bonito	*Sarda sarda*	0.937	0.009
Razza bianca	White skate	*Raja alba*	0.917	0.009
Rossetto	Transparent goby	*Aphia minuta*	0.899	0.009
Pesce serra	Bluefish	*Pomatomus saltatrix*	0.715	0.007
Musdea	Forkbeard	*Phycis phycis*	0.677	0.006
Rombo chiodato	Turbot	*Psetta maxima*	0.653	0.006
Leccia stella	Pompano	*Trachinotus ovatus*	0.364	0.003
Granchi	Marine crabs nei	*Brachyura*	0.317	0.003
Ombrine	Shi drum	*Umbrina cirrosa*	0.281	0.003
Tracine	Weeverfishes nei	*Trachinidae*	0.281	0.003
Gobetto	Plesionika shrimps nei	*Plesionika spp*	0.274	0.003
Totano tozzo	Lesser flying squid	*Todaropsis eblanae*	0.256	0.002
Leccia	Leerfish	*Lichia amia*	0.194	0.002
Pesce prete	Stargazer	*Uranoscopus scaber*	0.190	0.002
Ricciole	Greater amberjack	*Seriola dumerili*	0.128	0.001
Triglie di scoglio	Surmullet	*Mullus surmuletus*	0.089	0.001
Latterino	Silversides(=Sand smelts) nei	*Atherinidae*	0.072	0.001
Occhiate	Saddled seabream	*Oblada melanura*	0.065	0.001
Mormore	Sand steenbras	*Lithognathus mormyrus*	0.043	< 0.001
Linguattola	Spotted flounder	*Citharus linguatula*	0.006	< 0.001
Cepola	Red bandfish	*Cepola macrophthalma*	0.005	< 0.001
Mendola, mennola	Blotched picarel	*Spicara maena*	0.005	< 0.001

Source: estimates from MIPAAFT/National Fisheries Data Collection Programme

Table 4.4.3.2 – List of species detected for the UoA using purse seine (PS) for small pelagic fish (SPF) in the GSA 16. The species underlined are the species detected for the selected UoA.

Italian name	English name	Scientific name	Mean landing in weight 2015-2016 (Ton)	Percentage (%)
Alici	European anchovy	*Engraulis encrasicolus*	1600.611	84.724
Sardine	European pilchard(=Sardine)	*Sardina pilchardus*	150.661	7.975
Lanzardo	Chub mackerel	*Scomber japonicus*	83.492	4.419
Lanzardo atlantico	Atlantic chub mackerel	*Scomber colias*	26.896	1.424
Sugarello o suro	Atlantic horse mackerel	*Trachurus trachurus*	23.635	1.251
Tonno rosso	Atlantic bluefin tuna	*Thunnus thynnus*	1.391	0.074
Pesce spada	Swordfish	*Xiphias gladius*	1.202	0.064
Palamita	Atlantic bonito	*Sarda sarda*	1.198	0.063
Cefali altri	Mullets nei	Mugilidae	0.119	0.006

Source: estimates from MIPAAFT/National Fisheries Data Collection Programme

Table 4.4.3.3 – List of species detected for the UoA using fixed longlines (LLS) in the GSA 18. The species underlined are the species detected for the selected UoAs.

Italian name	English name	Scientific name	Mean landing in weight 2015-2016 (Ton)	Percentage (%)
Nasello	European hake	*Merluccius merluccius*	459.345	51.138
Gronghi	European conger	*Conger conger*	98.047	10.915
Scorfani di fondale	Blackbelly rosefish	*Helicolenus dactylopterus*	75.085	8.359
Sugarello o suro	Atlantic horse mackerel	*Trachurus trachurus*	59.383	6.611
Sgombro	Atlantic mackerel	*Scomber scombrus*	47.410	5.278
Pagello fragolino	Common pandora	*Pagellus erythrinus*	43.880	4.885
Lanzardo atlantico	Atlantic chub mackerel	*Scomber colias*	32.303	3.596
Lanzardo	Chub mackerel	*Scomber japonicus*	30.318	3.375
Gallinella o cappone	Tub gurnard	*Chelidonichthys lucerna*	25.599	2.850

Source: estimates from MIPAAFT/National Fisheries Data Collection Programme

Table 4.4.3.4 – List of species detected for the UoA using trammel net (GTR) in the GSA 18. The underlined species are the species detected for the selected UoAs.

Italian name	English name	Scientific name	Mean landing in weight 2015-2016 (Ton)	Percentage (%)
Seppia mediterranea o comune	Common cuttlefish	*Sepia officinalis*	62.761	32.301
Pannocchie	Spottail mantis squillid	*Squilla mantis*	23.828	12.263
Pesce serra	Bluefish	*Pomatomus saltatrix*	23.397	12.042
Sogliole miste	Soles nei	*Soleidae*	13.440	6.917
Razza stellata	Mediterranean starry ray	*Raja asterias*	13.277	6.833
Cefali altri	Mullets nei	*Mugilidae*	10.904	5.612
Altri pesci	Marine fishes nei	*Osteichthyes*	9.355	4.815
Orate	Gilthead seabream	*Sparus aurata*	5.339	2.748
Rombo chiodato	Turbot	*Psetta maxima*	5.254	2.704
Polpo comune o di scoglio	Common octopus	*Octopus vulgaris*	4.383	2.256
Triglie di scoglio	Surmullet	*Mullus surmuletus*	4.153	2.138
Mormore	Sand steenbras	*Lithognathus mormyrus*	3.209	1.652
Salpa	Salema	*Sarpa salpa*	3.039	1.564
Sarago sparaglione o sparlotto	Annular seabream	*Diplodus annularis*	2.626	1.352
Scorfano rosso	Red scorpionfish	*Scorpaena scrofa*	2.267	1.167
Spigole	European seabass	*Dicentrarchus labrax*	1.998	1.028
Gallinella o cappone	Tub gurnard	*Chelidonichthys lucerna*	1.648	0.848
Sugarello maggiore	Mediterranean horse mackerel	*Trachurus mediterraneus*	1.354	0.697
Boghe	Bogue	*Boops boops*	1.204	0.620
Pagello fragolino	Common pandora	*Pagellus erythrinus*	0.861	0.443
Seppia mediterranea o comune	Common cuttlefish	*Sepia officinalis*	62.761	32.301
Pannocchie	Spottail mantis squillid	*Squilla mantis*	23.828	12.263
Pesce serra	Bluefish	*Pomatomus saltatrix*	23.397	12.042
Sogliole miste	Soles nei	Soleidae	13.440	6.917

Source: estimates from MIPAAFT/National Fisheries Data Collection Programme

4.4.4 Environmental context

The basin of the southern Adriatic is connected to the Northern Ionian Sea through the Otranto Channel, which represents the area in which an annual flow of water masses of 35 million m^3 is conveyed. The circulation of water masses is typically cyclonic (Artegiani et al., 1997). In the basin flow the Dense Waters of the Northern Adriatic (NADW), the Deep Waters of the Adriatic (ADW) and the Intermediate Waters Levantine (LIW).

The NADW Dense Waters (cold waters) flow from north to south along the western continental shelf, the deep waters originate in the lower Adriatic basin, while the warmer and salty Levantine intermediate waters enter the northern Ionian through the Channel d ' Otranto and flow in a south-north direction along the eastern coasts of the Adriatic. These masses of water make the funds of the eastern part of the southern basin characterized by higher aline and thermal regimes than the western part (Artegiani et al., 1997). The superficial current present along the western coasts instead pushes the masses of water from the Adriatic to the Ionian. Thanks to the presence of these flows, the basin of the Southern Adriatic is characterized by the mixing of the cooler and less salty Adriatic waters and the Ionian waters, with higher temperatures and salinity (Vilicic et al., 1995).

As for the bathymetry, the maximum depth of the southern Adriatic is 1,233 m in the so-called 'Bari pit'. This depression has rather asymmetrical contours with the steepest eastern escarpment. The western area shows substantial differences in the two northern and southern portions; the first, where the Gulf of Manfredonia is located, has a wide continental shelf (distance between the coast line and the 200 m of depth equal to 45 nautical miles) and a slightly steep slope; the second one, on the other hand, has small islands of close depth, so that the 200 m are reached about 8 miles from Capo d'Otranto.

The presence and distribution of marine flora and fauna, as well as the main ecological characteristics of the basin are linked to environmental and morphological differences (Marano et al., 1998). The demersal species have landed on both the western and eastern sides of the basin with a respective distribution of 97% and 3% (MIPAAFT, 2017).

The area potentially exploited by trawlers is 15,000-17,000 km2 (70% on the western side, 30% on the eastern side). The extension of the trailing area has a positive gradient from south to north of the basin.

The southern Adriatic has a lower level of use than the northern one, as it is characterized mainly by deep habitats. Similarly to the northern basin there are facies and typical associations of mobile funds such as facies with Ophelia sp. and facies of dead leaves of Posidonia oceanica and other phanerogams. It contains a batial basin and includes a large depression that reaches about 1,200 m depth. The open area is dominated by the biocoenoses of offshore and debris funds.

Furthermore, in accordance with the Convention on Biological Diversity (CHM, 2017), the southern Adriatic and Ionian Strait are considered as significant EBSA areas (EBSA: Ecologically or Biologically Significant Areas). These areas contain important habitats for marine mammals such as Ziphius cavirostris, a species of Annex II of the Protocol concerning Protected Areas and Biological Diversity in the Mediterranean (SPA / BD Protocol) under the Barcelona Convention and significant densities of other iconic species such as Mobula mobular, Stenella coeruleoalba, Monachus monachus and Caretta Caretta, all listed in Annex II to the SPA / BD Protocol. Biocenosis of batial mud and white corals are present on hard substrates.

The southern Adriatic Sea is considerably deeper than the northern basin. Its average depth is 900 m, and its deepest part is the 1,300 m deep Adriatic pit. Through the Strait of Otranto the basin is connected to the Mediterranean Sea. Despite this, the productivity of this basin is quite high when compared with other Mediterranean areas having a similar geomorphology. The reasons for this situation have been understood thanks to the oceanographic studies carried out in the Adriatic date back to the last century. However, systematic and regular measurements in the central and southern Adriatic began in the 1950s. Measurements of temperature, salinity, transparency, oxygen and phosphate were carried out on a monthly basis. In the 1960s, primary production was included in the measures carried out in the middle Adriatic. Based on the standard oceanographic parameters, it is known that the entry of Mediterranean waters is an important factor, which has caused an increase in productivity in the southern Adriatic Sea. During these periodical "ingressioni", the waters of the Mediterranean, relatively rich in nutrients, are transported in the Adriatic, increasing the productivity of the oligotrophic waters of the middle and southern Adriatic. The increase in productivity is supposed to occur mainly due to the flow of phosphorus from the eastern Mediterranean. Furthermore, an increase in temperature and salinity on an annual scale is also observed, which coincided over time with such "ingresses". A certain regularity has been observed in production fluctuations year after year and related to the passage of water from the Mediterranean to the Adriatic. A change in the composition of phytoplankton species was observed, as was increased biomass and a modified species composition in zooplankton communities. Over the years it has been found that a stronger input of water from the Mediterranean coincides with a higher primary production, a greater biomass of zooplankton and changes in the composition of the species.

The most important feature of the Mediterranean waters that enter the Adriatic (in the middle layer) is their high salinity. This high salinity is characteristic of the Levantine basin, which has one of the highest salinities of all the seas in the world (> 39 psu). The temperature of the Levante waters is higher than that of the Adriatic waters, so that the "income" is also reflected on the temperature. Referring to these phenomena and to certain climatic factors, it has been stated that the most important factor that enhances the water exchange between the two basins is the horizontal pressure gradient in the eastern Mediterranean. A large number of studies until the 1970s showed that the intensity of water exchange between the Adriatic and the Ionian Seas was the most important factor in long-term production fluctuations in the central and southern Adriatic.

Also Marasovic et al. (1999) observed the irregular increase in primary production in southern Adriatic waters and linked it to periods of intensified influxes of Mediterranean waters in the Adriatic Sea carrying higher amounts of nutrients. Their results confirm that the increase in primary biological production is related to the intensified influx of Mediterranean water into the Adriatic. However, these authors hypothesize that the upwelling, reported south of Palagruza, caused by the intense influx of Mediterranean waters, causes the enrichment of the waters of the southern Adriatic by "native" nutrients already present in this area..

Distribution of marine seagrasses

In the southern Adriatic there are Cymodocea nodosa, Ruppia maritima and Posidonia ocenanica. While the presence of the first two is circumscribed in small parts of the

Apulian coast, the second is uniformly distributed on both the Italian and Albanian side and Montegrino (Figure 4.1.4.2, Annex I, GSA 10).

Distribution of coralligenous

In the southern Adriatic some information on the distribution of coralligenous are available for Albania, while no information is officially available for Montenegro, although there are internal reports that refer to the presence of bioconstructions (Figure 4.4.4.1). In Puglia there are many areas characterized by the presence of coralligenous funds (Figure 4.4.4.1), while they seem to be absent mäerl bottoms.

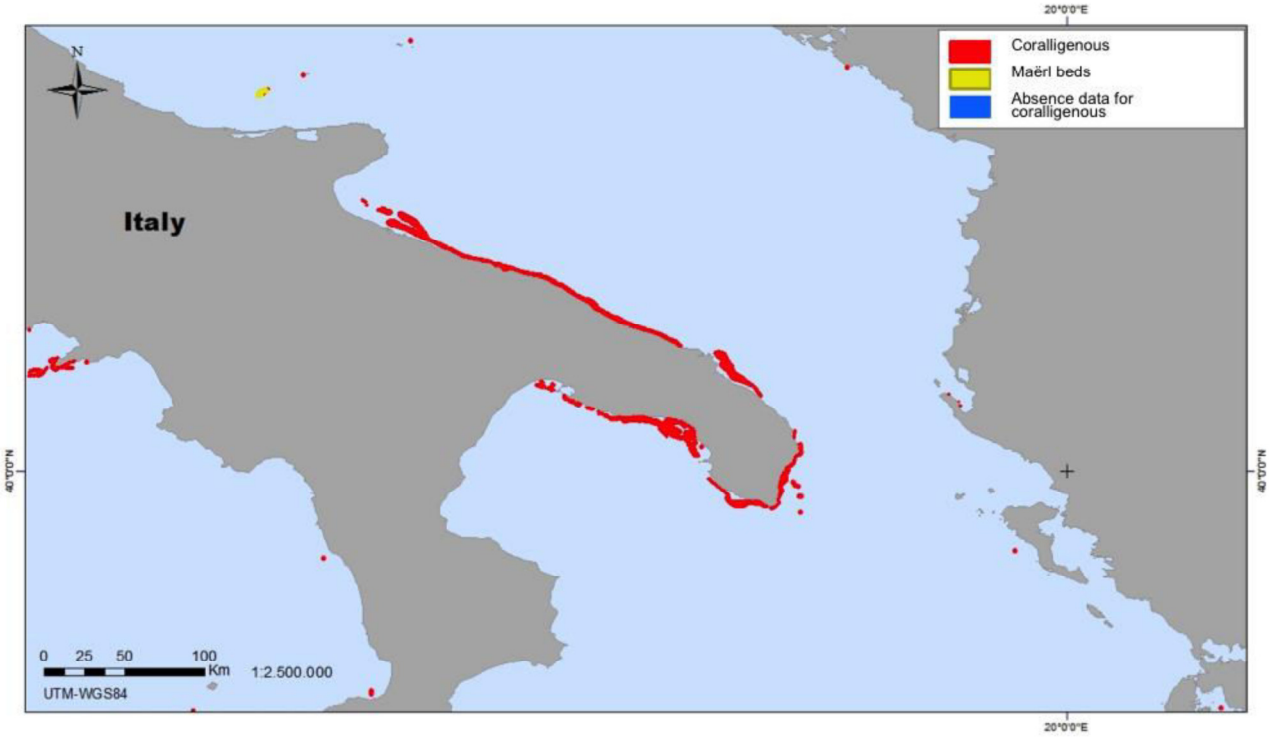


Figure 4.4.4.1 – Map of the distribution of coralligenous bottoms in the southern Adriatic (Giannoulaki et al., 2013).

Deep coral biocoenosis

This biocoenosis is constructed from so-called white corals or cold-water corals (CWC), which include two main branched forms: Lophelia Pertusa and Madrepora oculata, which are a relict species of the Quaternary cold fauna. The peculiar geomorphology of the deep basin of the southern Adriatic determines the optimal conditions for a wide coverage of CWC (Savini et al., 2014). This biocoenosis (Figure 4.4.4.2) develops a complex 3D habitat providing shelter, breeding sites and nursery areas for many associated species and is of key importance as attractors and shelter for deep-sea fish fauna (D'Onghia et al. ., 2012)

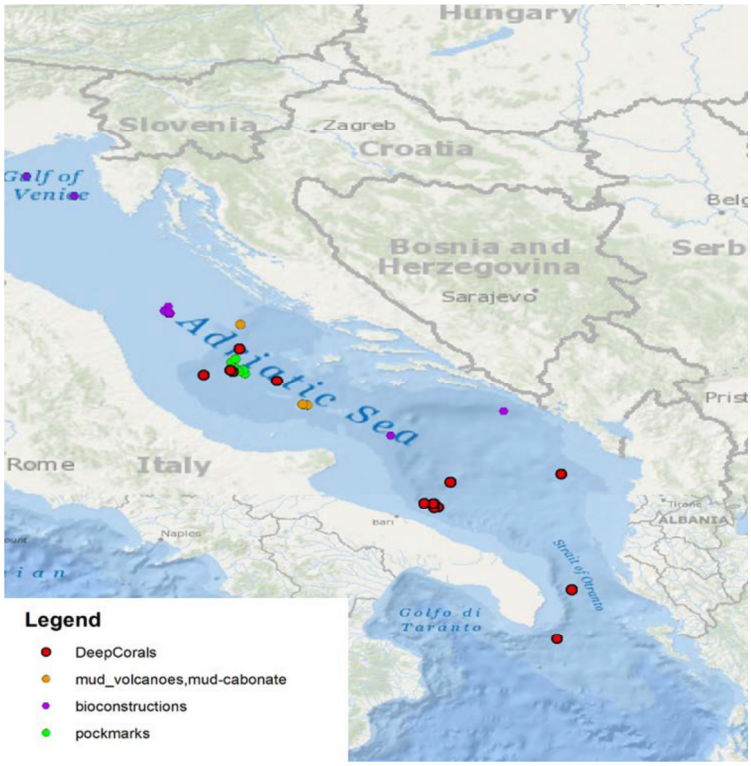


Figure 4.4.4.2 – Map of the distribution of deep-sea coral in the Adriatic Sea (Angeletti et al., 2014).

The ecosystem of the southern Adriatic

The GSA 18 is located entirely in the Adriatic ecoregion together with the GSA 17. In this area, based on the analyzes conducted by Piroddi et al. (2016), the trend of the biomass of the different functional groups shows a decline for some of the apical predators, demersal and pelagic fishes and some invertebrates (Figure 4.4.4.3). In particular, the model was able to capture the sharp decline in pinnipeds observed in the Adriatic since the mid-70s and the less marked decline in small demersal fish observed in the mid-1990s. The model has captured some of the patterns observed for hake, sharks and stingrays, which suggest a decline of these functional groups until the late 90s, followed by a slight increase or fluctuations (in the case of hake) in last years of the period studied. An overall satisfactory correspondence was found between the expected and available data for bentopelagic cephalopods where a decrease was observed from the beginning of the investigation period and for benthic cephalopods and crustaceans. Once again, the model does not represent well the trends for deep fish. As for the small pelagics, when the model uses the anomaly of primary production as a driver, it is not able to reflect the decreasing tendency of the biomass observed in the anchovies, while it has been able to collect a general decline for sardines. However, when using primary production estimated by a biogeochemical model, the ecosystem model is able to follow the sharp decline observed in anchovies in the mid-'70s and also slightly improve the estimate of sardine decline (Figure 4.4.4.3).

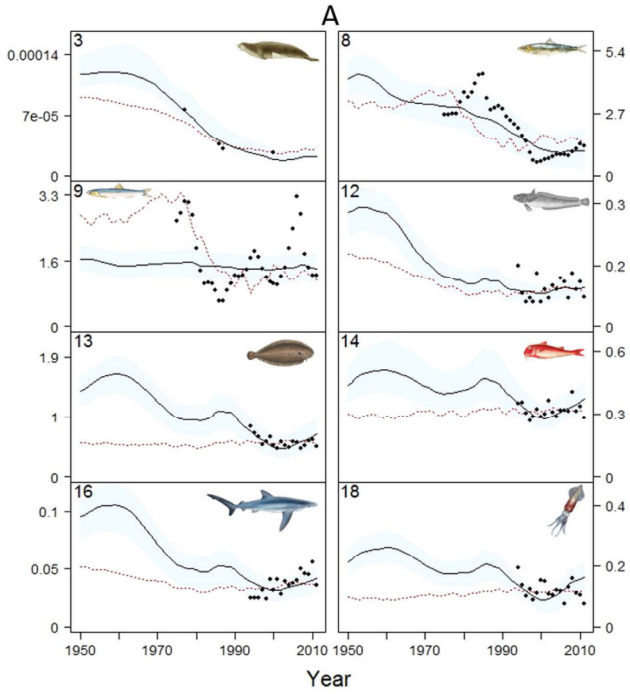


Figure 4.4.4.3 – Representation of the results of the ecosystem model for some functional groups that are observed in the Adriatic Sea for the period 1950-2011 (Piroddi et al., 2016)

4.4.5 Socio-economic context. Analysis of the main socio-economic indicators and of market trends in the 10 UoAs selected for the Deeper Mapping

The southern Adriatic fleet accounts for 8% of the Italian fishing vessels and for 9% of national GT (2017 data). This area is thus host to a considerable capacity, which confirms the importance of the fishing sector in the region. This is all the more true if one considers that Apulian trawlers – the vessels employing the most productive fishing technique – account for 18% of the national trawler fleet.

The composition of the Apulian fleet in terms of fishing techniques is quite different from the average composition in the other Italian areas, since small fishing boats (< 12 m LOA) using only passive gears are only 48% compared with 71% in the country as a whole. Yet, they make up the largest segment, with trawlers ranking second. There are also about 30 longliners and 10 purse seiners (registered in GSA 18 but mostly operating in GSA 17) targeting European pilchard, and some boats using hydraulic dredges.

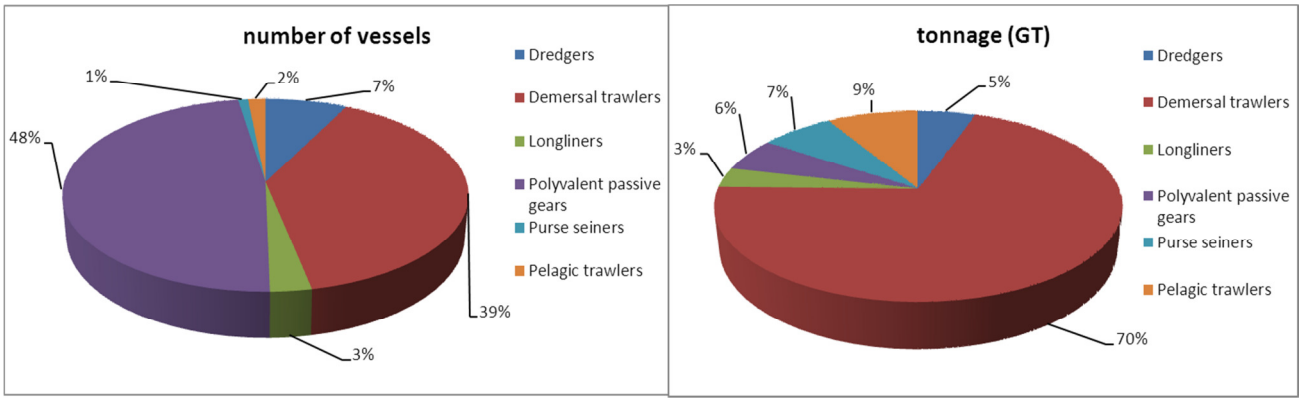


Figure 4.4.5.1 – Composition of the fleet registered in the ports of GSA 18 in relation to predominant fishing technique, vessel number, and tonnage (2017 data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

Notably, trawlers make up 70% of GT and are by far the most important segment in GSA 18. They are concentrated in the ports of Molfetta and Manfredonia, because in this area the continental shelf is very extensive and declines gradually, whereas more to the south the coastal waters are much deeper. The reader is referred to the Fast Scan for data on vessel number and geographical distribution.

In the past few years, boats using set longlines have been reporting a reduction in landings as well as of fishing grounds. The fishery restricted area set up in the Pomo Pit, which used to be a key fishing area for this fleet, and the temporary closures regarding swordfish have certainly penalised it. The result has been an increased use of bottom longlines and an increased pressure on demersal species, particularly adult European hake and tub gurnard (MIPAAFT, 2017).

The fleets of GSA 18 face a number of problems in terms of catch sales as well as market organisation (MIPAAFT, 2017). In fact, market facilities are poorly organised – the market in Manfredonia has been closed since 2017 – and the sale chain is almost wholly managed by traders operating under near-monopoly conditions, as demonstrated by the sale volumes of wholesale markets (Figure 4.4.5.5 *et seq.*). This clearly affects average sale price and, especially, payment terms, since organised markets commonly ensure short-term payment (usually under one week), whereas traders may take more than a month to pay for the product.

The analysis of local product flows demonstrated that the local markets trade fairly small amounts of local fish, since less than 4% of the product auctioned in the markets of Molfetta and Manfredonia is caught locally.

The fishing activities carried out in the 10 UoAs of GSA 18 that have been selected for the Deeper Mapping (listed in Table 4.4.1.1) use trawls, passive gears (chiefly trammel nets), and purse seines. The next table reports the estimated number of vessels which in 2017 practiced a *métier* based on a combination of gear and group of target species according to EU DCF programme codifications. Notably, since the utilisation of a gear does not exclude the use of another gear in the course of the same year and, in some cases, even of the same day, it is impossible to sum vessel and crew numbers.

Table 4.4.5.1 – Structural and production indicators for the 10 UoAs selected in GSA 10 (2017 data)[1]

Gear (species defining the selected UoA)	Group of target species	Number of vessels	Estimated crew number	Total value of landings (€ 000)	Value of landings of species of the selected UoA (%)
Trammel nets *(Common cuttlefish)*	DEF	232	360	6,533	40%
Set longlines *(European hake)*	DEF	32	161	4,600	73%
Purse seines *(European anchovy)*	SPF	10	155	4,266	84%
Bottom otter trawl *(Horned octopus, Deep-water rose shrimp, European hake, Spottail mantis squillid, Norway lobster, Common cuttlefish, Red mullet)*	DEF	358	939	60,055	65%
	MDD	12	31	6,300	47%

- DEF: Demersal fish
- DWS: Deep-water species
- MDD: Mixed demersal and deep-water species
- SPF: Small pelagic fish

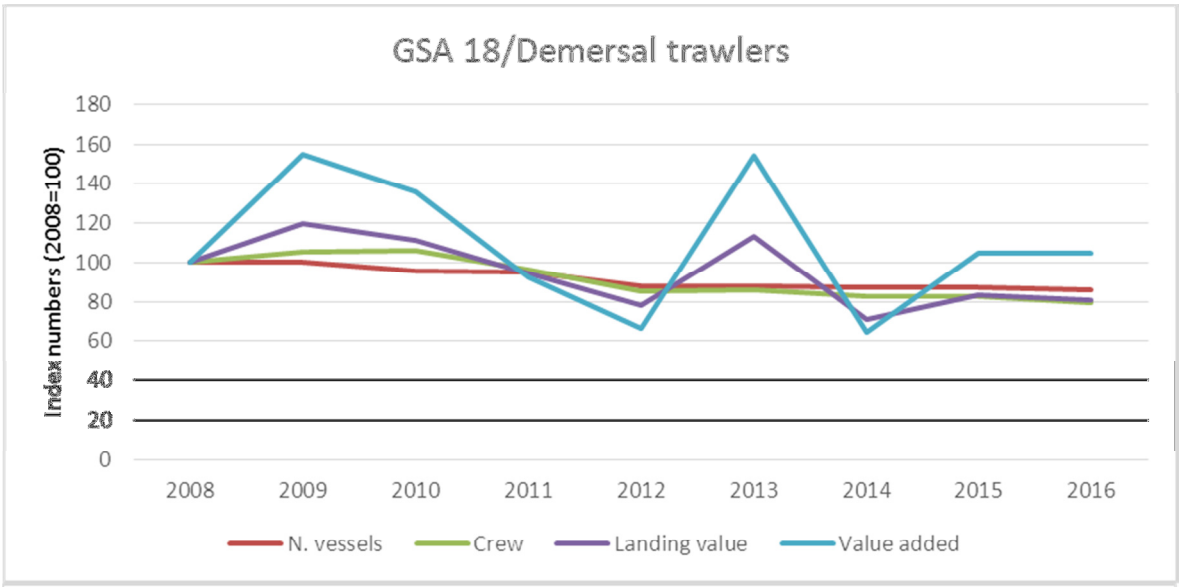
***Source*: MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.**

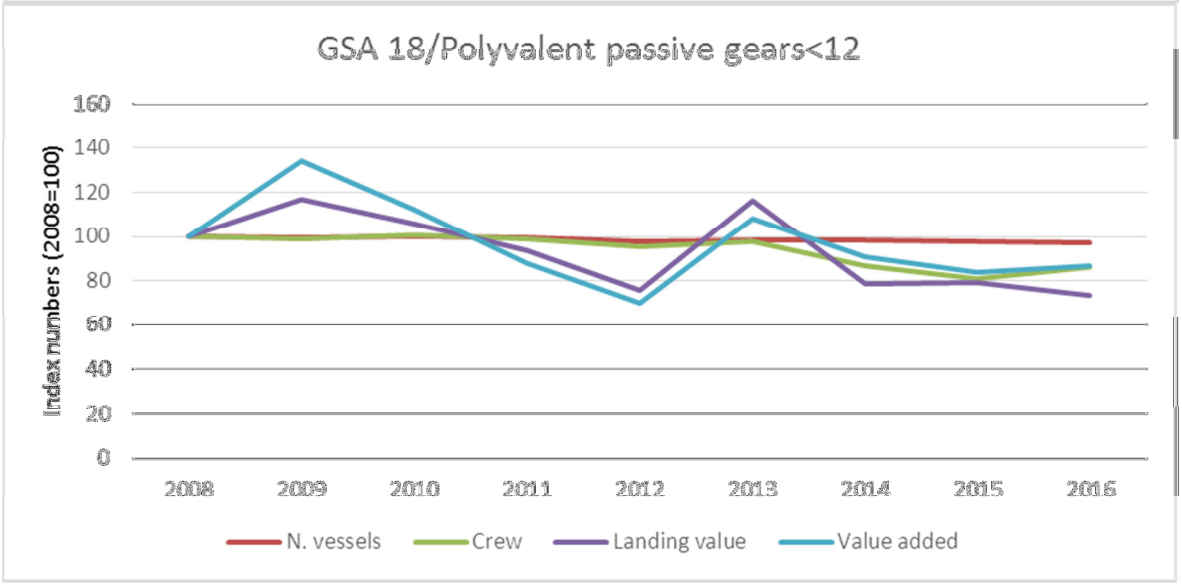
The 10 UoAs selected for the Deeper Mapping belong to the three main fleet segments defined by Commission Regulation (EC) No 1639/2001, as follows:

- polyvalent passive vessels (PGP): vessels using only passive gears (for the selected UoAs that use trammel nets)
- longliners (HOK): vessels using hooks (longlines, for UoAs that use set longlines)
- purse seiners (PS): purse seines
- demersal trawlers and demersal seiners (DTS): for the selected UoAs, bottom otter trawls.

The next figure shows the 2008-2016 trends of the main structural indicators (vessel and crew number) and production variables (value of landings and value added) of the fleet segments to which the 10 UoAs of GSA 18 belong.

[1] Crew numbers are based on the average job figures reported in the period in question for the fleet segment to which the 10 UoAs belong (where a segment includes vessels using predominantly a given gear).


GSA 18/Demersal trawlers
Index numbers (2008=100)
180
160
140
120
100
80
60
40
20
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
N. vessels
Crew
Landing value
Value added


GSA 18/Polyvalent passive gears<12
Index numbers (2008=100)
160
140
120
100
80
60
40
20
0
2008
2009
2010
2011
2012
2013
2014
2015
2016
N. vessels
Crew
Landing value
Value added

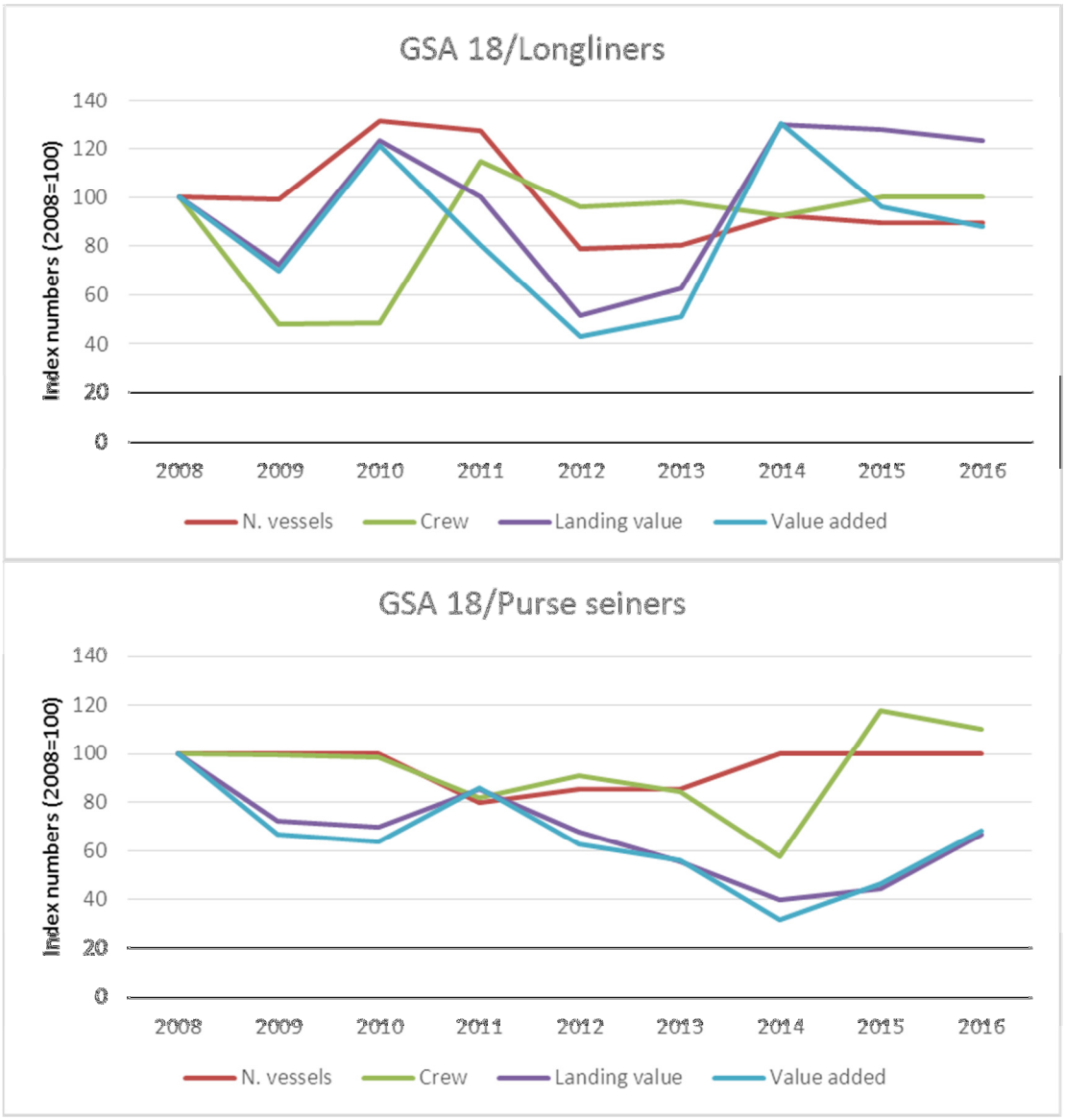


Figure 4.4.5.2 - Trends of the structural and production indicators of the fleet segments to which the 10 UoAs selected in GSA 18 belong; index numbers 2008-2016 (2008=100). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

As illustrated in the diagram, trawler and crew number were fairly stable in the final part of the 2008-2016 period, whereas the two economic performance indicators – gross value of landings and value added – show a cyclic trend: a decline, from 2009, in landing value and a more than proportional reduction in value added were followed by a new peak in 2013, by a recovery that began in 2014, and then by a plateau phase in 2015.

A similar situation applies to polyvalent passive vessels less than 12 m LOA, although their peaks and troughs are less steep.

All the indicators of the vessels using predominantly longlines are more unstable, although it should be stressed that the data do not refer to the vessels with licences, but to those using predominantly longlines.

The economic performance indicators of purse seiners show a decline, although a recovery can be seen in the last three years of the series.

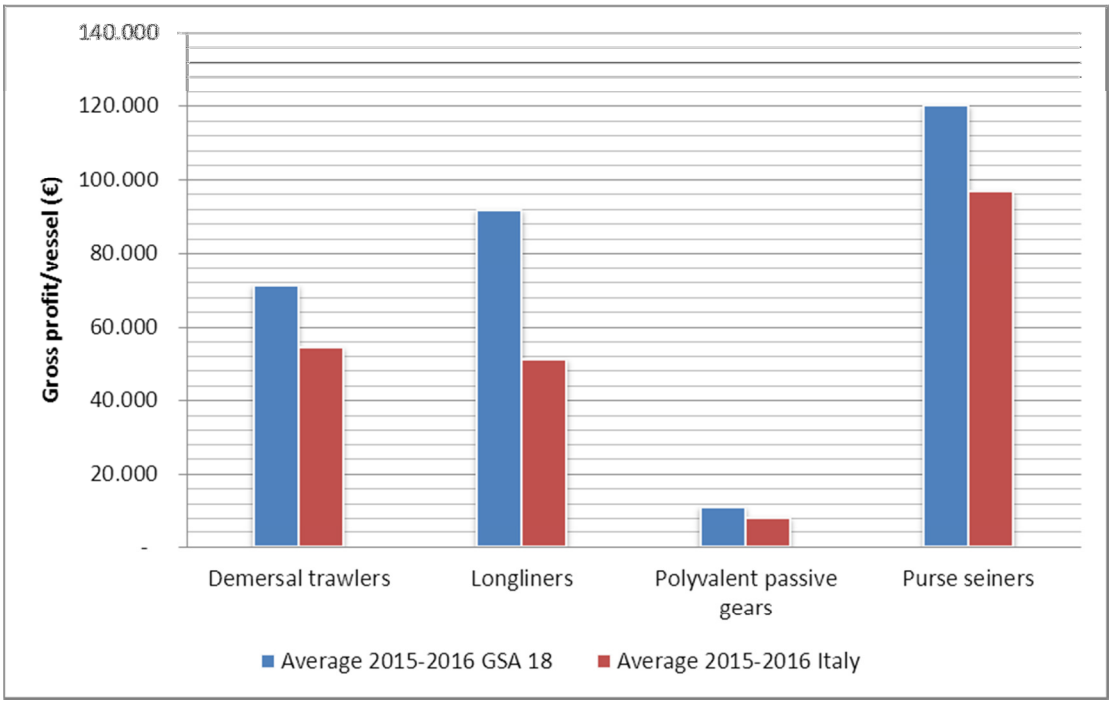


Figure 4.4.5.3 - Gross profit *per* vessel for each fleet segment of the 10 UoAs selected in GSA 18. Comparison with the 2015-2016 Italian national average. *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

The gross profit data are excellent for all segments, with a profit *per* vessel that exceeds the national average and which for longliners is nearly twice the Italian average.

The 10 UoAs selected for the Deeper Mapping of GSA 18 are listed below. For each UoA, this report provides quarterly production figures (landed volume and sale price) for 2015-2017, wholesale market volumes and prices (minimum and maximum), and data regarding the consumption of domestic and imported product (as available).

- European anchovy: purse seines
- Common cuttlefish: trammel nets and bottom otter trawls
- European hake: set longlines and bottom otter trawls
- Horned octopus: bottom otter trawls
- Deep-water rose shrimp: bottom otter trawls
- Spottail mantis squillid: bottom otter trawls
- Norway lobster: bottom otter trawls
- Red mullet: bottom otter trawls.

European anchovy:

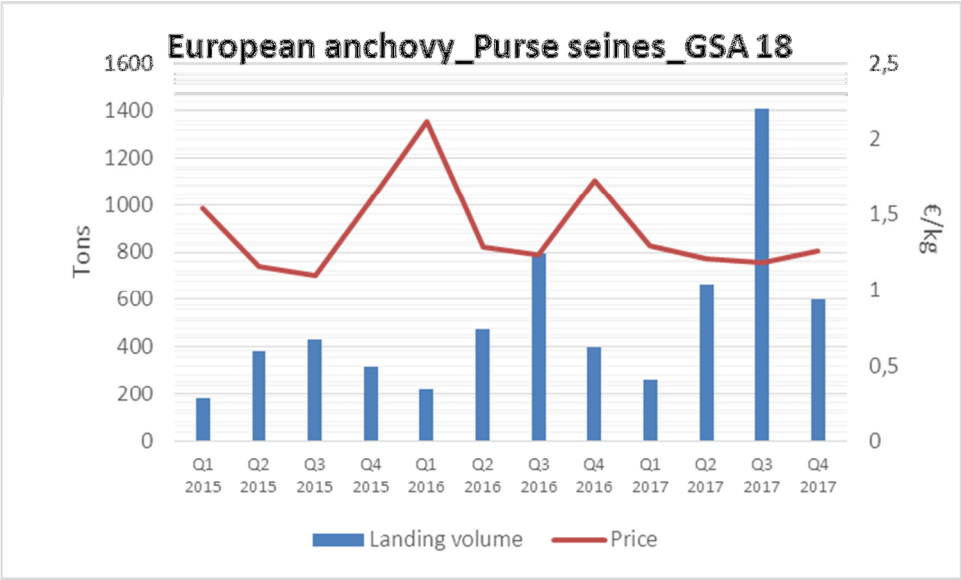


Figure 4.4.5.4 – Average volumes and production prices of anchovy (ANE) landed by vessels using purse seines (PS) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

Average annual anchovy landings with purse seines increased from 2015 to 2017 from 1,300 tons to about 3,000 tons. The peaks in the third quarter reflect the greater availability of the resource in summer.

The average first sale price was €1.30 / kg; however, prices were higher in the months when landings were least abundant.

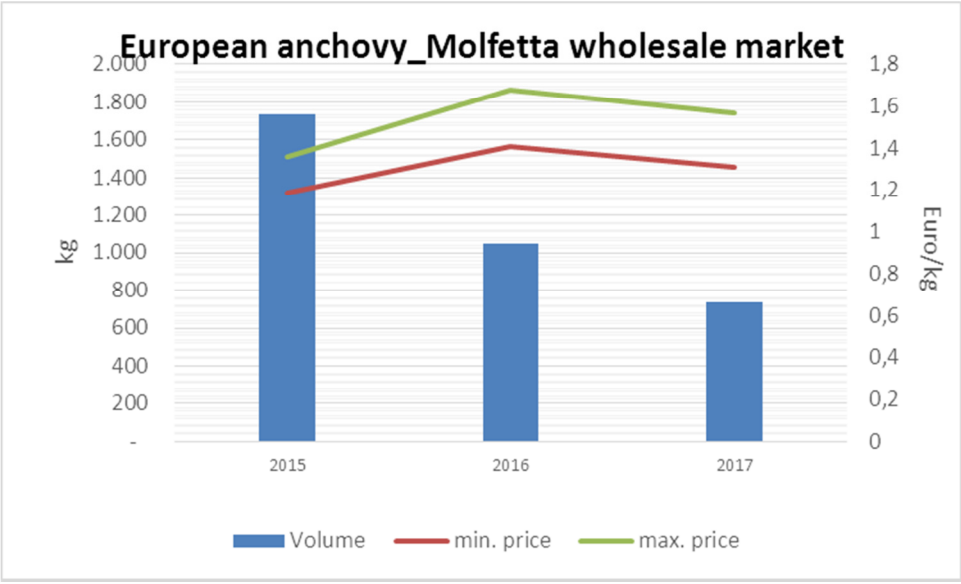


Figure 4.4.5.5 – Traded volume and minimum and maximum price of anchovies recorded at the mixed market in Molfetta (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

In 2015-2017, the product volumes traded in the Molfetta market fell by more than 57% while average sale prices grew by about 13% to around €1.40 / kg in 2017. No anchovies were traded in the Manfredonia market in 2015-2017.

As regards the consumption and import-export figures, the reader is referred to the national trends reported in Annex I (GSA 10).

Common cuttlefish:

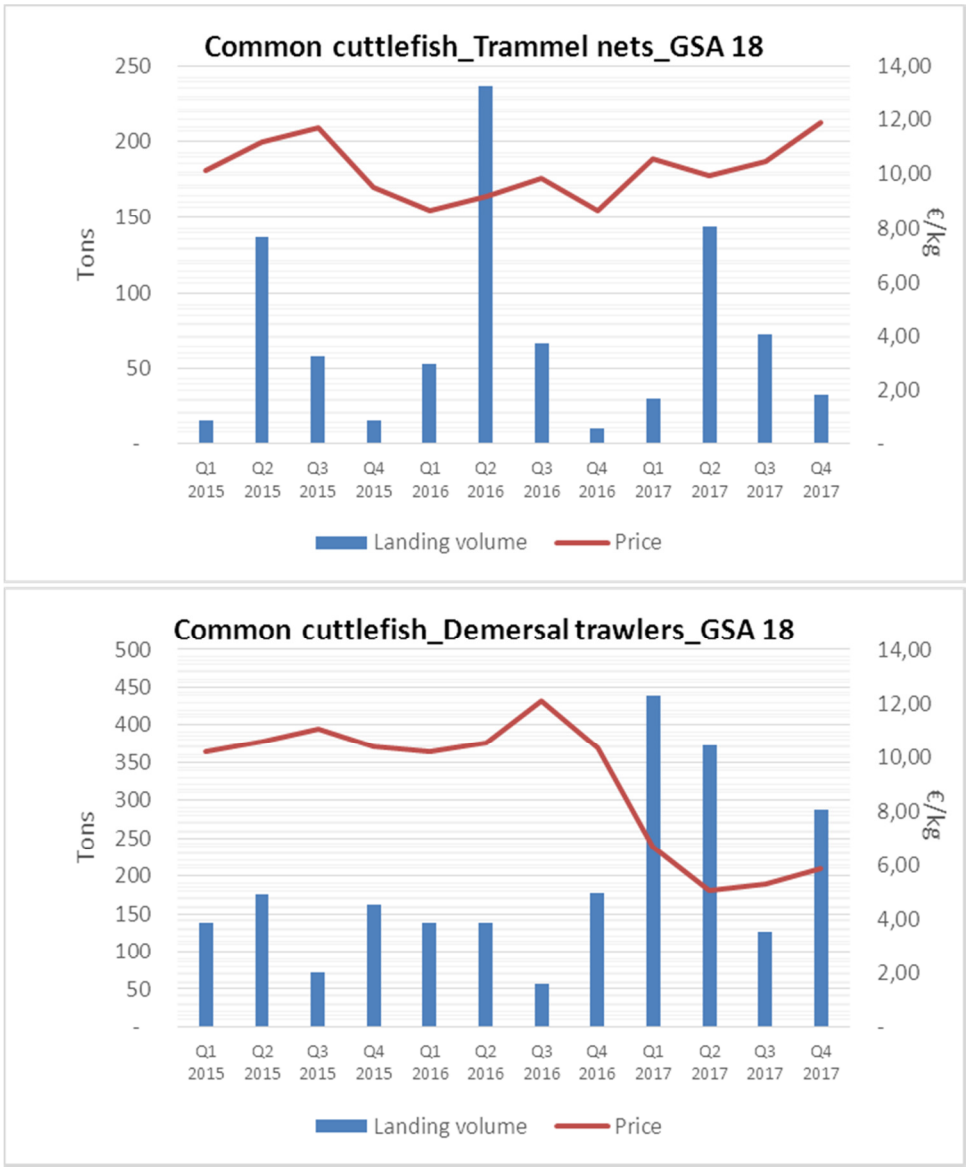


Figure 4.4.5.6 – Average volumes and production prices of common cuttlefish (CTC) landed by vessels using trammel nets (GTR) and bottom otter trawls (OTB) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

Common cuttlefish are a highly traditional and profitable target species in GSA 18, particularly in the Gulf of Manfredonia, the "Siponto lagoon" of pre-Roman times. According to the Greek historian, geographer, and traveller Strabo, the Greeks called

the town of Siponto *Sepiunte*, due to the enormous amount of cuttlefish (*sepiae*) that were caught in its area. The average annual landings of the vessels that used trammel nets in 2015-2017 were fairly stable at about 300 tons. The diagram shows a peak in late spring (2nd quarter), the period when catches with trammel nets (*i ndramacchiéte* in the local dialect) are most abundant.

The average first sale price increased slightly from 2015 to 2017 to more than €10 / kg.

Average trawler landings were more abundant, and have been rising from 2015 to 2017. In this case landings do not seem to show a seasonal trend, and the average price of the product is similar to the one commanded by cuttlefish caught with trammel nets.

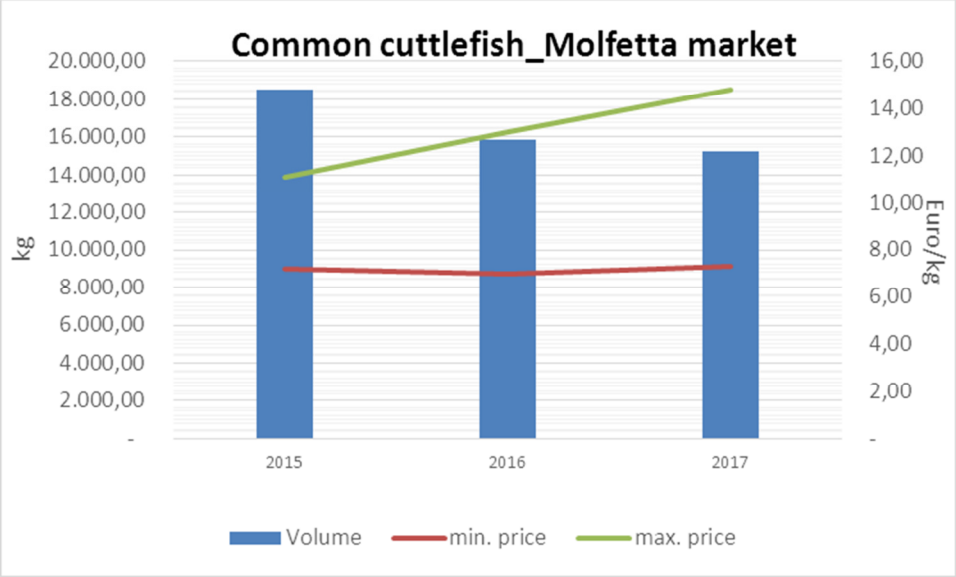
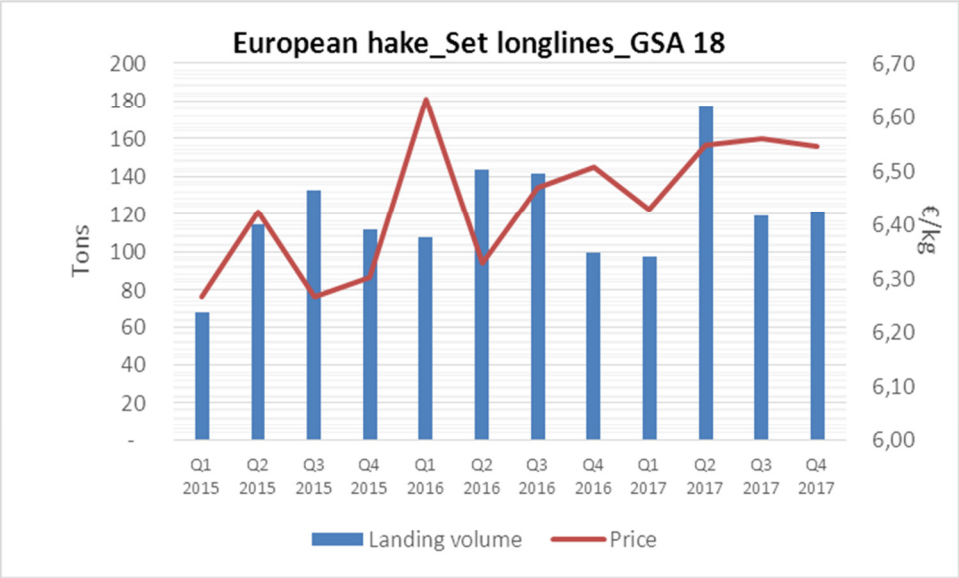


Figure 4.4.5.7 – Traded volume and minimum and maximum price of cuttlefish recorded at the mixed market in Molfetta (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

The prices in the Molfetta market showed a wide range, due to the slight decline in landings recorded in 2017. No cuttlefish auctions are recorded in the market of Manfredonia, whereas data for the Molfetta market indicate that more than 90% of the product was caught locally. The average price commanded by local cuttlefish in 2017 was significantly higher than the retail price paid by consumers in the same year according to EUMOFA. Cuttlefish is a highly prized product that is consumed both cooked and raw. Although local and imported cuttlefish may be sold in the same retail market, the import volumes and value figures suggest the existence of two distinct types of consumers: those who buy the less expensive imported product and those who are prepared to pay even twice as much for the local product.

For the consumption and import-export figures, the reader is referred to the national trends reported in Annex I (GSA 10).

European hake:



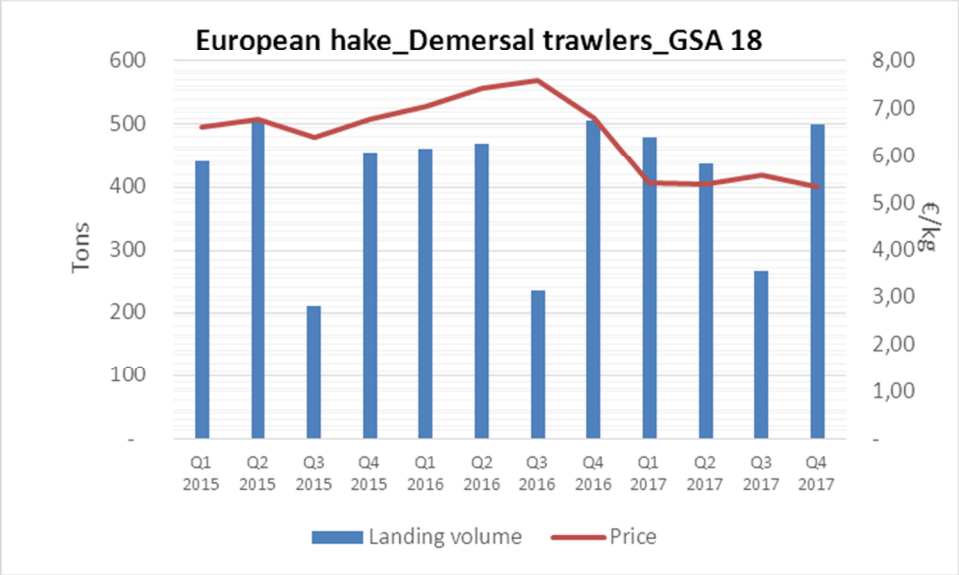


Figure 4.4.5.8 – Average volumes and production prices of European hake (HKE) landed by vessels using set longlines (LLS) and bottom otter trawls (OTB) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

In 2015-2017, the average annual landings of European hake in GSA 18 were fairly constant, about 400-500 tons for the vessels using set longlines and about 1,600 tons for trawlers. There does not seem to be a seasonal trend, since the species is available virtually throughout the year.

From 2015 to 2017, the average first sale price of European hake landed by longliners increased slightly, to about €6.50 / kg in 2017, whereas the average price of the fish landed by trawlers has been declining and in 2017 reached €5.40 / kg.

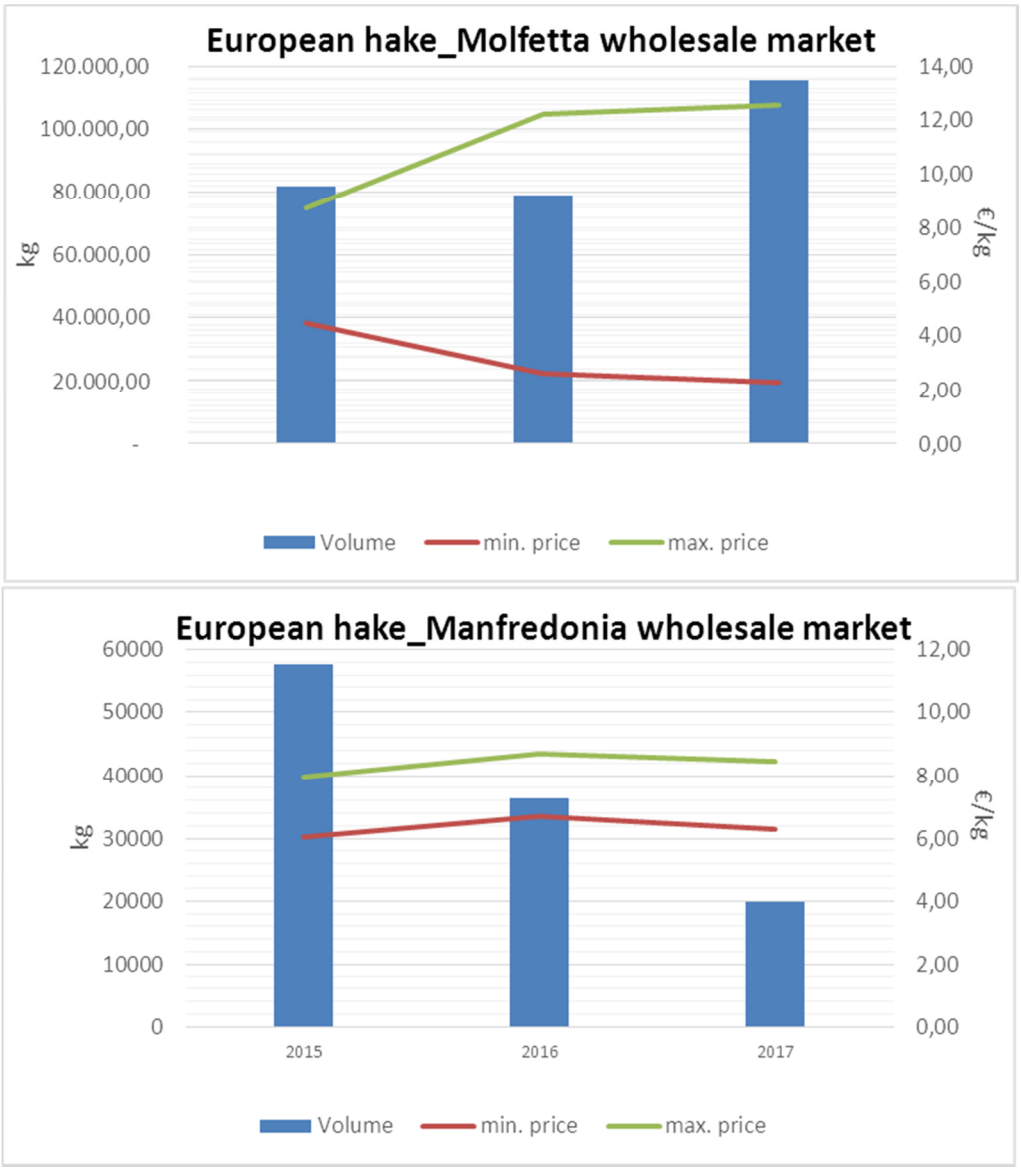


Figure 4.4.5.9 – Traded volume and minimum and maximum price of hake recorded at the mixed market in Molfetta and the fishermen's market in Manfredonia (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

European hake was traded both in the mixed wholesale market of Molfetta and in the wholesale market of Manfredonia. It was all locally caught, even though the Molfetta market, being mixed, also trades fish from other parts of Italy and from abroad. The different prices (both minimum and maximum) recorded in the two markets depend mainly on fish size, which was larger in the mixed market. Prices in these two markets are more stable than those recorded in the fishermen's market in Manfredonia, where the range was much narrower and never exceeded €2 / kg. Imported hake, which is recorded in Molfetta market only in 2015, did not affect the price of the local hake.

For the data regarding hake consumption and import-export the reader is referred to the national trends reported in Annex I (GSA 10).

Horned octopus:

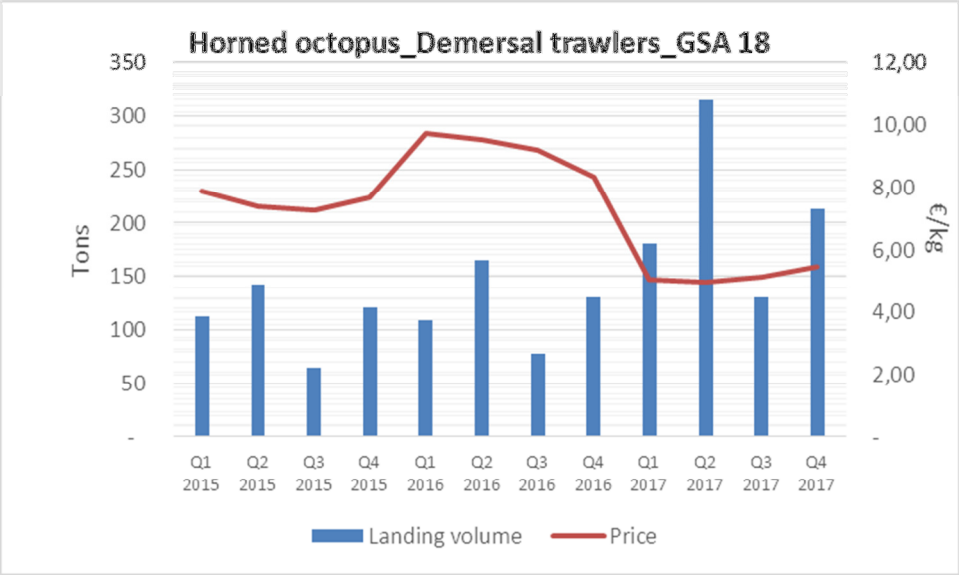


Figure 4.4.5.10 – Average volumes and production prices of horned octopus (EOI) landed by vessels using bottom otter trawls (OTB) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

The average landings of horned octopus in GSA 18 nearly doubled from 2015 to 2017, when they exceeded 800 tons. Given the high supply, the first sale price declined from about €7.50 / kg in 2015 to €5.15 / kg in 2017, with a trough at less than €5 / kg in the peak production period (2nd quarter of 2017).

The diagram reports slightly higher volumes in the second and fourth quarter, since horned octopus are caught in March, April, and the winter months.

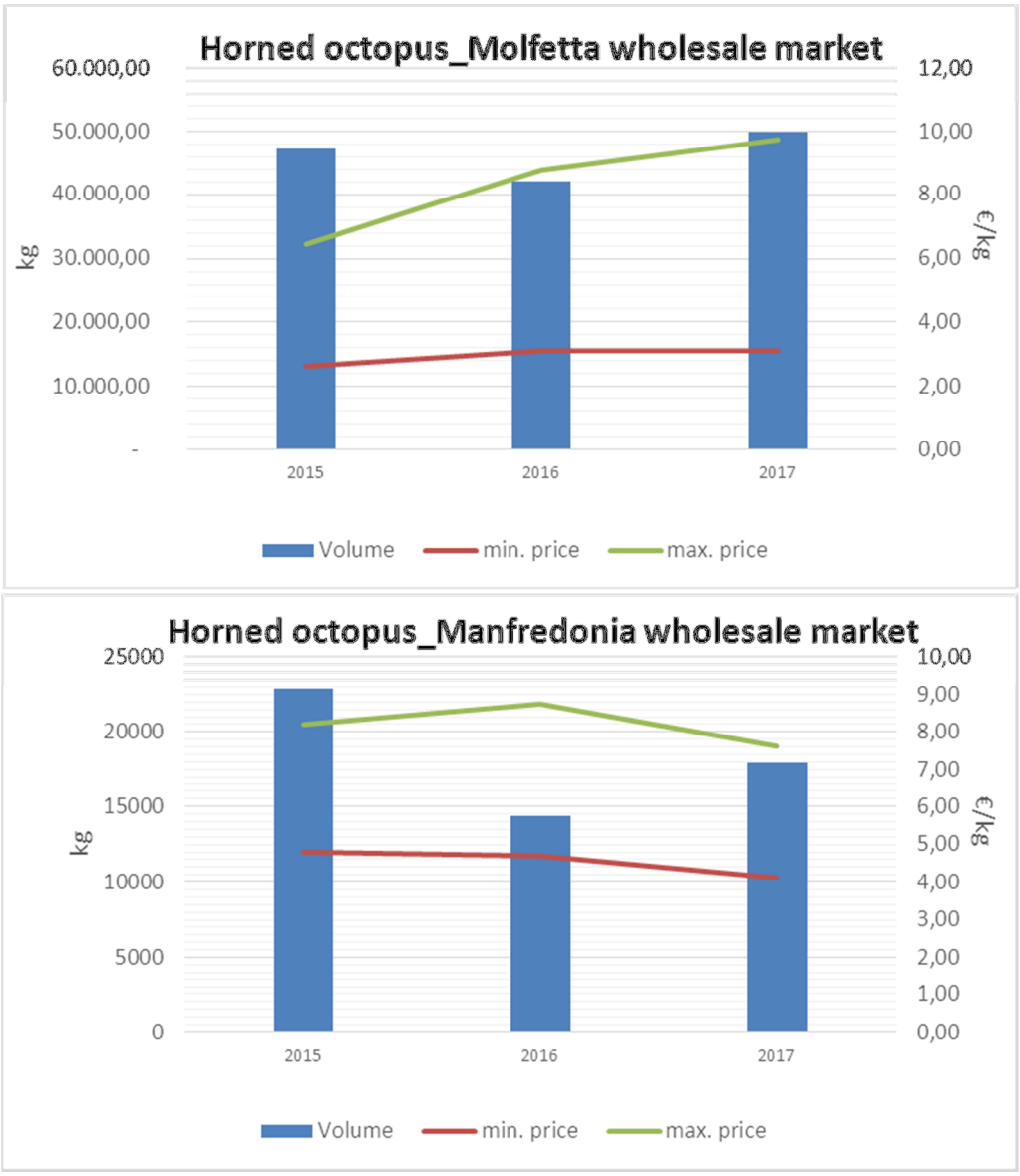


Figure 4.4.5.11 – Traded volume and minimum, maximum, and average GSA price of octopus recorded at the mixed market in Molfetta and the fishermen's market in Manfredonia (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

Octopus were sold both in the Manfredonia fishermen's market and, in considerably higher amounts, in the mixed market of Molfetta. The latter market trades greater amounts of product at prices that are on average higher, especially because the local product is prized by the wholesalers and buyers who participate in the local auctions. The lower average prices recorded in the Manfredonia market are due to the fact that the product is commonly traded by a limited number of wholesalers, who purchase the local supply and then sell it directly.

No consumption or import-export data are available for this species.

Deep-water rose shrimp:

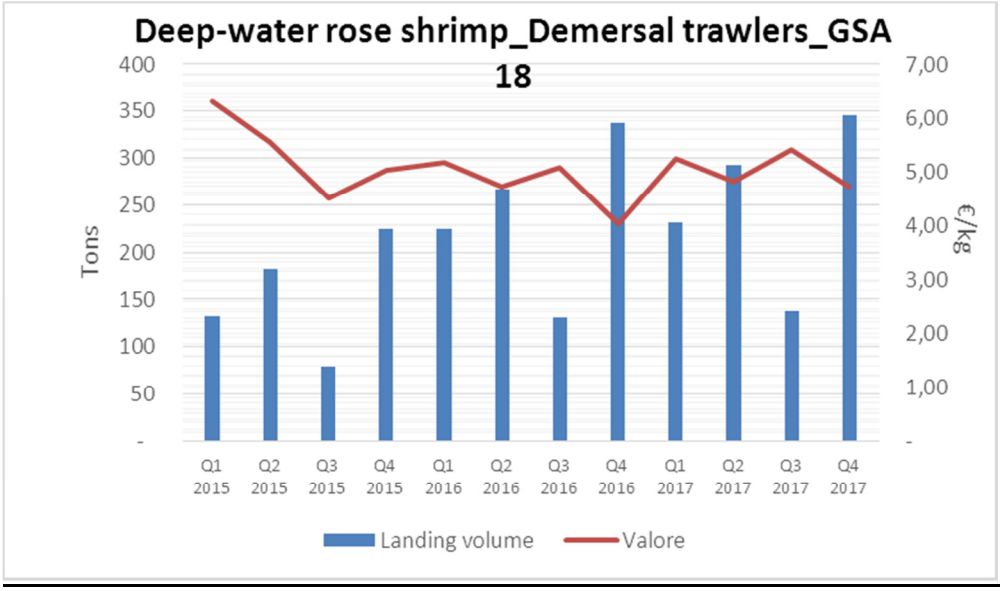


Figure 4.4.5.12 – Average volumes and production prices of deep-water rose shrimp (DPS) landed by vessels using bottom otter trawls (OTB) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

The average annual production of deep-water rose shrimp landed in GSA 18 by trawlers rose from 2015 to 2017 from little more than 600 tons in 2015 to about 1,000in 2017.

Landings were especially high in the fourth quarter, which was characterised by a general increase in shrimp consumption during the Christmas period. The average price, which showed a slight reduction in 2016-2017, reached about €5 / kg in 2017.

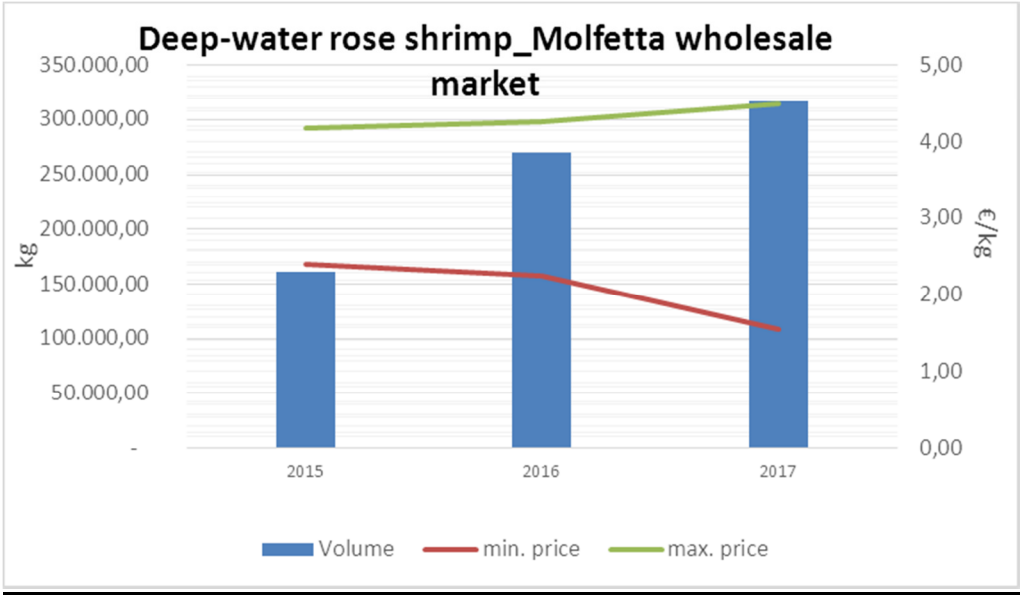


Figure 4.4.5.13 – Traded volume and minimum and maximum price of shrimp recorded at the mixed market in Molfetta (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

Sales of deep-water rose shrimp are recorded only in the mixed market of Molfetta, where very low volumes of product compared with the local supply were traded intermittently in 2015-2017. These data confirm a tendency, typical of this GSA, to trade commercially valuable species outside fish markets. In fact, no auctions of deep-water rose shrimp are recorded in the Manfredonia fishermen's market at any time in 2015-2017. Analysis of ISMEA data for the mixed market in Molfetta highlighted that besides the limited sale volumes, minimum and maximum average prices were also modest, about €2.20 / kg in 2015-2017.

No consumption or import-export data are available for this species.

Spottail mantis squillid:

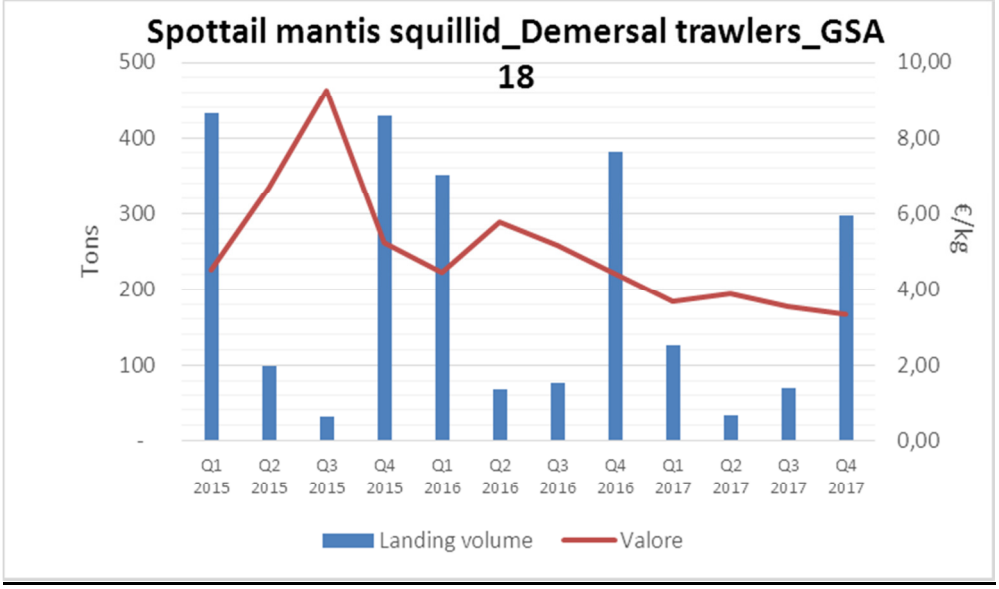


Figure 4.4.5.14 – Average volumes and production prices of spottail mantis squillid (MTS) landed by vessels using bottom otter trawls (OTB) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

The landings of spottail mantis squillid by trawlers operating on the Adriatic coast of GSA 18 diminished from 2015 to 2017 from more than 900 tons to slightly more than 500 tons. The species shows a marked seasonality with peaks in winter.

The average first sale price fell from €6.40 / kg in 2015 (with a peak at €9 / kg in summer) to €3.60 / kg in 2017.

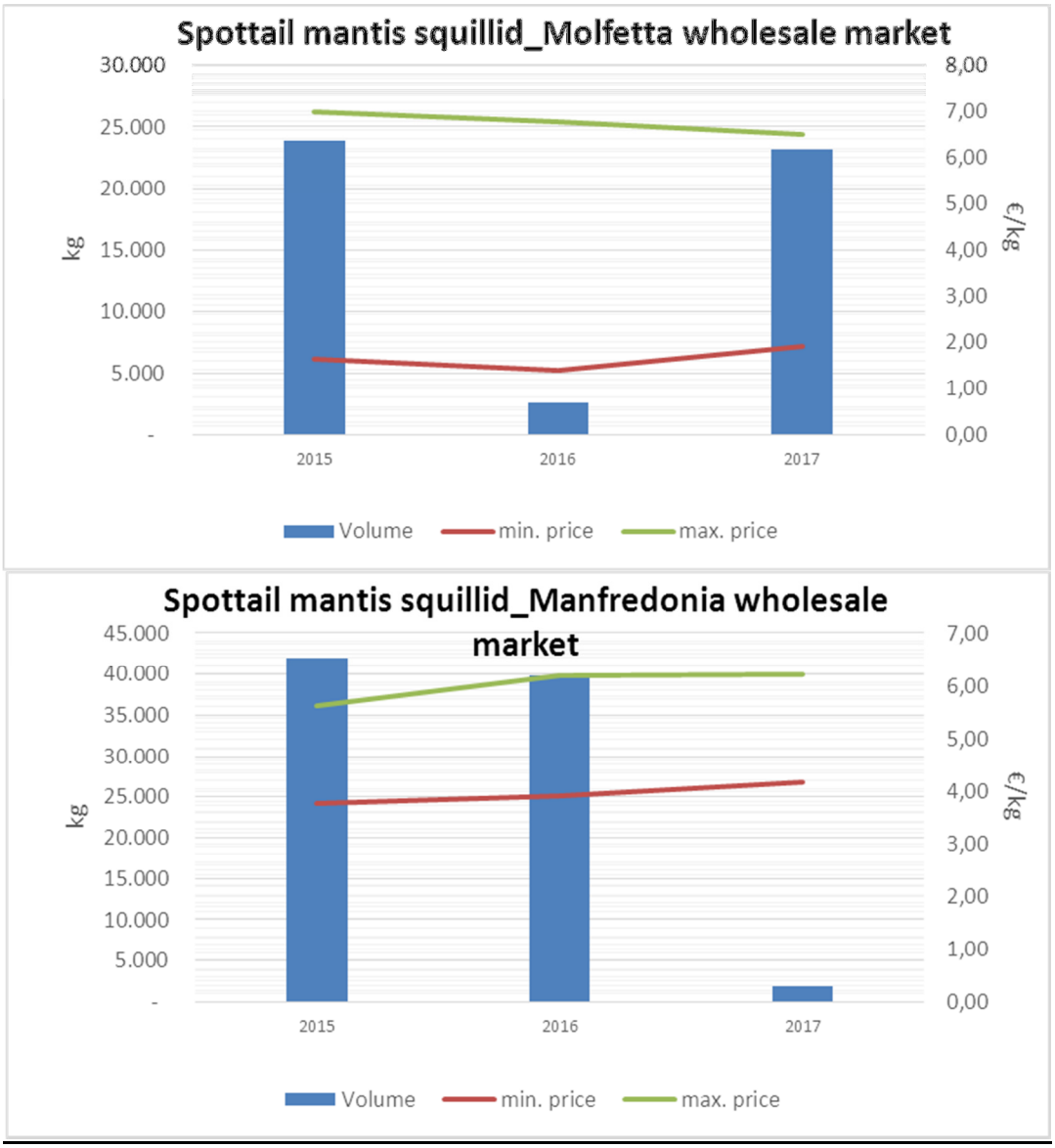


Figure 4.4.5.15 – Traded volume and minimum and maximum price of mantis squillid recorded at the mixed market in Molfetta and the fishermen's market in Manfredonia (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

Two opposite trends were recorded for the sales of spottail mantis squillid in the two reference markets. In 2016 the Molfetta market experienced a reduction in local spottail mantis squillid volumes as a result of the reduction of the amounts supplied to the market. The price range was constant at the Molfetta market and less stable at the Manfredonia fish market, which is unable to ensure a constant supply.

Consumption and import-export data are not available for spottail mantis squillid.

Norway lobster:

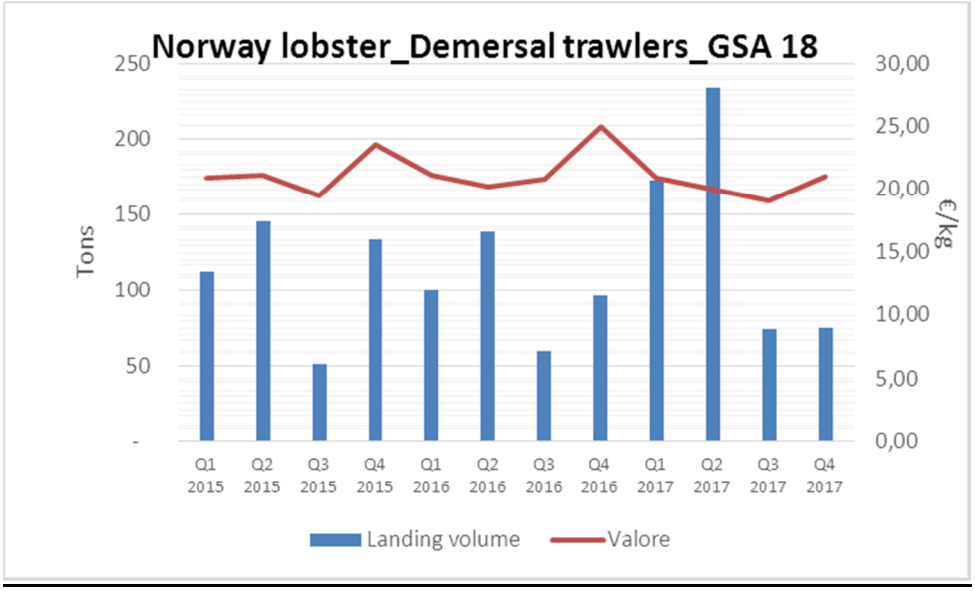


Figure 4.4.5.16 – Average volumes and production prices of Norway lobster (NPS) landed by vessels using bottom otter trawls (OTB) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

Trawling for Norway lobster is by far the most profitable UoA among those selected for this analysis, as the value of landings in 2017 exceeded €11 million. Landing volumes increased slightly in 2017, while the first sale price was stable at more than €20 / kg.

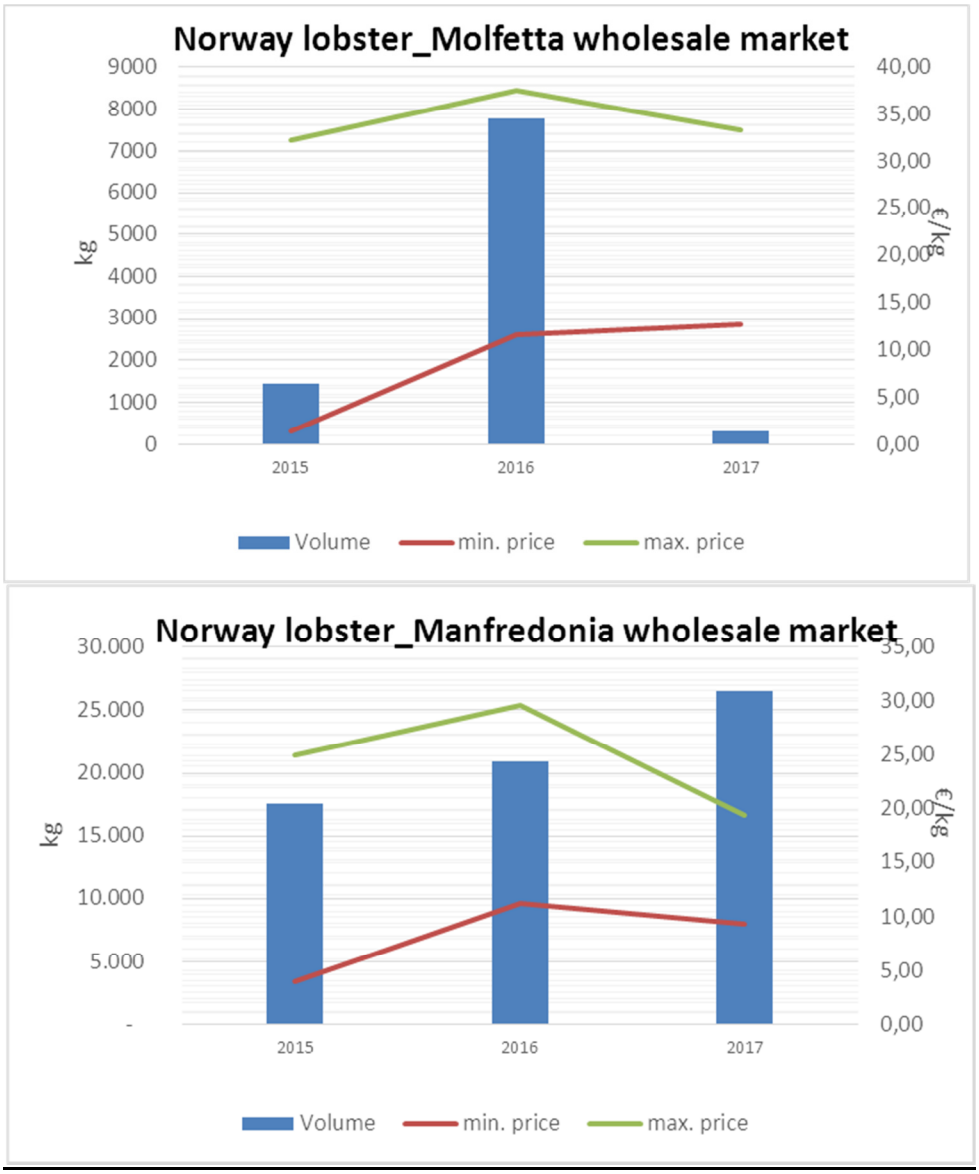


Figure 4.4.5.17 – Traded volume and minimum and maximum price of Norway lobster recorded at the mixed market in Molfetta and the fishermen's market in Manfredonia (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

The Norway lobster sold in the Manfredonia fishermen's market is caught locally, but the small specimens that are predominantly traded there command a limited average price. The more highly prized medium- and large-size specimens are sold directly by wholesalers to their local clients – chiefly high-end restaurants - for significantly higher prices. In 2015-2017 the Molfetta mixed market traded a fairly constant amount of Norway lobster, whose prices were characterised by a wide range due to two factors: their different origins (since national and imported Norway lobster far exceeded the amount of local product) and size. Medium-sized specimens were the most common sizes traded in the mixed market, and their wholesale price was significantly higher than the wholesale price recorded in the Manfredonia fishermen's market.

Consumption and import-export data are not available for Norway lobster.

Red mullet:

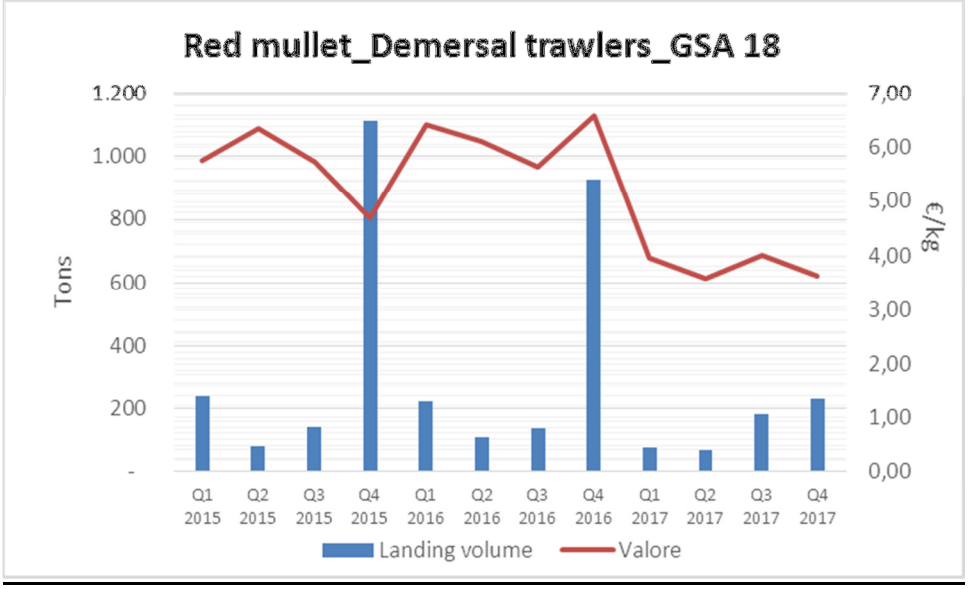


Figure 4.4.5.18 – Average volumes and production prices of red mullet (MUT) landed by vessels bottom otter trawls (OTB) in GSA 18 (2015-2017 quarterly [Q] data). *Source:* MIPAAFT / National Fisheries Data Collection Programme. Data processed by NISEA.

From 2015 to 2017, the average annual landings of red mullet with bottom otter trawls fell by 2/3 to 550 tons, accounting for a total value of about €2 million.

A landing peak was detected in late autumn (4th quarter). The average price declined to less than €4 / kg in 2017.

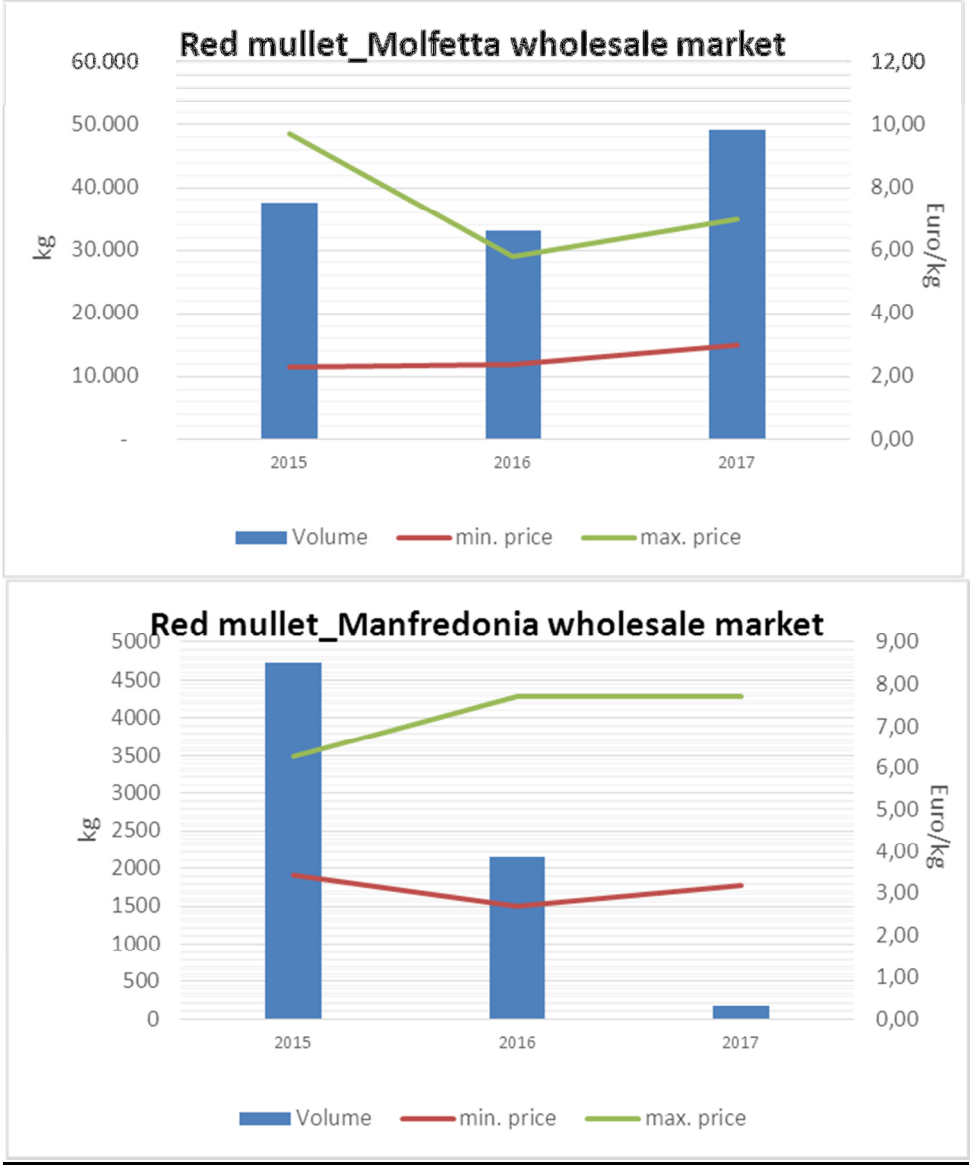


Figure 4.4.5.19 – Traded volume and minimum and maximum price of red mullet recorded at the mixed market in Molfetta and the fishermen's market in Manfredonia (Adriatic coast of Apulia). Average annual data (2015-2017). Data processed by NISEA.

Red mullet was traded in both GSA 18 markets. The mixed market in Molfetta traded red mullet from Sicily, which in 2015-2017 commanded a slightly higher (about 19%) price compared with local red mullet (slightly more than €5 / kg in 2017). The Molfetta market trades fresh local product, but the main sales are of chilled and even frozen product (red mullet from Sicily are commonly frozen or chilled).