"Piloting of eco-innovative fishery supply-chains to market added-value Adriatic fish products"

D3.1.2: Report of the mapped fisheries in Croatia

WP3 - Piloting of sustainable and eco-certified fishery productions/ A3.1. Analysis of state, management and seasonality of fisheries in the Adriatic Sea.

PP2 – National Research Council, December 2019

Final version
Confidential

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GLOSSARY

CFP	Common Fisheries Policy
DCF	Data Collection Framework
EC	European Commission
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
FDI	Fishery Dependent Information
GFCM	General Fisheries Commission for the Mediterranean
GSA	Geographical Subarea
ICCAT	International Commission for the Conservation of Atlantic Tunas
JRC	European Commission Joint Research Centre
MA	Ministry of Agriculture
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
SAC	GFCM Scientific Advisory Committee
STECF	Scientific, Technical and Economic Committee for Fisheries

EXECUTIVE SUMMARY

This report provides an overview of Adriatic fisheries in the framework of **Prizefish**, a project coordinated by the Alma Mater Studiorum - Università Di Bologna (Italy) within the INTERREG V-A ITALY – CROATIA COOPERATION PROGRAMME 2014-2020, which involves partners from both sides of the Adriatic Sea. The project goal is to engage Adriatic fisheries in moving towards sustainability.

In particular the report, corresponding to deliverable **D3.1.2 "Report of the mapped fisheries in Croatia"**, summarises the results of the "Activity 3.1: Analysis of state, management and seasonality of fisheries in the Adriatic Sea" of the Work Package 3 (WP3) of the Prizefish Project, providing an overview of the all fisheries traditionally carried out by the Croatian fleet in Geographical Subarea (GSA) 17 of the General Fisheries Commission for the Mediterranean (GFCM). The same analysis has been conducted on the Italian side of the Adriatic, leading to a **Report of the mapped fisheries in Italy** (deliverable D3.1.1), that after being shared with the other PPs was published on the Prizefish project website. The structure of the report and some contents have been partially taken from that of the Fast Scan (Stage 1.a) Report prepared for Blufish, a project pre-assessment (PPA) coordinated by the Marine Stewardship Council (https://www.msc.org/it/).

Based on these preliminary analyses, a certain number of fisheries per each of the two countries will be selected to enter in a mapping phase that will gather all existing data, documenting in details local fishing practices, their environment, social and economic importance and traditional skills, in order to develop precise guidelines on how to reach sustainable standards at regional level (Activity 3.2: Selection of sustainable fisheries and guidelines on how to reach sustainable standards).

The 1161 Croatian fisheries (as combination of species and gears) mapped in the deliverable 3.1.2. are therefore the assessment basis, from which about 20 will be selected for the following activities. The number of fisheries is significantly higher than that in the Italian side of the Adriatic Sea (622 fisheries mapped in the deliverable 3.1.1), because Croatian vessels use a wider range of gears.

The report provides the following quantitative and qualitative information:

- a list of all the fisheries (combination of species and gear/target group) operating under the scope of the project with indication of: the main target species, the main gears used, stock area, and availability of stock assessment and exploitation levels;
- average landings in volume and value in recent years;
- landing composition in terms of volume and value by fishery;
- fleet composition by fishing technique;
- geographical characterisation of the main fisheries;
- list of the main landing ports.

The main sources of information are Data Collection Framework from the JRC data dissemination tool(https://stecf.jrc.ec.europa.eu/data-dissemination), the latest GFCM, ICCAT and STECF evaluations, national regulations, and the EU Fleet Register. Information on fish stock status was also extracted from the recent literature.

1. INTRODUCTION

Almost 90% of the fish stocks assessed in the Mediterranean Sea are presumed to be overexploited (Colloca et al, 2017). This is the result of fleet overcapacity, poor involvement of the fishing sector in decision-making processes and weak market engagement in promoting the sustainable exploitation of natural resources. Also in the Adriatic Sea, recent analyses have shown that most of the relevant stocks suffer of over-fishing or severe exploitation and decline risk, stressing the need to make the methods and intensity of the fishing harvest more compatible with the potential for biological renewability of species.

The Common Fisheries Policy of the European Union recommends to implement medium-term strategy for sustainability, based on strong scientific/socio-economic analyses and innovative actions that can empower small-scale fishermen and fishery operators to adopt low-impact fishing methods. Accordingly, the Common Organization of the Markets in fisheries and aquaculture products of the EU recommends cross-border cooperation among fishers towards sustainable fishing to match market demands and consumer attitudes, as well as to create innovative added-value seafood products that can penetrate with success EU and non-EU markets.

However, the eco-labels for fishery and aquaculture products currently in use are mostly private and international, and there are almost no public ones that comply with requirements established for environmental labels.

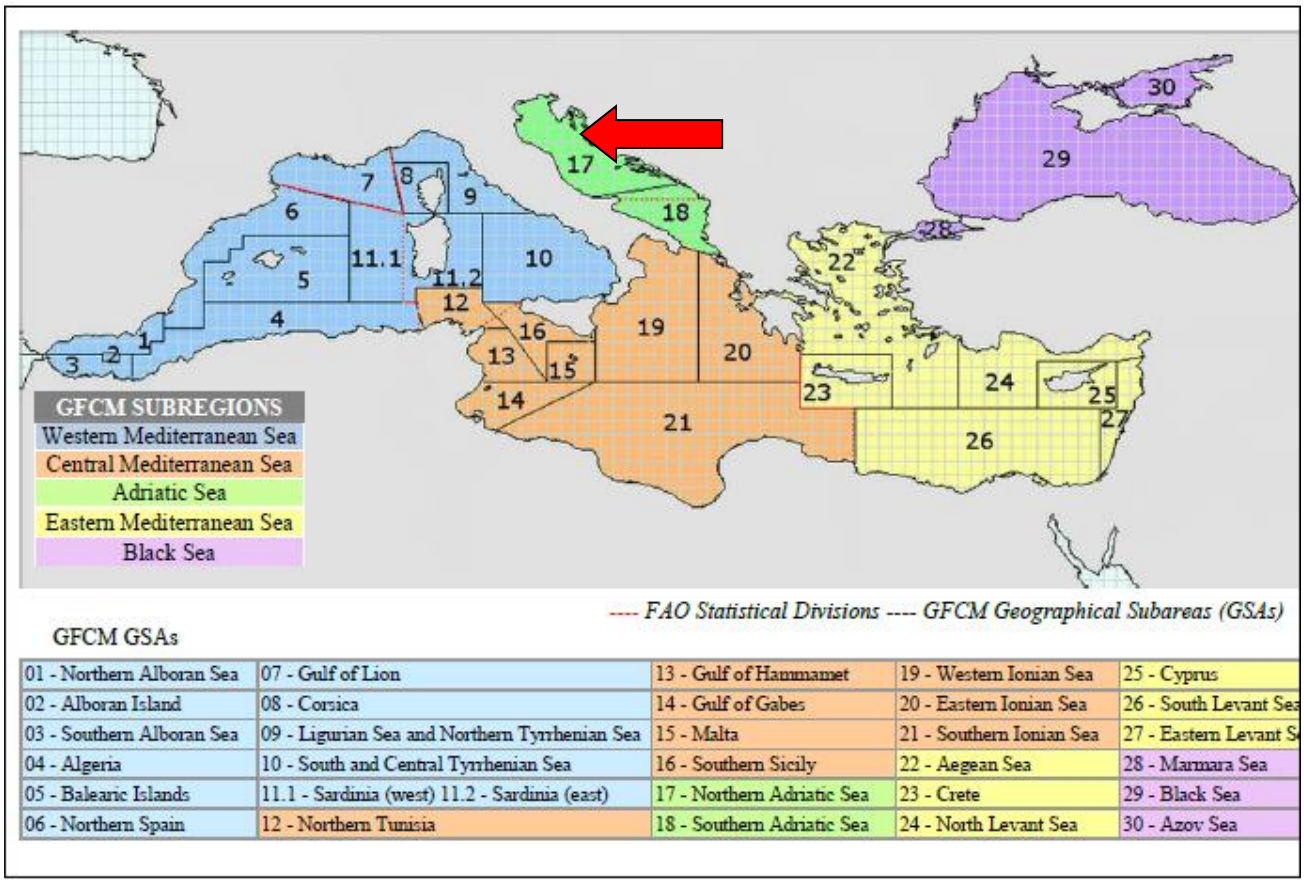
In this framework, the PRIZEFISH project aims to innovate fisheries in the North Central Adriatic area by piloting eco-labeled fish productions and fishery products derived, throughout the implementation of a cross-border, territorial and socio-economic developmental change in the cooperative renewable exploitation of Adriatic fishery resources, that would produce benefits in the long-term also to Adriatic marine ecosystems.

This can be achieved in particular through the development of a certification scheme for an eco-label brand fully Adriatic, the **Adriatic Responsible Fishery (ARF)**, that would combine environmental protection with the social dimension and economic aspects. The purpose of Adriatic Responsible Fishery (ARF) is to provide a framework for the recognition of fisheries management

best practices and to foster the adoption of measures capable of achieving and maintaining appropriate level of stocks over time. The ARF programme will focus on the value of certification in driving improvement in the marine environment and in enhancing traceability and transparency throughout the supply chains. However, besides the direct benefits of certification and market recognition, the ARF standard and assessment process will provide a tool to diagnose and identify improvement needs at a more general level, irrespective of eventual certification. Notably, management authorities could begin to use the ARF standard as an independent, credible ground-truthing approach before making wide-sweeping adjustments to enhance efficiencies for all fisheries, not just those seeking certification.

This multi-stakeholder, collaborative approach, which has become known as the Project Pre-Assessment (PPA) model, has already been applied in the Mediterranean region, in Australia, Indonesia, Mexico, South Africa, Japan, and the UK with the aim of helping in the improvement of the management of the sector. Through a combination of mapping and pre-assessment exercises, the PPA model offers governments, fishermen, scientists, market players, and local non-governmental organisations the opportunity to collaborate to identify the most efficient route to make environmental improvements at the most appropriate scale. Critical features of a PPA are that its intended impact extends beyond the immediate project results and that it has the purpose of improving management. Fisheries deciding to pursue certification when their performance allows to do so, find in the PPA a streamlined, stakeholder-supported approach to sustainability, whereas those that do not choose to purse certification still benefit through PPA projects and can achieve significant management efficiencies. Prizefish is therefore a “PPA project” involving both Italian and Croatian fisheries.

The report summarises the results of the “Activity 3.1 – Analysis of state, management and seasonality of fisheries in the Adriatic Sea” of the Work Package 3 (WP3) of the Project, whose aim is to provide an overview of and to map Croatian fisheries in Geographical Subarea (GSA) 17 of the General Fisheries Commission for the Mediterranean (GFCM). The structure of the report and some contents have been partially taken from that of the Fast Scan (Stage 1.a) Report prepared for Blufish, a project pre-assessment (PPA) coordinated by the Marine Stewardship Council (https://www.msc.org/it/).



GFCM GSAs

01 - Northern Alboran Sea	07 - Gulf of Lion	13 - Gulf of Hammamet	19 - Western Ionian Sea	25 - Cyprus
02 - Alboran Island	08 - Corsica	14 - Gulf of Gabes	20 - Eastern Ionian Sea	26 - South Levant Sea
03 - Southern Alboran Sea	09 - Ligurian Sea and Northern Tyrrhenian Sea	15 - Malta	21 - Southern Ionian Sea	27 - Eastern Levant S
04 - Algeria	10 - South and Central Tyrrhenian Sea	16 - Southern Sicily	22 - Aegean Sea	28 - Marmara Sea
05 - Balearic Islands	11.1 - Sardinia (west) 11.2 - Sardinia (east)	17 - Northern Adriatic Sea	23 - Crete	29 - Black Sea
06 - Northern Spain	12 - Northern Tunisia	18 - Southern Adriatic Sea	24 - North Levant Sea	30 - Azov Sea

Figure 1 – GSA 17: Northern Adriatic Sea

Source: GFCM Data Collection Reference Framework, Version 2018.1 (GFCM, 2018).

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- a list of all the fisheries operating under the scope of the project with indication of: the main target species, the main gears used, stock area, and availability of stock assessment and exploitation levels;
- average landings in volume and value in the most recent years;
- landing composition in terms of volume and value by fishery;
- fleet composition by fishing technique;
- geographical characterisation of the main fisheries;
- list of the main landing ports.

The study, methodology, including data sources, the way data were analysed, and the mapping results are reported in the chapters that follow.

2. METHODOLOGY

2.1 Data sources

A variety of data types were used to conduct the mapping. These data and their sources are listed below.

2.1.1 Fleet Register

Official data on the Croatian fishing fleet and ports recorded in the Croatian Fleet Register were downloaded from the European Commission web site (Management of fishing capacity - fishing fleet: https://ec.europa.eu/fisheries/cfp/fishing_rules/fishing_fleet_en). Data included the vessel details reported in the Fishing License which is released to vessel owners by the MA, namely port name, vessel name, owner's name, registration number, vessel length, main gear type, secondary gear type, tonnage, engine power and year of construction.

2.1.2 European Commission

Data Collection Framework (DCF) database

The EU DCF is publicly available on the DCF website at https://datacollection.jrc.ec.europa.eu/data-analysis.Data are available for use according to the format (i.e. variables and disaggregation level) stated in each data call. Official Data calls (e.g. EU Aquaculture, Fisheries-Dependent Information, Fleet Economic Performance, Mediterranean and Black Sea and Fish Processing Industry) are launched periodically (usually once a year) and are principally aimed at gathering information for the main DCF end-user, the Scientific, Technical and Economic Committee for Fisheries (STECF), for analysis and reports.

Scientific, Technical and Economic Committee for Fisheries (STECF)

The STECF performs periodic (usually yearly) stock assessments of several species of commercial interest, whose distribution falls within EU GSAs. Summaries of such assessments are publicly available on its website athttps://stecf.jrc.ec.europa.eu/dd/medbs/ram. Detailed information is also available, in the form of reports, on the webpage: https://stecf.jrc.ec.europa.eu/reports/medbs.

In parallel to the STECF, the Scientific Advisory Committee (SAC) to the GFCM, runs stock assessments for shared Mediterranean demersal stocks and small pelagic fish stocks.

2.1.3 General Fisheries Commission for the Mediterranean(GFCM)

The SAC-GFCM Working Groups on Stock Assessment of Demersal (WGSAD) and Small Pelagic Species (WGSASP) annually perform stock assessment for different shared demersal and small

pelagic Mediterranean species of commercial interest. Their outcomes are regularly published as an annex to the annual SAC report and are publicly available on the GFCM website. The SAC-GFCM results werecross-checked and incorporated in the present report along with the STECF data.

2.1.4 International Commission for the Conservation of Atlantic Tunas (ICCAT)

Highly migratory stocks in the Atlantic Ocean and the Mediterranean Sea fall under the purview of the ICCAT. Its scientific working group periodically produces stock assessments for tuna and tuna-like species. The information is publicly available on the ICCAT website.

2.1.5 Other sources: scientific literature

Since a preliminary examination indicated that stock assessments were only partially available for GSA 17, the decisions was made to review the recentl iterature for information on the status of the Adriatic stocks in the area included in the Prizefish project, even if it had not been formally validated by the STECF or the GFCM.

In particular, the paper by Froese et al. (2018) examines the current status, exploitation pattern, required stock rebuilding time, potential future catch if stocks are managed at the maximum sustainable yield (MSY), and consequent future profitability of 397 European stocks. Fishing pressure and biomass are estimated from 2000 to 2017 in 10 European eco-regions and in two wide-ranging regions. The authors also analyse stocks that are distributed in the GSA 17.

2.2 Data analysis and reporting

2.2.1 Fishing fleet data: gears, metiers and fishing technique

The composition of the Croatian fishing fleet in GSA 17was obtained from the raw data from the Fleet Register - which reports the main gear of each vessel as stated in the fishing license - by sorting them out in a pivot table. The database was last updated on 22.07.2019.

The gears are reported in the Fleet Register according to the DCF classification[1]and are structured by fishing activity (métier) and region in line with the Commission Decision of 18 December 2009 according to a multiannual Community programme for the collection, management and use of data

[1]Also adopted by the GFCM (GFCM, 2018).

in the fisheries sector for the period 2011-2013 (2010/93/EC). These data are summarised in Table 1.

Table 1–Acronyms and gear types as reported in Commission Decision 2010/93/EC

Gear acronym	Gear description
DRB	Boat dredges
DRH	Hand dredges
FPN	Stationary uncovered pound nets
FPO	Pots
FYK	Fyke nets
GNC	Encircling gillnets
GND	Driftnets
GNS	Set gillnets (anchored)
GTN	Combined gillnets-trammel nets
GTR	Trammel nets
HAR	Harpoons
HMD	Mechanised dredges including suction dredges
LA	Lampara nets
LHM	Handlines and pole-lines (mechanised)
LHP	Handlines and pole-lines (hand-operated)
LLD	Drifting longlines
LLS	Set longlines
LNB	Boat-operated lift nets
LNS	Shore-operated stationary lift nets
LTL	Troll lines
MIS	Miscellaneous Gear
NK	NOT KNOWN[2]
NO	NO GEAR
OTB	Bottom otter trawl
OTM	Midwater otter trawl
OTT	Otter twin trawl
PS	Purse seines
PTB	Bottom pair trawl
PTM	Pelagic pair trawl
SB	Beach seines

[2] NK, Not Known is allowed in case of confidentiality issues.

Gear acronym	Gear description
SDN	Danish seines
SPR	Pair seines
SSC	Scottish seines
SV	Beach and boat seines
TBB	Beam trawl

Source:https://datacollection.jrc.ec.europa.eu/web/dcf/wordef/gear-type

According to the Commission Decision of 6 November 2008 – which adopted a multiannual Community programme pursuant to Council Regulation (EC) No. 199/2008, establishing a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice to the CFP (2008/949/EC) – a métier is "a group of fishing operations targeting a similar (assemblage of) species, using similar gear, during the same period of the year and/or the same area and which are characterised by a similar exploitation pattern". The notion of métier is therefore closely linked to fishermen's activities, patterns, traditions, and gears. Accordingly, each métier involves a set of fishing operations characterised by a combination of fishing gear, target species, area, and season which make up homogeneous units that supply the main characteristics of a large number of fishing trips in a single variable (González-Álvarez et al., 2016).

The list of métiers of the Mediterranean Sea (Table 2) has been identified by the Regional Coordination Meeting for the Mediterranean and the Black Sea (RCMMED&BS, Sete 2008) and is available on the STECF website (https://datacollection.jrc.ec.europa.eu/wordef/fishing-activity-metier).

Table 2 – List of metiers in the Mediterranean Sea up to level 4.

Level 1	Level 2	Level 3	Level 4
Activity	**Gear classes**	**Gear groups**	**Gear type**
Fishing Activity	**Dredges**	Dredges	Boat dredge [DRB]
	Trawls	Bottom trawls	Bottom otter trawl [OTB]
			Multi-rig otter trawl [OTT]
			Bottom pair trawl [PTB]
			Beam trawl [TBB]

Level 1	Level 2	Level 3	Level 4
Activity	**Gear classes**	**Gear groups**	**Gear type**
		Pelagic trawls	Midwater otter trawl [OTM]
			Pelagic pair trawl [PTM]
	Hooks and Lines	Rods and Lines	Hand and Pole lines [LHP] [LHM]
			Trolling lines [LTL]
		Longlines	Drifting longlines [LLD]
			Set longlines [LLS]
	Traps	Traps	Pots and Traps [FPO]
			Fyke nets [FYK]
			Stationary uncovered pound nets [FPN]
	Nets	Nets	Trammel net [GTR]
			Set gillnet [GNS]
			Driftnet [GND]
	Seines	Surrounding nets	Purse seine [PS]
			Lampara nets [LA]
		Seines	Fly shooting seine [SSC]
			Anchored seine [SDN]
			Pair seine [SPR]
			Beach and boat seine [SB] [SV]
	Other gear	Other gear	Glass eel fishing
	Misc. (Specify)	Misc. (Specify)	
Other activity than fishing			
Inactive			
Recreational fisheries			

Source:https://datacollection.jrc.ec.europa.eu/wordef/fishing-activity-metier

Thus, a métier is essentially based on a combination of a gear (as listed above), a target assemblage and a mesh size. The analysis performed in the present report stops at level 5 of the definition of métier employed by the DCF system, i.e. the target assemblage, which is represented by a category of species that are biologically and environmentally similar. The abbreviations of the assemblages are reported in Table 3.

Table 3 – Acronyms and target assemblages as reported in the DCF framework

Target assemblage	Description
ANA	Anadromous
CAT	Catadromous
CEP	Cephalopods
CRU	Crustaceans
DEF	Demersal fish
DWS	Deep-water species
FIF	Finfish
FWS	Freshwater species
GLE	Glass eel
LPF	Large pelagic fish
MCD	Mixed crustaceans and demersal fish
MCF	Mixed cephalopods and demersal fish
MDD	Mixed demersal and deep-water species
MOL	Molluscs
MPD	Mixed pelagic and demersal fish
SLP	Small and large pelagic fish
SPF	Small pelagic fish

Source: Acronyms of target assemblage as reported in Appendix VI of the FDI data call 2018 on https://datacollection.jrc.ec.europa.eu/dc/fdi.

Since a vessel may use more than one gear during the year, and in some cases - especially where passive gears are concerned, also during the same day–the DCF framework has adopted the concept of fishing technique, indicating an aggregation of vessels using similar gears. Thus, a vessel is categorised under a given fishing technique on the basis of the "predominant" gear it uses. According to Commission Regulation (EC) No. 1639/2001 of 25 July 2001, establishing the minimum and extended EU programmes for the collection of data in the fisheries sector and laying down detailed rules for the application of Council Regulation (EC) No.1543/2000 (OJ L 222, 17.8.2001, p.

53), predominant is defined as follows: "If a vessel spends more than 50% of its time using a specific type of fishing technique, it should be included in the corresponding segment" (note 2 of Appendix III, section C), where a segment is the combination of a particular fishing technique category and a vessel length category (Appendix III), as also reported in Figure 2.

Appendix III (section C)

Basic segmentation of vessels for capacities (MP)

Vessel length		< 12 m	12 – < 24 m	24 – < 40 m	≥ 40 m
Type of fishing technique					
Mobile gears	Beam trawl				
	Demersal trawl and demersal seiner				
	Pelagic trawl and seiners				
	Dredges				
	Polyvalent				
Passive gears	Gears using hooks	(1)			
	Drift and fixed nets				
	Pots and traps				
	Polyvalent				
Polyvalent gears	Combining mobile and passive gears				

(1) This segment is aggregated for all passive gears.

Note 1: If a gear category contains fewer than 10 vessels, then the cell can be merged with a neighbouring length category to be specified in the national programme.

Note 2: If a vessel spends more than 50 % of its time using a specific type of fishing technique, it should be included in the corresponding segment.

Note 3: Length is defined as length overall (LOA).

Figure 2 – Definition of fleet segment under the DCF system

Source: Commission Regulation (EC) No. 1639/2001 of 25 July 2001 (Appendix VI)

Furthermore, according to EU Reg. 93/2010, if a vessel cannot be allocated to a fishing segment according to the predominance criterion, it is to be allocated to one of the following segments: (a) 'Vessels using Polyvalent active gears' if it only uses active gears; b) 'Vessels using Polyvalent passive gears' if it only uses passive gears; (c) 'Vessels using active and passive gears'.

When data on effort and landings are available by métier, the fishing technique is important from an economic point of view, since it is the category used for the collection and release - under the DCF - of fleet and economic data. Income and costs refer to the vessel unit; notably, some costs cannot be attributed to a separate gear, but to the vessel as a unit.

The fishing techniques identified by the DCF (European Decision 2008/949/EC, Appendix III) are reported in Table 4.

Table 4 – Acronyms and fishing techniques identified by the DCF

Fishing technique acronym	Fishing technique description
DFN	Drift and/or fixed netters
DRB	Dredgers

Fishing technique acronym	Fishing technique description
DTS	Demersal trawlers and/or demersal seiners
FPO	Vessels using pots and/or traps
HOK	Vessels using hooks (longliners)
MGO	Vessel using other active gears
MGP	Vessels using polyvalent active gears only
PG	Vessels using passive gears only for vessels < 12m
PGO	Vessels using other passive gears
PGP	Vessels using polyvalent passive gears only
PMP	Vessels using active and passive gears (polyvalent)
PS	Purse seiners
TM	Pelagic trawlers
TBB	Beam trawlers

Source: European Decision 2008/949/EC, Appendix III

The association of gears (Table 1) and of target assemblage (Table 3) is defined as a "fishery". The fisheries that are addressed in this report are listed in Table 6.

The analysis of fleet data performed for this report is based on the fishing technique and provides, wherever possible, information on the relationship between fishing technique and fishery taken.

Fleet data were processed to produce a list of the main fishing ports in GSA 17.

Table 5– List of registration portsin GSA 17 (Croatia)

Port name	Port name	Port name	Port name	Port name	Port name	Port name
Antenal	Fažana	Ljubeščica	Omišalj	Rab	Splitska	Unije
Bakar	Hvar	Lokrum	Omiš	Raša	Split	Uvala Mir
Baška	Ilok	Lopud	Obonjan	Rabac	Skradin	Vodice
Batina	Ist	Lopar	Opatija	Rogač	Susak	Viganj
Bibinje	Jablanac	Lastovo	Orebić	Rogoznica	Stomorska	Vrgorac
Belišće	Jadrija	Mali Lošinj	Osijek	Rijeka	Ston	Vir
Blace	Jelsa	Luka	Pag	Rogotin	Sustjepan	Vis
Biograd na Moru	Karlobag	Makarska	Pašman	Rovinj	Sućuraj	Veli Iž
Bol	Kali	Malinska	Pučišća	Sali	Supetar	Valbiska

Brbinj - Lučina	Kaštel Sućurac	Maslenica	Polače	Stobrec	Sućurac	Vela Luka
Brioni	Kastel Gomilica	Marčana	Ploče	Sobra	Sutivan	Veli Lošinj
Baška Voda	Klek	Metković	Plomin	Suđurađ	Sveti Juraj	Vranjic
Božava	Klimno	Milna	Pomena	Senj	Sveti Kajo	Vrgada
Čilipi	Komiža	Mali Iž	Punat	Stari Grad	Tkon	Vrbnik
Čavle	Klana	Mišnjak	Poreč	Starigrad	Tisno	Vrsar
Crikvenica	Korčula	Mošćenička Draga	Postire	Šibenik	Tunarica	Vrboska
Cres	Kostrena	Merag	Preko	Silba	Tribunj	RIS Inland waterways
Cavtat	Kaprije	Muna na Žirju	Primošten	Sisak	Trpanj	Zadar
Dalmacia	Kraljevica	Martinšćica	Prizna	Slano	Trstenik	Zagreb
Dubrovnik	Krk	Murter	Prapratno	Selce	Trogir	Žigljen
Dragoslavec	Koromačno	Nerezine	Prvić Šepurine	Solin	Turanj	Zlarin
Donje Celo	Kukljica	Novi Vinodolski	Prvić	Šilo	Ubli	Žut - Marina
Drvenik	Kneža	Novalja	Porozina	Slatine	Ugljan	
Dugi Rat	Lamjane	Obrovac	Pula	Sumartin	Umag	

2.2.2Identification of fisheries

The importance of the fisheries found within GSA 17 was established also using a recent and validated scientific method, the STECF/EWG 15-14 (STECF, 2015) approach, which considers the 75 % threshold of the cumulative value and volume of landings. The approach was originally developed by the STECF to address the EC request for support of the implementation of the landing obligation and has been employed to identify the main European demersal fisheries in the Mediterranean.

The 75% threshold of the cumulative value and volume of landings (sum of the values of the two years for which data were available, 2015-2016) was used for each fishery and gear combination, to identify the most represented taxa, which characterise the fisheries[3].

[3]For fisheries here we intend the combination of target groups of species and gears.

In the plot, the change in the slope of the cumulative value and volume of landings is reported to provide detailed information on catch composition. A mixed category was created for taxa accounting for less than 500 kg in landing weight, which were pooled into a group that was defined as “OTH” (others).

Only assessments whose reference year was 2012 or later were used. Where multiple sources of information were available for the same stock, only the most recent were considered. The information on stock status was reported in terms of F/F_{MSY}(F=fishing mortality; F_{MSY} =fishing mortality at MSY level). If biomass reference points were available, such information was also reported.

The analysis of activity by metier allowed identifying the combinations of gear and target assemblage (“fishery”), which are listed in Table 6.

Table 6–Main fisheries identified in the GSA 17

Gear_target assemblage	“Fishery” description
DRB_MOL	Boat dredges for molluscs
FPO_DEF	Pots and traps for demersal fish
FYK_CAT	Fyke nets for catadromous
FYK_DEF	Fyke nets for demersal fish
GND_SPF	Driftnets for small pelagic fish
GNS_DEF	Set gillnets (anchored) for demersal fish
GNS_SLP	Set gillnets (anchored) for small pelagic fish
GTR_DEF	Trammel nets for demersal fish
LHP-LHM_CEP	Handlines and pole lines for cephalopods
LHP-LHM_FIF	Handlines and pole lines for finfish
LLD_LPF	Drifting longlines for large pelagic fish
LLS_DEF	Set longlines for demersal fish
LTL_LPF	Troll lines for large pelagic fish
MIS_MIS	Miscellaneous gears for miscellaneous fish
OTB_DEF	Bottom otter trawl for demersal fish
OTB_DWS	Bottom otter trawl for deep water species
OTB_MDD	Bottom otter trawl for mixed demersal and deep-water species
OTM_MPD	Midwater otter trawl for mixed pelagic and demersal fish

Gear_target assemblage	"Fishery" description
PS_LPF	Purse seines for large pelagic fish
PS_SPF	Purse seines for small pelagic fish
PTM_SPF	Pelagic pair trawl for small pelagic fish
SB-SV_DEF	Beach and boat seines for demersal fish
TBB_DEF	Beam trawl for demersal fish

Source: https://datacollection.jrc.ec.europa.eu/

3. MAPPING RESULT: Croatian fisheries operating in the GSA17 potentially eligible for eco-labelling process

The mapping process yielded 1161 species/gears combinations, defined as fisheries. Details on fleet composition by fishing techniques and vessels size, on the most important fishing ports, on the composition of landings (using the 75% threshold approach)are given in the following sections.

3.1. Fleet composition

In GSA 17 operate 6.093 Croatian fishing vessels. With regards to vessels falling under the polyvalent passive gears segment (PGP), there was a major change from 2016 regarding a very specific category of non-commercial fishery that prior to the accession of Croatia to the EU belonged to small scale fleet for personal use. Those vessels were transferred to the commercial category in 2015, pursuant to the regulations in force. Administrative process of licensing followed throughout 2016. Following the transfer from the previous non-commercial fishery into the commercial one, Croatia included the small-scale vessels for personal needs into the national sampling scheme within the amended National Data Collection Programme (*source:* Annual report on balance between fishing capacity and fishing opportunities for 2018, available at: https://ec.europa.eu/2018-fleet-capacity-report-croatiaen.pdf).

However, although the current fleet composition include the full PGP segment (as reflected by the total number of vessels) the influence of those vessels on the following analyses is minor due to low value and volume of landings (they are not full-time engaged in the fishery and most of them have very limited activity).

In view of the foregoing, the fishing techniques most practiced are drift and/or fixed netters, followed by polyvalent passive gears only, demersal trawlers and/or demersal seiners, other active gears, hooks (longliners) and pots and/or traps. The GSA 17 Croatian fishing fleet has a total tonnage of 34.509 GT and 262.142 kW of total engine power. In 2015, there were 2.384 (FTE) employed in the fishing sector (EUMOFA, 2015). The average age of vessels is 35 years old. Average vessels length overall (LOA) is 11 meters.

Table 7 - GSA 17: Fleet composition by fishing technique and vessel size class (length overall, LOA) as of 31 December 2018

fishing_tech	vessel_length	Total number of vessels	Vessel tonnage	Engine power	Fishing days	kW fishing days (effort)	Average vessel length	Average vessel age
DFN	VL0006	313	320	4.032	20.674	266.690	5	35
DFN	VL0612	669	2.380	42.689	47.314	3.083.657	8	34
DFN	VL1218	17	218	3.010	1.041	168.244	13	35
DRB	VL0612	13	106	1.589	1.232	155.672	11	35
DRB	VL1218	28	409	4.993	3.240	569.797	14	34
DRB	VL1824	1	55	242	156	37.752	21	62
DTS	VL0006	4	4	59	146	2.038	5	45
DTS	VL0612	162	1.315	15.033	14.791	1.502.523	10	37
DTS	VL1218	168	3.207	26.239	17.006	2.633.952	15	43
DTS	VL1824	30	2.094	8.350	4.556	1.390.026	20	46
DTS	VL2440	13	1.700	5.997	2.089	974.774	26	32
FPO	VL0006	43	49	1.143	4.270	133.306	5	28
FPO	VL0612	110	293	5.870	15.656	833.234	7	35
FPO	VL1218	1	10	124	4	496	12	29
HOK	VL0006	80	77	1.489	2.942	56.000	5	33
HOK	VL0612	226	928	24.166	10.764	1.197.084	8	30
HOK	VL1218	5	99	2.473	313	170.766	13	21
MGO	VL0006	264	209	4.309	14.936	281.967	4	25
MGO	VL0612	70	249	5.006	5.283	448.713	8	33
MGO	VL1218	2	20	73	153	7.818	12	55
MGP	VL0612	2	19	121	116	4.832	11	33
MGP	VL1218	1	14	220	2	440	14	1
PGO	VL0006	6	6	230	415	16.751	5	24
PGO	VL0612	2	5	94	128	5.936	7	29
PGP	VL0006*	2.811	2.417	17.439	2.197	19.269	5	38
PGP	VL0612*	794	1.742	17.015	2.528	86.382	7	39
PMP	VL0006	28	25	248	1.106	12.963	5	36
PMP	VL0612	38	117	2.973	2.714	232.102	8	32
PMP	VL1218	3	28	413	260	34.932	13	35
PS	VL0006	2	2	53	189	6.543	5	21
PS	VL0612	33	199	2.541	2.684	225.695	10	43
PS	VL1218	31	638	5.313	3.908	700.907	15	40
PS	VL1824	49	3.933	17.147	7.609	2.712.768	21	51
PS	VL2440	73	11.620	41.434	11.283	6.545.218	29	29
TBB	VL0612	1	1	13	36	477	6	58
Totale complessivo		**6.093**	**34.509**	**262.142**	**201.741**	**24.519.725**	**11**	**35**

***Characteristics of PGP segment in 2018.**
Source: 2018 Croatian Fleet capacity report

Source: https://stecf.jrc.ec.europa.eu/data-dissemination

3.2. Fishing fleet distribution

Along the Croatian side of the Adriatic Sea there are 166 fishing landing places, out of which 63 represent 95% of the catches. Ports of major importance are the port of Dubrovnik, Split and Zadar, followed by Rijeka, Pula, Šibenik and Senj. The fishing techniques most used by vessels operating in those ports are drift and/or fixed netters, polyvalent passive gears (vessels used primarily for personal needs), demersal trawlers and/or demersal seiners and other active gears (fig. 3.2.1.).

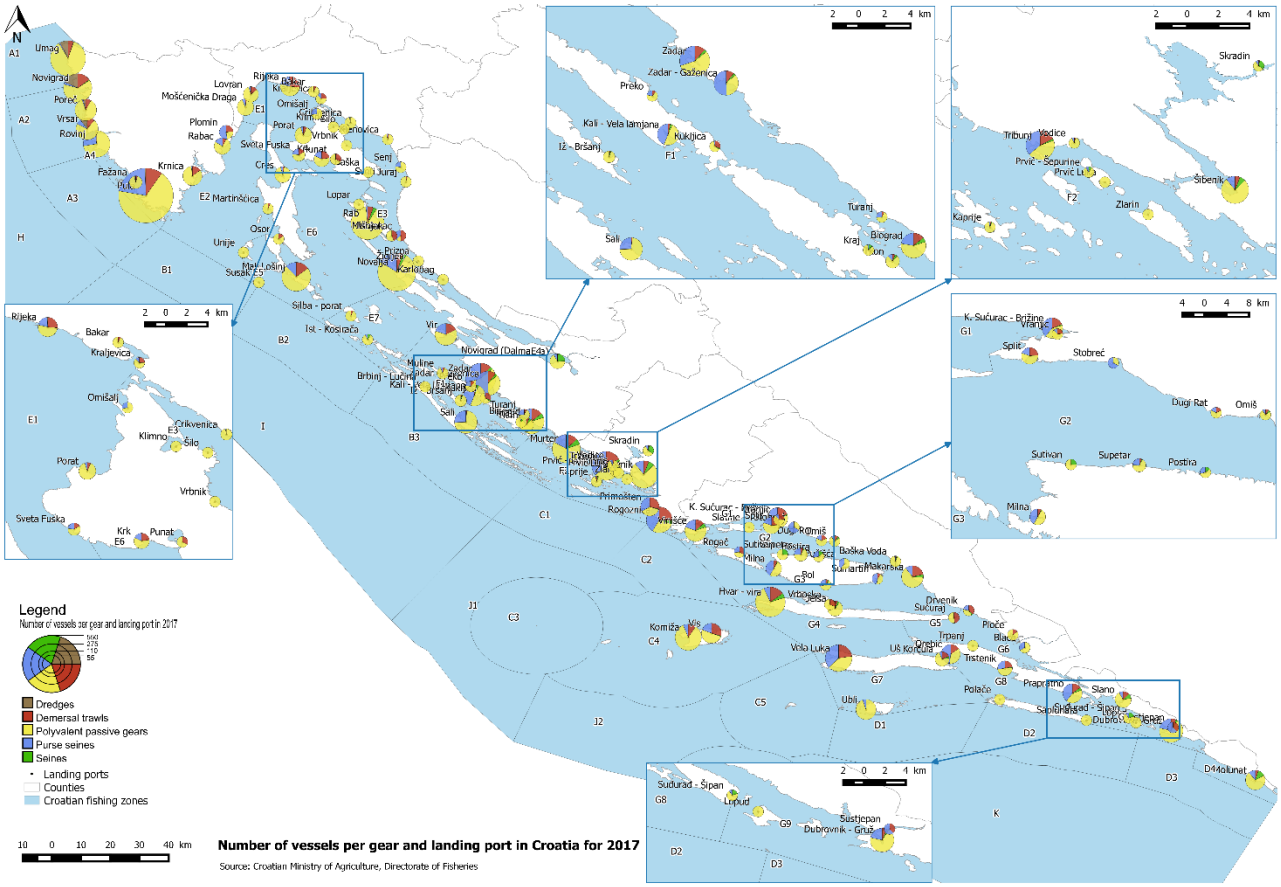

Figure 3.2.1. – GSA17: Map of registration ports and fleet characterisation by compartment

3.3. The most important fisheries for volume and value of landings

The most important fisheries in terms of landing volume are purse seines for small pelagic fish (65,458.42 tons); bottom otter trawl for demersal fish (2,310.64 tons) and bottom otter trawl for crustaceans (839.95 tons). The same three fisheries are the most important also in terms of value of landings, in the following order: purse seines for small pelagic fish (30,262.91EUR); bottom otter trawl for demersal fish (6,707.33 EUR); bottom otter trawl for crustaceans (4,803.05 EUR).

Table 8 – GSA 17: Landings volume and value (mean 2015-2016)

Fishery	Gear type	Mean landings in weight 2015-2016 (Tons)	Mean value of landings 2015-2016 (K Euro)	% Landings	% Revenues
SPF	PS	65,458.43	30,262.91	90.14	50.84
DEF	OTB	2,310.64	6,707.34	3.18	11.27
CRU	OTB	839.95	4,803.05	1.16	8.07
CEP	OTB	838.15	2,872.07	1.15	4.82
DEF	GTR	238.48	1,956.58	0.33	3.29
MOL	DRB	534.21	1,815.23	0.74	3.05
DEF	GNS	164.93	970.90	0.23	1.63
DEF	LLS	181.37	741.74	0.25	1.25
FIF	GNS	135.08	690.82	0.19	1.16
CRU	FPO	39.14	621.96	0.05	1.04
DEF	DRB	54.37	439.29	0.07	0.74
BFTE	LHP	47.83	433.91	0.07	0.73
CEP	FPO	78.31	404.74	0.11	0.68
LPF	PS	78.27	396.93	0.11	0.67
FIF	PS	94.50	295.57	0.13	0.50
CEP	DRB	60.36	251.70	0.08	0.42

Source: https://stecf.jrc.ec.europa.eu/data-dissemination

3.4. Composition of landings (volume and value) by fishery and species according to the 75% threshold approach, sum 2015-2016

As regards cephalopods fished by boat dredges, the Common cuttlefish and the Horned and musky octopuses are the most important species in terms of both value and volume of landings (fig. 3.4.1.).

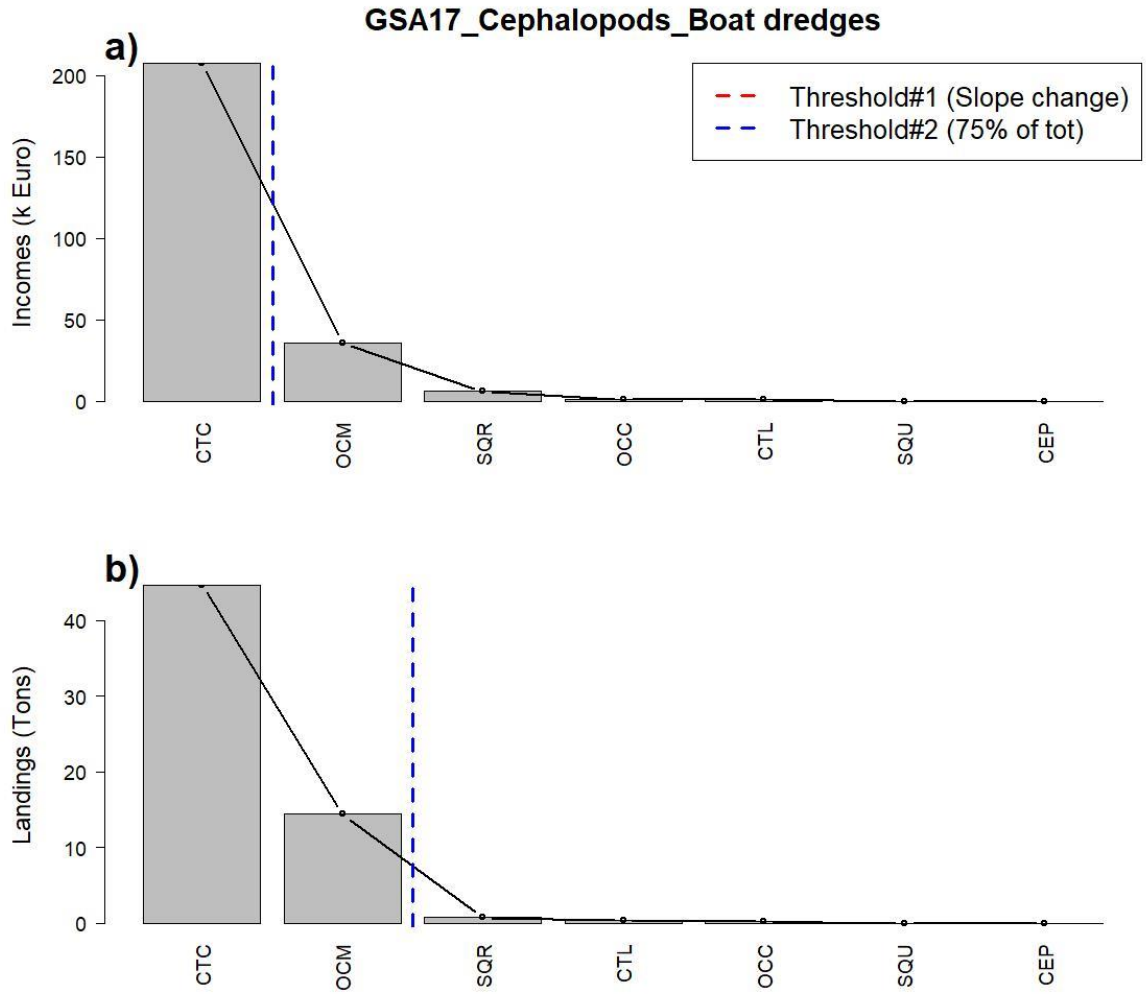

Fig. 3.4.1.: Landing value (a) and volume (b) of cephalopods fished by boat dredges in the Croatian side of GSA17.

As regards the cephalopods fished by bottom otter trawl, the Horned and musky octopuses, the European squid and the Common octopus are the most important species in terms of value of landings. In terms of volume of landings the most important are the Horned and musky octopuses, the Various squids nei and the European squid (fig. 3.4.2.)

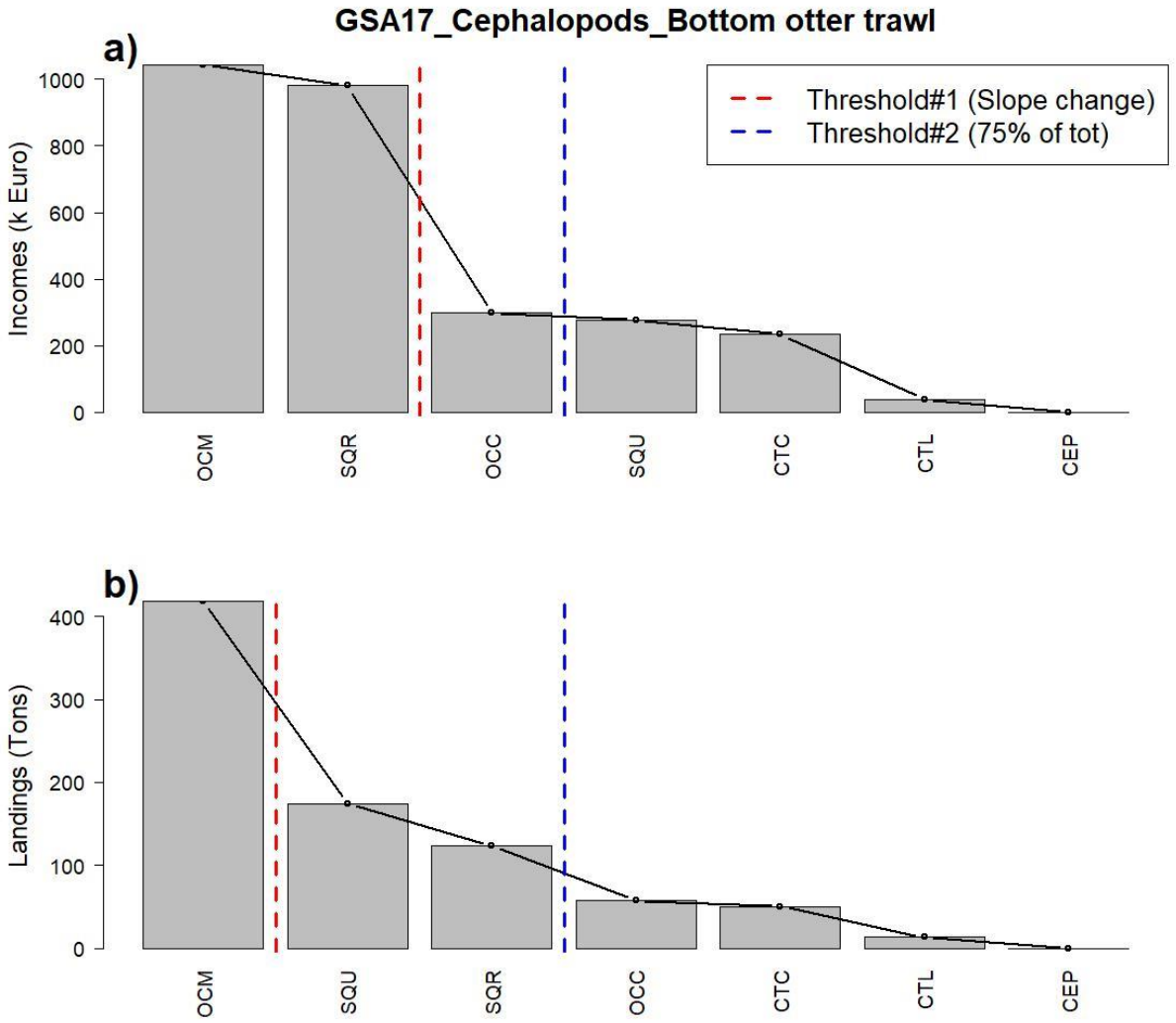

Fig. 3.4.2.: Landing value (a) and volume (b) of cephalopods fished by bottom otter trawl in the Croatian side of GSA17.

As regards cephalopods fished by pots, the Common octopus is the most important species in terms of both value and volume of landings (fig. 3.4.3.).

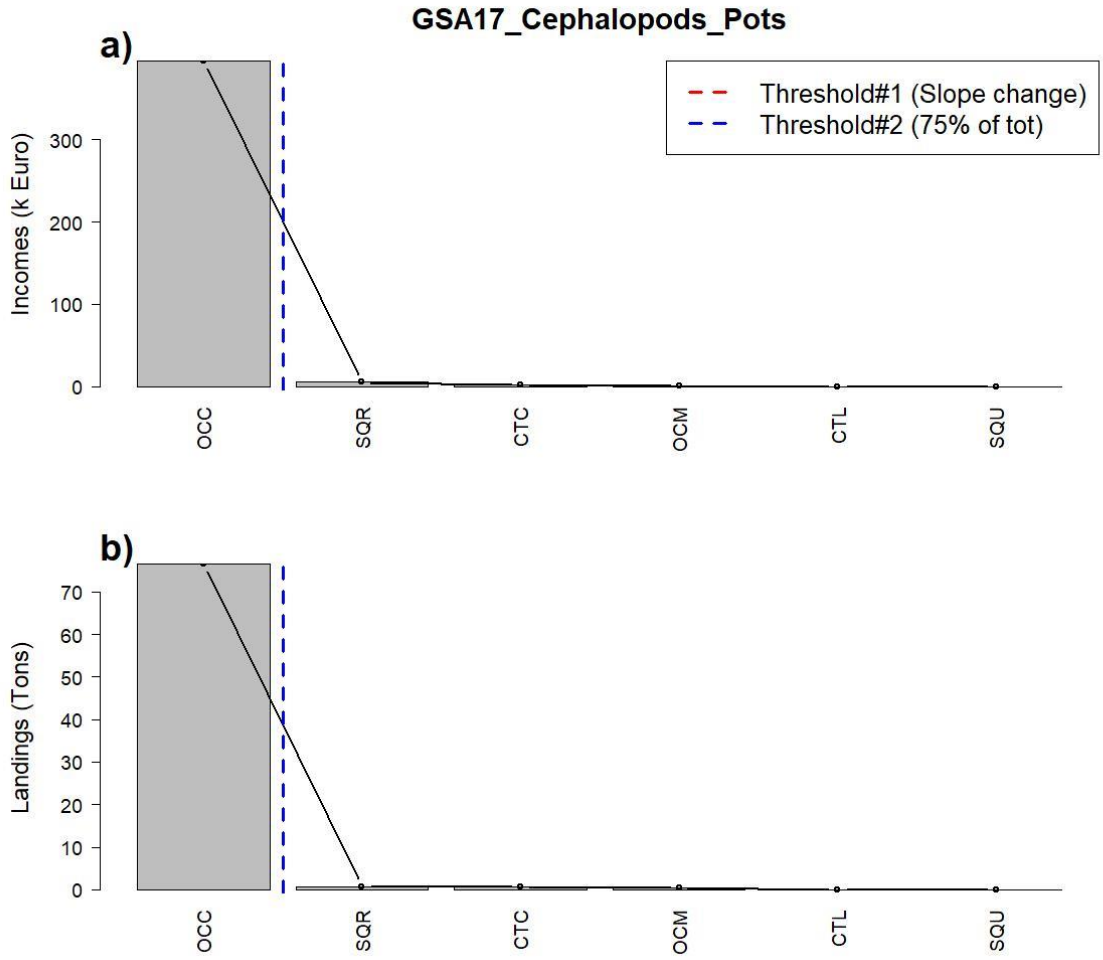

Fig. 3.4.3.: Landing value (a) and volume (b) of cephalopods fished by pots in the Croatian side of GSA17.

With reference to crustaceans fished by bottom otter trawl, the Norway lobster and the Deep-water rose shrimp are the most important species in terms of value and volume of landings (fig. 3.4.4.).

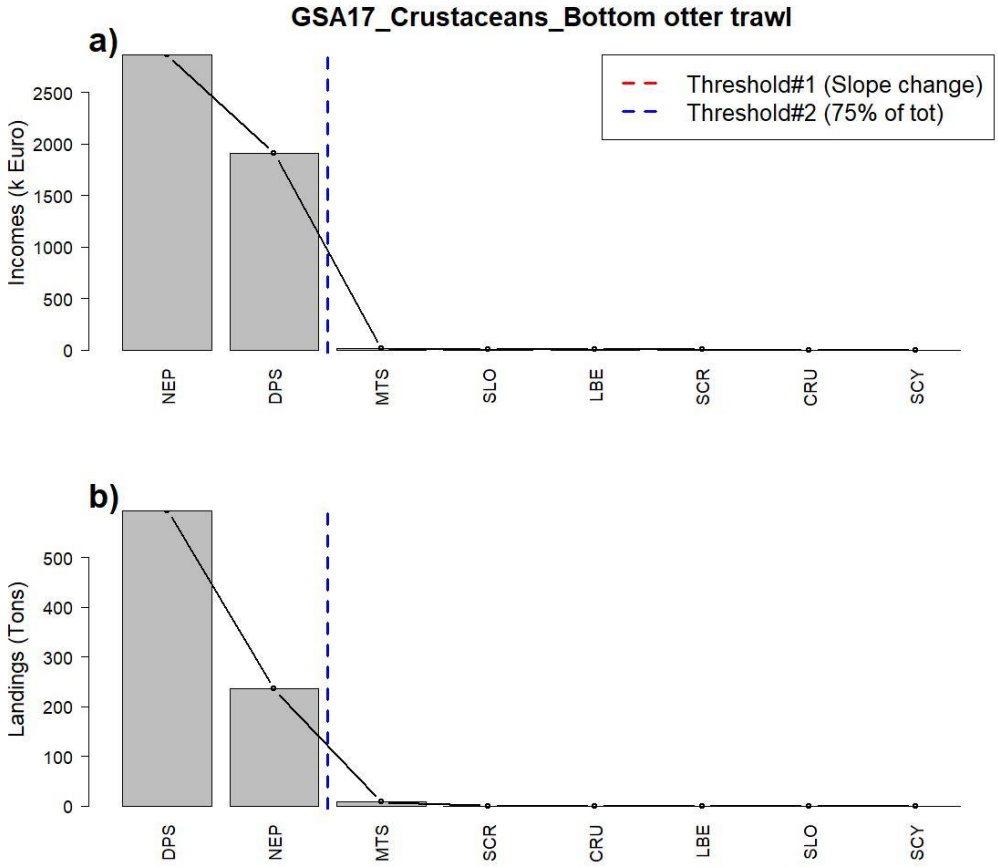

Fig. 3.4.4.: Landing value (a) and volume (b) of crustaceans fished by bottom otter trawl in the Croatian side of GSA17.

As regards crustaceans fished by pots, the Norway lobate and the Common spiny lobster are the most important fisheries in terms of both value and volume (fig. 3.4.5.).

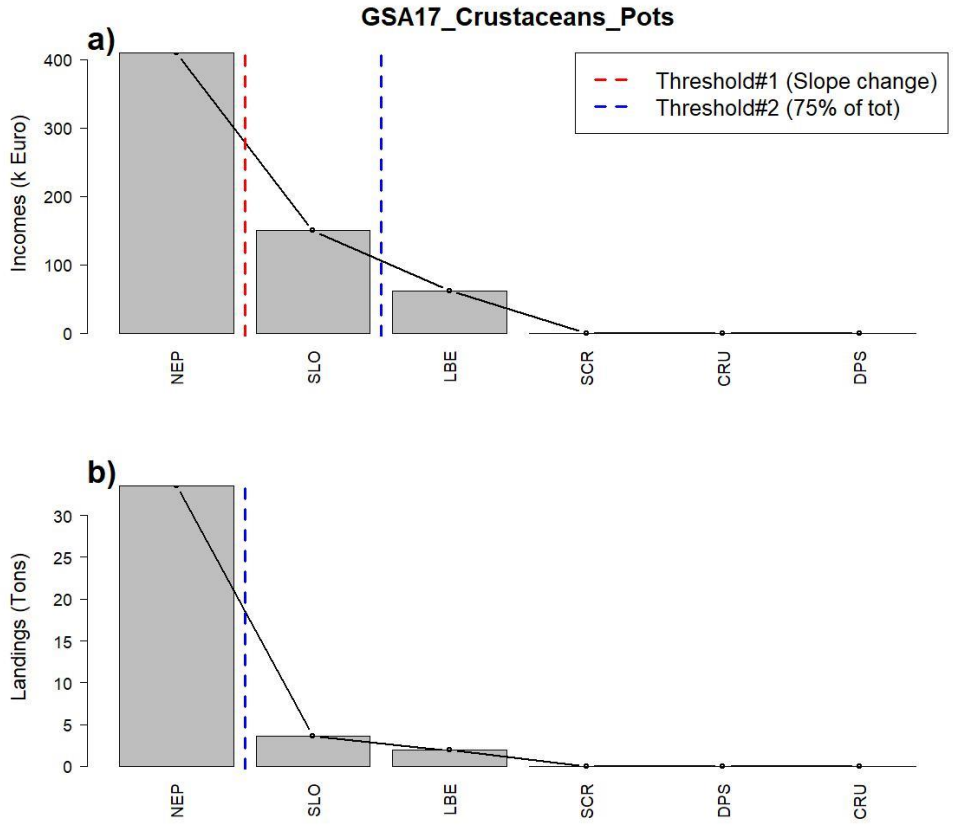

Fig. 3.4.5.: Landing value (a) and volume (b) of crustaceans fished by pots in the Croatian side of GSA17.

Regarding demersal fish fished by boat dredges, the Common sole is the most important species in terms of both value and volume of landings (fig. 3.4.6).

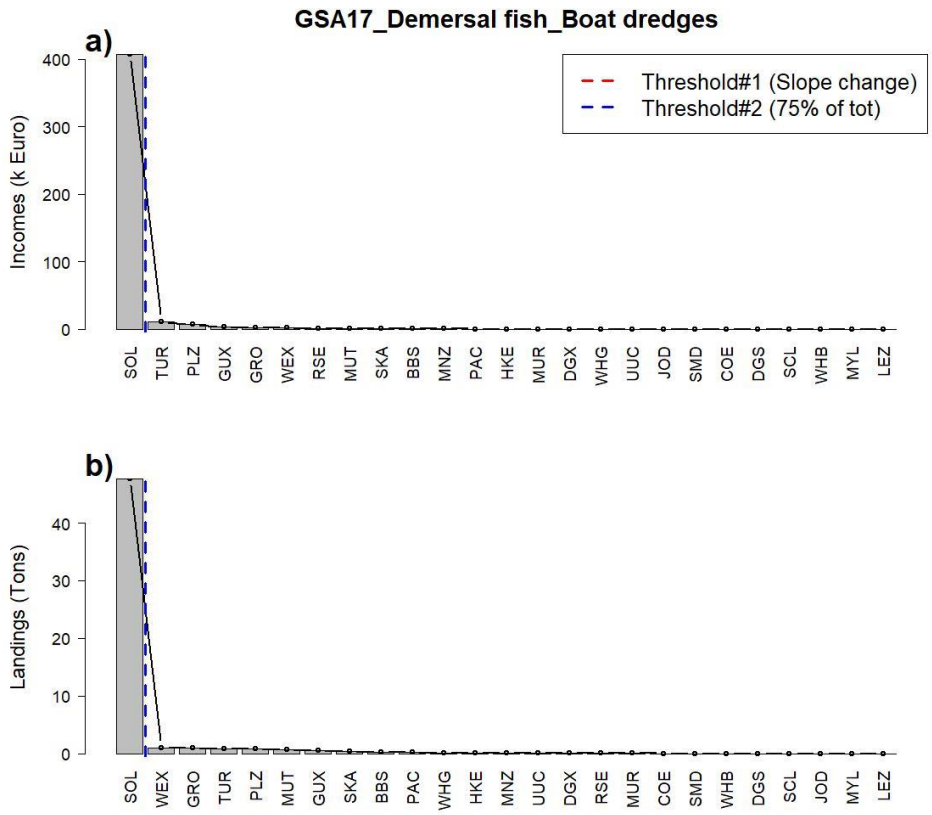

Fig. 3.4.6.: Landing value (a) and volume (b) of demersal fish fished by boat dredges in the Croatian side of GSA17.

As regards demersal fish fished by bottom otter trawl, the European hake, the Red Mullet, the John dory, the Monkfishes neiare the most important species in terms of value of landings. In terms of volume the most important are the Red Mullet,the European hake and the Whiting (fig. 3.4.7.).

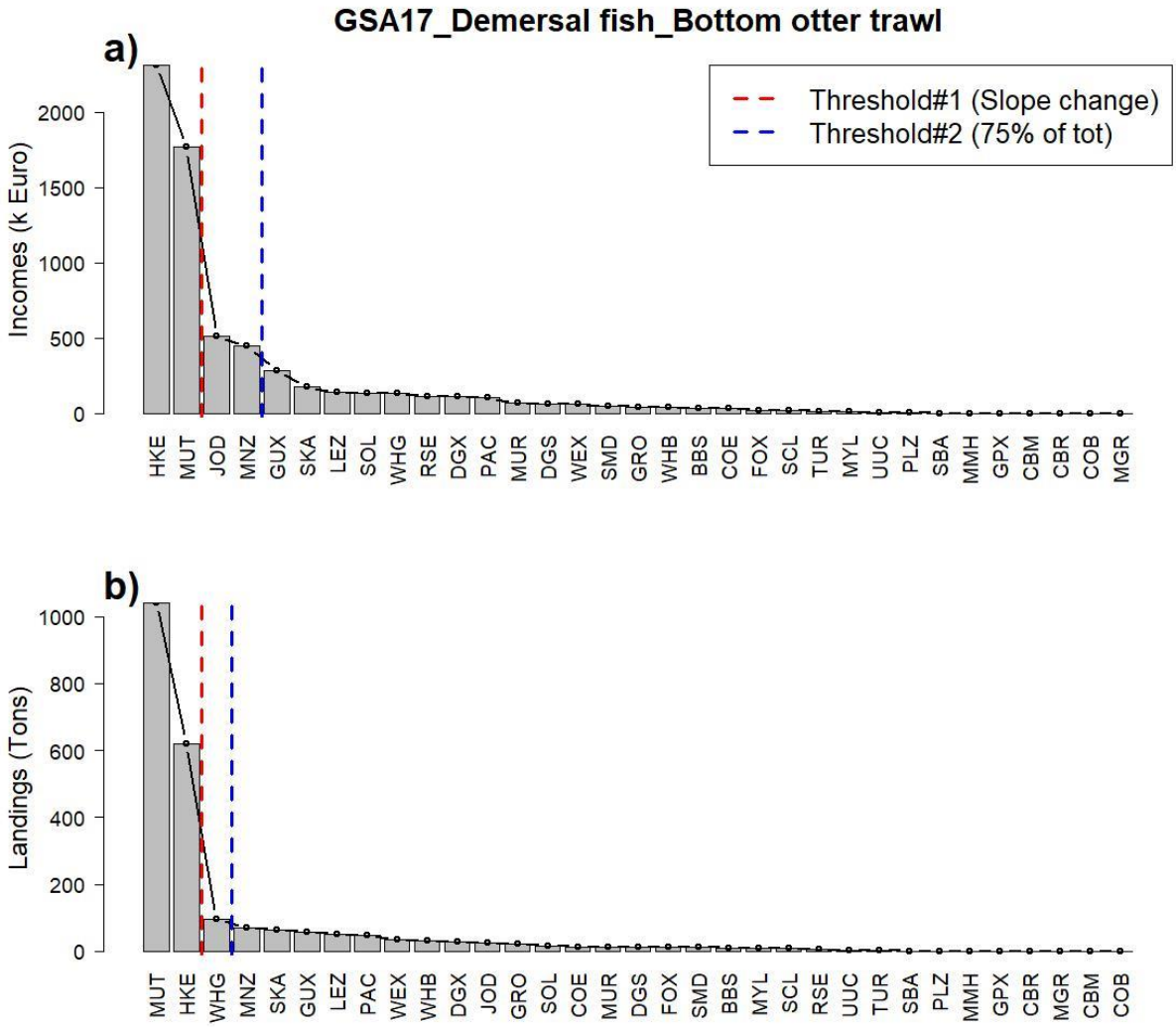

Fig. 3.4.7: Landing value (a) and volume (b) of demersal fish fished by bottom otter trawl in the Croatian side of GSA17.

As regards demersal fish fished by set gillnets nets(anchored), the Red scorpionfish, the European Hake, the John dory, the Turbot, the Common Sole, the Picked dogfishand and the Dogfish sharks neiare the most important species in terms of value of landings. In terms of volume the most important are: the European Hake, the Red scorpionfish, the Groundfishes nei, the Dogfish sharks nei, the Picked dogfish, the Raja rays nei, the Black scorpionfish, the John dory, the Red mullet, the Common pandora, the Common sole (fig. 3.4.8.).

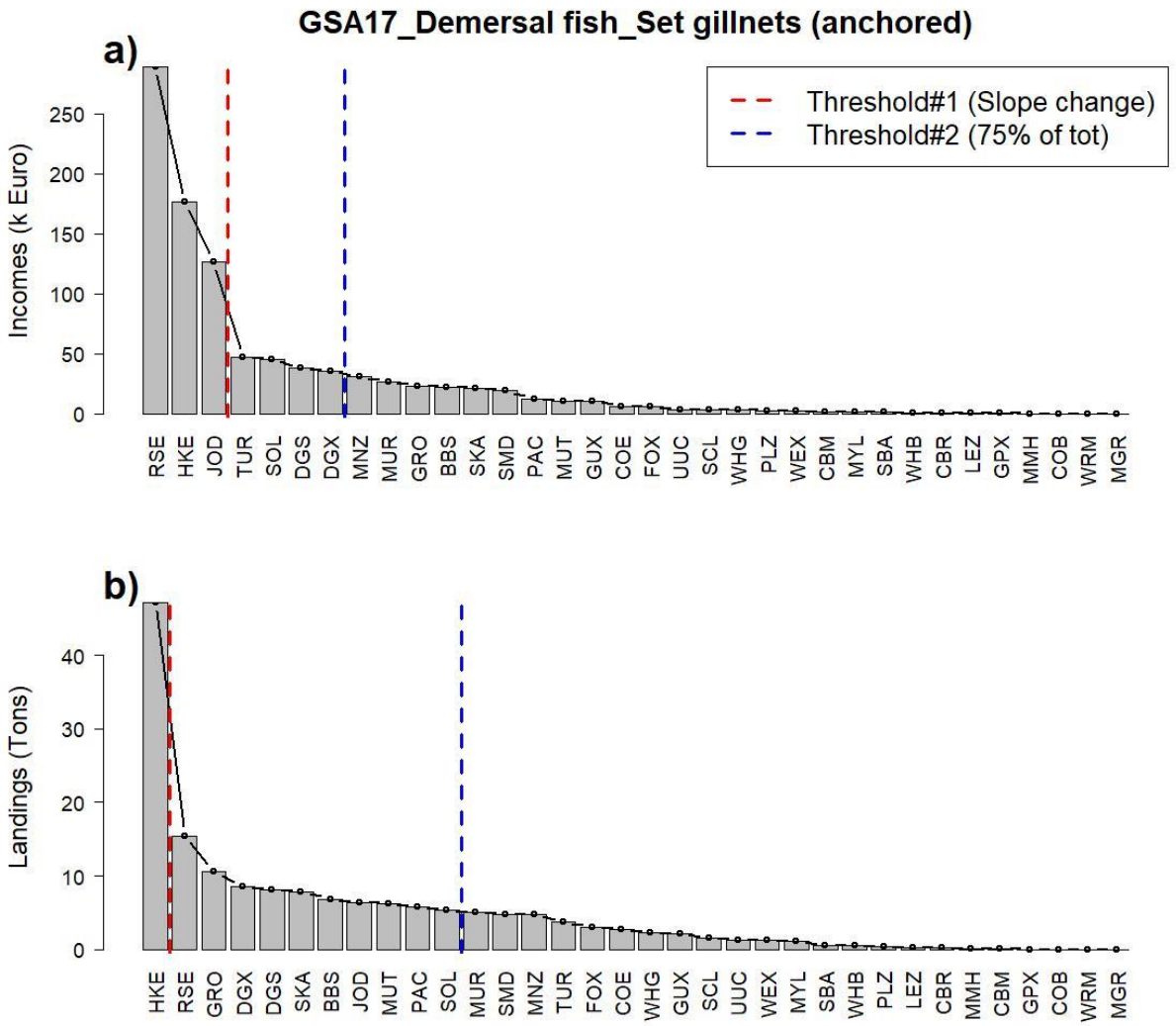

Fig. 3.4.8: Landing value (a) and volume (b) of demersal fish fished by set gillnets (anchored) in the Croatian side of GSA17.

As regards demersal fish fished by set longlines, the European Hake and the Gurnards, searobins nei are the most important species in terms of value and volume of landings respectively. Other important species in terms of value are the Red scorpionfish and the European conger. In terms of volume the European conger too (fig.3.4.9).

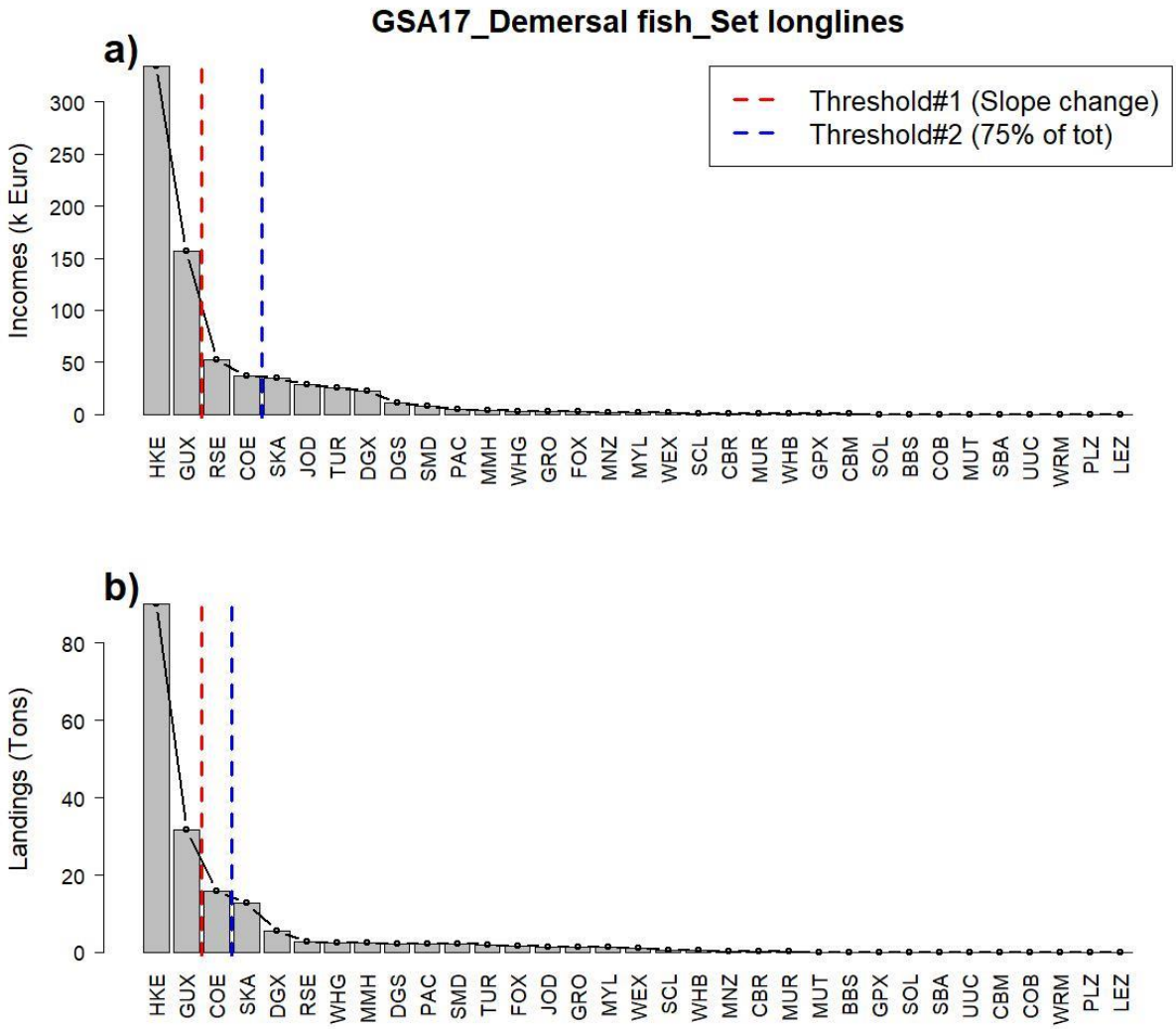

Fig. 3.4.9.: Landing value (a) and volume (b) of demersal fish fished by set longlinesin the Croatian side of GSA17.

As regards demersal fish fished by trammel nets, the Common Sole and the Turbot are the most important species in terms of both value and volume of landings. The Red scorpionfish is the third in terms of value (fig. 3.4.10.).

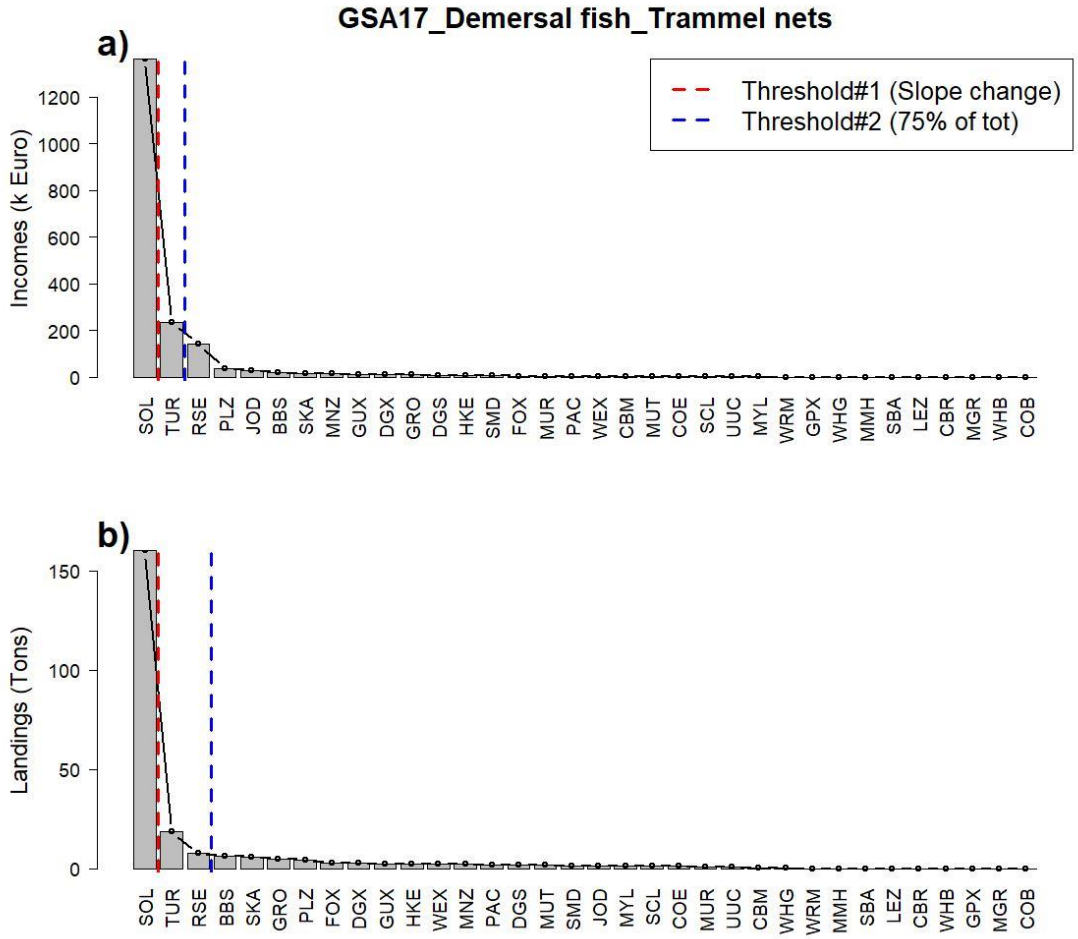

Fig. 3.4.10.: Landing value (a) and volume (b) of demersal fish fished by trammel nets in the Croatian side of GSA17.

As regards finfish fished by purse seines, the Gilthead seabream and the Bogue arethe most important species in terms of both value and volume of landings respectively (fig.3.4.11).

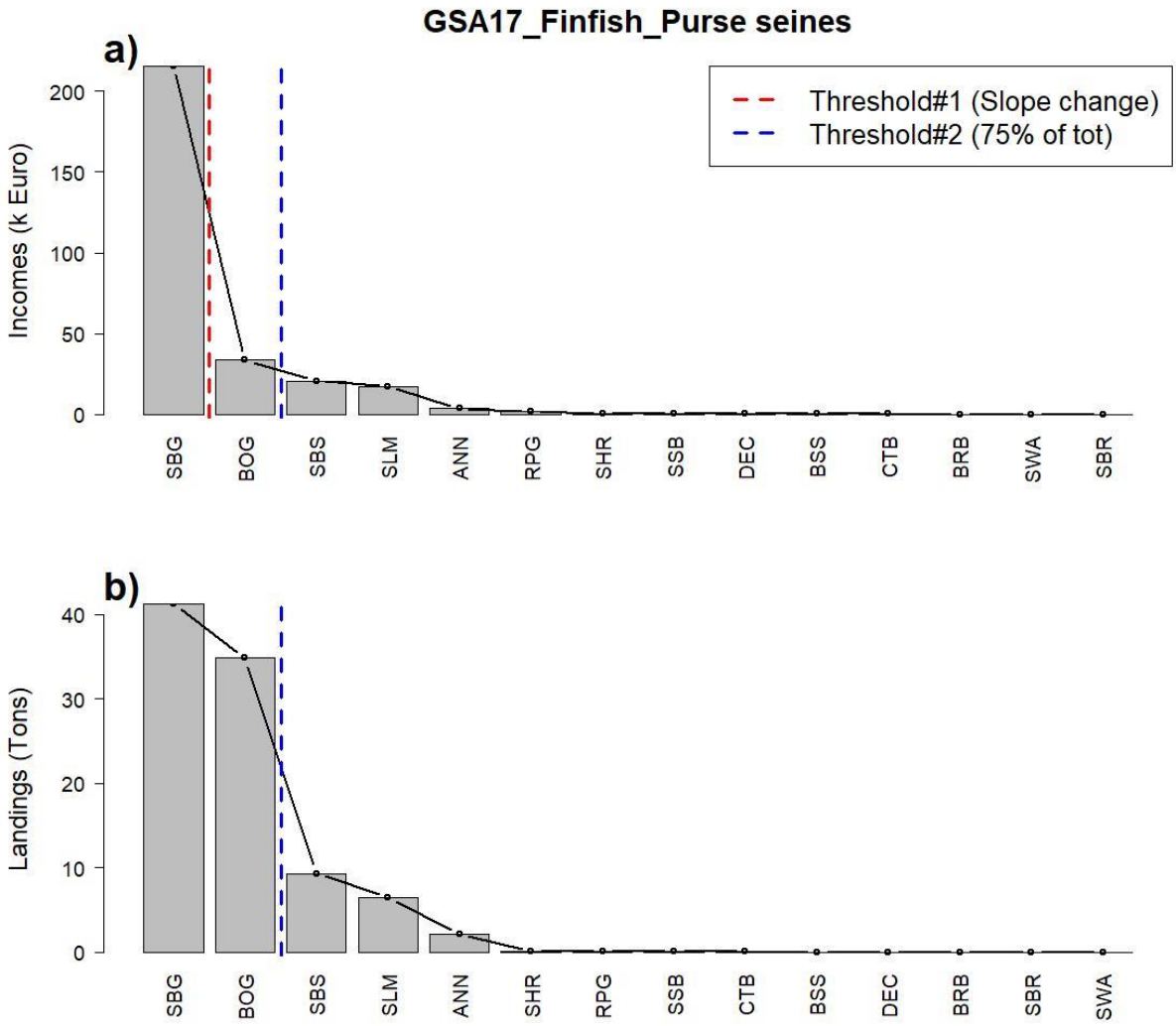

Fig. 3.4.11.: Landing value (a) and volume (b) of finfish fished by purse seines in the Croatian side of GSA17.

As regards finfish fished by set gillnets (anchored) the Gilthead seabream, Common dentex, Black scorpionfish, Salema are the most important species in terms of value of landings. The Gilthead seabream, Salema, Bogue and Saddled seabreamare the most important in terms of volume (fig. 3.4.12).

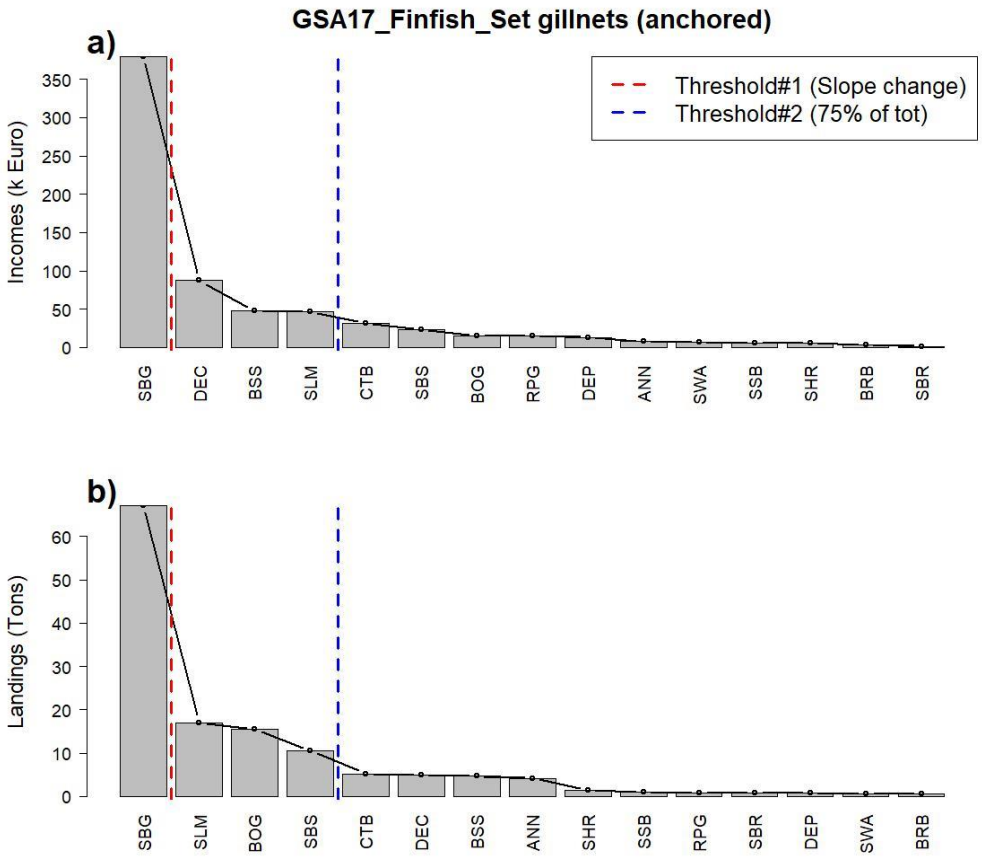

Fig. 3.4.12: Landing value (a) and volume (b) of finfish fished by set gillnets (anchored) in the Croatian side of GSA17.

As regards large pelagic fish fished by purse seines, the Greater amberjack and the Atlantic bonito are the most important species in terms of value of landings. In terms of volume the most important are: Greater amberjack, Little tunny (=Atl.blackskipj) and the Atlantic bonito (fig. 3.4.13.).

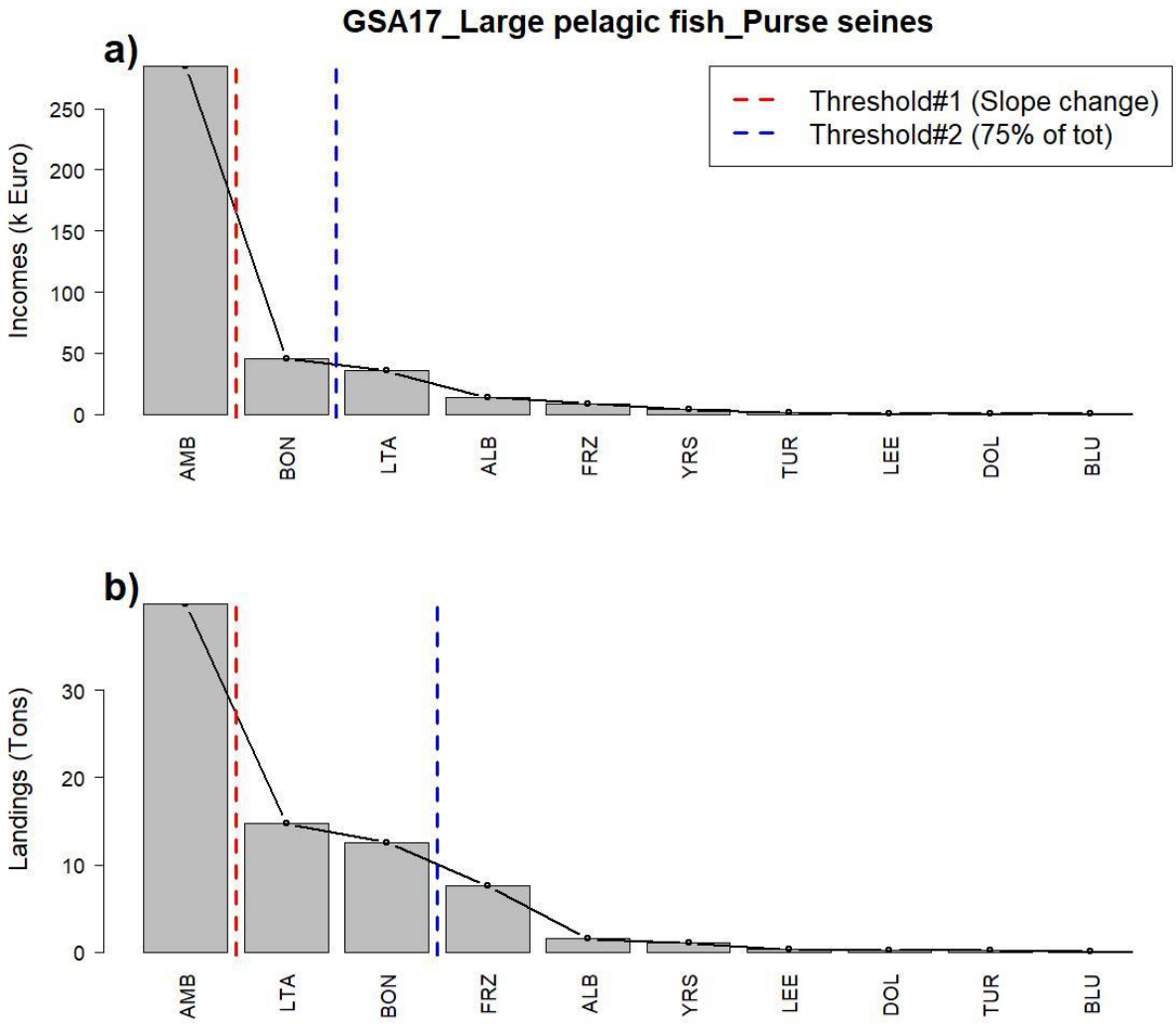

Fig. 3.4.13.:Landing value (a) and volume (b) of large pelagic fish fished by purse seines the Croatian side of GSA17.

In the framework of this activity, the fishery of blue fin tuna is very important in the Republic of Croatia with TAC of more than 660 tons. As Croatia is a bluefin tuna farming country, meaning that all bluefin tuna caught by purse seiners is transferred to cages for farming, and a large quantity of small pelagic fish landed on the landing sites is designated for tuna feeding. Since almost all BFT catch is intended for farming purposes it has very limited influence on the economics of PS fleet.

As regards molluscs fished by boat dredges, the European flat oyster and the Great Mediterranean Scallop are the most important species in terms of value of and volume landings (fig. 3.4.14.).

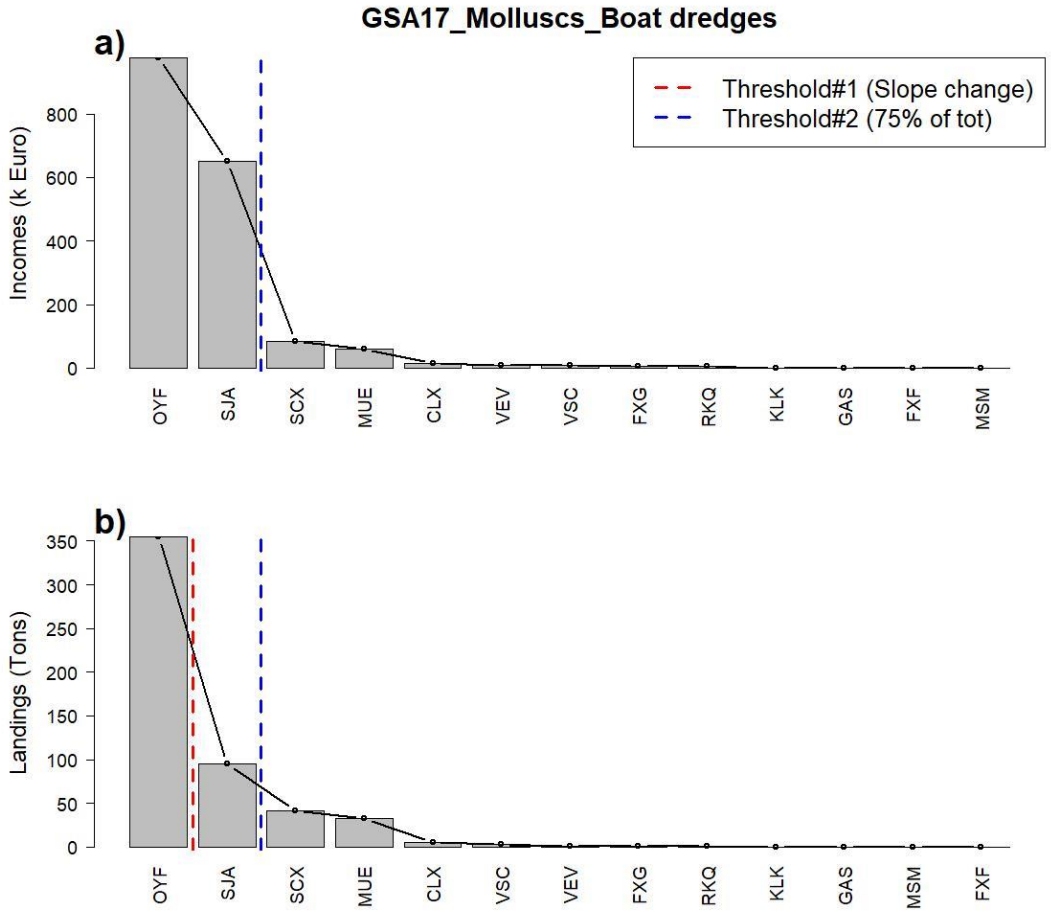

Fig. 3.4.13.: Landing value (a) and volume (b) of molluscs fished by boat dredges in the Croatian side of GSA17.

As regards small pelagic fish fished by purse seines, the European pilchard(=Sardine) and the European anchovy are the most important species in terms of both value and volume landings (fig. 3.4.14.).

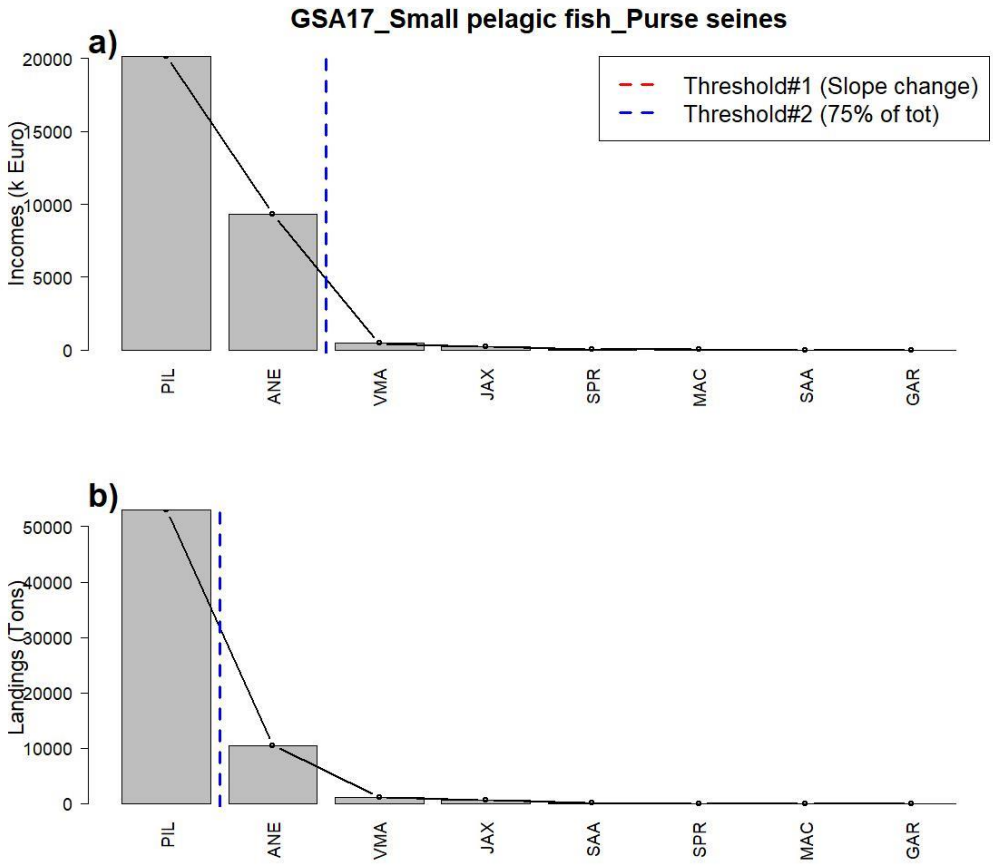

Fig. 3.4.14.: Landing value (a) and volume (b) of small pelagic fish fished by purse seines in the Croatian side of GSA17.

The large quantity of small pelagics intended for tuna feeding are declared with low prices in the sales notes. These low prices have a minimizing effect on the average price of small pelagic fish. For the purpose of tuna feeding, Croatia has a pronounced import of herring from other countries.

4. CONCLUSIONS

In the Croatian side of the Adriatic Sea (GSA17), the most important fisheries (as combination of species and gears) in terms of value are the following:

- European pilchard(=Sardine) fished by purse seines;
- European anchovy fished by purse seines;
- Norway lobster fished by bottom otter trawl;
- European hake fished by bottom otter trawl;
- Deep-water rose fished by shrimp bottom otter trawl;
- Red mullet fishe by bottom otter trawl;
- Common sole fished by trammel nets;
- Warty venus;
- Horned and musky octopuses fished by bottom otter trawl;
- European squid fished by bottom otter trawl.

The most important in terms of volume are:

- European pilchard(=Sardine) fished by purse seines;
- European anchovy fished by purse seines;
- Atlantic chub mackerel fished by purse seines;
- Red mullet fished by bottom otter trawl;
- European hake fished by bottom otter trawl;
- Jack and horse mackerels nei fished by purse seines;
- Deep-water rose shrimp fished by bottom otter trawl;
- Horned and musky octopuses fished by bottom otter trawl;
- European flat oyster fished by boat dredges;
- Norway lobster fished by bottom otter trawl.

Therefore, some of these fisheries, such as the European pilchard(=Sardine) fished by purse seines, the European anchovy fished by purse seines,the European hake by fished bottom otter trawl, the Deep-water rose fished by shrimp bottom otter trawl, are among the most important in both terms of value and volume of landings.

However, the first 20 fisheries in terms of value (Table 9) should be considered as potentially interested in applying for certification process, taking into account also the sustainability of the fishing techniques.

Table 9 - First 20 Fisheries in the Croatian side of the GSA 17 by value of landings

N°	Spp (3 alpha code)	Common name (English)	Fishing technique acronym	Fishing technique description	Mean value of landings 2015-2016 (K Euro)
1	PIL	European pilchard(=Sardine)	PS	Purse seines	20142.21
2	ANE	European anchovy	PS	Purse seines	9296.42
3	NEP	Norway lobster	OTB	Bottom otter trawl	2865.58
4	HKE	European hake	OTB	Bottom otter trawl	2312.87
5	DPS	Deep-water rose shrimp	OTB	Bottom otter trawl	1908.97
6	MUT	Red mullet	OTB	Bottom otter trawl	1768.60
7	SOL	Common sole	GTR	Trammel nets	1363.90
8	VEV	Warty venus	NK[4]	-	1055.12
9	OCM	Horned and musky octopuses	OTB	Bottom otter trawl	1043.37
10	SQR	European squid	OTB	Bottom otter trawl	980.31
11	OYF	European flat oyster	DRB	Boat dredges	976.83
12	SJA	Great Mediterranean scallop	DRB	Boat dredges	651.65
13	OCC	Common octopus	NK	-	543.55
14	JOD	John dory	OTB	Bottom otter trawl	509.74
15	VMA	Atlantic chub mackerel	PS	Bottom otter trawl	469.54
16	MNZ	Monkfishes nei	OTB	Bottom otter trawl	445.44
17	BFT	Atlantic bluefin tuna	LHP	Handlines and pole-lines (hand-operated)	433.90
18	NEP	Norway lobster	FPO	Pots	409.89

[4] NK, Not Known is allowed in case of confidentiality issues.

N°	Spp (3 alpha code)	Common name (English)	Fishing technique acronym	Fishing technique description	Mean value of landings 2015-2016 (K Euro)
19	**SOL**	Common sole	DRB	Boat dredges	407.20
20	**OCC**	Common octopus	FPO	Pots	395.51

Source: https://stecf.jrc.ec.europa.eu/data-dissemination

In addition, according to our expertise and considering the environmental impacts of gears, the following fisheries out of the top 20 in terms of value (as reported in Table 9) are potential source of eco-labelled products and, therefore, should be selected as "candidate sustainable fisheries" to start an Adriatic Responsible Fishery (ARF) certification process:

- Deep-water rose shrimp fished bybottom otter trawl;
- Common sole fished bytrammel nets;
- Atlantic bluefin tuna fished by Handlines and pole-lines (hand-operated);
- Norway lobster fished by pots;
- Common octopus fished by pots.

In view of their potential high value on the market, also the European pilchard(=Sardine) fished by purse seines and the European anchovy fished by purse seines can be included as "special cases", given that small pelagic species reproduce very quickly and the fishing technique is selective. The guidelines on how to reach sustainable standards (Deliverable 3.2.3: Sustainability guidelines) to be developed in the framework of Activity 3.2 in month 24 of the Project, will specify the conditions under which those two fisheries can apply to the Adriatic Responsible Fishery (ARF) certification process.

The provisionary list reported in Table 9, will be compared to that emerging from the *Activity 3.1:Analysis of state, management and seasonality of fisheries* carried out in the Italian side of the Adriatic Sea, provided under Deliverable 3.1.1 in month 10 of the Prizefish Project.

Based on this preliminary scrutiny, a final list of 10-20 fisheries will be developed taking into account, besides the potential market added-value of fisheries products and the characteristics of the fisheries sector in both sides of the Adriatic Sea, also the environmental impacts of the fisheries concerned as well as their social and economic dimension.

5. REFERENCES

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STECF, 2015. Scientific, Technical and Economic Committee for Fisheries (STECF) –Landing Obligation -Part 6 (Fisheries targeting demersal species in the Mediterranean Sea) (STECF15-19) 2015. Publications Office of the European Union, Luxembourg, EUR 27600 EN, JRC 98678, 268 pp.

6. Annex I– List of species fished in GSA 17

The table below (Table 10) reports species included in the mapping of GSA 17 by Spp. acronym (3 alpha code), scientific name, and common name (in English).

Spp. (FAO 3-alpha code)	Scientific name	Common name (English)
AGK	*Gymnothorax unicolor*	Brown moray
ALB	*Thunnus alalunga*	Albacore
ALV	*Alopias vulpinus*	Thresher
AMB	*Seriola dumerili*	Greater amberjack
ANE	*Engraulis encrasicolus*	European anchovy
ANK	*Lophius budegassa*	Blackbellied angler
ANN	*Diplodus annularis*	Annular seabream
ARA	*Aristeus antennatus*	Blue and red shrimp
ARG	*Argentina spp*	Argentines
ARS	*Aristaeomorpha foliacea*	Giant red shrimp
BBS	*Scorpaena porcus*	Black scorpionfish
BFT	*Thunnus thynnus*	Atlantic bluefin tuna
BIL	*Istiophoridae*	Marlins,sailfishes,etc. nei
BLL	*Scophthalmus rhombus*	Brill
BLU	*Pomatomus saltatrix*	Bluefish
BOG	*Boops boops*	Bogue
BON	*Sarda sarda*	Atlantic bonito
BOY	*Bolinus brandaris*	Purple dye murex
BPI	*Spicara maena*	Blotched picarel
BRB	*Spondyliosoma cantharus*	Black seabream
BRF	*Helicolenus dactylopterus*	Blackbelly rosefish
BSH	*Prionace glauca*	Blue shark
BSS	*Dicentrarchus labrax*	European seabass
BSX	*Serranidae*	Groupers, seabasses nei
CBC	*Cepola macrophthalma*	Red bandfish
CBM	*Sciaena umbra*	Brown meagre
CIL	*Citharus linguatula*	Spotted flounder
CLV	*Veneridae*	Venus clams nei
COB	*Umbrina cirrosa*	Shi drum

COE	*Conger conger*	European conger
COZ	*Cardiidae*	Cockles nei
CRA	*Brachyura*	Marine crabs nei
CRU	*Crustacea*	Marine crustaceans nei
CSH	*Crangon crangon*	Common shrimp
CTB	*Diplodus vulgaris*	Common two-banded seabream
CTC	*Sepia officinalis*	Common cuttlefish
CTL	*Sepiidae, Sepiolidae*	Cuttlefish, bobtail squids nei
CTZ	*Chelidonichthys lastoviza*	Streaked gurnard
CVW	*Chlorophthalmus agassizi*	Shortnose greeneye
DEC	*Dentex dentex*	Common dentex
DGZ	*Squalus spp*	Dogfishes nei
DOL	*Coryphaena hippurus*	Common dolphinfish
DON	*Donax spp*	Donax clams
DPS	*Parapenaeus longirostris*	Deep-water rose shrimp
EDT	*Eledone moschata*	Musky octopus
EHI	*Centracanthus cirrus*	Curled picarel
ELE	*Anguilla anguilla*	European eel
EOI	*Eledone cirrhosa*	Horned octopus
EZS	*Scorpaena elongata*	Slender rockfish
FIM	*Aphia minuta*	Transparent goby
FLE	*Platichthys flesus*	European flounder
FOR	*Phycis phycis*	Forkbeard
FRZ	*Auxis thazard, A. rochei*	Frigate and bullet tunas
GAR	*Belone belone*	Garfish
GAS	*Gastropoda*	Gastropods nei
GAU	*Galeus spp*	Crest-tail catsharks nei
GFB	*Phycis blennoides*	Greater forkbeard
GPA	*Gobiidae*	Gobies nei
GPD	*Epinephelus marginatus*	Dusky grouper
GUG	*Eutrigla gurnardus*	Grey gurnard
GUM	*Chelidonichthys obscurus*	Longfin gurnard
GUN	*Trigla lyra*	Piper gurnard
GUR	*Aspitrigla cuculus*	Red gurnard
GUU	*Chelidonichthys lucerna*	Tub gurnard
HKE	*Merluccius merluccius*	European hake

HMM	*Trachurus mediterraneus*	Mediterranean horse mackerel
HOM	*Trachurus trachurus*	Atlantic horse mackerel
HXT	*Heptranchias perlo*	Sharpnose sevengill shark
JAA	*Trachurus picturatus*	Blue jack mackerel
JAI	*Raja miraletus*	Brown ray
JOD	*Zeus faber*	John dory
JRS	*Raja asterias*	Mediterranean starry ray
KLK	*Callista chione*	Smooth callista
LBE	*Homarus gammarus*	European lobster
LEE	*Lichia amia*	Leerfish
LTA	*Euthynnus alletteratus*	Little tunny(=Atl.black skipj)
LZS	*Liza saliens*	Leaping mullet
MAC	*Scomber scombrus*	Atlantic mackerel
MAS	*Scomber japonicus*	Chub mackerel
MGA	*Liza aurata*	Golden grey mullet
MGC	*Liza ramada*	Thinlip grey mullet
MMH	*Muraena helena*	Mediterranean moray
MOL	*Mollusca*	Marine molluscs nei
MON	*Lophius piscatorius*	Angler(=Monk)
MPT	*Mustelus punctulatus*	Blackspotted smooth-hound
MSF	*Arnoglossus laterna*	Mediterranean scaldfish
MTS	*Squilla mantis*	Spottail mantis squillid
MUE	*Murex spp*	Murex
MUF	*Mugil cephalus*	Flathead grey mullet
MUL	*Mugilidae*	Mullets nei
MUR	*Mullus surmuletus*	Surmullet
MUT	*Mullus barbatus*	Red mullet
MZZ	*Osteichthyes*	Marine fishes nei
NAU	*Naucrates ductor*	Pilotfish
NEP	*Nephrops norvegicus*	Norway lobster
NSQ	*Nassarius mutabilis*	Changeable nassa
OCC	*Octopus vulgaris*	Common octopus
OUW	*Alloteuthis spp*	Alloteuthis squids nei
PAC	*Pagellus erythrinus*	Common pandora
PIL	*Sardina pilchardus*	European pilchard(=Sardine)

POA	*Brama brama*	Atlantic pomfret
POD	*Trisopterus minutus*	Poor cod
POP	*Trachinotus ovatus*	Pompano
POR	*Lamna nasus*	Porbeagle
PRA	*Pandalus borealis*	Northern prawn
RAE	*Solen marginatus*	European razor clam
RJA	*Raja alba*	White skate
RJC	*Raja clavata*	Thornback ray
RJM	*Raja montagui*	Spotted ray
RPG	*Pagrus pagrus*	Red porgy
RSE	*Scorpaena scrofa*	Red scorpionfish
SAA	*Sardinella aurita*	Round sardinella
SAN	*Ammodytes spp*	Sandeels(=Sandlances) nei
SAU	*Scomberesox saurus*	Atlantic saury
SBA	*Pagellus acarne*	Axillary seabream
SBG	*Sparus aurata*	Gilthead seabream
SBL	*Hexanchus griseus*	Bluntnose sixgill shark
SBR	*Pagellus bogaraveo*	Blackspot(=red) seabream
SBS	*Oblada melanura*	Saddled seabream
SCF	*Scophthalmidae*	Turbots nei
SCO	*Scorpaenidae*	Scorpionfishes nei
SCR	*Maja squinado*	Spinous spider crab
SCX	*Pectinidae*	Scallops nei
SDS	*Mustelus asterias*	Starry smooth-hound
SFS	*Lepidopus caudatus*	Silver scabbardfish
SHR	*Diplodus puntazzo*	Sharpsnout seabream
SIL	*Atherinidae*	Silversides(=Sand smelts) nei
SJA	*Pecten jacobaeus*	Great Mediterranean scallop
SKA	*Raja spp*	Raja rays nei
SKJ	*Katsuwonus pelamis*	Skipjack tuna
SKX	*Elasmobranchii*	Sharks, rays, skates, ect.
SLM	*Sarpa salpa*	Salema
SLO	*Palinurus elephas*	Common spiny lobster
SMD	*Mustelus mustelus*	Smooth-hound
SNQ	*Scorpaena notata*	Small red scorpionfish
SOL	*Solea solea*	Common sole

Source:

SOX	*Soleidae*	Soles nei
SPC	*Spicara smaris*	Picarel
SPN	*Sphyrna spp*	Hammerhead sharks nei
SPR	*Sprattus sprattus*	European sprat
SQC	*Loligo spp*	Common squids nei
SQE	*Todarodes sagittatus*	European flying squid
SQM	*Illex coindetii*	Broadtail shortfin squid
SQR	*Loligo vulgaris*	European squid
SRG	*Diplodus spp*	Sargo breams nei
SRX	*Rajiformes*	Rays, stingrays, mantas nei
SSB	*Lithognathus mormyrus*	Sand steenbras
STT	*Dasyatidae*	Stingrays, butterfly rays nei
SVE	*Chamelea gallina*	Striped venus
SWA	*Diplodus sargus*	White seabream
SWO	*Xiphias gladius*	Swordfish
SYC	*Scyliorhinus canicula*	Small-spotted catshark
SYT	*Scyliorhinus stellaris*	Nursehound
TDQ	*Todaropsis eblanae*	Lesser flying squid
TGS	*Penaeus kerathurus*	Caramote prawn
TRA	*Trachinidae*	Weeverfishes nei
TUR	*Psetta maxima*	Turbot
UUC	*Uranoscopus scaber*	Stargazer
VMA	*Scomber colias*	Atlantic chub mackerel
WHB	*Micromesistius poutassou*	Blue whiting(=Poutassou)
WHG	*Merlangius merlangus*	Whiting
WRA	*Labridae*	Wrasses, hogfishes, etc. nei
XKX	*Plesionika spp*	Plesionika shrimps nei
XYN	*Xyrichtys novacula*	Pearly razorfish
YRS	*Sphyraena sphyraena*	European barracuda

https://stecf.jrc.ec.europa.eu/data-dissemination

7. Annex II– Mapping results in Excel Table

The overall results of the mapping of fisheries in the Croatian side of the Adriatic Sea, detailed in Section 3 of the Report, are available in excel format at the following hypertext link:

DELIV 3_1_2_ prizefish_project.xlsx

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