

## FAIRSEA (ID 10046951)

### “Fisheries in the Adriatic Region - a Shared Ecosystem Approach”

## D.5.2.1 Scenarios of application of local management measures

<b>Work Package:</b>	WP5 “Decision support system for the development of sustainable fisheries in Adriatic”. Activity: 5.2 “ Pilot actions: identification of conflicts and possible solutions”
<b>Type of Document</b>	The Deliverable is a disclosure document presenting the results in terms of potential impacts (ecological, economic and social) at the local scale and in the medium/short terms.
<b>Use</b>	public
<b>Responsible PP</b>	PP02-MSP in cooperation with LP-OGS, PP04-ASSAM, PP09-VEGAL, PP05-COISPA
<b>Authors</b>	Francesca Perretta, Uriano Meconi (PP04-ASSAM); Danijela Miokovic (PP-02 MPS), Nedo Vrgoc, Igor Isajlovic (PP1-IOF), Svjetlana Krstulović Šifner (PP10-UNIST), Cinzia Gozzo, Andrea Pio Di Leo, Paolo Valeri (PP09-VEGAL), Maria Teresa Spedicato, Pino Lembo (PP05-COISPA), Simone Libralato (LP-OGS). External Support: Alberto Caccin
<b>Version and date</b>	Version 2, 31.08.2021

## Deliverable D.5.2.1

# Report on the resulting scenarios of application of local management measures

### **FAIRSEA – Fisheries in the Adriatic Region – a shared Ecosystem Approach**

FAIRSEA is financed by Interreg V-A IT-HR CBC Programme (Priority Axis 1 – Blue innovation)

*Start date: 01 January 2019*

*End date: 31 August 2021*

## TABLE OF CONTENTS

The FAIRSEA project.....	3
FAIRSEA: decision support system for the development of sustainable fisheries in Adriatic .....	5
The FAIRSEA pilot actions at local level: identification of conflicts and possible solutions .....	6
Target groups .....	7
The three pilot actions of FAIRSEA .....	7
Pilot 1: Fishing common sole with trammel net in Istria County.....	9
Pilot area description .....	9
Main fishery and target species .....	10
Key stakeholders .....	12
Pilot actions description.....	12
Scenarios tested and results .....	13
Technical and policy recommendations .....	14
Pilot 2: Recreational, small scale and clam fishery in the Veneto Region .....	15
Pilot area description .....	15
Main fishery and target species.....	17
Key stakeholders .....	24
Pilot actions description.....	24
Pilot actions results .....	27
Technical and policy recommendations .....	34
References .....	34
Pilot 3: Fishing common sole with rapido trawl in Marche Region .....	35
Pilot area description .....	35
Main fishery and target species.....	39
Key stakeholders .....	44
Pilot actions description.....	45
Disclaimer .....	48

## The FAIRSEA project

FAIRSEA is a European Territory Cooperation project, financed under the priority 1 “Blue innovation”, Specific Objective 1.1 “Enhance the framework conditions for innovation in the relevant sectors of the blue economy within the cooperation area” of the INTERREG VA Italy –Croatia Programme 2014-2020 (<https://www.italy-croatia.eu/>).

The project focuses on the fisheries sector - key driver for the blue growth of the Adriatic communities – towards a sustainable co-management of resources and marine ecosystem protection. Given the transboundary nature of marine resources, cross-border cooperation and a shared “Vision” are essential to properly tackle and address the different socio-economic and environmental challenges related to fisheries activities management.

In this context, FAIRSEA aims at enhancing transnational capacity and cooperation in the field of an ecosystem approach to fisheries in the Adriatic region by exchanging knowledge and sharing good practices between regional and transnational key actors.

Coordinated by the OGS of Trieste (IT), the project involves a consortium of 12 strategic and operational partners from Italy and Croatia that will make to best use of their complementary expertise to address and support the application of the ecosystem approach to fisheries, ensuring a strong and interactive engagement of institutional, technical and socio-economic stakeholder in project activities.

### THE FAIRSEA PARTNERSHIP



By merging partners' competences and stakeholder feedbacks, the project is expected to firstly deliver a strategic and operational Roadmap for EAF application in Adriatic to be further translated into technical and institutional recommendations and shared operational tool for EAF management. The project core activity is in fact the development of an integrated platform that will serve as spatially explicit dynamic tool to support the shift from a conventional management of fisheries towards an integrated management of this sector. In this context, the FAIRSEA platform is particularly innovative and extremely useful since it integrates in a unique tool the cornerstone elements for an ecosystem approach to fisheries: water masses circulation and connectivity (module HYDRO), biogeochemical planktonic processes (BGC), distribution of resources (BSTAT), catch and fleet statistics (FSTAT), effort distribution (EFFORT), bio economic responses (BIOECO) and food web dynamics (FWM). The shared integrated platform will be concretely used as planning tool into demonstrative testing of applicable fisheries policies both at local (subareas) and whole Adriatic scales. It will help policy makers in decision-making based on solid scientific shared evidence that comes from a range of marine disciplines integrated across boundaries.



## FAIRSEA: decision support system for the development of sustainable fisheries in Adriatic

Among its activities, FAIRSEA foresees a set of actions (Under the “WP/Working Package” 5) dedicated to the full development of a participatory process for the definition of management scenarios shaped accounting for the integrated multiple processes embedded in the tool developed within the project. This in the aim of enhancing collaborative and participated definition of management pathways/actions through professional facilitation techniques and the involvement of a range of key stakeholders, particularly fishermen and NGOs, organised in a multi-stakeholder platform, and representatives from all partners.

The Working Package (WP) includes the following activities:

- The international stakeholders’ events aimed at detecting the stakeholder point of view and preferences on alternative management scenarios modelled by the FAIRSEA integrated tool as well as at engaging the key actors of the fisheries sector under participatory approaches.
- The implementation of management actions at local and Adriatic basin level in the integrated decision support tool will result in applicative pilot actions demonstrative of operative use and potential insights that can be gained from the shared integrated approach.

The main output of this WP is to share knowledge, benefits and challenges on an ecosystem approach to fisheries including the definition of common standards and practices using a participatory approach. This WP assists to design management strategies at different time and spatial scales and with different tactics, pathways and objectives in an EAF context. The Working Package intends also to contribute in focusing objectives, ranking decisions, providing criteria for selecting management alternatives and certification opportunities more suitable for the Adriatic region, considering the ecological, economic and social pillars of the fishery sustainability.

The WP is coordinated by MEDAC (Advisory Council for the Mediterranean) in close cooperation with institutional and technical organizations from the partnership according to their mission and competences.

## The FAIRSEA pilot actions at local level: identification of conflicts and possible solutions

The FAIRSEA project Activity 5.2 is devoted to the pilot actions implementation at sub-areas level. Pilot actions are demonstrative case studies to show the potential effects, both at local and on a wider spatial scale, induced by management actions. The pilot actions regard the scenarios of local management actions in the integrated decision support tool developed, this in the following pilot areas of the Adriatic basin:

1. Istra County
2. Eastern Veneto
3. Marche region

The FAIRSEA case studies intend to explore, **through a simulation approach**, which are the more suitable pathways to achieve sustainability objectives for ecological, economic and social fisheries components.

The pilot actions provide feedback and advice on the ecological, economic and social impacts at local and at a wider scale in the medium/short terms. To these, a close interaction among all the project's actors and **local stakeholders** have been foreseen also to design the pilot actions and discuss the resulting potential impact, through professional facilitation techniques.

The pilot actions tested at local level were, in fact, jointly defined with local fisheries stakeholder by means of technical meeting arranged in Veneto, Marche and Istra and considering also the status quo of resources and the functionalities of the modelling tools used within the project. Consultation events were periodically arranged by the FAIRSEA partners so to:

- show the potential direct and indirect effects, both at local and on a wider spatial scale, induced by the implementation of each management plan
- ensure the institutional and socio-economic stakeholder involvement and a “feedback” mechanism

At project level, the activity is coordinated by the Ministry of Agriculture of the Republic of Croatia with the high contribution and involvement of local partners (PP9-Vegal for Veneto Region, PP4-ASSAM for Marche Region, PP02-MSP for Istra County) and project's scientific bodies (LP-OGS, PP05-COISPA, PP01-IOF, PP3-CNR-IRBIM) and external expertise appointed for the purpose.

The approach use is the following:

- a) the local partners develop the framework of interest, conceptualize the issue under study and pose the issue in for of question;

- b) the scientific partners and the local partners were both involved in collaborating with in collecting information and data useful to set the basis;
- c) the scientific partners implement quantitative models to answer to the issues posed in the pilot study. The analysis is presented as a scenario analysis to answer to the question.

**Target groups**

The target group of the FAIRSEA pilot actions at local level is:

- National, regional and local authorities dealing with fisheries, environmental and coastal management policies
- Fisheries sector SME and fishermen
- Fisheries sector Association
- Labour Market Associations
- NGOs

**The three pilot actions of FAIRSEA**

The following pilot actions were implemented in the period 2019-2021 in the local subareas of Veneto, Marche and Istra.

<b>Pilot Area/Case study</b>	<b>Pilot Action topic</b>	<b>Short description</b>
PILOT STUDY 1  Istra County  (HR)	Fishing common sole with trammel net in Istra County	<p>The pilot action for Istra intends to evaluate the effects of introduction of a modified net for the trammel fishers with social ecological and economic implications.</p> <p>Common sole is an important target species for the trammel net fisheries of Istra region. The status of the resource is improving and the technical measures adopted might improve not only the status of the resource at the scale of the North Adriatic but might also represent an economic benefit for the fishers because of the higher price of large specimens eventually sold.</p>



<p>PILOT STUDY 2</p> <p>Eastern Veneto (IT)</p>	<p>Recreational, small scale and clam fishery in the Veneto Region</p>	<p>The pilot action for the Veneto region concern the interactions between clam fishery and small scale fisheries in particular, with the increasing presence of Recreational fisheries.</p> <p>Recreational fishers, in fact, is perceived as competing with the professional activities for resources, and sometimes for space. There is also evidence of increasing number of sport fishing thus local stakeholders recognize this area important where to shed quantitative light.</p>
<p>PILOT STUDY 3</p> <p>Marche Region (IT)</p>	<p>Fishing common sole with rapido trawl in Marche Region</p>	<p>The pilot actions in Marche Region focuses on management scenarios targeting Common sole and Rapido trawl fleet.</p> <p>Common sole is, in fact, one of the most important commercial species since it is highly valued by consumers. Moreover, nursery areas of this species are located along the coastal zone of Marche Region. Simulations using bio-economic model – BIOECO (developed by COISPA) to evaluate the impacts of potential management actions at the local basin scale, in the short and medium terms, considering spatial and temporal closures.</p>

## Pilot 1: Fishing common sole with trammel net in Istria County

### Pilot area description

The Istrian waters are divided into the western Istrian coast, which is low and rocky, and the eastern coast, which is steeper and deeper. The length of the west coast is about 400 km including the islands, while the east coast is about 100 km long with a steeper coast and deeper waters.

The Croatian part of the western coast of Istria stretches from the mouth of the Dragonja river to Cape Kamenjak. It is a shallow, rocky shoreline that extends in the NNW-SSE direction for approximately 50 Nm. Along this slightly indented coast, several deep bays stand out: the Dragonja estuary or Piran Bay, the Mirna estuary (also known as Tarska vala) and the Lim Channel. In the southern part of the Istrian peninsula are the Pula, Veruda, Vinkuran and Banjole bays. North of Tar Bay, the coast is shallow, with a slight slope towards the open sea, without islands and underwater cliffs. In the middle part of the coast, it is more indented, and south of Poreč, near Funtana and Vrsar, the first groups of islands appear. In the lower indented part, south of the Lim Channel, the Rovinj group of about twenty islands and cliffs stands out, and in the extreme south is the Brijuni archipelago with Veli and Mali Brijun and smaller islands and reefs. The greatest average depths are 30-35 m. In the southernmost part, next to the prominent cape Kamenjak / Premantura, we find the vast Medulin or Pomer bay with a large number of islands and cliffs.

The Kvarner Bay, on the east side, is the largest bay in the northern Adriatic, closed by the steep shores of the island of Cres. To the north, it connects with the Gulf of Rijeka via the Great Gate. The Istrian part of Kvarner stretches from Punta Marlera to the Great Gate. Not far from the coastal edge, the medium depths are much steeper and descend to 70 m. The eastern coast of Istria is without islands, except in the extreme southern part, near the town of Medulin. On the eastern coast of the Istrian peninsula, there are a few deep estuaries: Raša bay, the Plomin Bay and the bays Krnica, Budava, Kuje and Ližnjan.

Both along the western and along the Kvarner side, the supralittoral and mediolittoral steps of the Istrian coasts are basically rocky.

The area of the western coast of Istria is characterized by a biocenosis of sandy-detrital, mostly silty bottom, with little transparency. Along the coast of Istria there are some economically significant species of fish and other marine organisms, which are rarer or not found at all in other parts of the Croatian sea. In this part of the Adriatic, boreal species are

found, such as flounder, *Platichthys flesus* and whiting, *Meralangius merlangus*, and two other species of boreal character: sardine, *Sardina pilchardus* and sprat, *Sprattus sprattus*. Some species of the genus *Solea*, (*S. solea*, *S. kleini*, *S. lascaris*) are also more common than in other parts of the Adriatic, which makes them particularly important from a commercial point of view.

The area of detrital, more or less silted bottoms in the northern Adriatic is rich in other species, such as the red mullet, *Mullus barbatus*, common pandora, *Pagellus erythrinus* and the hake, *Merluccius merluccius*. This area is also known for significant amounts of cephalopods such as cuttlefish, *Sepia officinalis* and *Eledone moschata*, the musky octopus.

The European spider crab, *Maja squinado* is a commercially important species, together with European lobster, *Homarus gammarus*, and mantis shrimp *Squilla mantis* has always been the best hunting ground.

Of the mussels, the most commercially important species is certainly the Mediterranean scallop, *Pecten jacobaeus*, which is caught only in this area of the Adriatic in large quantities with dredges (rampon).

The eastern coastal area of Istria is characterized by fine-grained terrigenous silt, while along the coastal edges of the seabed we find solid rocks or coarse-grained sediments. Organic production in this area, the Gulf of Rijeka and Kvarner, is lower than on the west coast of Istria. The most economically important species of demersal fish are hake, *Merluccius merluccius*, red mullet, common pandora and monkfish, *Lophius piscatorius*. This area is known as the spawning ground for sardine and anchovy, *Engraulis encrasicolus*. One of the most valuable species found here is a crustacean, Norway lobster, *Nephrops norvegicus*. The most important cephalopods are squid, *Loligo vulgaris* and *Illex sp.*

The pilot area is situated on the western coast of the Istrian peninsula, where a proposal from local fishermen for the increase in mesh size of trammel nets for catching sole (*Solea sp.*) was accepted as an interesting problem that could be analysed with the modelling tool developed by the project FAIRSEA.

#### Main fishery and target species

There are around 700 commercial fishing vessels registered in the Istrian county. However, the fishing vessels from other Croatian counties can often be found fishing around the Istrian peninsula, especially purse-seine fishers targeting small pelagic fish. More than 80% of fishing vessels registered in the Istrian county are under 12 meters of length. Only 13 vessels

are larger than 24 meters, 4 vessels are 18 to 24 meters long, and 103 vessels are 12 to 18 meters long.

There are 21 registered landing ports in the county, that are mandatory for all catches made by bottom trawls, purse-seiners and dredges. Catches made by other gear may be landed anywhere, usually in the port where the vessel is moored.

In the Istrian county there are 111 authorised bottom trawlers and 21 authorised purse-seiners. Most of the other vessels are only using passive gear.

Regarding landing volume, small pelagic fish is the most important. Around 15.000 tons are landed in the Istrian county each year, but as was previously mentioned, vessels from other Croatian counties contribute to this amount. Other catches include white fish (500 tonnes), cephalopods (250-350 tonnes), shellfish (90-150 tonnes) and sharks and rays (87 tonnes).

Largest landing ports are Rovinj, Pula, Plomin and Vrsar.

The most important fleet segment are purse seiners targeting small pelagic fish. The catch is processed in 3 plants in Istrian county or transported by truck to other counties. Part of the catch goes immediately to export.

The next fleet segment that is significant are the bottom trawlers and dredges. The catch along the western coast is dominated by mussels, squid, whiting, mullet and sole. Fishing activities are of a highly seasonal type, with varying total and catch composition. The highest values of catches are realized in the autumn period, when red mullet is most abundant. In the winter months, catches are reduced due to bad weather and a small number of fishing days. The increase in catches in the spring is due to catches of hake, mussels and shrimp. This is followed by a decline in catches and fishing activities in the summer.

Trammel nets are mostly used for catching cuttlefish, sole, gilthead sea bream and mullet.

## Key stakeholders

<b>Local, regional and national public authorities</b>	Croatian Ministry of Agriculture, Local Port Authority, Istrian county representatives, NP Brijuni
<b>Regional and local development agencies, chambers of commerce and other business support organisations</b>	Croatian chamber of trade, craft and economy, Croatian chamber of commerce
<b>SMEs</b>	Fishermen association Istra, individual fishermen from Istria county
<b>Universities, technology transfer institutions, research institutions</b>	University of Pula, Center for marine research Rovinj

## Pilot actions description

The participants attending the stakeholder meetings in Poreč on 24th of July 2019 were interviewed and ideas and suggestions regarding local management actions were noted.

These suggestions were further discussed with PP on the technical meeting in Split and on Skype meeting held on 20th of November, as well as in personal communication within PP.

The management action chosen for pilot action in Istria County is a proposal for the increase in mesh size of trammel nets for catching sole (*Solea sp.*) and the resulting effects on stock and on marketing price, as well as economic consequences for fishermen.

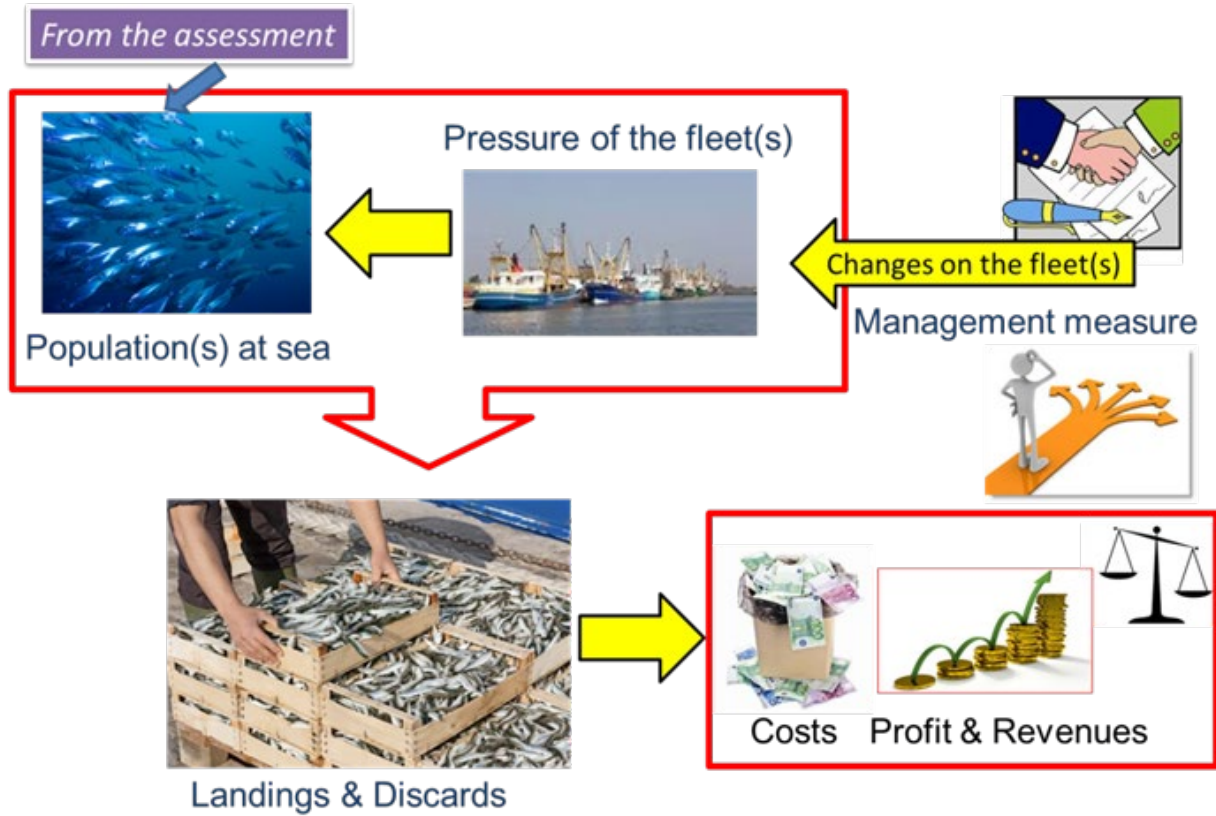
The testing of these nets has already started with the project ARIEL – this was accepted as an innovation idea. Selectivity data was gathered by scientists from IOF.

Trammel nets for catching sole are made from 3 layers of netting with a slack small mesh inner netting between two layers of large mesh netting within which fish will entangle.

The minimum mesh size for the inner net is 40mm, and the proposal is to increase the mesh size to 42mm

The data was collected for the INTERREG project Ariel (ARIEL overall objective is to promote technological and non-technological solutions for innovation up take of small-scale fishery and aquaculture in Adriatic-Ionian basin), during the period from June 2018 to December 2019, in the fishing area A1 (around Savudrija-Salvore and Umag-Umag).

The catches and discards by 15 fishermen were analysed in detail, with two mesh sizes used.



### Scenarios tested and results

Simulations of the Pilot action were done using bio-economic model – BIOECO (developed by COISPA) to evaluate the impacts of potential management actions at the local basin scale, in the short and medium terms, considering spatial and temporal closures and the effects on common sole. Currently the stock is in overexploitation ( $F_{curr}/F_{msy}=1.15$ ) with relatively low biomass and the need to preserve the reproductive potential.

Scenarios tested were:

- Increase length at first capture(2cm) due to increase of the mesh size for DNF (trammel nets) for the Northern Croatia;

- Increase length at first capture(2cm) due to increase of the mesh size for DNF (trammel nets) for the entire DNF Croatian fleet;
- Combined scenario of increase of mesh net for trammel net, improved selectivity for TBB to the other Italian Regions and to DTS, including a fishing ban of 1 month (November) for Italian SSF.

Results showed that the Pilot action proposed would have positive effects (although minimal) on the SSB of the *Solea solea* even if the application is for the local Istra area.

#### Technical and policy recommendations

Extending best practices of Istria small scale improvement on selectivity to the western Adriatic fleets adopting a fishing ban of 1 month in winter time would not negatively affect the fleet performance and will improve the exploitation pattern.

## Pilot 2: Recreational, small scale and clam fishery in the Veneto Region

### Pilot area description

The pilot area coincides with the area covered by the VeGAC PoA (Venetian FLAG), and it includes the municipalities bordering the Maritime Compartment of Venice, with a surface area of approximately 783.5 km<sup>2</sup> (equal to 4.3% of the regional territory) and a coastline of approximately 83 km (over 55% of the length of the Veneto coastline).

The whole area concerned represents a homogeneous profile from a geographical point of view, with coastal areas, transitional environments, river areas and worked agricultural land. In this context there are representative cities from a historical, economic and tourist point of view, such as Venice, Jesolo, Caorle, Bibione, Cavallino-Treporti and Eraclea.

From a geographical point of view, the set of municipalities involved represents a coastal continuum, homogeneous from an institutional point of view (all municipalities belong to the metropolitan city of Venice), characterised by a more or less deep coastline with many environmental emergencies and protected and valuable natural areas, in correspondence with river mouths or maritime/ lagoon inlets.

From the point of view of socio-economic characteristics, the territories of the Venetian coastal strip present similar features, as they have developed, especially in the last 30-40 years, a relevant seaside tourism system characterised by more than 30 million tourist presences per year, very much linked to the proximity of the historical city of Venice, which is a point of attraction for the whole territory. From a relational point of view, the fishing world has always remained in the background compared to other economies, but it is slowly trying to find a relevant and solid position in order to be co-leader in strategic choices, especially in the field of works interfering with fishing, also thanks to the launch - starting from the 2007-13 EFF programming - of a Coastal Action Group coordinated at territorial level with the Local Action Group.

The natural areas of particular value, such as the lagoon areas (lagoon of Venice and Caorle), which have been historically used for fishing and aquaculture activities, are integrated from a socio-economic and management point of view with the activities carried out in the marine environment: many fishing enterprises of the main Venetian marines operate both in the sea and in the lagoons, managing to find those income integrations which contribute to balance



the fishing effort among the different areas and favouring the sustainability of the fish resource.

The separation between the lagoons and the mainland is marked in many cases by the presence of 27 fishing valleys (22 around the Venice lagoon and 5 between Caorle and Bibione), natural areas of great ecological value and with a significant historical, cultural and social importance. Until a few decades ago the valleys were the pride and joy of Venetian aquaculture, guaranteeing a product of excellent quality and supporting a system that grouped together the profession of fishmonger, operators specialised in collecting fry for extensive farming in fishing valleys.

All the fishing systems of the Venetian area, with more than 270 vessels authorised to fish at sea and the vessels used in the long-line systems, together with those operating in the transitional and inland environments, with about 9,000 t/year of product passing through the Fish Markets, more than 1.500 t/year guaranteed by the hydraulic dredges, about 1.5 t/year of mussels and clams and about 300 t/year of valley products, represent a significant production potential with a historical, cultural and social heritage deeply rooted in the territory that must be preserved and developed in an eco-sustainable way and integrated with the other territorial economies. In the area there are two fish markets (Venice and Caorle), with the first one managing about 50 million euros of turnover and being one of the main ones in Italy; in the commercial chain there are also two important producer organisations, O.P. Bivalvia Veneto and O.P. Fasolari.

The coastal artisanal fishing characterizes the maritime compartment with about 125 boats, the hydraulic dredges for the fishing of bivalve molluscs are 86 units, representing the close coastal fishing (within 6 miles). The compartment is characterised by 19 mussel farms, most of them located south of the city of Venice, between Lido and Pellestrina, with an important lack in the northern coastal stretches.

The port infrastructures are diffuse; the fishing port of Caorle represents a peculiarity at regional level since it is inside the historical centre of the town; in the Venetian islands of Burano and Pellestrina fishing boats coexist with those related to other functions, but they characterise the landscape and the culture of the places. In the municipality of Cavallino-Treporti a new port infrastructure dedicated exclusively to professional fishing is under construction, which represents one of the emerging facts for the fishing economy of the area.

## Main fishery and target species

### *Overview of Veneto fishing fleet<sup>1</sup>*

Based on the latest statistical data from the EU Fleet Register, there's evidence of a sharp decline in the number of fishing vessels in Veneto, which started at the beginning of the millennium and continued until 2014, and which occurred in the entire Upper Adriatic area.

The decrease in the Veneto's maritime fleet has only stopped in the last five years. The sudden drop in the number of vessels over the period was encouraged by the EU, through ad-hoc funds for scrapping certain types of fishing vessels, incentives to reduce the fishing effort and thus aim for greater eco-sustainability of the sector.

In 2019, the number of vessels in the Veneto maritime fleet stood at 652 units, which corresponds to an annual decrease of 0.9%, a loss that rises to -13.4% if the comparison is made with that recorded in 2010 (753 units).

Table 2.1 reports all the technical and structural parameters of Veneto's fishing vessels, based either on the fishing system actually used or on the one registered in the Fleet Register as "main gear". It must be noted, however, that this subdivision does not give an accurate picture of the situation in the Veneto region, since there is not always a clear correspondence between the main fishing gear declared and the main one commonly used. This is the case of midwater pair trawls: these vessels, in fact, often declare "trawl" as their main fishing gear, while they almost always operate with pelagic nets. There are also licences for purse seines, although these are absent in the region. In any case, the availability of several fishing licences in the hands of a ship-owner allows the latter to move from one system to another according to the seasonality of the resource, the trawling closure periods, or the economic convenience.

The Table 2.1 shows that the total length of the 652 vessels in the Veneto Region is 7,626 metres, a value that determines an annual decrease of 1.7%, which increases to -14.3% in a ten-year comparison of hull lengths. The boats with the longest average length, as well as those with the highest tonnage and engine power, are those operating with trawl nets (17.6 metres), followed by hydraulic dredges (13.1 metres).

In terms of overall tonnage, expressed in units of Gross Tonnage (GT), the dimension of the fleet is 11,412 GT in 2019, a decrease of -4.0% compared to 2018, while a comparison with the 2010 figure shows a ten-year decline of -10.3%. It is the vessels in the trawl sector that have the highest average tonnage (47.3 GT). The cumulative engine power recorded in 2019 is 75,875 kW, with an annual loss of -3.2% and -11.1% over the decade.

The vessels in the Veneto fishing fleet are obsolete on average, with the mean age of vessels ranging from 30 years upwards based on the segment, and a third of these being around 40 years old.

*Table 2.1: technical parameters of the Veneto fishing fleet - 2019*

Type of fishing gear	Number of boats	Cumulative length (m)	Average length (m)	Cumulative GT	Average GT	Cumulative Power (kW)	Average Power (kW)	Average age
<i>Hydraulic dredge</i>	164	2.152	13,1	1.820	11,1	18.013	109,8	32
<i>Fixed longlines</i>	69	457	6,6	155	2,2	1.854	26,9	36
<i>Trawls</i>	189	3.328	17,6	8.935	47,3	48.454	256,4	30
<i>Seines</i>	16	116	7,3	33	2,1	571	35,7	39
<i>Small-scale fishing</i>	214	1.572	7,3	469	2,2	6.984	32,6	40
<b>Total</b>	<b>652</b>	<b>7.626</b>		<b>11.412</b>		<b>75.875</b>		
<i>Variation 2019/2018</i>	<b>-0,9%</b>	<b>-1,7%</b>		<b>-4,0%</b>		<b>-3,2%</b>		
<i>Variation 2019/2010</i>	<b>-13,4%</b>	<b>-14,3%</b>		<b>-10,3%</b>		<b>-11,1%</b>		

The number of vessels in the Venice maritime fleet remained unchanged in 2019, while the remaining ones showed decreases ranging from -0.6% in Caorle and Polesine to -1.8% in Chioggia. Chioggia, in addition to having the largest number of vessels, has the highest tonnage and total engine power, a clear sign of a well-equipped offshore fleet (Table 2.2).

*Table 2.2: technical characteristics of the Veneto fleet by port - 2019*

Port	N. boats	% change 2019/ 2018	Length (m)	% change 2019/ 2018	GT	% change 2019/ 2018	Power (kW)	% change 2019/ 2018
<i>Caorle</i>	158	-0,6%	1.469	-1,0%	1.037	-2,1%	10.178	-1,6%
<i>Chioggia</i>	218	-1,8%	3.279	-3,1%	7.650	-5,6%	41.222	-5,0%
<i>Polesine</i>	169	-0,6%	1.657	-0,8%	1.935	-0,4%	15.538	-0,9%
<i>Venice</i>	107	0,0%	1.221	0,0%	790	0,0%	8.937	0,0%
<b>Total</b>	<b>652</b>	<b>-0,9%</b>	<b>7.626</b>	<b>-1,7%</b>	<b>11.412</b>	<b>-4,0%</b>	<b>75.875</b>	<b>-3,2%</b>

In Table 2.3, the regional maritime fleet has been subdivided by hull length, a parameter that also generally defines the maritime working environment of ship owners. Fifty percent of the vessels have a size under 12 metres, a sign of artisanal fishing along the coast. Approximately 12% of vessels are over 18 metres, including trawlers and midwater pair trawls.

Table 2.3: technical characteristics of the Veneto fleet by length range - 2019

Boat length range	Number of boats	Cumulative length (m)	Average length (m)	Cumulative GT	Average GT	Cumulative Power (kW)	Average Power (kW)	Average age
0 to 11.9 metres	326	2.391	7,3	731	2,2	11.361	34,8	39
12.0 to 18.0 metres	248	3.449	13,9	3.770	15,2	32.589	131,4	30
over 18.0 metres	78	1.785	22,9	6.911	88,6	31.925	409,3	30

The presence of 17 midwater pair trawls in the region is confirmed in 2019 as well, with the Chioggia navy counting on 4 pairs, while the 13 pairs in Pila-Porto Tolle remain unchanged. The midwater pair trawls present in the Veneto region, which represent around 25% of those operating in the Adriatic Sea, catch all the regional blue fish.

It should be remembered that, by virtue of the Ministerial Decrees of 25 January 2016, of 10 August 2017 and, of 30 March 2018, the list of maritime units authorised to fish small pelagics in GSA 17 and 18 was defined, from which there are 41 vessels accredited in the Chioggia Maritime Compartment, of which 27 units are present in Pila-Porto Tolle and the remaining 14 in Chioggia.

In addition, the subsequent Ministerial Decree of 26 July 2019 defines the rules for the management of small pelagic stocks, which were severely affected by previous fishing methods in previous years. In the Decree, for the years 2019, 2020 and 2021, the maximum annual fishing days for small pelagics (180 days), closed fishing periods and other limits are defined.

The compulsory fishing closure in 2019 has affected the trawling sector for a total of 30 days, from 29 July to 27 August, with further days of forced stoppage depending on the length of the boat and to be carried out by the end of the year. Boats under 12 metres will be banned for a further seven days, those between 12 and 24 metres will be banned for 10 days, and those over 24 metres will be banned for 13 days. The ban on fishing within six miles for trawlers and midwater pair trawls has been confirmed until 31 October but has been reduced to four miles from the coast for boats involved in small-scale coastal fishing. The aim of the biological closure is to allow an optimal reproduction phase of the target species, protecting them and increasing their stocks. In 2019, according to operators in the sector, large Venetian midwater pair trawls went out to sea for an average of 176 days, not reaching the maximum number of annual working days allowed for small pelagic fishing, i.e. 180. Small and medium-sized vessels fished for about 161 days. Large trawlers, net of the days of closure imposed on them, worked for about 145 days. By contrast, large otter trawlers went

out to sea an average of 135 times, while small and medium-sized trawlers fished for 133 days.

### Small-scale fishing

Caorle and Jesolo represent the two most important ports in the northern part of the Veneto coast, and they host the major fishing fleets of the region apart from Chioggia, which is the largest port in the entire basin.

According to the EU Fleet Register, the fleet in the study area includes 216 vessels, among which 79 belong to artisanal fisheries. The features of this component of the fleet can be summarized as follows: length, 4.30-12.08 m; gross tonnage, 1-2 tons; and crew, 1-2 fishermen. These vessels mainly operate in fishing grounds located between 0.1 and 3 miles from the coastline. Artisanal fishermen adopt four different fishing techniques: gill nets, trammel nets, pots, and basket traps that vary seasonally (Table 2.4).

*Table 2.4: Description of the artisanal fishery, in terms of gears, number of vessels, main target species and fishing season<sup>2</sup>.*

Fishing technique	no. vessels	Target species	Fishing season
Gillnets	79	<i>S. solea</i> , <i>S. mantis</i> , <i>C. lucerna</i>	May-Jun, Sep-Nov
Trammel nets	79	Flatfish	Jan-Mar, Nov-Dec
Pots	79	<i>S. officinalis</i>	Apr-Jul
Basket traps	75	<i>S. mantis</i>	Jul-Oct

Gillnets are employed from May to June and from September to November, to tackle *S. solea*, *S. mantis* and *Chelidonichthys lucerna* (Table 2.4). The net length ranges between 1.000 and 5.000 m, and the length used mainly depends upon the vessel size. Catches can include up to 78 species (8 target, 27 by-catch, and 43 discarded species, reflecting 78.5%, 13.3%, and 8.2% of the total biomass, respectively). Notably, *S. solea*, *S. mantis* and *Mustelus mustelus* represent 73% of the commercial biomass. The resulting discarded fraction is dominated by three species: *Bolinus brandaris*, *Liocarcinus vernalis* and *Myliobatis aquila*. Regarding the total CPUE, gillnets represent the second most common fishing technique and the most important species yielded are *S. solea* (15.0 kg d<sup>-1</sup> v<sup>-1</sup>), smooth-hound shark (7.1 kg d<sup>-1</sup> v<sup>-1</sup>) and mantis shrimp (4.3 kg d<sup>-1</sup> v<sup>-1</sup>). Trammel nets are employed in the periods from January to March and November to December, and they target flatfish – *Scophthalmus maximus*, *S. rhombus*, *Platichthys flesus* and *S. officinalis*. The net length is between 350 and 2000 m, and mainly depends upon the vessel size. Catches can include up to 37 species (5 target, 21 by-catch, and 11 discarded species, reflecting 74%, 23% and 3% of the total biomass,

respectively), among which *S. maximus*, *S. officinalis*, and *S. rhombus* represent 62% of the commercial biomass. The discarded fraction is almost entirely composed of three species: *Liocarcinus vernalis*, *Alosa fallax* and *Bolinus brandaris*. In terms of the total CPUE, trammel nets represent the fourth most common fishing technique, and the most important species that it yields are *S. maximus* ( $4.5 \text{ kg d}^{-1} \text{ v}^{-1}$ ), *S. officinalis* ( $2.5 \text{ kg d}^{-1} \text{ v}^{-1}$ ) and *S. rhombus* ( $2.1 \text{ kg d}^{-1} \text{ v}^{-1}$ ). Pots are employed from April to the beginning of July, and they target *S. officinalis*. This activity is regulated by the Port Authority, which establishes annual monitoring of the fishing season and monitors fishing vessels. In 2014, the fishing period was from April to 10 July with an allowance of 300 pots per fisherman (in cases of three or more embarked fishermen, the maximum limit of pots was 600 per vessel). Catches are composed of 99.6% target species, with a few *L. vernalis* being the discarded species. In terms of the total CPUE, pots represent the best fishing technique, with  $71.4 \text{ kg d}^{-1} \text{ v}^{-1}$  of cuttlefish. Basket traps are employed from July to October, and they target *S. mantis*. Catches are composed of 86% target species. The discarded fraction represents four species of invertebrates: *B. brandaris*, *Hexaplex trunculus*, *Tritia mutabilis* and *Nassarius nitidus*. In terms of the total CPUE, basket traps represent the third best fishing technique, with  $33.9 \text{ kg d}^{-1} \text{ v}^{-1}$  of *S. mantis*. Based on the CPUE data and vessel numbers for each fishing technique, an annual catch of 735 or 1050 tons can be estimated for different fishing effort estimates of 150 or 214 days at sea, respectively. *S. officinalis*, *S. mantis*, *S. solea* and *S. maximus* show the highest values, ranging from 58 to 440 tons per year (Table 2.5).

Table 2.5: CPUE (kg per vessel per day) of commercial species (target and bycatch), estimates of the annual catches and fishing gear; catch 1 refers to the 150 days at sea scenarios, catch 2 refers to the 214 days at sea scenarios; the 95% confidence interval is reported for each estimate (LB = lower boundary and UB= upper boundary); TL = trophic level; G: gillnet; T: trammel net; P: pot; B: basket trap<sup>2</sup>.

Species	LB	CPUE	UB	LB	1 - total	UB	LB	2 - total	UB	gear
		(kg v <sup>-1</sup> d <sup>-1</sup> )			catches (t)			catches (t)		
<i>Sepia officinalis</i>	55.5	74.3	95.3	233.6	311.5	398.8	333.3	444.4	568.9	P-T-G
<i>Squilla mantis</i>	59.1	72.1	87.3	151.1	190.3	240.3	215.5	271.6	342.8	B-G
<i>Solea solea</i>	11.2	15.7	21.1	62	86.1	114.8	88.5	122.8	163.8	G-T
<i>Mustelus mustelus</i>	3.5	7.6	12.3	19.3	41.2	65.8	27.6	58.8	93.9	G-T
<i>Psetta maxima</i>	3.1	4.6	6.2	11.2	16.7	22.4	15.9	23.8	32	T
<i>Chelidonichthys lucerna</i>	2.3	3.3	4.5	11.6	17.1	23.4	16.5	24.3	33.3	G-T
<i>Scophthalmus rhombus</i>	1.8	2.6	3.5	6.9	10.4	14	9.9	14.8	20	T-G
<i>Sparus aurata</i>	1.1	2.6	4.3	6.2	13.8	22.9	8.8	19.7	32.6	T-G
<i>Lithognathus mormyrus</i>	0.6	1.8	3.3	3.4	10	18.2	4.8	14.2	25.9	T-G
<i>Arnoglossus laterna</i>	0.7	1.7	3	3.7	9.3	16.6	5.3	13.3	23.6	G
<i>Umbrina cirrosa</i>	0.6	1.4	2.3	3.1	6.7	10.8	4.5	9.6	15.4	T-G
<i>Dicentrarchus labrax</i>	0.3	1.1	2.2	1.2	4.2	8.4	1.7	6	12	T-G
<i>Platichthys flesus</i>	0.3	1.1	2.1	1.2	3.8	7.6	1.7	5.4	10.8	T-G
<i>Bolinus brandaris</i>	0.3	0.7	1.1	1.9	3.9	6.3	2.8	5.6	9	T
<i>Chelon auratus</i>	0.1	0.6	1.5	0.4	2.7	6.2	0.6	3.9	8.9	G
<i>Chelon ramada</i>	0	0.3	0.6	0.2	1.2	2.7	0.3	1.7	3.9	G
<i>Homarus gammarus</i>	0	0.3	0.9	0	1.6	4.4	0	2.2	6.3	G
<i>Chelon saliens</i>	0	0.1	0.2	0.2	0.5	1	0.2	0.8	1.5	G
<i>Diplodus annularis</i>	0	0.1	0.2	0	0.3	0.7	0	0.4	1.1	G-T
<i>Penaeus kerathurus</i>	0	0.1	0.2	0.3	0.5	0.9	0.4	0.8	1.3	G
<i>Pomatomus saltatrix</i>	0	0.1	0.2	0	0.3	0.9	0	0.5	1.2	T
<i>Raja miraletus</i>	0.1	0.1	0.2	0.4	0.7	1.1	0.5	1	1.5	G-T
<i>Sciaena umbra</i>	0	0.1	0.2	0	0.4	1	0	0.5	1.4	T-G
<i>Scorpaena scrofa</i>	0	0.1	0.2	0	0.4	1.3	0	0.6	1.9	T-G
<i>Scyliorhinus stellaris</i>	0	0.1	0.3	0	0.5	1.4	0	0.7	2	T-G
<i>Trachurus trachurus</i>	0	0.1	0.1	0.2	0.4	0.7	0.2	0.6	1.1	T-G
<i>Chelon labrosus</i>		<0.1		0	0.1	0.2	0	0.1	0.3	T
<i>Diplodus sargus</i>		<0.1		0	0.1	0.4	0	0.2	0.5	G-T
<i>Lichia amia</i>		<0.1		0	0.2	0.6	0	0.3	0.8	T-G

<i>Loligo vulgaris</i>	<0.1		0	0.1	0.2	0	0.1	0.2	T
<i>Merlangius merlangus</i>	<0.1		0	0.1	0.2	0	0.1	0.2	G
<i>Mullus barbatus</i>	<0.1			<0.1			<0.1		G-T
<i>Octopus vulgaris</i>	<0.1		0	0.1	0.5	0	0.2	0.7	T
<i>Pagellus erythrinus</i>	<0.1		0	0.2	0.5	0	0.2	0.7	G
<i>Pecten jacobaeus</i>	<0.1			<0.1			<0.1		G
<i>Sarpa salpa</i>	<0.1			<0.1			<0.1		B
<i>Scomber scombrus</i>	<0.1		0	0.1	0.2	0	0.1	0.3	G
<i>Trachinus araneus</i>	<0.1			<0.1			<0.1		G
<i>Zeus faber</i>	<0.1		0	0.1	0.1	0	0.1	0.2	G

### Clam dredging<sup>1</sup>

Considering the harvest of bivalve molluscs from the sea, Veneto represents one of the most productive areas in the northern Adriatic and in Italy. The number of operational hydraulic dredges in the region is stable at 163 from many years, since the fishery is subjected to a resources management plan and their number remains limited, as do the companies operating in the bivalve mollusc's sector. For more than twenty years, these vessels have been associated in the two consortia active in the region, namely the Clam Management Consortia (*ConSORZI Gestione Vongole - Co.Ge.Vo.*) of Chioggia and Venice, both of which are committed to the rational management of the resource, coordinating harvesting times, quantities that can be fished and related fishing methods.

From an analysis of the 163 turbo dredgers currently active in the Veneto region, 86 are active in the Venice area, and the other 77 harvest bivalve molluscs in the Chioggia Maritime Compartment. Depending on the main product caught, the hydraulic dredgers belong to two major categories, i.e. 121 vessels are engaged in sea clam (*Chamelea gallina*) fishing, while the remaining 42 boats operate exclusively in the collection of *Callista chione*.

Of the hydraulic dredgers present in Chioggia, 58 are clam dredgers and 19 *Callista* dredgers, while in Venice there are 63 clam dredgers and the remaining 23 *Callista* dredgers. In summer, some companies fishing bivalve molluscs are authorised to fish with fyke nets.

For the rational management of the resource, the two Venetian consortia support their members by encouraging very prudent clam fishing throughout the year, self-imposing technical biological rest periods, which in 2019 were respected in April and May.

In addition to imposing maximum daily fishing volumes, the turbo vessels fishing for fasolari also implement voluntary fishing closure, with each vessel rotating between January and



April for two months. This limits further the impact on the resource, while maintaining a certain level of product on the market.

### *Recreational fishing*

Although being one of the most relevant and popular leisure activities in the pilot area, very little data are available that characterize these activities and their link and effects on the ecosystem and on commercial fisheries<sup>3,4</sup>. Therefore, the analysis that follows aims to contribute to reduce these knowledge gaps.

### Key stakeholders

The increased participation of local fisheries stakeholder in planning and management is one of the key principles of the EAFM, thus an effective and systematic engagement of key actors is a horizontal activity of FAIRSEA project. The table below shows the stakeholders targeted by the participatory approaches implemented by VeGAL.

<b>INSTITUTIONAL STAKEHOLDER</b>	Italian Ministry of Agriculture (Mipaaf), Veneto Region (Direzione caccia e agricoltura)
<b>TECHNICAL STAKEHOLDER</b>	VEGAL acts as a technical stakeholder, facilitating collection of data
<b>SOCIO-ECONOMIC STAKEHOLDER</b>	Members of the FLAG VEGAL that includes fisheries cooperatives, fishers, NGOs

### Pilot actions description

The overall objective of FAIRSEA is to enhance the conditions for implementing innovative approaches in the sector of sustainable fisheries management in the Adriatic Sea considered as the FAO geographical sub-areas (GSA) 17, 18 and 19. This is done through the development of a shared conceptual and operational framework for an Ecosystem approach to fisheries (EAF). It will be achieved through the implementation of a spatially explicit and territorially integrated tool that considers water mass circulation, physical-chemical properties, plankton productivity, dynamics of resources including their interactions, fisheries displacement, and bio-economic drivers. The technical integration is adapted to address stakeholders' and policy makers' issues and is used for increasing awareness, for understanding EAF, for increasing technical skills and capacities in the region also through demonstrative applications.

The Pilot Action implemented by VeGAL aims at verifying that the platform developed by the project effectively contributes to the identification of conflicts (inter- and intra-sectoral) and possible solutions and therefore represents a valid decision support system for sustainable development.

This is achieved by test-running the platform using data collected in the Venetian maritime compartment, specifically:

1. Professional (trawling and small-scale) fishery landings time series for the main target species
  - The specificity and selectivity of each metier was taken into account
2. Recreational fishing landings
3. Clam dredging time series concerning:
  - Landings
  - Fleet composition
4. Mapping of the main spatial management measures affecting fisheries in the study area
5. Mapping of active and proposed resources management plans

The required data were collected from the following sources, respectively:

1. Integrated landing time-series databases provided by the Department of Environmental Sciences, Informatics and Statistics of the University of Venice, and by the Socioeconomic Observatory on fisheries and aquaculture maintained by Veneto Agricoltura<sup>1,5,6</sup>. The databases were in turn built on Veneto's wholesale fish market records.  
The specificity and selectivity of the various fishing metiers was derived from on published research<sup>2,7</sup>, integrated with expert opinions of the University of Venice researchers and experts from the Veneto Agricoltura, and of the fishery operators themselves.
2. Recreational fishing is the most difficult sector to assess. Lacking official data, estimates had to be made by drawing up a questionnaire aimed at obtaining the following information from recreational fishermen operating along the Veneto coast on a seasonal basis:
  - a. Typical fishing area
  - b. Number of fishing trips
  - c. Average duration of fishing trips
  - d. Type of fishing practised

- e. Use or non-use of a boat
- f. Species caught, and typical quantity per trip, in kg.
- g. In addition, fishermen were asked to indicate, in their own experience, how the proportions of catches of the various species have varied over the past decades compared to the current quantities.

For the specific case of bluefin tuna (*Thunnus thynnus*), the approach was different. For this species, there is an official Unimar report<sup>8</sup>, which contains, among other things, catch data referring to recreational fishing in all Italian coastal regions from 2010 to 2015. On the basis of this report, the average incidence of catches in Veneto was calculated with respect to the national total, and this value was used to derive the catches from 2016 to 2020, starting from the quotas established at national level.

3. For clam dredging, monthly catches, in kg, of clams (*Chamelea gallina*) and fasolari (*Callista chione*) were collected with the collaboration of the Veneto Agricoltura Socioeconomic Observatory on fisheries and aquaculture, based on official data from the Venice and Chioggia CoGeVo. The data are available from 2000 to 2019 and are divided according to the compartment they belong to. It is also available the quantification of the average annual fishing days per boat, according to the compartment of belonging and the species fished, for the years 2016-2018, and the number of active boats, by compartment and target species, from 2016 to 2019.

In addition, a census was made on the Community Fishing Fleet Register ([https://webgate.ec.europa.eu/fleet-europa/search\\_en](https://webgate.ec.europa.eu/fleet-europa/search_en)) of vessels registered in Veneto with a main licence for hydraulic dredging (DRB), for the years 2010-2020.

4. The spatial limitations to fishing in were mapped in GIS using publicly available databases.
5. Active and proposed management plans along the Veneto coast too were mapped in GIS using publicly available databases.

Pilot actions results

Figure 2.1 shows the distribution of catches, for the main species considered, per fishing metier obtained from direct observations, literature and expert opinions. It is clear that all the catches of some species are easily attributed to a specific gear/metier (e.g., small pelagics are almost entirely fished by means of midwater pair trawl), while others are caught by different gears. In these cases, it was possible to attribute the catches to the various gears in fairly precise proportions.

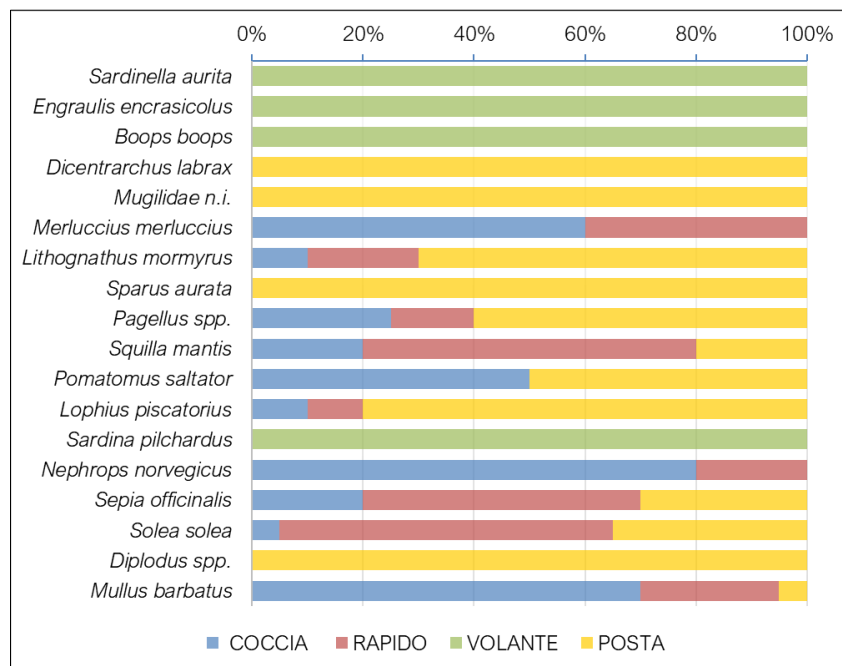


Figure 2.1: distribution of catches per fishing metier

Table 2.6 shows the periodicity of the time series obtained, and the fish markets considered. It must be noted that this is one of the few works that takes into account landing data from Pila fish market, which, particularly for some species, aren't negligible.

Table 2.6: Fish markets considered, and periodicity of data – 1 – Socioeconomic Observatory on fisheries and aquaculture; 2 – Università Ca’Foscari Venezia – DAIS

Market	Periodicity	Source
<b>Pila</b>	Yearly since 2001	1
	Monthly since 2005	
<b>Chioggia</b>	Yearly and Monthly since 1945	1, 2
<b>Venice</b>	Yearly since 1946	1, 2
	Monthly since 2006	
<b>Caorle</b>	Yearly since 2003	1
	Monthly since 2005	

Concerning clam dredging, in the case of *Chamelea gallina* an erratic trend could be observed, with a collapse in 2010, followed by a partial recovery. A slight but steady downward trend can be observed in the case of *Callista chione* (Figure 2.2).

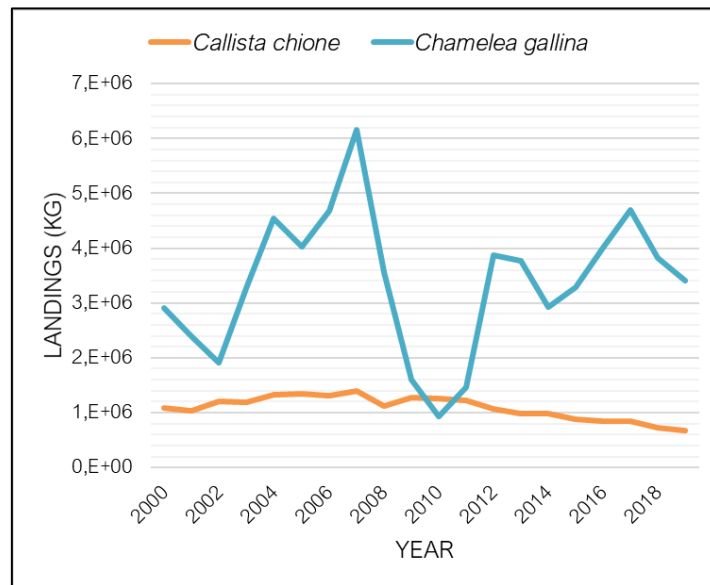
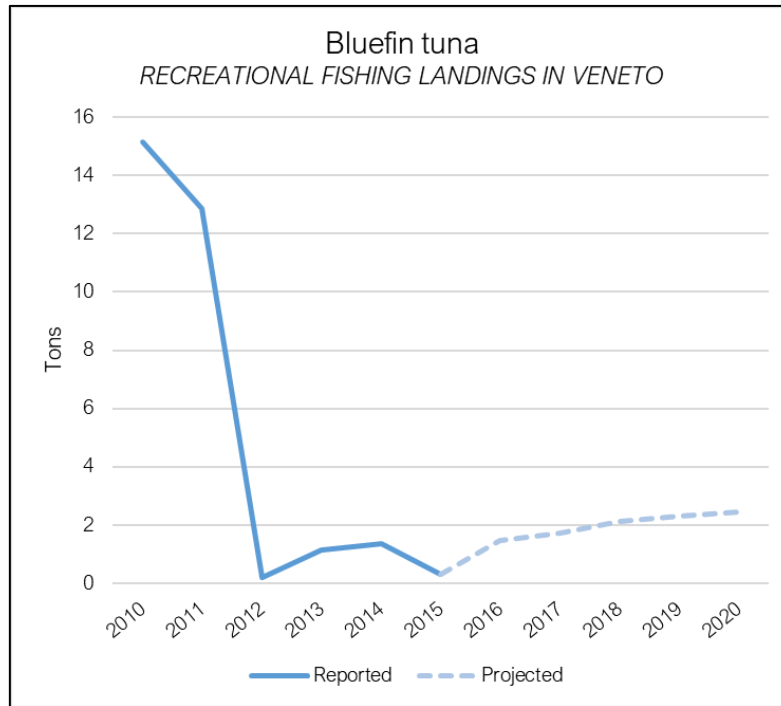


Figure 2.2: *C. gallina* and *C. Chione* landing trends in Veneto (2000-2019)

With regards to recreational fishing, official data is only available for Bluefin tuna landings, and only for the period 2010-2015. On the basis of the UNIMAR report<sup>8</sup>, the average incidence of catches in Veneto was calculated with respect to the national total, and this value

was used to derive the catches from 2016 to 2020, starting from the quotas established at national level.



*Figure 2.3: Bluefin tuna landings from recreational fishing in Veneto 2010-2020*

For all other target species, the data collected through the questionnaire allowed to infer:

- CPUE (kg/angler/trip) - Figure 2.4
- Average number of fishing trips, per angler, per season
- Landing trend for the main target species in the last 20 years - Figure 2.5

The number of active anglers in Veneto was retrieved from the Ministry database of angling permits.

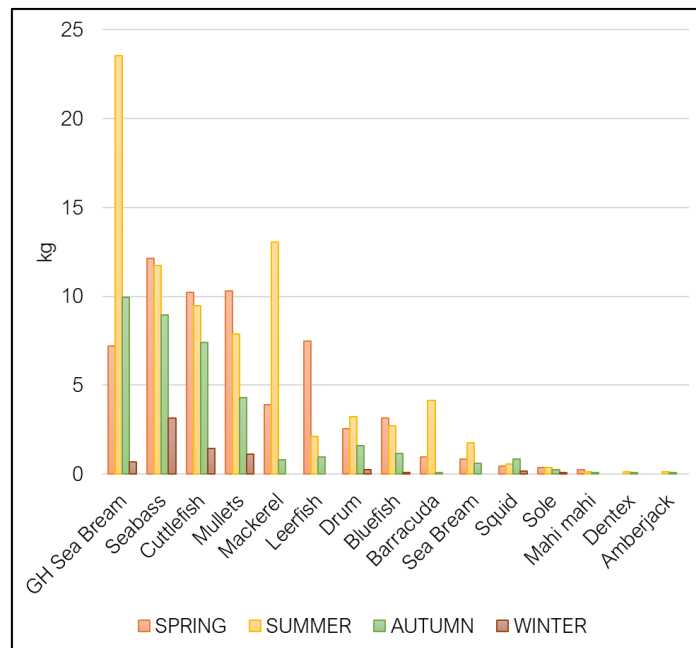


Figure 2.4: CPUE (kg/angler/trip) for recreational fishing in Veneto

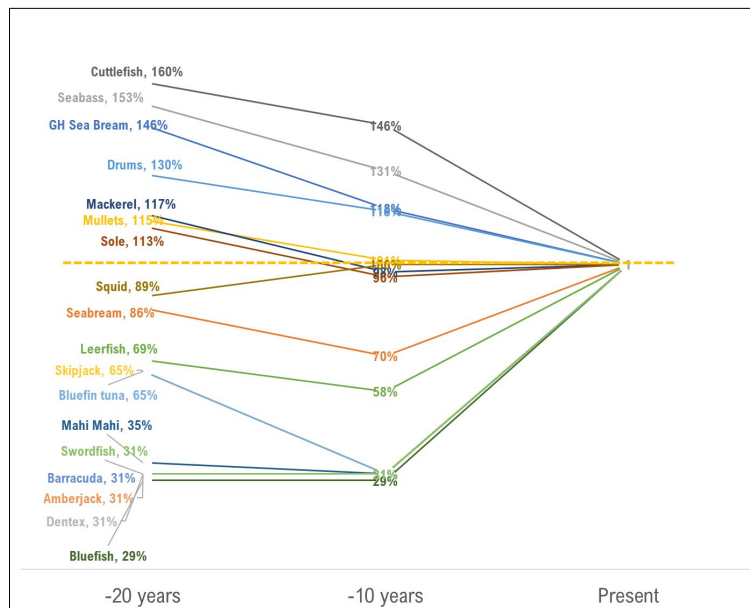
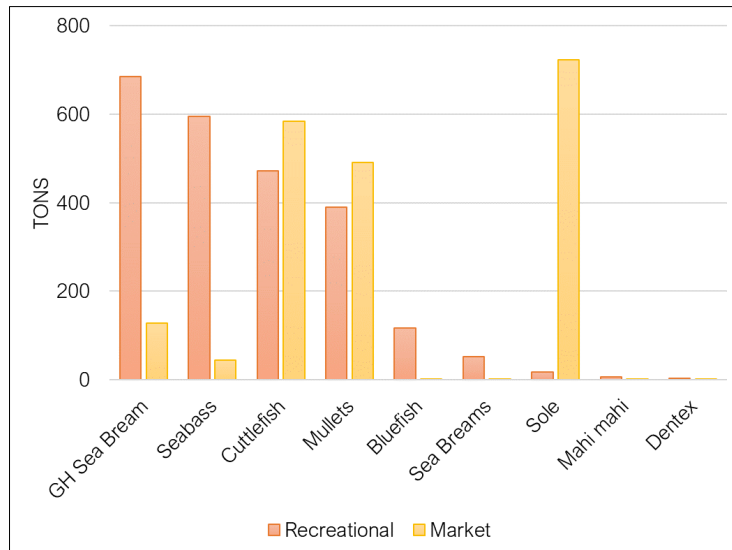


Figure 2.5: Landing trend for the main target species for recreational fishing in the last 20 years in Veneto

Combining these observations with the number of active anglers in Veneto retrieved from the Ministry database of angling permits, it was possible to estimate the total landings due

to recreational fishing in Veneto, and this in turn allowed to make comparisons with landings from professional fishing (Figure 2.6).



*Figure 2.6: comparison of landings from recreational and from professional fishing in Veneto in 2019, for the main targeted species.*

The values in Figure 2.6 are obtained considering a very conservative proportion of 10% of active anglers on the total ministry-issued permits. This suggests an impact of recreational fishing on marine resources and other fisheries that is very significant, and certainly greater than might have been expected. Consequently, the scenarios tested with the decision-support tool were aimed at investigating the possible direct and indirect effects of this impact.

Figure 2.7 shows the impact, estimated with the tool, of the various fishing activities, including recreational, on the mortality rates of the main target species, maintaining the assumption that only 10% of the registered permits represent active anglers. For seabass, seabream, mackerel, cuttlefish, bluefin tuna and barracuda, among others, such impact is not negligible.



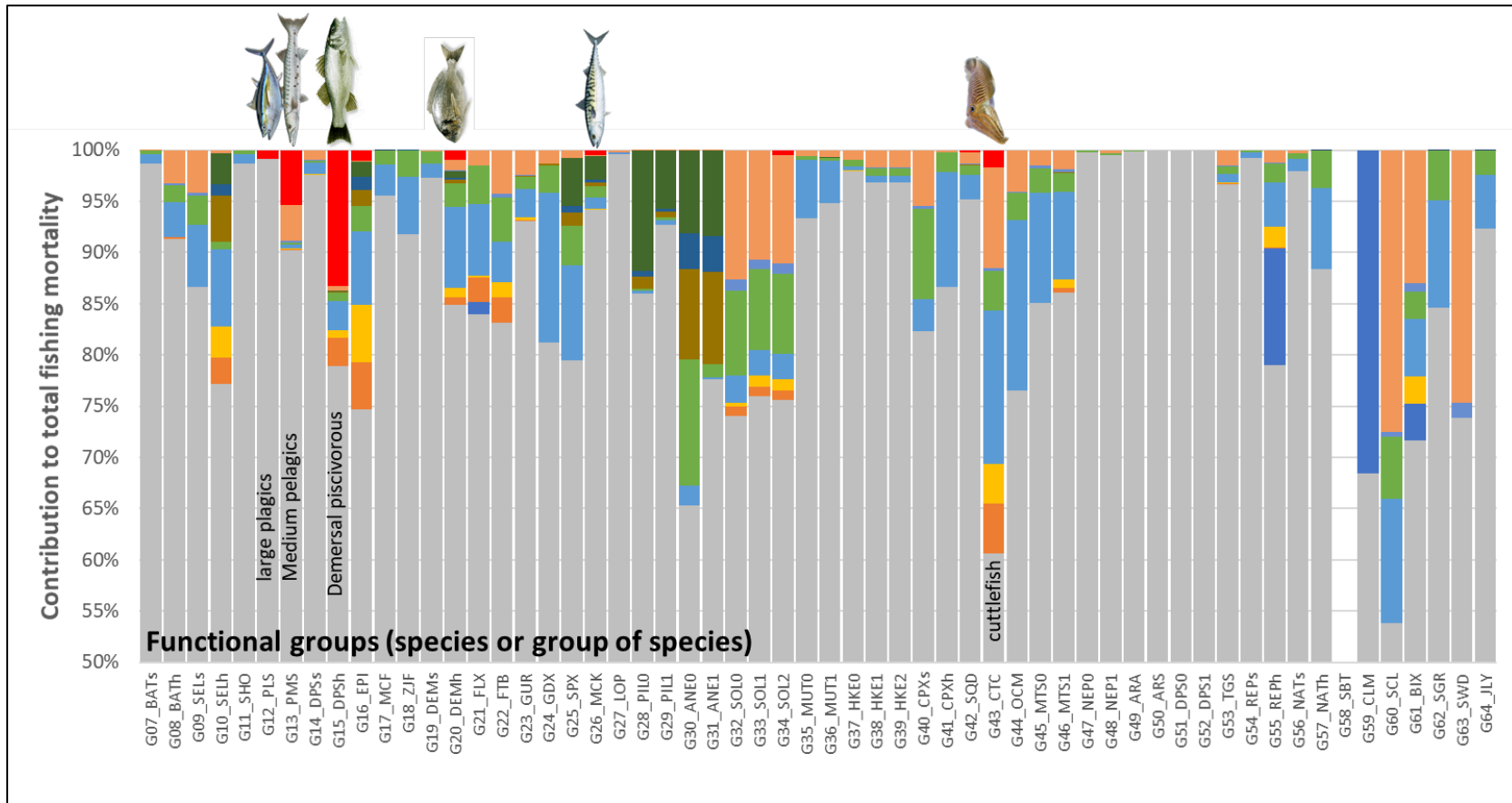


Figure 2.7: contribution to mortality of the main target species calculated with the tool. Grey represents non-fishing mortality. The contribution of recreational fishing is in red.

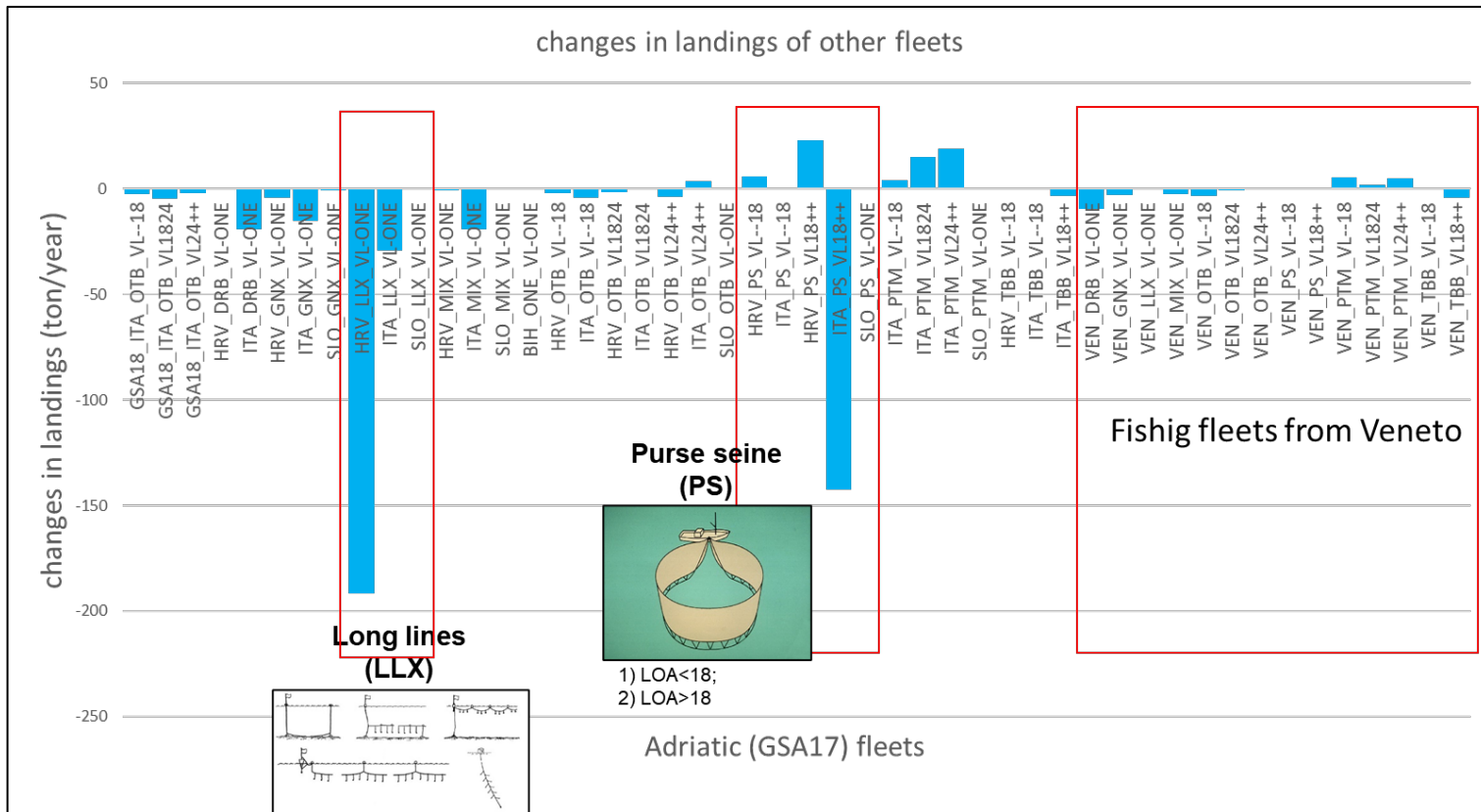


Figure 2.8: estimated effect, using the tool, of increasing recreational fisheries x 5 times in 10 years on other professional fleets.

Figure 2.8 shows the effect of a sensitivity test of the tool, conducted by hypothetically increasing Veneto recreational fishing fivefold over 10 years, at the whole northern Adriatic scale. Results show that in this scenario, local professional fisheries wouldn't suffer significant impacts, but indirect effects would strongly affect other metiers in other areas, with the worst decreases in the catch of longlines in Croatia.

### Technical and policy recommendations

First observations made with the tool, confirmed the indication recreational fisheries impact is not negligible, but in order to gain a more representative picture, improving data gathering is an important issue.

Apart from this, the tool could provide hints on the possible link between the small-scale fisheries decline and recreational fisheries increased trend presently ongoing, and more, since indications are that interactions of recreational fisheries and other gears goes far beyond small scale fisheries.

The tool could also be used to test possible management scenarios for recreational fisheries, such as daily quotas, spatial restrictions or limited permits.

### References

1. Liviero, A., Severini, N. & Censori, A. *La pesca in Veneto 2019*. (2020).
2. Pranovi, F., Monti, M. A., Caccin, A., Brigolin, D. & Zucchetta, M. Permanent trawl fishery closures in the Mediterranean Sea: An effective management strategy? *Mar. Policy* **60**, 272–279 (2015).
3. Guyader, O. *et al.* Small scale fisheries in Europe: A comparative analysis based on a selection of case studies. *Fish. Res.* **140**, 1–13 (2013).
4. Pranovi, F., Anelli Monti, M., Caccin, A., Colla, S. & Zucchetta, M. Recreational fishing on the West coast of the Northern Adriatic Sea (Western Mediterranean) and its possible ecological implications. *Reg. Stud. Mar. Sci.* **3**, (2016).
5. Liviero, A., Severini, N. & Censori, A. *La pesca in Veneto 2018*. (2019).
6. Liviero, A. & Severini, N. *La pesca in Veneto 2017*. (2018).
7. Caccin, A. *La pesca nell'alto Adriatico: Identificazione delle principali strategie di sfruttamento e possibili ipotesi gestionali*. (Università Ca'Foscari Venezia, 2010).
8. Consorzio Unimar. *Pesca ricreativa del tonno rosso*. (2016).

## Pilot 3: Fishing common sole with rapido trawl in Marche Region

### Pilot area description

The Marche Region covers 9,694 km<sup>2</sup> with a population of around 1,500,000 inhabitants (154 inh/km<sup>2</sup>). The geographical area covers the eastern slope of the Apennines characterized by a system of river basin that develops from West to East and from hillside sloping down to the Adriatic coast. The western border of the Marche Region coincides with the central Apennines mountain reliefs while the eastern edge is bounded by the coastline that stretches for about 174 km. Marche Region territory includes more than 2% of the Italian coastal area with 23 Municipalities and about 600,000 inhabitants (ISTAT, 2012).



### *The regional fisheries sector*

Fisheries is traditional and well-developed activities in the Region of Marche.

The coastline of the Region is divided in 3 Maritime Districts reporting to the 3 main Coast Guards:

#### 1. *Pesaro*

The District covers 40 km of coastline including 4 coastal municipalities: Gabicce, Pesaro, Fano e Mondolfo.

#### 2. *Ancona*

The District covers 80 km of coastline including 9 coastal municipalities: Senigallia, Montemarciano, Falconara Marittima, Ancona, Sirolo, Numana, Porto Recanati, Potenza Picena e Civitanova Marche.

#### 3. *S. Benedetto del Tronto*

The District covers 39 km of coastline including 10 coastal municipalities: Porto Sant'Elpidio, Fermo, Porto S. Giorgio, Altidona, Pedaso, Campofilone, Massignano, Cupra Marittima, Grottamare e S. Benedetto del Tronto.

The major ports of the coastal municipalities developed over centuries around seafaring villages, contributing to the economic development of the coastal areas. In recent years, every action taken has been directed towards achieving excellence, as for example in the field of traceability and quality certification of the product, in the development of the aquaculture sector, and in the creation of the processing and marketing zone. In a dynamic context, research too has found fertile territory. Experimentation in aquaculture, the raising of shellfish and freshwater fish, and plans for developing more selective, environmentally friendly technologies have contributed to modernising the sector, ensuring that the best national experiences in terms of the fish supply chain come from the Marche.

In the Marche the fisheries sector is based on a well-established system of trade *Associations* that represent, protect and support the workers. The individual businesses, too, could not exist without this work. The Associations provide technical, legal, administrative, tax and insurance support. The Producers' organisations have set up procedures for responsible management of the fish stocks.

*Research, development and training* are active in the region. The sector can count on three universities, besides the CNR-IRBM (National Research Council, specialising in marine and aquaculture research. In addition to these, there are institutes for training technical and specialist staff connected with the sea. There are also numerous private companies and firms devoted to research applied to technology transfer in the sector.

*Processing* of fish products occupies second place among industrial processing sectors in the Region. Treatments used for fish in the industry are: fresh, frozen, and preserved in marinades or under oil. The companies have processing lines which are largely automated, and laboratories for quality control. They take an innovative approach to packaging and preservation to maintain the freshness of the product.

*Quality*, health and freshness of the catch and compliance with European market regulations are all monitored by the administration of the Fish Market. There is a consolidated network of fish markets in the region. In addition to this there are pioneering commercial concerns, well-known at national level, with fishery operators involved in the management and integrity of the market. The technicalities of dealings on the electronic and remote auctions, the transparency of the transactions, as well as traceability systems and quality marking of the product, are properly monitored and regulated, and are a strong point of the Marche fishery supply chain. Furthermore, in this context, the Marche Region is holder of a regional

brand named QM – Quality guaranteed by Marche – that is applied to many agri-food products, including fish products too. In particular, there are two type of QM specifications (in Italian named Disciplinari) for fish products: “Fish supply chain” and “Molluscs” that give added value to seafood regional products. Also the QM brand is characterized of the quality (maximum freshness), traceability for consumers and control by an independent certification body. For the “Fish supply chain”, in addition to the certification requirements, the sustainability of the fleet adhering to the mark is required.

### *Regional fisheries sectors: main challenges*

Despite its relevance for the regional economy, the fisheries sector is facing a progressive income reduction due to:

- ⇒ Increasing of operating costs (labour, fuel, administrative costs)
- ⇒ Competition with seafood products from extra EU Countries
- ⇒ Enforcement of national and European fisheries restrictions aimed at long term environmental protection and sustainable exploitation of stocks (short term economic loss for fishers)

In addition to the progressive loss of income, fisheries sector faces other problems such as spatial conflicts: spatial planning is still mainly a top-down process with a scarce engagement of local socio-economic stakeholder into decision making. Increased participation of fisheries stakeholder in performing co-management is, thus, a key challenge for the regional fisheries governance.

Small-scale fisheries vessels are predominant in the Marche Region fleet composition, however this sector is characterized of several micro-companies, providing an atomized entrepreneurial landscape and tending to be marginalized in decision-making processes (ARIEL project, 2018). Moreover, the regional small-scale fisheries suffer from the decrease of seafood value due to concurrent exploitation of the same resources. In fact, when SSF exploit the same resources of trawling (e.g. common sole, cuttlefish, etc.), the higher catches of trawling generally decrease the value of SSF products. In addition to this, the regional small-scale fisheries operators are poorly aggregated in cooperatives and associations, while fishers from other sectors (e.g. trawling and hydraulic dredges) are highly aggregated (ARIEL project, 2018).

From the economic point of view, despite the implicit added value of small-scale fisheries products given by the sustainability of this fishing activity, their market prices are often too low and fishers are often obliged to cheaply sell their product. Moreover, the regional stakeholder report difficulties to access at local fish market and high variability in profitability. The operators of the fishing district of Ancona strongly complain about the limited mooring/docks and logistic infrastructures dedicated to small-scale fisheries (ARIEL project, 2018).

Although the good cooperation among public administrations and research bodies, the key challenge is to facilitate and improve the innovation speed-up and uptake at entrepreneurial level, bridging the gap between science and practice.

### *The fisheries sector financial instruments*

The EU offers several financial opportunities to support the sustainable fisheries sector management at local, national and transnational level through direct and indirect funds. The main financial instrument for fisheries and aquaculture entrepreneurs is the European and Maritime Fisheries Fund; in the programming period 2014/2020 the budget allocation for Marche Region was more than 30 Million of EUR. The Italian regional authorities, in fact, formally act as EMFF Intermediate Bodies of the EMFF.

Moreover, the environmental and sea resource protection is a horizontal priority of several INTERREG Programmes involving also the Marche Region territory. By means of the co-financing of the European Regional Development Fund (ERDF), a number of cooperation projects were carried out at regional level in last decades. Regional Public administrations, sectoral agencies, universities and research centers are actively involved in cross-border and transnational cooperation towards a shared governance of fisheries resources. Projects aims at protecting and conservation of Adriatic ecosystems and promoting the sustainable use of marine resources by means of:

- Shared actions built upon scientific evidences
- Engagement and involvement of fisheries operators
- Scenarios' simulation to adopt management measures aimed at reducing the negative impact of some fishing activities on the most important stocks include testing practices, and tools methodologies to innovate the sector, exchanging of knowledge, socio-economic stakeholder engagement in valorisation and protection activities.

### Main fishery and target species

The fishing fleets of Marche Region included 778 vessels (IREPA, 2018) belonging to: small-scale fishery (401), hydraulic dredges (221), bottom otter trawl (119), rapido trawl (19), pair pelagic trawl (17) and purse seine (1).

Small-scale fishery dominated in terms of number of vessels (52% of the total), while bottom otter trawling dominated in terms of Gross Tonnage (GT; 45% of the total) and engine power (kW; 36% of the total).

The average size of vessels in terms of engine power and Gross Tonnage ranged respectively from 30.3 kW and 1.9 GT for small-scale fishery to 441.0 kW and 144.0 GT for the vessel using purse seine.

*Tab. 3.1- Technical specifications and percentage composition of fishing fleets, MARCHE, 2018*

	<b>Unit</b>	<b>Tonnage</b>	<b>Engine power</b>
<b>System</b>	<b>No</b>	<b>GT</b>	<b>KW</b>
Purse seine	1	144	441
Hydraulic dredge	221	3.396	23.616
Artisanal fisheries	401	763	12.151
Rapido trawl	19	1.799	7.335
Bottom otter trawl	119	6.588	29.213
Pelagic pair trawl	17	1.850	8.319
<b>Grand total</b>	<b>778</b>	<b>14.540</b>	<b>81.075</b>

**Source:** SISTAN IREPA, 2018

*Tab. 3.2- Average values of gross tonnage (GT) and engine power (kW) by fishing fleet, MARCHE, 2018*

	<b>MARCHE</b>		<b>ITALY</b>	
<b>System</b>	<b>Average GT</b>	<b>Average kW</b>	<b>Average GT</b>	<b>Average kW</b>
Purse seine	144,00	441,00	34,23	176,36
Hydraulic dredge	15,37	106,86	13,17	108,10
Artisanal fisheries	1,90	30,30	2,89	35,68
Rapido trawl	94,68	386,04	83,38	393,60



Bottom otter trawl	55,36	245,49	39,76	198,90
Pelagic pair trawl	108,82	489,35	67,42	335,15
<b>Grand total</b>	<b>18,69</b>	<b>104,21</b>	<b>11,91</b>	<b>77,39</b>

**Source:** SISTAN IREPA, 2018

Hydraulic dredges, bottom otter trawl and pair pelagic trawl landed similar quantities of seafood products (about 5,900 tons), while small-scale fishery and rapido trawl landed 1,700 tons and 1,379 tons, respectively.

Bottom otter trawl obtained the highest revenues (43.5 Millions of Euro), representing 51% of total revenues.

*Tab. 3.3 - Landings, revenues and prices by fishing fleet, MARCHE, 2018*

	<b>Landings (tons)</b>	<b>% Landings</b>	<b>Revenues (million Euros)</b>	<b>% Revenues</b>	<b>Prices (€/Kg)</b>
Hydraulic dredge	5.928	28,26%	14,70	17,16%	2,48
Artisanal fisheries	1.792	8,54%	10,89	12,72%	6,08
Rapido trawl	1.379	6,57%	7,89	9,22%	5,72
Bottom otter trawl	5.939	28,31%	43,52	50,82%	7,33
Pelagic pair trawl	5.937	28,30%	8,63	10,08%	1,45
<b>Grand total</b>	<b>20.976</b>	<b>100,00%</b>	<b>85,64</b>	<b>100,00%</b>	<b>4,08</b>

**Source:** SISTAN IREPA, 2018

*Tab. 3.4 – Trend of annual average gross revenues per vessel by fishing fleet, Marche, 2013-2018*

*Values expressed in 000 €*

<b>Year</b>	<b>Bottom trawl</b>	<b>Purse seine</b>	<b>Artisanal fisheries</b>	<b>Hydraulic dredge</b>	<b>Rapido trawl</b>	<b>Pelagic pair trawl</b>	<b>Grand total</b>
<b>2013</b>	346,88 -		39,55	145,92	510,79	474,27	149,94
<b>2014</b>	492,18 -		70,96	127,42	654,82	519,08	181,80
<b>2015</b>	521,53 -		63,34	133,35	841,35	546,45	188,29

<b>2016</b>	484,47 -		62,21	186,26	699,83	742,44	206,93
<b>2017</b>	513,59 -		64,75	112,91	1030,13	663,53	196,76
<b>2018</b>	731,49	908,48	54,32	133,01	830,87	1015,41	221,31

**Source:** SISTAN IREPA, 2018

*Tab. 3.5 - Trend of daily average gross revenues per vessel by fishing fleet, Marche, 2013-2018*  
*Values expressed in €*

<b>Year</b>	<b>Bottom trawl</b>	<b>Purse seine</b>	<b>Artisanal fisheries</b>	<b>Hydraulic dredge</b>	<b>Rapido trawl</b>	<b>Pelagic pair trawl</b>	<b>Grand total</b>
<b>2013</b>	3.149,89 -		434,93	1.787,22	7.010,84	3.246,10	1.599,28
<b>2014</b>	3.306,38 -		570,25	1.547,95	4.300,98	3.204,19	1.538,79
<b>2015</b>	3.880,15 -		689,57	1.639,58	5.099,87	3.480,58	1.895,92
<b>2016</b>	3.959,82 -		642,54	1.805,25	4.809,83	4.388,83	1.944,51
<b>2017</b>	3.652,80 -		670,79	1.693,19	5.945,16	4.366,49	1.974,75
<b>2018</b>	4.976,95	6.138,37	660,87	2.072,98	6.352,73	8.355,23	2.483,47

**Source:** SISTAN IREPA, 2018

Overall fishing effort was dominated by small-scale fisheries (32,962 fishing days), followed by bottom otter trawl (17,490 fishing days) and hydraulic dredges (14,180 fishing days).

*Tab. 3.6 - Fishing effort by fishing fleet, MARCHE, 2018*

<b>System</b>	<b>Number of days</b>	
	<b>Total</b>	<b>Average</b>
Purse seine	148,00	158,00
Hydraulic dredge	14.180,00	73,93
Artisanal fisheries	32.962,21	88,72

Rapido trawl	2.485,00	143,32
Bottom otter trawl	17.490,00	162,72
Pelagic pair trawl	2.066,00	134,88
<b>Grand total</b>	<b>69.331,21</b>	<b>89,11</b>

**Source:** SISTAN IREPA, 2018

Landed species was represented by 45 taxa including fish (11,232 tons), molluscs (8,722 tons) and crustaceans (1,477 tons). The venus clam *Chamelea gallina* dominated the landings in terms of biomass (5,941 tons; 28% of total landings), followed by the European anchovy *Engraulis encrasicolus* (4,290 tons; 20% of total landings), and the sardine *Sardina pilchardus* (2,097 tons; 10% of total landings).

Tab. 3.7 - Landings, revenues and prices by species, MARCHE, 2018

Source: SISTAN IREPA, 2018

SPECIES	CATCHES (TONS)	% OF THE TOTAL	REVENUS (000 €)	% OF THE TOTAL	PRICES (€/KG)
European anchovy	4.290,63	10,01%	7.268,51	4,22%	1,69
European pilchard (sardine)	2.097,79	4,89%	1.264,45	0,73%	0,60
Atlantic Mackerel	319,28	0,74%	1.312,39	0,76%	4,11
Albacore (longfin tuna)	0,14	0,00%	0,52	0,00%	3,71
Atlantic bonito	2,96	0,01%	22,21	0,01%	7,50
Swordfish	21,79	0,05%	260,42	0,15%	11,95
Atlantic bluefin tuna	72,10	0,17%	1.070,71	0,62%	14,85
Other tunas	35,01	0,08%	102,47	0,06%	2,93
Bogue	2,62	0,01%	1,79	0,00%	0,68
Tub gurnad	264,93	0,62%	845,71	0,49%	3,19
Poor cod	114,05	0,27%	425,72	0,25%	3,73
Grey Mullet	305,38	0,71%	831,20	0,48%	2,72
Picarel					
European hake	92,54	0,22%	342,00	0,20%	3,70
Common Pandora	30,69	0,07%	59,19	0,03% 0,01%	1,93
Blue whiting	7,09	0,02%	12,77	0,01%	1,80
Rajiformes	154,70	0,36%	543,84	0,32%	3,52
Monkfishes	268,27	0,63%	2.703,09	1,57%	10,08
Greater amberjack	1,37	0,00%	17,69	0,01%	12,94
Turbot	39,43	0,09%	1.089,27	0,63%	27,63
Common sole	506,53	1,18%	6.076,19	3,53%	12,00
Dogfishes nei	13,53	0,03%	34,74	0,02%	2,57
Horse Mackerel	39,98	0,09%	80,68	0,05%	2,02
Red mullet	1.340,20	3,13%	6.192,70	3,60%	4,62
Striped red mullet	19,92	0,05%	305,41	0,18%	15,33
Marine fishes nei	388,72	0,91%	2.965,78	1,72%	7,63
<b>TOTAL FISH</b>	<b>11.232,86</b>	<b>26,21%</b>	<b>39.715,06</b>	<b>23,07%</b>	<b>3,54</b>
European squid	53,49	0,12%	1.207,55	0,70%	22,57
Murex, Changeable nassa	1.528,55	3,57%	3.870,85	2,25%	2,53
Horned octopus	44,24	0,10%	193,48	0,11%	4,37
Musky octopus	145,37	0,34%	666,98	0,39%	4,59
Common octopus	29,17	0,07%	402,33	0,23%	13,79
Common cuttlefish	458,60	1,07%	4.889,50	2,84%	10,66
European flying squids	488,76	1,14%	2.565,51	1,49%	5,25
Venus clams nei	1,66	0,00%	7,43	0,00%	4,47
Striped venus	5.941,09	13,86%	14.712,99	8,55%	2,48
Marine molluscs nei	31,14	0,07%	167,69	0,10%	5,39
<b>TOTAL MOLLUSCS</b>	<b>8.722,07</b>	<b>20,35%</b>	<b>28.684,31</b>	<b>16,66%</b>	<b>3,29</b>
Common spiny lobsters and European lobsters	2,79	0,01%	98,32	0,06%	35,24
Deepwater rose shrimp	209,32	0,49%	1.188,17	0,69%	5,68
Giant red shrimps	1,14	0,00%	23,90	0,01%	20,97
Blue and Red shrimps	0,98	0,00%	25,12	0,01%	25,56
Caramote prawn	397,79	0,93%	7.243,79	4,21%	18,21
Spottail mantis shrimp	669,55	1,56%	6.015,40	3,49%	8,98
Norway lobster	60,67	0,14%	2.443,87	1,42%	40,28
Marine crustaceans nei	135,00	0,31%	653,11	0,38%	4,84
<b>TOTAL CRUSTACEANS</b>	<b>1.477,25</b>	<b>3,45%</b>	<b>17.691,69</b>	<b>10,27%</b>	<b>11,98</b>
<b>Grand total</b>	<b>21432,18</b>	<b>100,00%</b>	<b>86091,07</b>	<b>100,00%</b>	<b>4,02</b>

## Key stakeholders

The increased participation of local fisheries stakeholder in planning and management is one of the key principles of the EAFM, thus an effective and systematic engagement of key actors is a horizontal activity of FAIRSEA project. The table below shows the Marche region stakeholder targeted by the participatory approaches.

<b>INSTITUTIONAL STAKEHOLDER</b>	Ministry of Agricultural, Food and Forestry Policies and Tourism*, Regional Authority (Intermediate Body of EMFF) **, Agency for the Environmental Protection of Marche (ARPAM), Harbours' Masters of the maritime districts of Marche, Sectoral Agencies
<b>TECHNICAL STAKEHOLDER</b>	Polytechnic University of Marche, University of Camerino, University of Urbino, National Research Centre-Institute of Institute for Biological Resources and Marine Biotechnologies, private advisory companies
<b>SOCIO-ECONOMIC STAKEHOLDER</b>	Fisheries and small-scale fisheries enterprises, Fishermen Associations, Labour-market organization, FLAGs (Marche Nord, Centro, Marche Sud)

*\*The Ministry is the National Managing Authority of the EMFF and it carries out the functions assigned to it by art. 125 of the Reg. (UE) 1303/2013 and art. 97 of the Reg. (EU) 508/2014; it is responsible for the effectiveness and regularity of the implementation of the Operational Programme as a whole and, in this sense, indicates the common procedures to be followed by all the subjects, in order to harmonize their implementation.*

*\*\*The Regions have been identified as Intermediary Bodies (Art. 123 of Regulation (EU) no. 1303/2013) for the delegation of precise functions of the Managing Authority, regarding the implementation of the delegated measures. The tasks, functions and responsibilities of Intermediate Bodies, as well as their relations with the Managing Authority or with the Certifying Authority, are regulated by means of a formal agreement between the parties concerning the procedures, criteria and responsibilities connected with the implementation of the delegated tasks. The Intermediate Body formally delegated to carry out the activities provided for in the agreement entered into with the MA and/or CA, operates on the basis of the provisions contained in Community and national legislations as well as on the basis of the provisions of the Manual of Procedures and Controls of the delegating Authority.*

### Pilot actions description

The FAIRSEA project aims to contribute to the implementation of EAF in Adriatic by a set of strategic and operational actions carried out at Adriatic basin and sub-areas level. In the Marche region area, the first step consisted in the key stakeholder identification and categorization at regional level for their engagement in consultation meetings aimed at;

- presenting and discussing the FAIRSEA project, its tools and expected results
- detecting the stakeholder point of view on EAF
- identifying scenarios of interest to test

This activity was carried out by ASSAM in cooperation with OGS and Vegal in the year 2020. Moreover, the regional stakeholders were involved in participatory events such as the second stakeholder meeting arranged by MEDAC in cooperation with ASSAM and University of Macerata on February 2021.

The consultation process led to the identification of a first list of scenarios to test using the BIOECO model developed by the scientific partner COISPA, however many benefits arisen also from the cross-border simulations carried out at whole Adriatic Sea Basin level.

### *Target species*

The pilot actions in Marche Region focuses on management scenarios targeting Common sole and Rapido trawl fleet.

Common sole is, in fact, one of the most important commercial species since it is highly valued by consumers. Moreover, nursery areas of this species are located along the coastal zone of Marche Region, explaining why catches are dominated by age 0 and age 1 sole. The species is targeted by Rapido trawl (all year round) and set nets (from spring to fall).

### *Tools*

Simulations using bio-economic model – BIOECO (developed by COISPA) to evaluate the impacts of potential management actions at the local basin scale, in the short and medium terms, considering spatial and temporal closures.

The modelling scenario was anticipated by an analysis for linking fishing grounds (e.g. the more visited) to the beam trawl (TBB) group of vessels by month/season. Combine the information on the fleet behaviour with the main target species (common sole) distribution

according to the season and life stages. Thus a specific selectivity is associated to the fleets. Currently the stock is in overexploitation ( $F_{curr}/F_{msy}=1.15$ ) with relatively low biomass and the need to preserve the reproductive potential.

### *Scenarios tested and results*

Scenarios implemented:

- improve TBB fleet selectivity, extending the fishing prohibition within 6 nautical miles to December
- improve TBB fleet selectivity implementing the fishing prohibition within 9 nautical miles in October, extended to December
- Combined scenario of increase of mesh net for trammel net, improved selectivity for TBB to the other Italian Regions and to DTS, including a fishing ban of 1 month (November) for Italian SSF.

The effects of temporal and spatial measures (closure of the 6 or 9 nm for 2 or 4 months) following the Italian summer fishing ban in Rapido trawl fleet active in Marche Region. The effects on the Marche region only, however, is producing little effect on the stocks.

Extending to the other beam trawlers and trawlers in the Adriatic (GSA17) the measure implemented for Marche beam trawlers, as regards the extension of the fishing prohibition within 6 nautical miles to December, appears more equitable for the whole fleet.

### *Policy recommendation's*

#### *Ecosystem-based approach to fisheries management and co-management*

- ⇒ Institutional stakeholder recognizes the opportunity deriving from the application of models and tools to support, facilitate decision-making and implement EAF, however a strong cooperation with scientific bodies shall be ensured
- ⇒ Socio-economic stakeholder consultation should be adopted as working tool in a systematic way so to guarantee a more efficient co-decision and co-management of sea resource
- ⇒ National and local governments and research institutions should define an operational Roadmap for the EAF implementation at local and cross-border level

- ⇒ Socio-economic stakeholder involvement should be ensured horizontally
- ⇒ Co-management should be put in practice to address the EAF components
- ⇒ The implementation of EAF can bring added value to seafood products
- ⇒ Capacity building actions for technical and policy officers should be promoted and implemented by means of long-term programmes
- ⇒ Dissemination and communication of scientific results and data should be improved and tailored according to the different target groups involved in sea resources exploitation and management



## Transferability and durability of pilot actions outcomes

The FAIRSEA key challenge is to operationalize the ecosystem-based approach to fisheries management in Adriatic, ensuring the transferability and durability of its outcomes after the project lifespan.

To this, the cooperation between local and cross-border technical, institutional and socio-economic stakeholder is the leverage to consolidate the regional, national and cross-border aspects that need to be included in EAF implementation, as well as a process for selecting parameters that may depend on the characteristics of each fishery and management level. Project partners worked to stimulate the dialogue among different key actors of the fisheries sectors, committing themselves to translate strategic objectives into operational tools and actions for EAF implementation.

Under these premises, FAIRSEA partnership delivered a first cross-border Roadmap where key challenges, best practices and development trajectories for a good governance of the Adriatic basin fisheries were outlined to address the further use of the tools developed and tested within the project.

### Disclaimer

*“This Report has been produced with the financial assistance of the European Union. The content of this Report is the sole responsibility of the FAIRSEA project partnership and can under no circumstances be regarded as reflecting the position of the European Union and/or Italy-Croatia Programme authorities.”*