Study on maritime intra-sectorial interactions analysis as a deepening of the spillover effects of the establishment of Natura 2000 areas in the upper Adriatic sea

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Report	Study of interaction of new Natura 2000 areas in upper Adriatic
Description	The effect that the new marine SCI areas established between Veneto and Emilia-Romagna have had on both fishing and other activities in the maritime space is verified.
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TABLE OF CONTENTS

1 Introduction

Over the last few decades, the awareness has emerged that "pressures on natural marine resources and demands for marine ecosystem services are often too high" and that therefore there is "a need to reduce their impact on marine waters, regardless of where their effects occur". The marine environment is a precious heritage that must be protected, safeguarded and, where possible, restored with the ultimate aim of maintaining biodiversity and preserving the diversity and vitality of the seas and oceans so that they are clean, healthy and productive.

The European Parliament and Council's Marine Strategy Framework Directive, MSFD, 2008/56/EC, sets the goal of achieving good environmental status of the seas surrounding Europe by 2020, in consonance with the most recent Goal 14 of the 2030 Agenda for Sustainable Development: "conserve and sustainably use the oceans, seas, and marine resources for sustainable development".

The Habitats Directive no. 92/43/EEC (implemented into Italian legislation with Presidential Decree no. 357 of 8/09/1997. Official Journal no. 248 of 23/09 and updated and integrated with Presidential Decree 120/2003) provides Community provisions on the safeguarding, protection and improvement of the quality of the environment, including the protection of natural habitats, wild flora and fauna, and imposes on Member States the obligation to establish Special Areas of Conservation (SAC) for the conservation of habitats and species of Community interest and indicates a procedural path.

At the beginning of 2016, the European Commission notified Italy of the opening of an infringement procedure (EU-Pilot 8348/16/ENVI) for the lack of marine Natura 2000 sites, inviting it to expand the network of Sites of Community Interest (SCI) and also set up a SCI in the Upper Adriatic to ensure better protection of dolphins and sea turtles.

The Ministry of the Environment and Protection of Land and Sea (MATTM) has therefore identified a path aimed at resolving the potential violation of EU legislation and thus preventing the beginning of an infringement procedure, providing for the establishment of new marine SCIs and SPAs. The Ministry has delegated the responsibility for the identification and management of Natura 2000 sites to the Regions, pursuant to the provisions of Presidential Decree no. 357/1997 and subsequent amendments.

ISPRA, in one of its scientific documents, identified the Northern Adriatic Sea as a critical area for bottlenose dolphin (*Tursiops truncatus*) and sea turtle (*Caretta caretta*) species, as these species tend to intensify their presence in this area. The Ministry therefore urged the Northern Adriatic Regions to take action to set up the necessary marine SCIs, to protect the two species, within the 12 Italian NM.

The Veneto Region, through its participation in the Northern Adriatic Fishing District and in a Community-Led Local Development (CLLD), sensitized all the stakeholders in the area so that a process of sharing and comparison on the perimeter of the marine SCI and on the proposed conservation measures could be initiated.

Several research bodies were involved (UNIPD and ARPAV), which carried out an initial monitoring of marine mammals in the Veneto region subsequently extending it to the *Caretta caretta* species. Through the programming of the Veneto FLAGs, it was possible to implement the TARTATUR project, where further monitoring of the *T. truncatus* and *C. caretta* species was envisaged, also indirectly through interviews with fishermen and an indication of the fisheries that could be affected by the SCI perimeter.

The synthesis of all these studies, presented in Bologna in a meeting of the Northern Adriatic Fishing District, allowed for the perimeter of the marine SCI in the waters of the Veneto Region and, with a similar procedure, in those of the Emilia Romagna Region.

The regional administrative acts that sanctioned their creation are:

- DGR n. 1135 of 06 August 2020 Identification of a new Site of Community Importance named S.I.C. IT3270025 "Adriatico Settentrionale Veneto - Delta del Po". Natura 2000 European Ecological Network. Directives 92/43/EEC and 2009/147/EC. VENETO REGION
- DGR. 1572 of 09/11/2020 Identification of the SCI IT4060018 Northern Adriatic - EMILIA ROMAGNA REGION

Figure 1.1: Boundary of the Veneto marine SCI area (source DGR Veneto 1135/2020).

Figure 1.2: Boundary of the Emilia Romagna marine SCI area (source DGR Emilia Romagna 1572/2020).

2 Description of the two marine SCIs

The marine SCI of the North Adriatic, which is divided into two different areas only due to administrative boundaries, extends South of the main stem of the Po River in Veneto territory and ends in front of the city of Ravenna in the Emilia Romagna region.

The marine SCI **IT3270025 'Northern Adriatic Veneto - Po Delta' is** located in the Maritime Compartment of Chioggia. It is positioned between the 6 and 12 NM line from the Veneto coastline, with a length of approximately 22 km and a total surface area of 22,513 hectares, equal to 225.1 km^2 .

The marine SCI **IT4060018 'Northern Adriatic Emilia Romagna' is** located in the Ravenna Maritime Compartment. It is positioned between the 4-6 NM line and the 12 NM line from the coast, with an area of 31,160 hectares, equal to 311.6 km^2 .

Both areas are characterized by sandy bottoms with depths between 20 and 30 meters. There are no seagrass beds, maerls or coral formations in the areas.

The Northern Adriatic has been identified as one of the Important Areas for Marine Mammals (cIMMA) in the Mediterranean by the IUCN Joint SSC/WCPA Marine Mammal Protected Areas Task Force for the presence of a resident population of bottlenose dolphins, the only resident cetacean, having fulfilled four basic criteria:

- vulnerability of the species and/or population;
- abundance and distribution;
- reproduction area;
- special features - distinction.

This area is also an important growth area for sub-adult individuals of the Mediterranean population of *Caretta caretta* with migratory corridors close to the coast

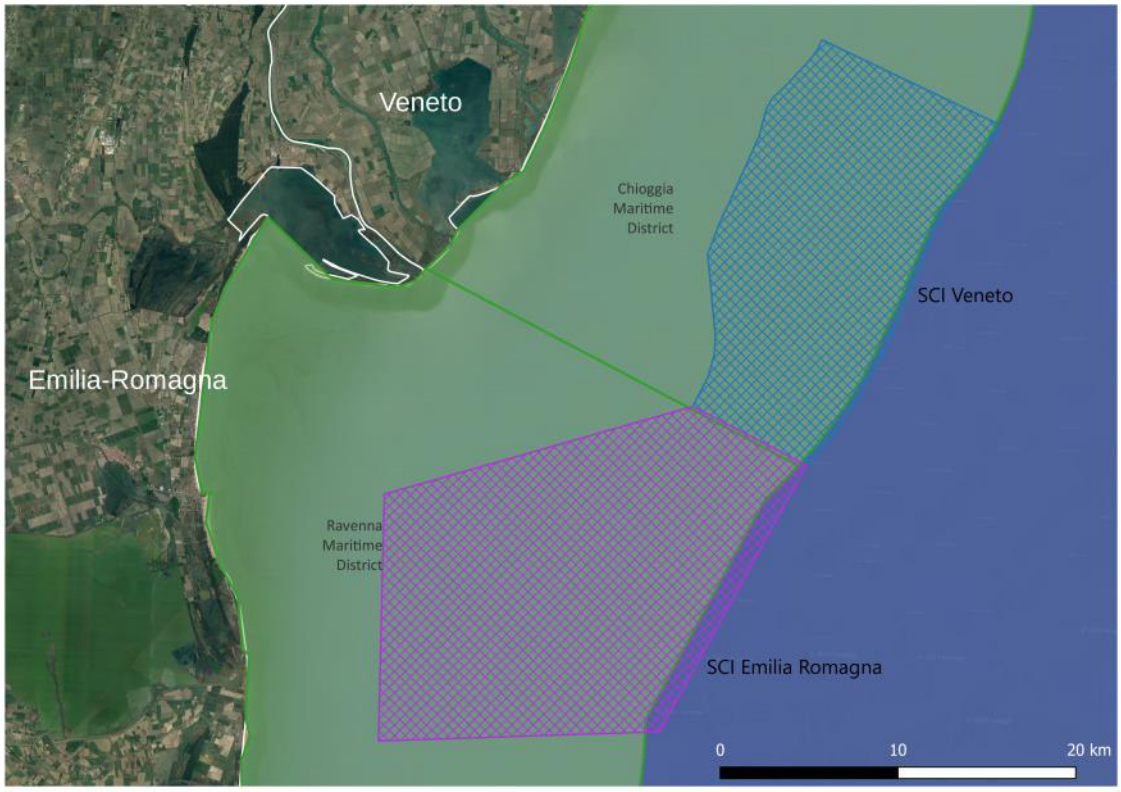


Figure 2.1: Overview of the Veneto and Emilia Romagna SCI areas within the maritime districts of Chioggia and Ravenna.

The area of the two SCIs is one of the most fishy areas of the Upper Adriatic, used by many vessels from Veneto and Emilia Romagna. Fishing is allowed as there are no seagrass beds, maerls or coral formations, as reported in Article 4 (paragraph 1 and paragraph 2) of Reg. (EC) 1967/2006:

- *Paragraph 1*. Fishing with trawl nets, dredges, traps, purse seines, boat seines, beach seines and similar nets is prohibited, particularly on posidonia (*Posidonia oceanica)beds* or other marine phanerogams.
- *Paragraph 2*. Fishing with trawl nets, dredges, beach seines and similar nets on coralligenous habitats and maerl beds is prohibited.

Figure 2.2: Potential ports with interest in the areas of the two marine SCIs.

The biocenosis present in the area are:

- Heterogeneous population (100% in the Emilia SCI area and approximately 50% in the Veneto SCI area)
- Muddy detritus (in the remaining part of the Veneto SCI area)

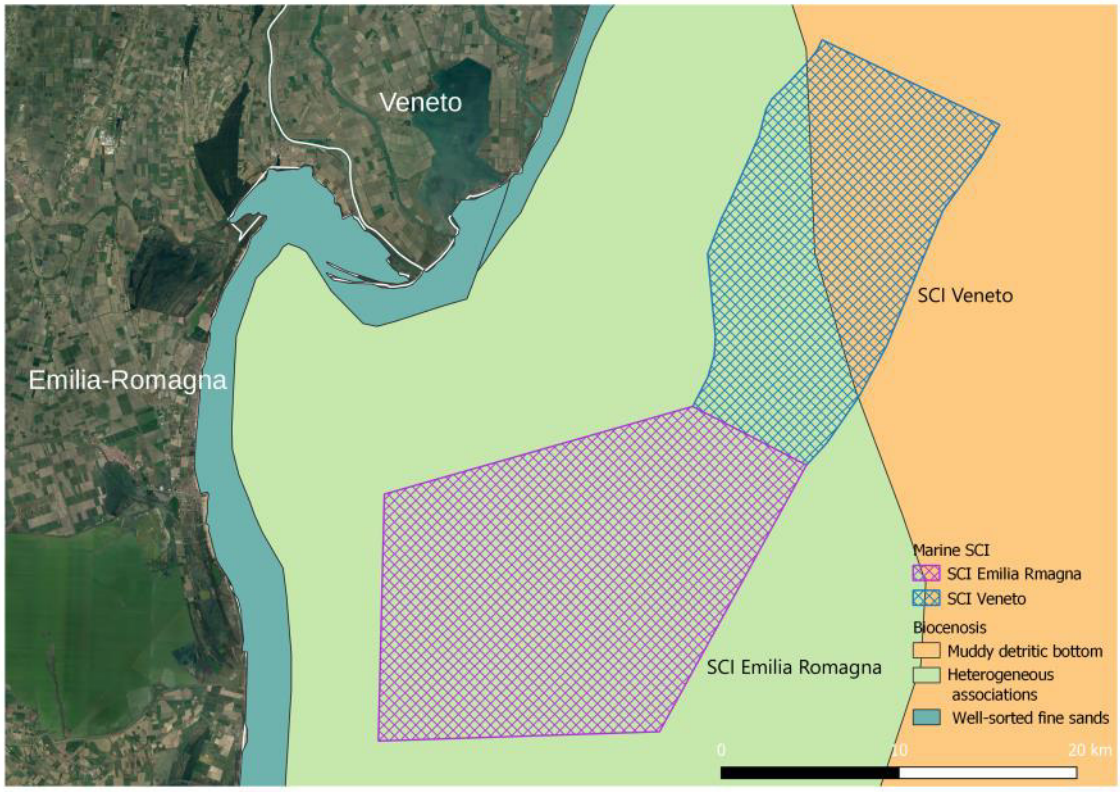


Figure 2.3: North Adriatic biocoenosis and marine SCI areas.

The sedimentological characterization (Kruit – Nota, 1954) shows a homogeneous environment with a seabed formed mainly by the pelitic component. There are no connection to the late glacial relict environment that generated, at North of the mouth of the river Po, the submerged fossil dunes which represent very productive environments for some fishing sectors (rapids, hydraulic dredges, otter trawls).

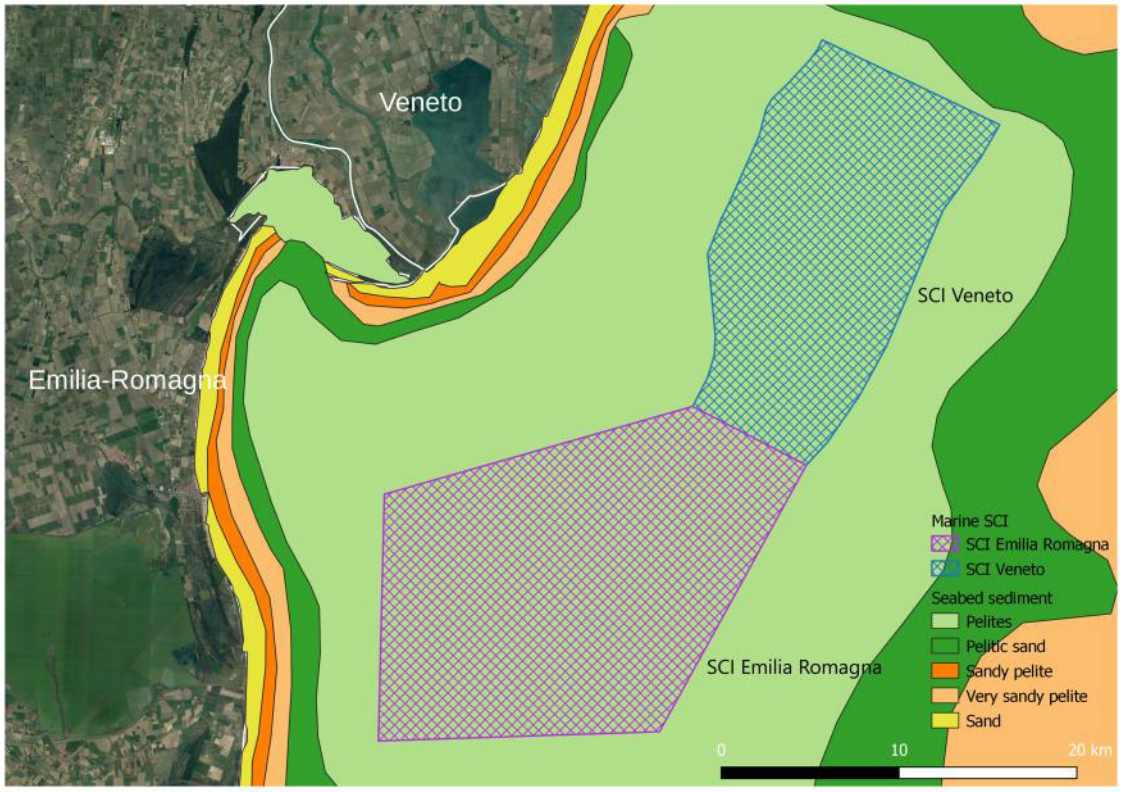


Figure 2.4: Sedimentological Map of Upper Adriatic sediments and marine SCI areas.

3 The particular suitability of the North Adriatic area for target species

The determination of the two SCI areas took place following a collaboration between the stakeholders with the active participation of the two Venetian FLAGs, Venice and Chioggia Delta del Po, through the TartaTur project. This co-operation project between FLAGs has made it possible to collect, order and analyze a lot of information on the species *Tursiups truncatus* and *Caretta caretta*, both under the aspect of historical monitoring of strandings, both on direct and indirect monitoring and also on the behavior of these two species.

3.1 Environmental aspects

Human activities are the main cause of the strong oceanographic and trophic fluctuations that characterize the Northern Adriatic basin (Degobbis et al. 2000, Russo et al. 2002, Solidoro et al. 2009, Fortibuoni et al. 2010, Mozetič et al. 2010, Lotze et al. 2011). The variations that occur due to environmental causes at the base of the trophic chain in primary production, affect the availability of prey for higher predatory organisms such as the bottlenose dolphin, influencing their abundance and distribution (Bearzi et al. 2008a, Fortuna et al. 2018). The presence of dolphins may also depend on other factors related to their behavior related to human activities, such as the feeding strategy following the fishing vessels, related to the distribution of fishing effort, and anthropogenic noise (Rako-Gospić et al. 2017). It follows that the data collected through interviews with fishermen that show an increase in the total number of dolphins could derive from a misperception due to interactions with fishing boats or mass movements of groups of dolphins, rather than an actual increase in their presence .

The information relating to turtles is instead more complex and less known. However, the University of Padua experts are inclined to hypothesize that the same conditions that favor the presence of the bottlenose dolphin support the neritic behavior of this species, especially in areas such as the Sacca di Goro.

3.2 Historical observations on strandings

The Stranded Data Bank (SDB- http://mammiferimarini.unipv.it/) is a database managed by the University of Padua that records data on marine mammal stranded. In parallel, when possible, there is a protocol for sampling stranded carcass tissues, and many of the tissues recovered from such animals are still preserved in the Mediterranean Marine Mammal Tissue Bank

(www.marinemammals.eu).

The data reported are for the North Adriatic basin, for the Italian component, i.e. Friuli Venezia Giulia, Veneto and Emilia Romagna. From 1986 to 2018, 409 cetaceans were stranded (137 in Veneto and Friuli and 272 in Emilia Romagna), 80,4% of them (329) were bottlenose dolphins (*Tursiops truncatus*). Less present in strandings are striped dolphins (*Stenella coeruleoalba*) (18 – 4,4%), where, however, a more constant presence has been recorded since 2012, and Risso's dolphins (*Grampus griseus*), which often strand in pairs (7 – 1,7%). Common fin whale (*Balenoptera physalus*) and common dolphin (*Delphinus delphis*) are practically absent, with only 2 specimens each (last common dolphins in 2000).

Podestà et al. in 2015 analysed data from the Strandings Data Bank obtaining a map of the distribution of strandings in Italy. The Adriatic basin is a strong attractor for bottlenose dolphins, especially the central and northern basin where the greatest number of strandings are concentrated.

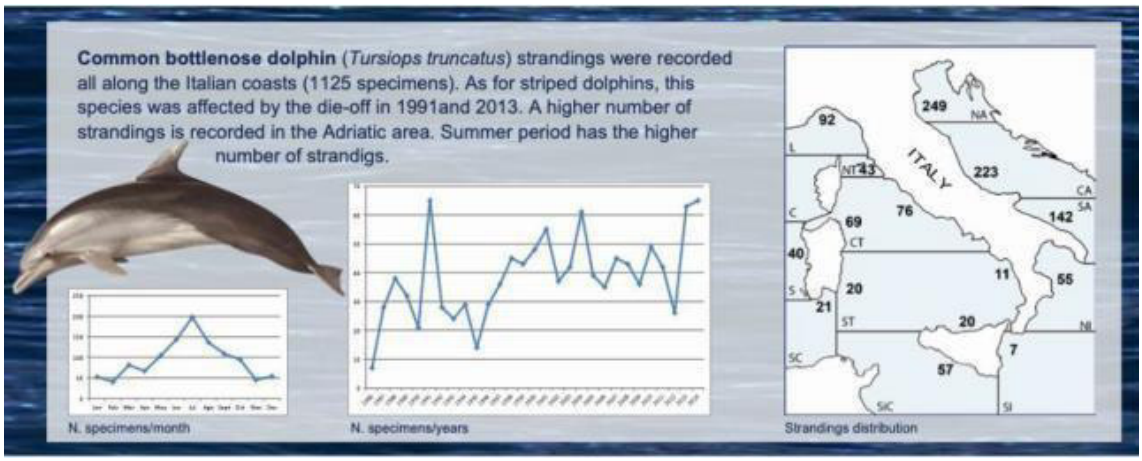
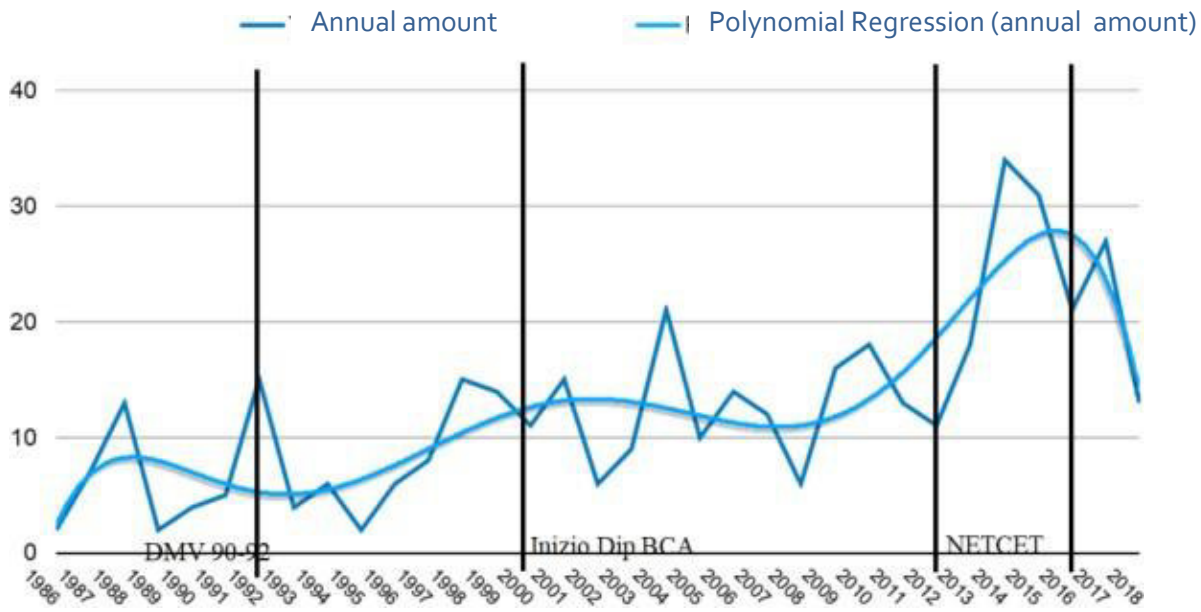


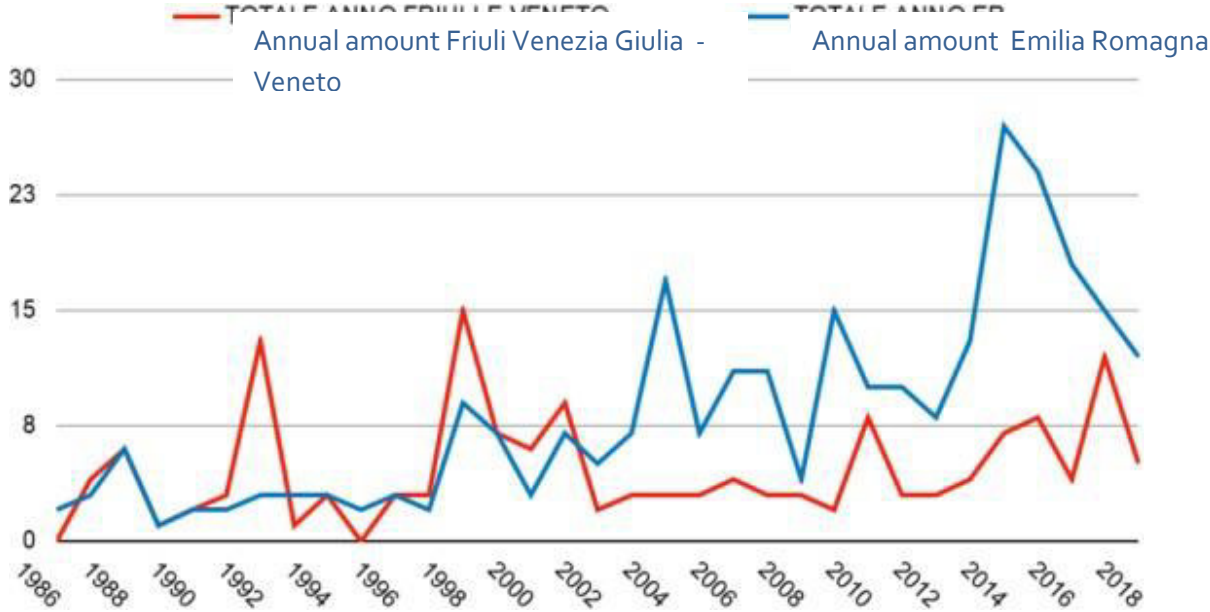
Figure 3.1: Strandings distribution of dolphins from Podestà et al. 2015.

Historical data show a correlation between funding sources and strandings, as many times an increase in strandings is also associated with more funding and not with real fluctuations in strandings. The following graph shows both the strandings and the projects that allowed them to be recorded.



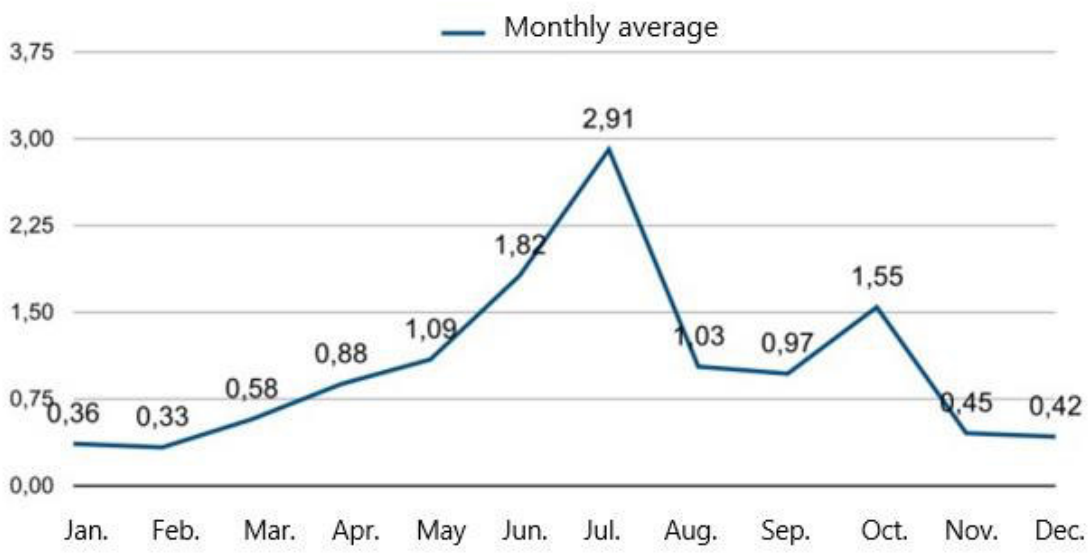
Graph 3.1: Trend of strandings from 1986 to 2018 (UNIPD database).

The spatial analysis of strandings in the North Adriatic area also shows that they are much greater in the Emilia-Romagna area than in the Veneto-Friuli Venezia Giulia part; this division was made taking into account the demarcation line of the Po River, considered as the watershed between the two areas of the North Adriatic.



Graph 3.2: Trend of strandings divided for region of strand (UNIPD database).

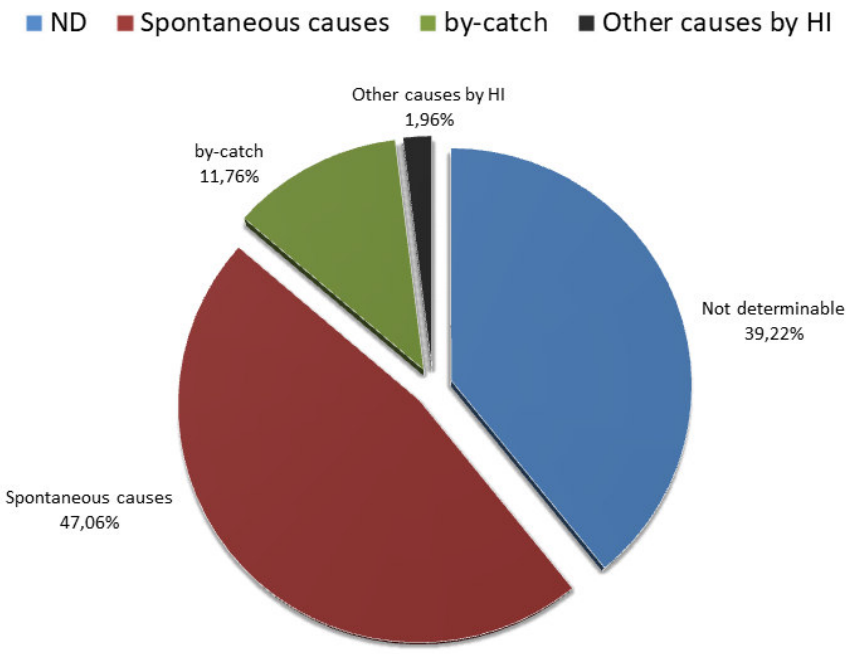
Analysis of annual stranding data shows that these are greater in the summer months than in the winter, with a peak occurring in July each year. A second peak of lesser intensity occurs in October.



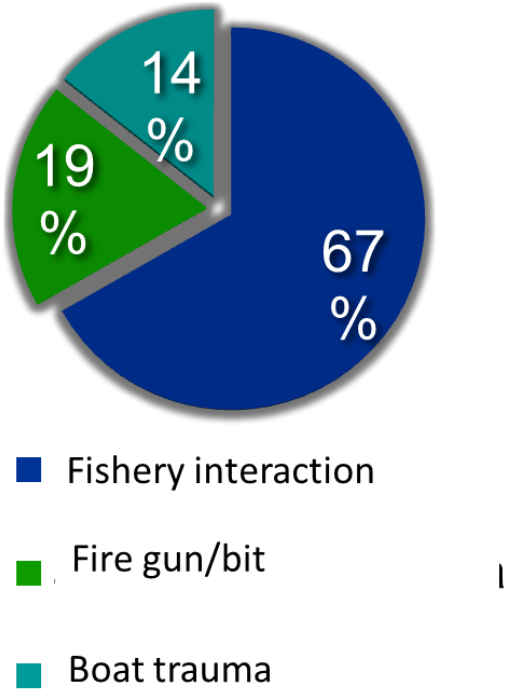
Graph 3.3: Monthly strandings of dolphins (UNIPD database).

Among the causes of death of stranded dolphins, almost 50% is attributable to spontaneous causes, for almost 40% it is not possible to determine the causes of death. The by-catch attributable to human activities represents only 11.78%.

Analysing the anthropogenic causes of death (i.e. that which can be associated with by-catch), the majority, about 2 out of 3 deaths, were associated with fishing activities, about 20% were caused by weapon attacks, and 14% were attributable to impacts with vessels (especially pleasure boats at high speed).



Graph 3.4: Main causes of death for stranded dolphins (UNIPD database).

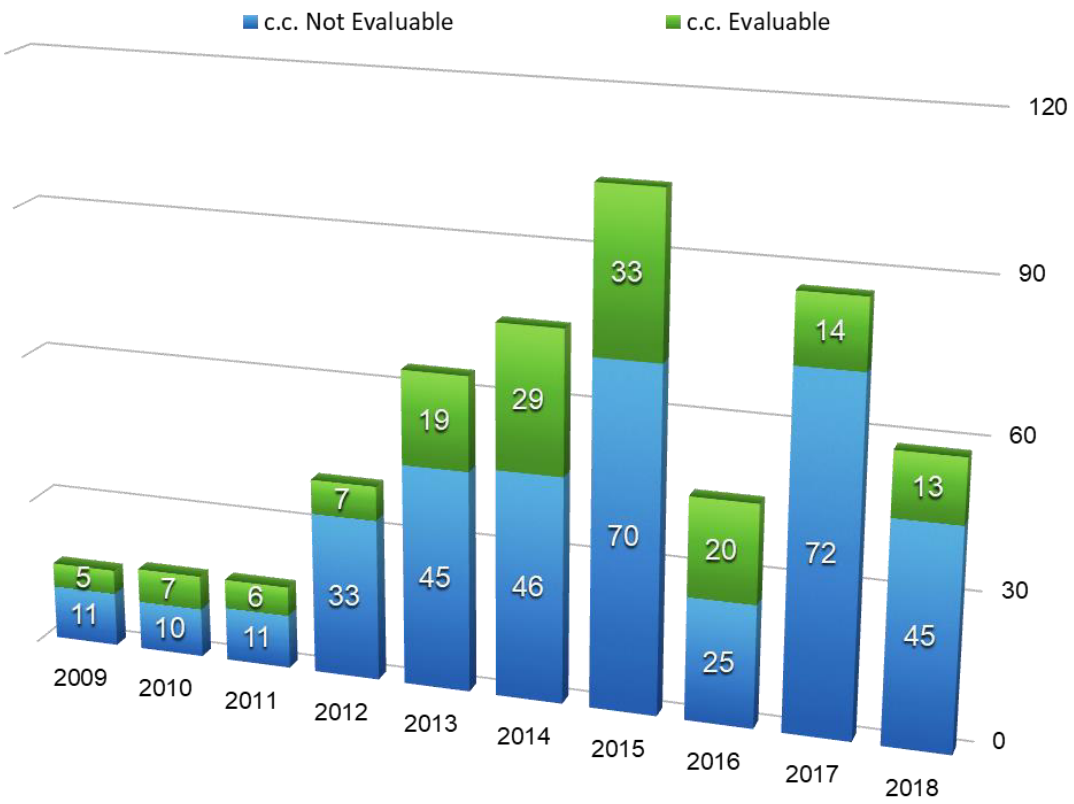


Graph 3.5: Anthropic causes of dolphin deaths (UNIPD database).

Turtle strandings appear to follow the same trend as dolphin strandings but the available data is less detailed and unavailable at a national level. Added to this is the difficulty in determining the causes of death as often the stranded specimens have an advanced state of decomposition (more than 62%

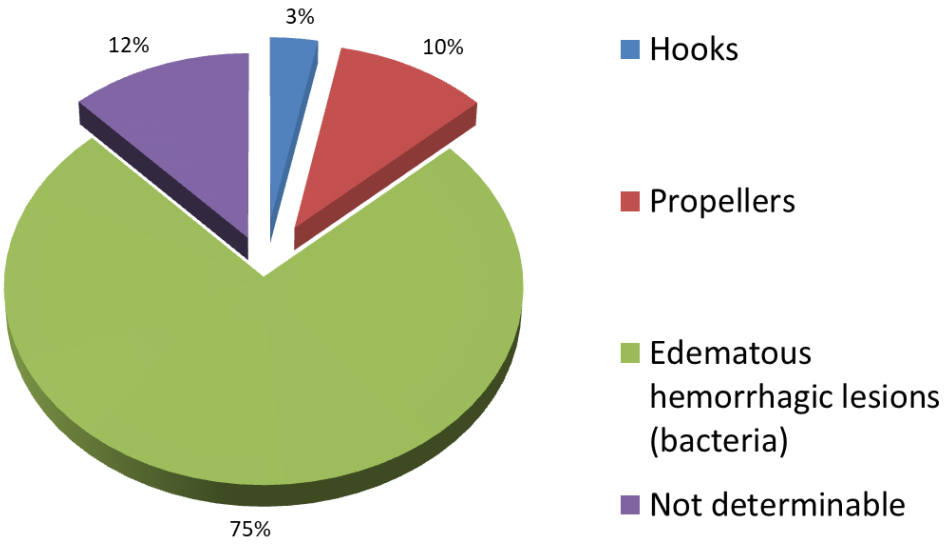
of cases).

The trend of strandings, shown in the graph below, could lead to a misinterpretation of the data as it seems that there has been a strong increase since 2012-2013, whereas this increase is mainly the result of specific projects that have allowed a better and more timely data collection (NETCET project).



Graph 3.6: Strandings of turtles from 2009 to 2018 (UNIPD database).

Among the main causes of turtle death, only a small part can be associated with fishing activities (mainly due to professional fishing with gill nets or sport fishing with rod, line and hooks); 10% can be associated with impacts with boat propellers and about 12% cannot be associated with the cause given the condition of the carcass. Three out of four turtles, on the other hand, died of epidermal bacterial infections; these skin lesions may also have been caused by impacts with boats, propellers or by rubbing against fish hooks or fishing lines, even if not found directly on the carcasses.



Graph 3.7: Principal causes of turtles death (UNIPD database).

The NETCET program mapped the strand locations in all the upper Adriatic coasts, not only for the Italian side.

From the information collected and from direct observations by UNIPD, it emerged that the Italian side is more affected by the phenomenon of dolphin and turtle stranding, although this is not an indication of greater mortality in Italian waters. It must be underlined that most of the carcasses arrive along the Veneto and Emilia Romagna coasts in an advanced state of decomposition, suggesting a death far from regional waters and therefore a passive transport due to currents and winds towards the Italian coasts. Professor Sandro Mazzariol from UNIPD department of General Pathology and Anatomical Veterinary Pathology, during the presentation of TARTATUR project at North Adriatic District meeting in Bologna 31-01-2019, assumed that there is not so much stranding in East Adriatic coast for a reason: in case of death for various reasons, the floating carcass would be pushed by the North Adriatic current towards the Italian coast (Sandro Mazzariol personal communication).

Graph 3.8: Strandings of dolphins and North Adriatic currents (Netcet database 2018).

Graph 3.9: Strandings of turtles (Netcet database 2018).

4 Interference with fishing and aquaculture activities

In the Mediterranean, dolphins have long been considered harmful animals for fisheries and their killing was a common practice until the 1960s. The extermination of dolphins has been promoted for at least a century by the governments of many Mediterranean countries, including Spain, France, Italy, former Yugoslavia and Greece, including through cash bounties (Bearzi et al. 2004, 2008c, Gonzalvo et al. 2015). It was only in 1979 that Italy prohibited unauthorized killings, while in Croatia the killings remained legal until 1995 (Bearzi et al. 2004). Direct mortality today is primarily due to bycatch in fishing gear, but risk factors of concern include the decline in dolphin prey due to overfishing and changes in the marine ecosystem, threats that addiction to exposure to contaminants, pathogens and anthropogenic noise (Bearzi et al. 2004, 2008c).

Dolphins have learned over time to coexist with man by exploiting the opportunities that activities, especially those related to the world of fishing and aquaculture, gave them. An example is the feeding behaviour, many cetaceans hang around fishing boats waiting for the rejected product to be available. Over time this almost symbiotic behavior has developed in two different ways:

- for trawler fishermen, there is a form of protection of the bottlenose dolphin seen as a 'play' companion
- for gill net fishermen, dolphins (as well as turtles) are seen as disturbing elements, causing economic damage related to the loss or deterioration of the product caught, as well as damage to the fishing gear itself.

However, this second view is not confirmed by objective data as several studies have shown that the economic damage caused by gillnet fishing is relatively modest but also that the perception of the damage by the operators is often excessively wrong, distorting the real impact (sometimes suggested by possible economic compensation).

With regard to interaction with forms of aquaculture, different considerations must be made:

- fish farms provide an artificial substrate that, together with the nutrient supply of feed, can increase the concentration of wild prey (acting as a fish concentrator) and facilitate their capture by dolphins, which in some areas of the Mediterranean tend to concentrate near the farms (Díaz López 2006, Piroddi et al. 2011, Bonizzoni et al. 2014, Bearzi et al. 2016).
- mollusc farms can provide an enriched habitat in which dolphins can feed more efficiently (Díaz López and Methion 2017), but a negative effect of these facilities has been observed in some areas (Markowitz et al. 2004, Watson-Capps and Mann 2005, Pearson et al. 2012).

Although there are studies, reported by FoS (Friend of Sea - https://friendofthesea.org/), which speak of interference between cargo ships and cruise ships with large cetaceans (whales and sperm whales), with a sharp increase in the incidence worldwide from 5,000 deaths in the early 2000s to more than 20,000 deaths per year at present, there is no evidence that these same impacts occur in the field of dolphins or turtles. It is possible that stranded carcasses with obvious signs of impact are also caused by collisions along merchant and cruise lines, but according to UNIPD, it seems more likely that small pleasure boats, which are much more unpredictable in their changes of direction, can cause greater damage to these protected specimens with their propellers or hulls.

Analyzing the specific case of the marine SCI area established between Veneto and Emilia Romagna could have potential interferences:

- Professional, recreational fishing and aquaculture
- Extraction activities
- Other transport activities (persons and goods)

Each of these activities has a specific interference with the SCI area that can range from simple passage activities such as transport activities (where the greatest risk concerns the potential impact with dolphins and turtles), to potential risks related to possible environmental spills for mining activities, ending with the fishing sector (both professional and sport) where the interference could be greater as the target species under protection could be accidentally caught by fishing gear.

Many analyses, that are usually carried out in the context of SCI protection areas, are developed for the protection of specific habitats with which animal/vegetal species to be protected are associated. In the particular case of these two SCIs, however, it is not a specific environment that has led to the protection of the area (in fact, there is no valuable environment in the seabed) but the protection of the two target species bottlenose dolphin and turtle. If the activities that are developed within the area do not interfere with the two target species, there is no change to the activities currently in place and the establishment of the protection area is primarily aimed at protection against activities that might be established in the future (e.g. mining or aquaculture activities).

The new integrated analysis approach, where both the environmental and conservation interests of the site and also all those activities that could directly or indirectly be affected by restrictive measures in the use of maritime space and resources are contemplated, allows for much improved management of marine areas subject to protection, seeking to encourage the coexistence of production activities and conservation measures of Natura 2000 sites, including through the development of site-specific Management Plans.

One possible interference that any maritime activity could have with the perimeter of the SCI area relates to passages within the boundaries of the area.

Through the use of the tracks of the vessel tracking systems, it is possible to assess the degree of interference with the SCI area. Geolocation systems make it possible to view the positions and routes taken by the various boats and specifically differentiate between:

- public access systems, mandatory for some categories of vessels and optional for others (AIS)
- satellite systems for the exclusive use of control authorities (Harbour Offices) that cannot be viewed by the ordinary user and are used exclusively on fishing vessels (VMS). These data can be required for specific scientific project.

4.1 Tracking and identification systems

4.1.1 AIS system

AIS is an automatic tracking system compulsorily adopted by ships with a GT of 300 tonnes or more, passenger ships and fishing vessels with a LOA of 15 metres or more. For recreational vessels, the use of AIS is optional. The AIS system transmits and receives on VHF digital bands through electronic equipment mounted on the vessel; the identification data transmitted can be viewed in real time by any vessel under way, thus avoiding the risk of collision with other vessels based on their reciprocal routes and speeds, and also allows the authorities to monitor vessel traffic. AIS integrates a standardised VHF transceiver with a positioning system such as a LORAN or GPS receiver, with other electronic navigation sensors such as a gyrocompass. Ships outside the radio coverage of AIS can be monitored with the Long Range Identification and Tracking (LRIT) system.

The information that can be transmitted by the units' AIS transponder is:

- Unit name;
- MMSI number (maritime mobile service identifier);
- IMO (International Maritime Organisation) number;
- Type of vessel and size;
- Latitude and Longitude;
- BRG (bearing) - true bearing of the ship from our position;

- SOG (speed over ground) - true speed over the seabed;
- COG (Course over ground) - unit's true course over the seabed;
- CPA (Closing point of approach) - minimum distance at which the unit will pass from the receiving vessel;
- TCPA (Time to CPA) - expected time to reach the point of shortest distance.

In compliance with Legislative Decree no. 196 of 19 August 2005, transposing Directive 2002/59/EC of 27 June 2002 of the European Parliament and of the Council, on the establishment of a Community vessel traffic monitoring and information system, the General Command, in its capacity as 'National Competent Authority', has set up a 'national network' to receive AIS information transmitted by ships. The network consists of a series of base stations installed in a position to ensure complete radio coverage of the national coastal profile. The information acquired is centralized at the General Command and made available by it, through appropriate machine-to-machine interfaces, to other services under the General Command's responsibility and to other State Administrations, thus enabling them to avoid equipping themselves with similar equipment for their own institutional purposes. In this perspective, the Italian Vessel Traffic Service centers are not equipped with their own AIS stations, but make use of the services guaranteed by the 'national AIS network'.

All data sent by the world's AIS devices can be viewed through specific portals, such as www.marinetraffic.com, which also offer data processing services providing annual density/traffic maps for different categories of vessels.

Vessels are grouped on the basis of the activity they perform (fishing vessels, cargo vessels, transport of liquids/gas, transport of persons, etc.) and for cargo vessels there is a further division into classes:

- Handysize: cargo ships with a deadweight capacity of between 15,000 and 60,000 tonnes.
- Handymax: cargo ships with a deadweight capacity of between 30,001 and 50,000 tonnes and a length of between 150 and 200 m
- Panamax: cargo ships whose dimensions allow them to pass through the Panama Canal locks; the canal locks measure 304.8 m in length, 33.5 m in width and 12.5 m in depth, so the maximum dimensions of Panamax ships are 294 m in length, 32.3 m in width and 12.04 m in draught. They have a capacity of approximately 60,000 to 80,000 tonnes.

- Aframax: these are tankers with a deadweight capacity of between 80,000 and 120,000 tonnes; the term derives from the classification system established by the Average Freight Rate Assessment or AFRA and are used in the regional commercial traffic of the North Sea, the Caribbean, the Mediterranean and Asia.

- Suexmax: ships whose dimensions allow passage through the Suez Canal; the canal has no length limitations as it has no locks, while it has limits on draught (20.1 meters), width (77.5 meters) and maximum height (68 meters, calculated to make it easy to pass under the Suez Canal bridge).

- Capesize: ships whose dimensions do not allow passage through either the Panama Canal or the Suez Canal. In fact, the term "capsize" is synonymous with 'unlimited' and refers to the Cape of Good Hope near Cape Town. Vessels with a displacement of more than 150,000 metric tons belong to this category: typically large bulk carriers carrying coal or other raw materials in solid form or oil tankers of the VLCC class, up to 200,000 tons, and ULCCs with a capacity of more than 300,000 tons.

For fishing vessels, the AIS position-recording system was mandatorily established under Annex II, Part I, point 3 of Directive 2002/59/EC, which states that fishing vessels with an "overall length of more than 15 meters" are required to have an "Automatic Identification System" (AIS) which they ensure is functioning properly and which complies with the performance standards established by the International Maritime Organization in accordance with Chapter V, regulation 19, section 2.4.5, of the 1974 SOLAS Convention.

Since it is not possible to implement this regulation immediately and widely on all boats due to technical issues, a timetable has been set for compliance with this regulation:

- as from 31 May 2012 for Community fishing vessels with an overall length of 24 meters or more and less than 45 meters;

- as from 31 May 2013 for Community fishing vessels of an overall length of 18 meters or more and less than 24 meters;

- as from 31 May 2014 for Community fishing vessels of an overall length of 15 meters or more and less than 18 meters.

Despite the limitations of the AIS system, due to regulations requiring its use only on certain units, its use for interference analysis provides important information on vessel routes. Furthermore, in support of the consistency of the data provided by the tracking system, it is important to highlight

that fishing vessels with LFTs of less than 15 m in most cases carry out activities that have no interfere with the SCI area, these are in fact mainly:

- units operating with gill nets
- hydraulic dredgers

Gill nets are rarely positioned at distances of more than 3 miles and can be considered absent beyond 6 miles except in restricted areas of the eastern Veneto; this absence is partly justified by the problems linked to the difficulty of managing them in areas far from the coast and partly by the greater risk of damage to nets left in the open sea.

Hydraulic dredges, although they could also fish at greater bathymetries and distances from the coast, for the distribution of target species they operate within 1NM for clam and razor clam fishing, while they can reach over 6NM for fishing for smooth callista (*Callista chione*), which are, however, only found at such distances in the Venice Maritime Compartment.

For fishery vessels equipped with AIS system, spatial processing was carried out using the data on www.marinetraffic.com where it is possible to consult traffic density maps both for the overall routes (navigation+fishing) and for those exclusive to the fishing pressure (data obtained from the voluntary communications that each vessel makes through the AIS tool).

Every vessel equipped with AIS has the option of indicating whether it is sailing or fishing:

- Underway: the boat is sailing
- Engaged in fishing: the boat is fishing.

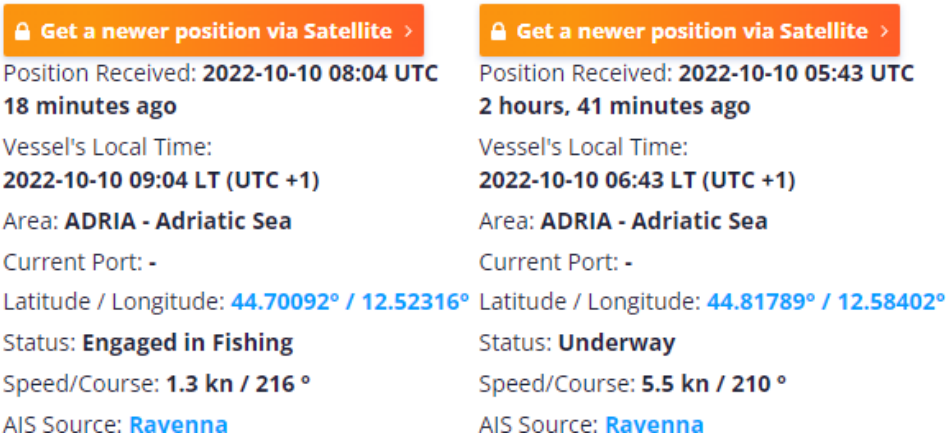


Figure 4.1: Box where you can check the status of a vessel, if underway o engaged in fishing.

Since the AIS does not have a control role but only information, there is no obligation to indicate the status of the vessel. The information relating to the "engaged in fishing" status is therefore purely indicative, otherwise the information regarding the overall traffic (underway + engaged in fishing) is correct and relevant.

4.1.2 VMS Satellite – based vessel monitoring system

Council Reg. EC No. 1224/2009 of 20 November 2009 and Implementing Reg. (EU) No. 404/2011 of 8 April 2011, establish detailed provisions on how the Community fleet and third country vessels operating in Community waters The EC Regulation n. 1224/2009 of the Council of 20 November 2009 and the Implementing Regulation (EU) n. 404/2011 of 8 April 2011, establish detailed provisions regarding the management and control methods of the Community fleet and of third country vessels operating in Community waters through satellite tracking systems, in order to effectively monitor the fishing activities carried out by fishing vessels wherever they are, as well as the fishing activities carried out in their waters.

From the 1st January 2012, fishing vessels over 12 meters in length have been obliged to install on board a fully functioning device that allows for the automatic satellite tracking and identification of the vessel by the "satellite-based Vessel Monitoring System" (VMS**,** commonly known as the **Blue-box**), which provides position, course and speed data at regular intervals to the fishing authorities. Community fishing vessels with an "overall length of less than 15 meters", flying the flag of the Member State, may be exempted from the Vessel Monitoring System requirement if:

- operate exclusively in the territorial waters of the flag Member State;
- never spend more than 24 hours at sea from departure to return to port (trip).

As mentioned, these data are not public but for the exclusive use of the Port Authorities and the Ministry mainly for the purpose of monitoring compliance with current legislation.

They may be requested for scientific purposes limited to certain specific information.

In order to have uniformity of data, it was chosen to analyse AIS data (with all the limitations this may have for the fishing sector) for spatial interference for both fishing boats and all other boats.

4.2 Fishing fleet and fishing activity in the marine SCI area

The different activities concerning the fisheries sector, whether professional or recreational fishing or for aquaculture activities (especially fish farming) could conflict with the purposes for which the SCI areas were established.

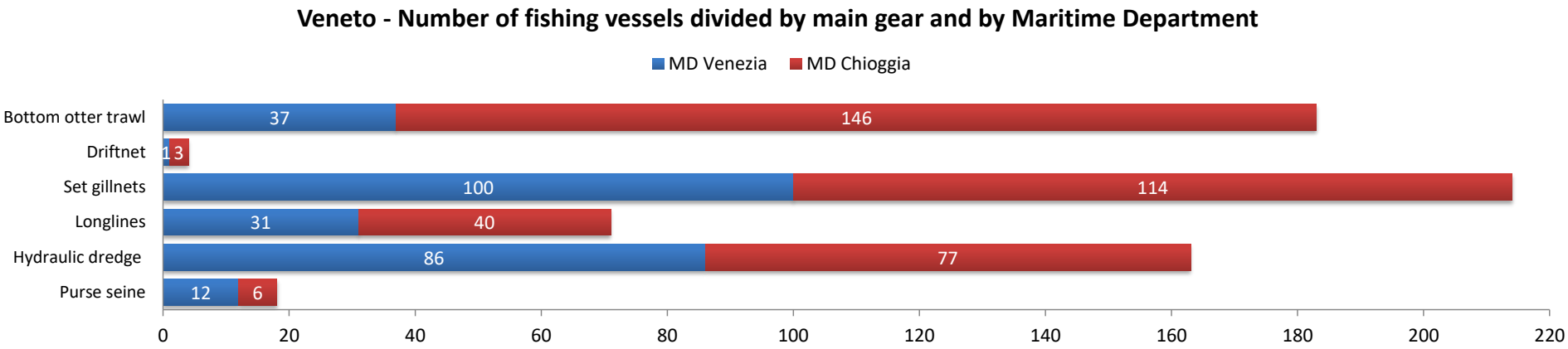
Fishing and aquaculture activities could encounter difficulties in a balanced coexistence with the protected areas, since fishing, both professional and recreational, tends to use spaces and resources that a SCI area aims to protect. Similarly, aquaculture, although it does not affect the stocks present, could produce boundary effects which could negatively interfere with the conservation objectives of the SCI.

The analysis of the fishing fleet potentially fishing within the marine SCI area was conducted by consulting the EU Fleet Register, dividing the vessels on the basis of fishing licences considering both main and secondary gear. The fleets of the Veneto and Emilia Romagna regions were considered as they are close to the survey area.

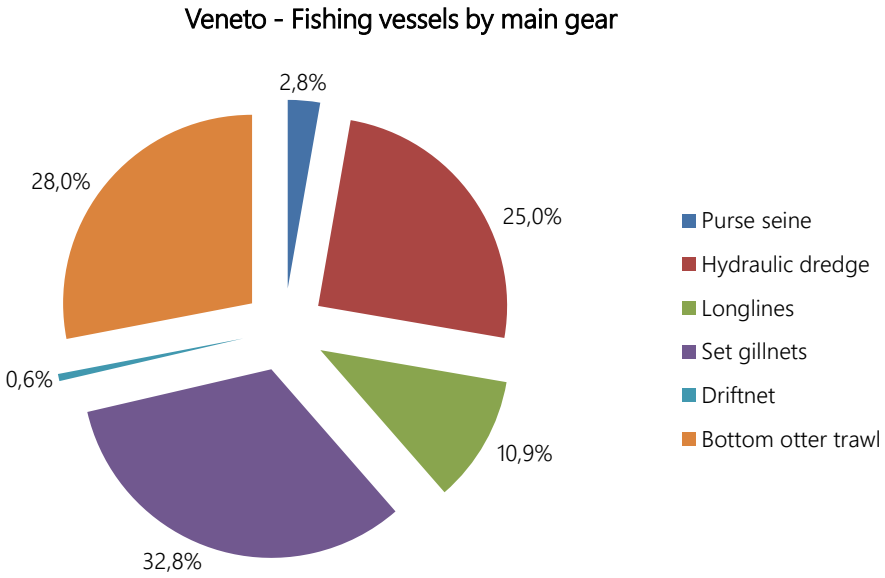
First of all, the consistency of the fleet that has potential interests in the SIC area and its production data were analysed.

In Veneto, the fishing fleet is composed of 653 vessels (Fleet Register 2022), of which 267 belong to the Maritime Compartment of Venice and 386 to the Maritime Compartment of Chioggia. Graph 4.1 shows the subdivision of the fleet on the basis of main licences, while the Graph 4.3 shows the sum of main and secondary licences for each fishing gear. The fishing activities that could interfere with the marine SCI area, due to its location, are mainly identified in bottom trawling and pelagic pair trawling; Fleet Register data (2022) indicate that for these two segments in Veneto, 229 and 51 units are respectively authorised, but a recent census conducted among the fishing Cooperatives of the territory and the operators allowed to identify that currently 14 pairs of pelagic pair vessel (28 vessels) are actively operating in Veneto, all located in the Maritime Department of Chioggia.

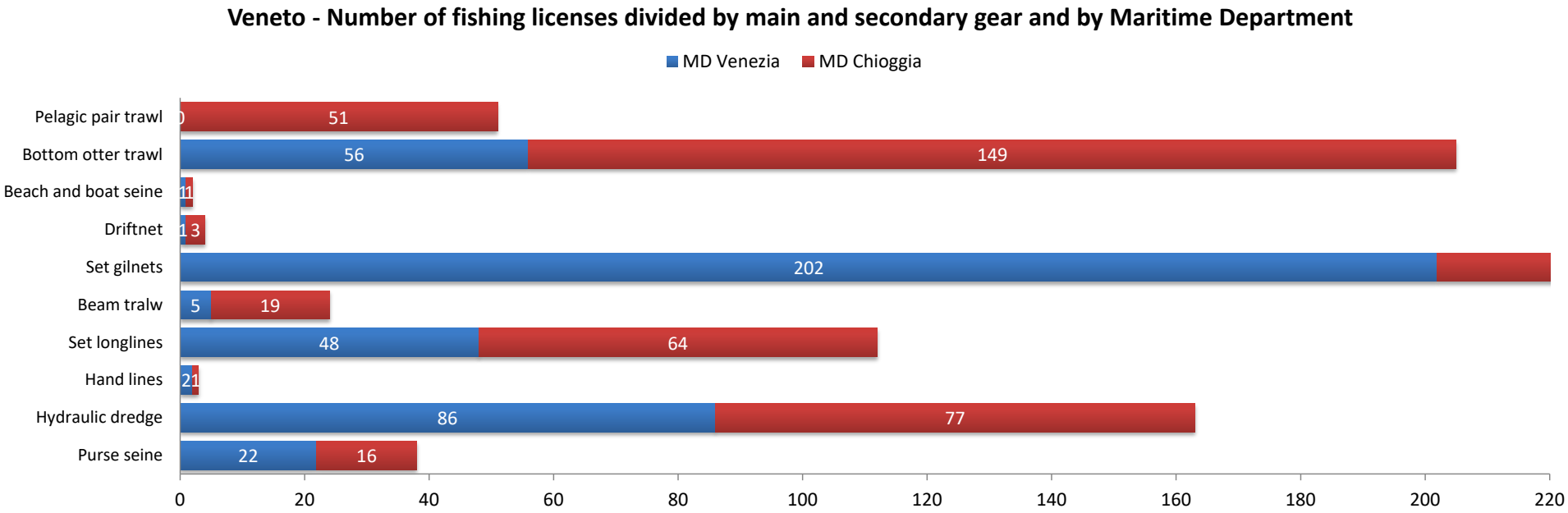
In Emilia Romagna the fleet is composed of 588 units, of which 365 belong to the Ravenna Maritime Department and 223 to the Rimini Maritime Compartment (Graph 4.5). Analysing the total number of trawling and pelagic pairs licences (primary and secondary), it can be observed that there are 222 and 46 licences respectively, the recent census showed that there are 8 pairs of vessels actively fishing with this system in Emilia Romagna for a total of 16 units.



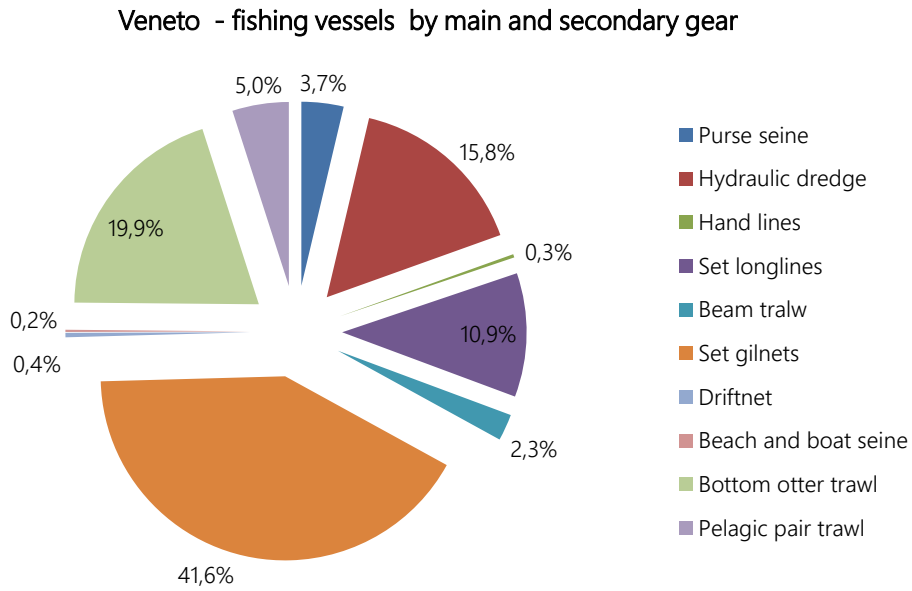
Graph 4.1: Number of fishing vessel sorted by main gear in the Maritime Department of Venezia and Chioggia (Fleet Register 2022).



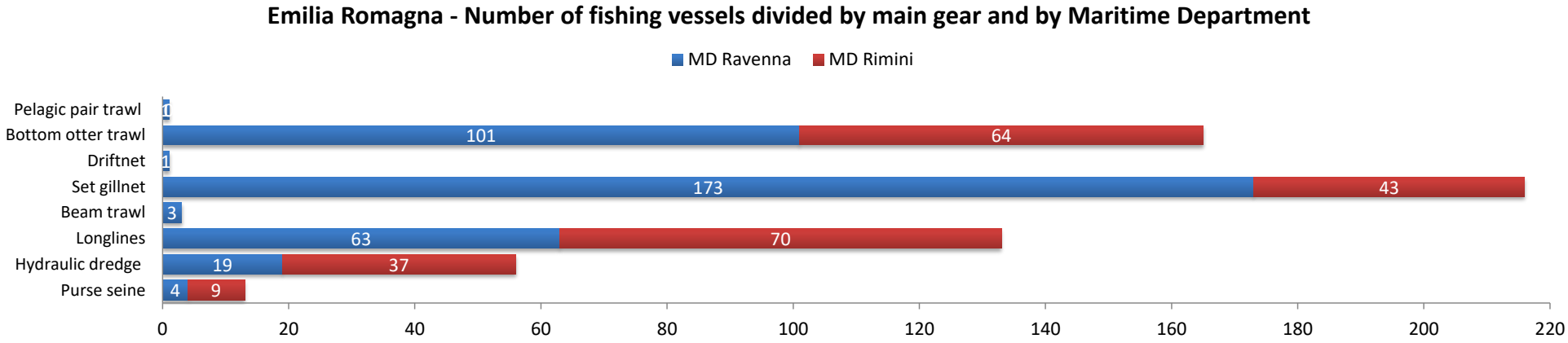
Graph 4.2: Percentage breakdown of the main gear for Veneto vessels (Fleet register 2022).



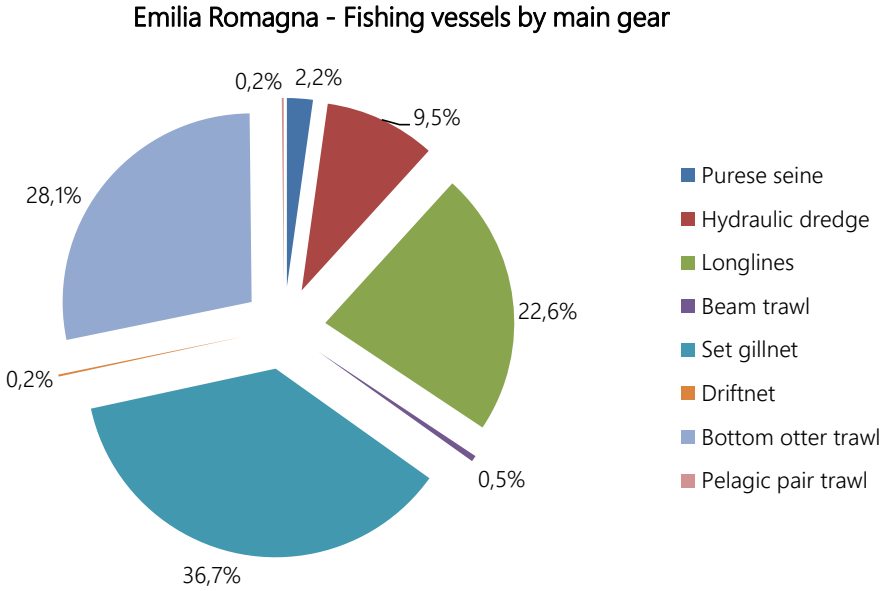
Graph 4.3: Number of fishing licenses sorted by main and secondary gear in the Maritime Department of Venezia and Chioggia (Fleet Register 2022).



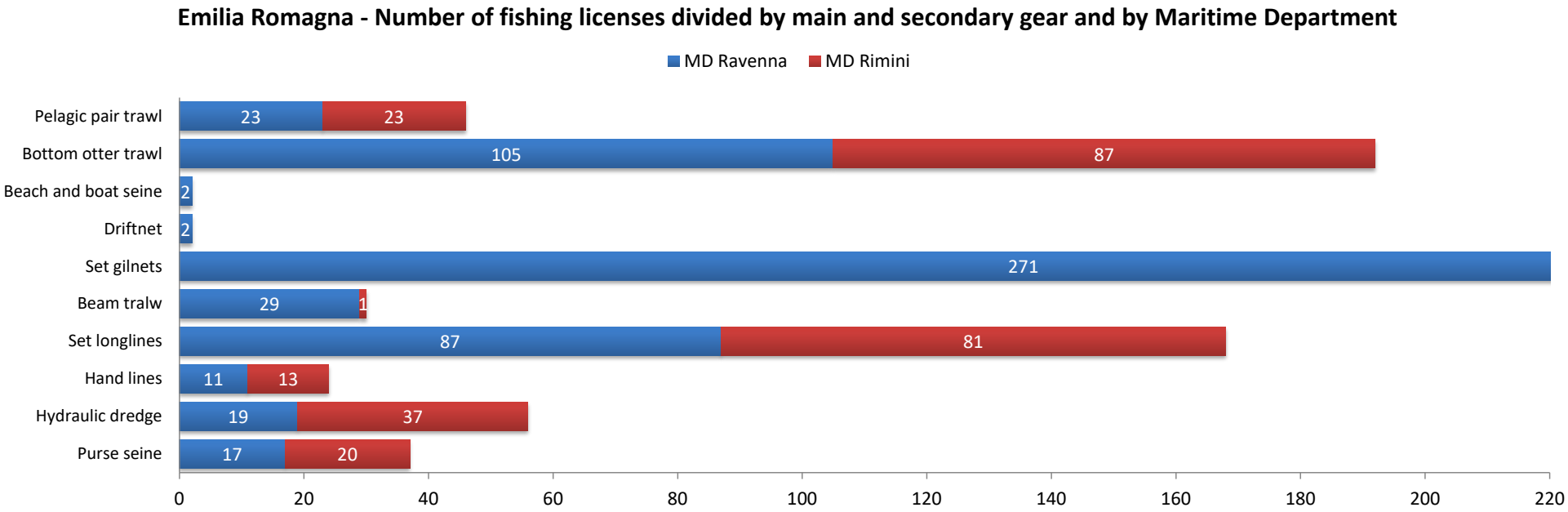
Graph 4.4: Percentage breakdown of the main and secondary gear for Veneto vessels (Fleet register 2022).



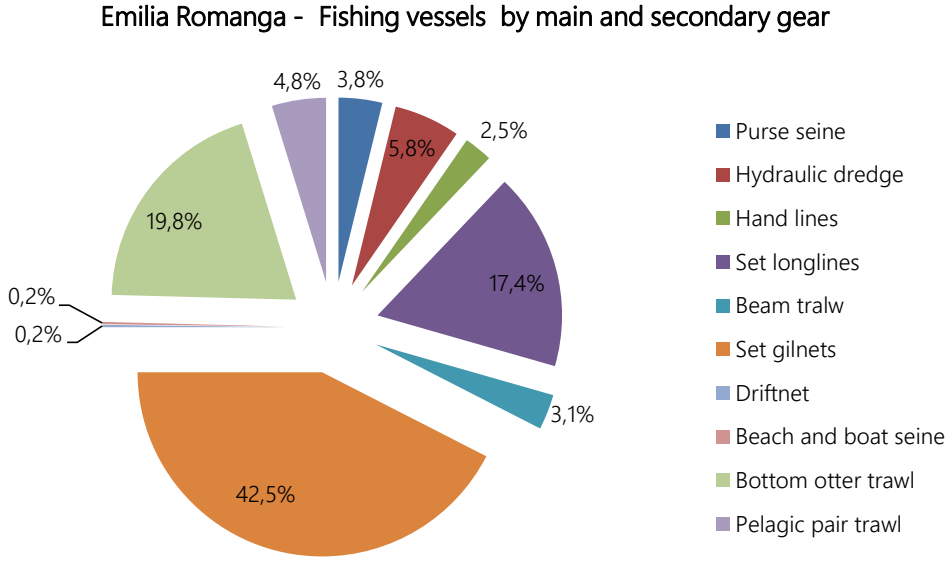
Graph 4.5: Number of fishing vessel sorted by main gear in the Maritime Department of Ravenna and Rimini (Fleet Register 2022).



Graph 4.6: Percentage breakdown of the main gear for Emilia Romagna vessels (Fleet register 2022).



Graph 4.7: Number of fishing licenses sorted by main and secondary gear in the Maritime Department of Ravenna and Rimini (Fleet Register 2022).



Graph 4.8: Percentage breakdown of the main and secondary gear for Emilia Romagna vessels (Fleet register 2022).

The fisheries that have a potential interference with the marine SCIs in question are those with vessels equipped for trawling. Other types of fishing are to be excluded as:

- • Fishing with gillnets is mostly practiced along the coast from small boats equipped with low-power engines; some trawlers are equipped to fish more than a mile from the coast but always within 3 miles so as not to conflict with the towed boats. Much more occasional are gillnets at distances of more than 6 miles.

- Fishing with hydraulic dredges is carried out within the first mile for the species *C. gallina, E. minor* and *S. marginatus.* Fishing for *C. chione* is also carried out beyond 6 miles but, at these distances, it mainly concerns the Maritime District of Venice, thus excluding possible interference with the SCI area.

From interviews conducted among Veneto operators it emerged that the area in question is not particularly suitable for trawling as there is a lot of detrital material on the seabed which poses risks to the equipment, probable damage to the catches and requires rapid fishing actions to avoid excessive weight to hoist.

Pelagic pair trawl fishing is not affected by this problem, the area of the two SCIs is widely used for this fishing sector.

4.3 Production data attributable to the area of marine SCI

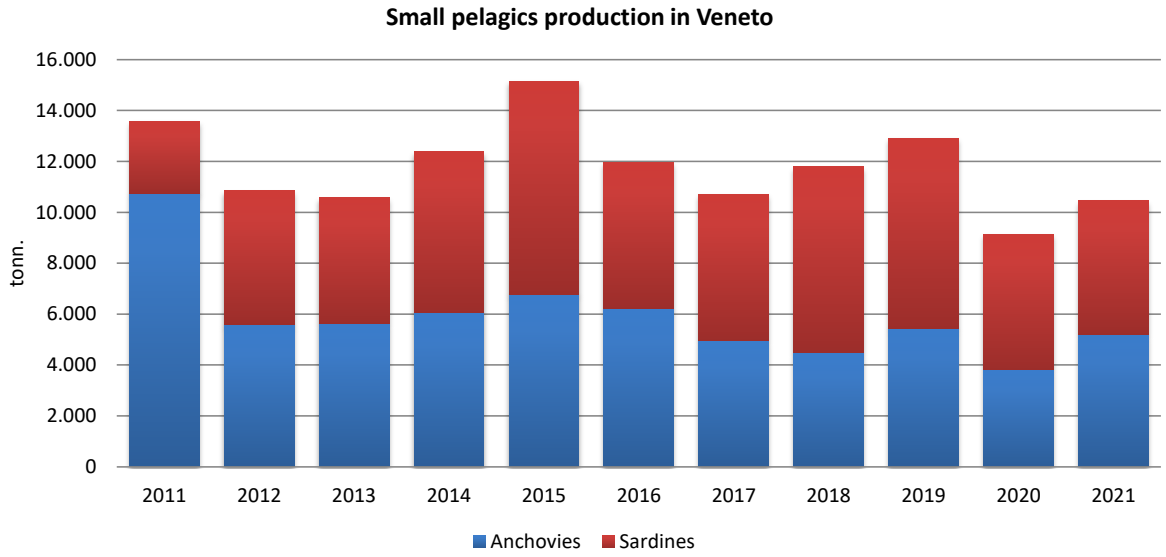
For the analysis of production, data from the Fish Markets of the territory affected by the SCI areas, i.e. the Veneto and Emilia Romagna regions, and the MIPAAF 2010/2020 data reported in the Yearbooks of Italian Agriculture (2010/2020) were used.

Below is the analysis of the productions for the bottom and pelagic trawls fishing systems which were the most affected by the establishment of the SCI.

4.3.1 Production in Veneto

The production of small pelagics, sardines and anchovies, fished by the segment of the **Pelagic Pair Trawl,** in Veneto is to be referred in its entirety to the Maritime Compartment of Chioggia as the fleet carrying out this type of fishing is located in this area.

As observed in the Graph 4.9 the production of small pelagics shows a downward trend with fluctuations in the 2011-2021 timeframe, with a peak in production in 2015 (around 15,000 tonnes) and a minimum in 2020 (around 9,000 tonnes), the year in which the pandemic had a strong impact on the markets. Anchovy production in the last 10 years has contracted sharply, particularly between 2011 and 2012, when production fell by 48%; as regards sardine production, an upward trend is observed until 2015, with small fluctuations in the following years and then a sharp drop in 2020-2021.



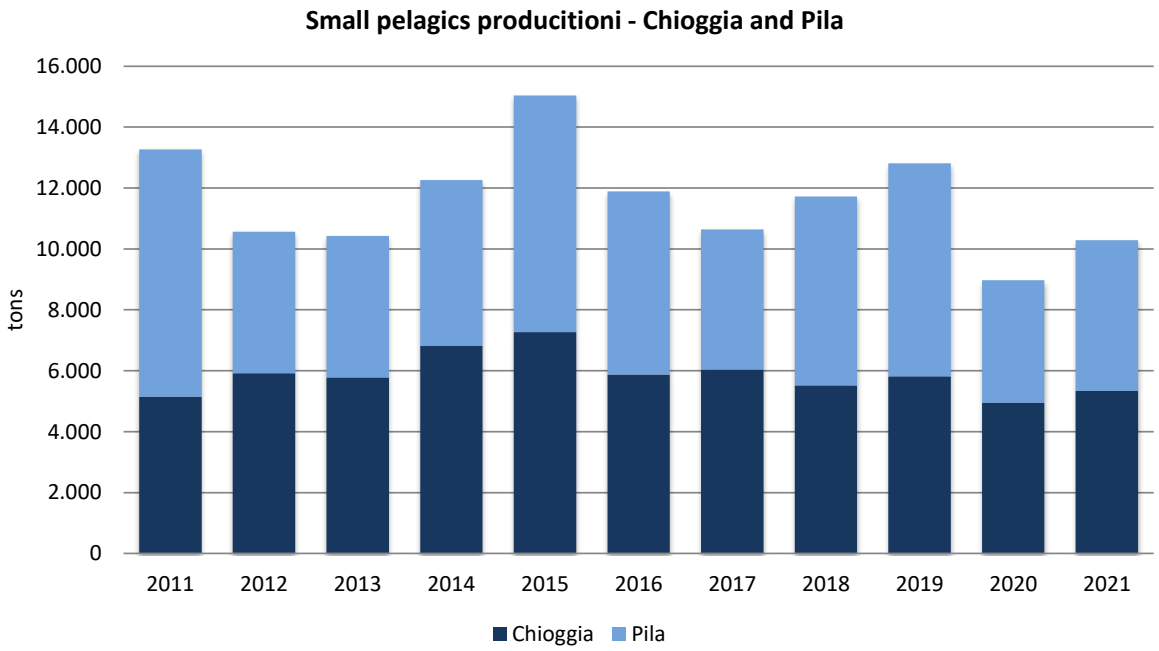
Graph 4.9: Production of anchovies and sardines in Veneto (Data source: elaborations of the Socio-Economic Observatory of Fisheries and Aquaculture of Veneto Agricoltura on data from the Veneto fish markets).

Given the location of the Veneto SCI, an in-depth analysis of the production of small pelagics in the Chioggia Maritime Department is provided below.

The production of small pelagics in the **Chioggia Maritime Department** can be analyzed by dividing the total quantities between the Chioggia and Pila marinas, where are located all the pelagic pair trawlers from Veneto.

As can be seen from the Graph 4.10 the production in the two areas is almost equivalent, with the exception of 2011. In the observed period, the percentage difference between the production of these areas never exceeds 15% in favor of Chioggia or Pila. In particular, as regards the fleet of Pila, which is closer to the area covered by the marine SCI, the quantities of fish caught vary between 8,129 tonnes

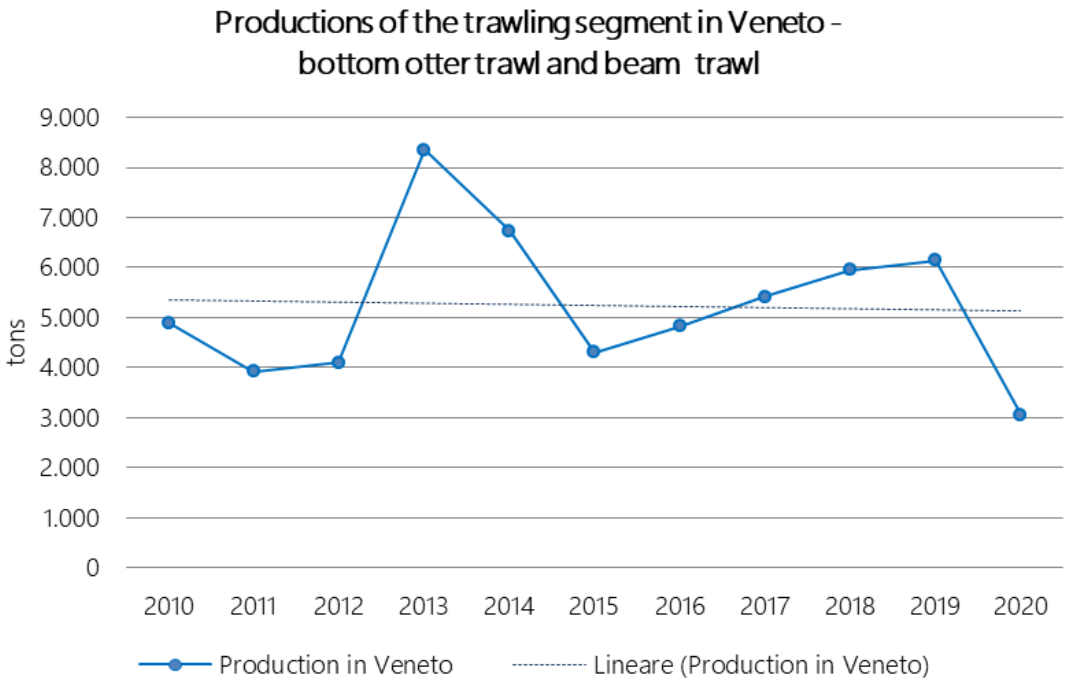
(2011) and 4,025 tonnes (2020).



Graph 4.10: Small pelagic production in the Chioggia Maritime Department (Chioggia and Pila).

Although, as can be seen from the testimonies of the operators, the areas subject to the establishment of marine SCIs are not very suitable for beam trawl or otter trawl fishing, an analysis of production was carried out using the MIPAAF data from the "National Fisheries Data Collection Programme", in the 2010/2020 period.

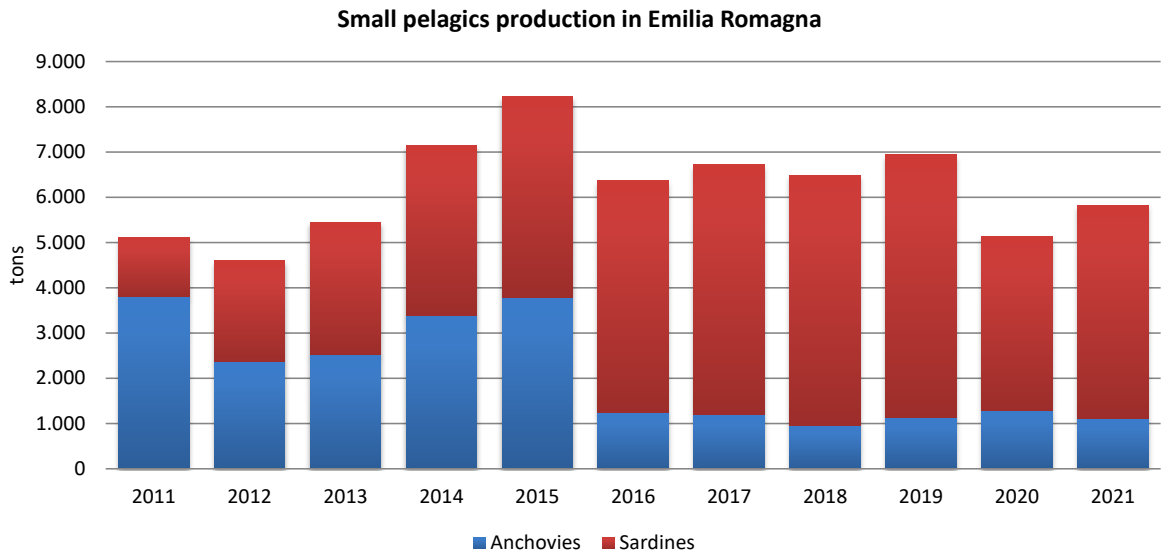
As can be seen from the Graph 4.11 production fluctuates over the analyzed decade with a general negative trend. 2013 is the year with the highest production with about 8,500 tonnes in total, a clearincrease compared to previous years, and a minimum in 2020, which was affected by the pandemic that influenced market trends, where production stood at about 3,000 tonnes. The average production for 2010/2020 is around 5,200 tonnes.



Graph 4.11: Production of the trawling (OTB, TBB) segment in Veneto (Source: Agriteco elaborations on MIPAAF data - national fishery data collection programme).

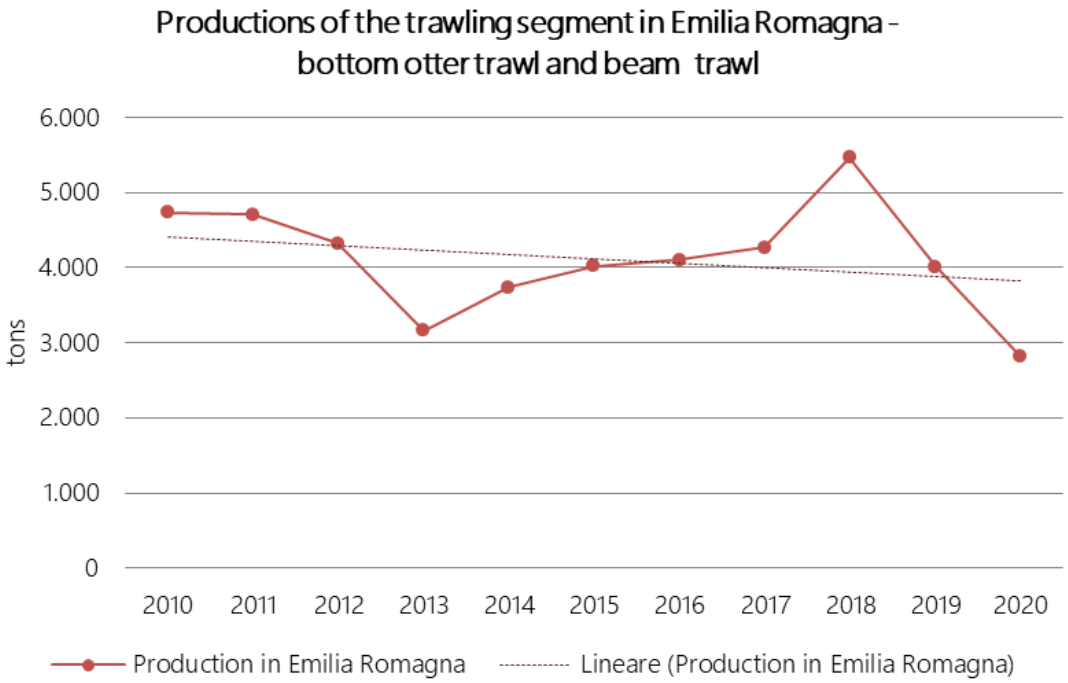
4.3.2 Productions in Emilia Romagna

The production relative to the Emilian fleet as regards fishing with **Pelagic Pair Trawl** shows a general trend in slight increase, the average production is 6,100 tonnes with a maximum of about 8,000 tonnes in 2015 and a minimum of just over 4,500 tonnes in 2012. The production of anchovies after2015 undergoes a drastic reduction, to remain constant in the following years, the opposite trend is observed for sardines, which from 2016 show an increase in production.



Graph 4.12: Production of anchovies and sardines in Emilia Romagna (Data source: processing by the Veneto Agricoltura Socio-Economic Observatory for Fisheries and Aquaculture on data from the Veneto fish markets).

The **trawling** segment (**OTB, TBB**) in Emilia Romagna shows a downward trend between 2010 and 2020 (MIPAAF data from the "National fisheries data collection programme" 2010/2020), the trend is strongly influenced by the situation in 2020, the year of the pandemic, in which production records the lowest value of around 2,800 tonnes. The most abundant production is observed in 2018 with quantities approaching 5,500 tonnes.



Graph 4.13: Production related to the trawling segment in Emilia Romagna (Source: Agriteco elaborations on MIPAAF data - national fishery data collection programme).

5 Marine SCIs and fishing tracks

The maritime space, in relation to fishing activities, may be divided on the basis of the fishing gears insisting on the different distances from the coast:

- 0-3NM: hydraulic dredges (clam, razor clam and smooth callista), longlines, gillnets
- 3-6NM: hydraulic dredges (smooth callista), gill nets, trawl nets, purse seine, pelagic pair nets
- Over 6NM: trawling, purse seine, pelagic pair nets.

The location of the SCI area, between 6 NM and 12 NM, means that interference is limited to some types of professional fishing. Bottom otter trawling, beam trawling and pelagic pair trawling fishing vessels operate almost exclusively within the area. No shoals of *Callista chione* are present in the area, thus excluding the presence of hydraulic dredges and, as far as purse seine are concerned, there are no boats operating with this gear in Veneto.

Following discussions with operators, it emerged that the area where the SCI is located is little used by bottom trawlers, both with beam and otter trawls, as the seabed is not optimal for these types of gears. Pelagic pair trawling vessels, which targets small pelagics, is commonly conducted in this area since it does not interact with the seabed.

The density map relating to the routes of fishing boats equipped with AIS shows how the area is affected by high traffic in the two SCI areas and in the neighboring area. In the SCI IT3270025 area the density of the routes is more intense in the NNW portion and in the strip closest to the coast.

The comparison between 2020 and 2021 highlights the impact of the COVID19 pandemic on fishing activities; 2020, albeit with a similar spatial coverage compared to 2021, presents lower absolute values given by the restrictions of the lockdown and the consequent effects on market requests.

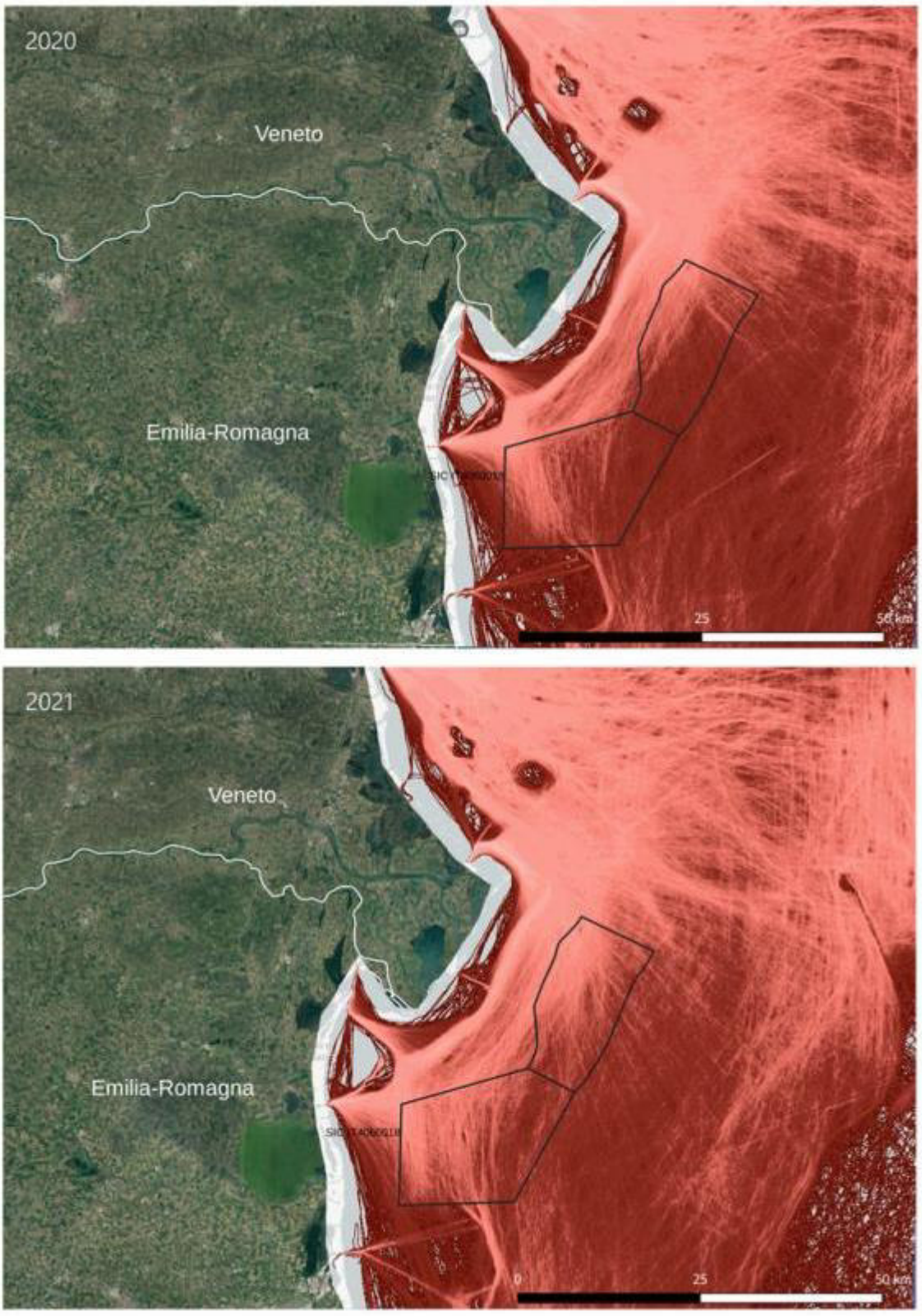


Figure 5.1: Density relative to the routes of fishing units equipped with AIS - 2020/2021.

The maps relating to the paths of the "engaged in fishing" units (defined in the portal as "pressure of fishing" maps), with the limitations highlighted above, also underline the marked difference between 2020 and 2021, with 2020 showing a reduced fishing pressure and a 2021 where the activity is recovering.

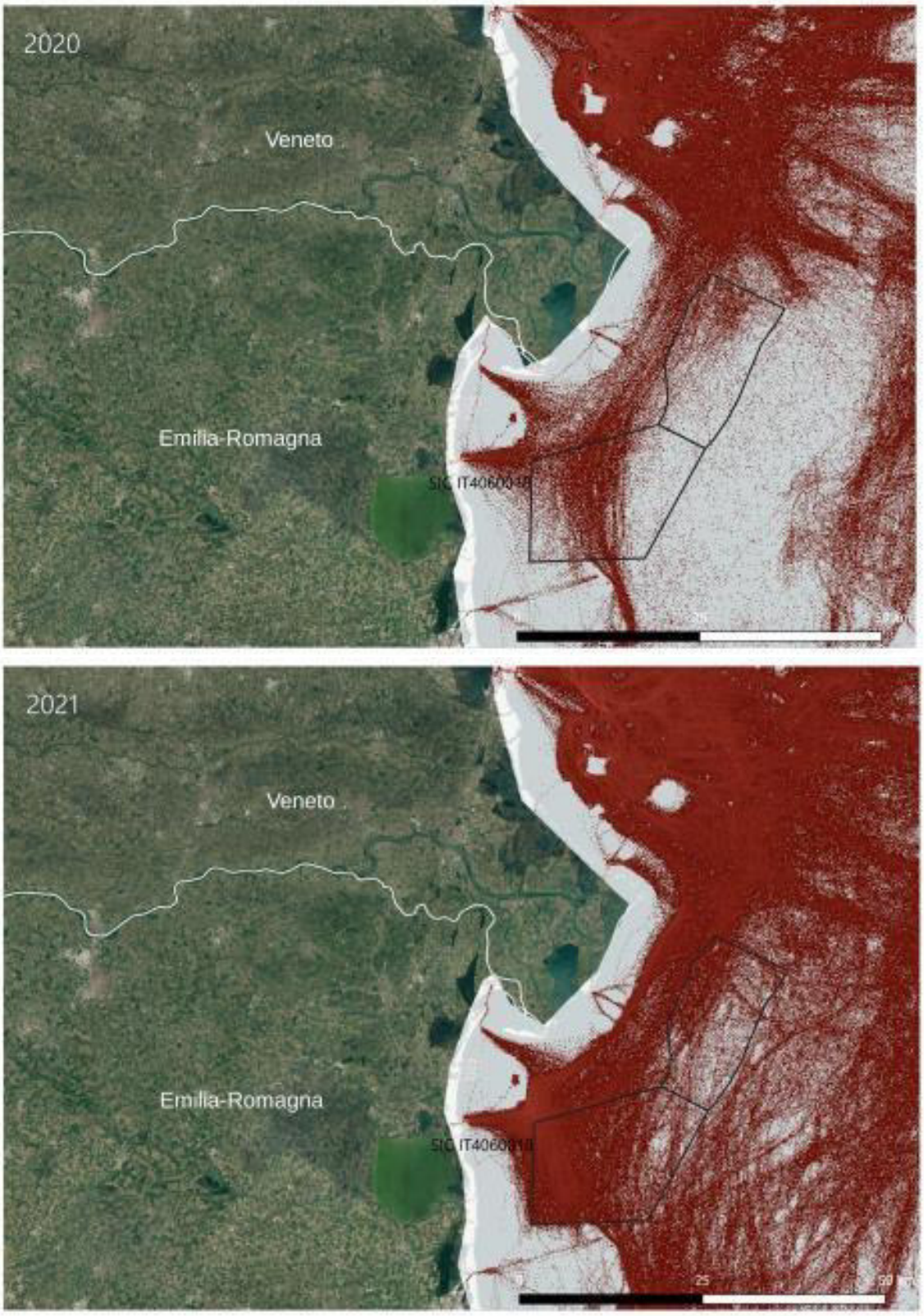


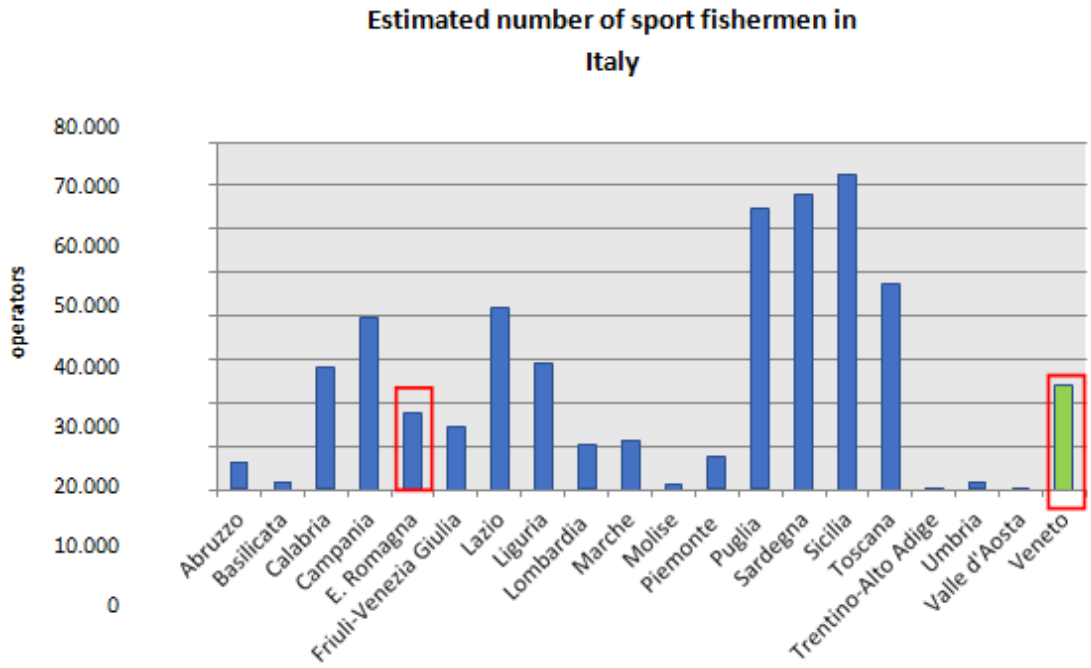
Figure 5.2: Tracks of fishing units indicated as 'in fishing' 2020 -2021.

6 Interference with sport fishing activities

Reg. (EU) No. 1380/2013 of 11.12.2013 on the Common Fisheries Policy points out that "since recreational fishing can have a significant impact on fishery resources, Member States must ensure that it is carried out in a manner compatible with the objectives of the CFP". With the Ministerial Decree of 6 December 2010, the MIPAAF promoted the survey of sport and recreational fishing at sea.

The impact of this fishery's activities on commercially valuable fish resources has increasingly become the subject of demand for assessment and control systems aimed at defining proper management forms. However, quantifying the impact of recreational fishing and its 'weight' within marine fisheries is also difficult due to the absence/lack of data, both historical and recent, on both fishing effort (number of fishermen, number of gears, fishing days, etc.) and the qualitative and quantitative composition of catches.

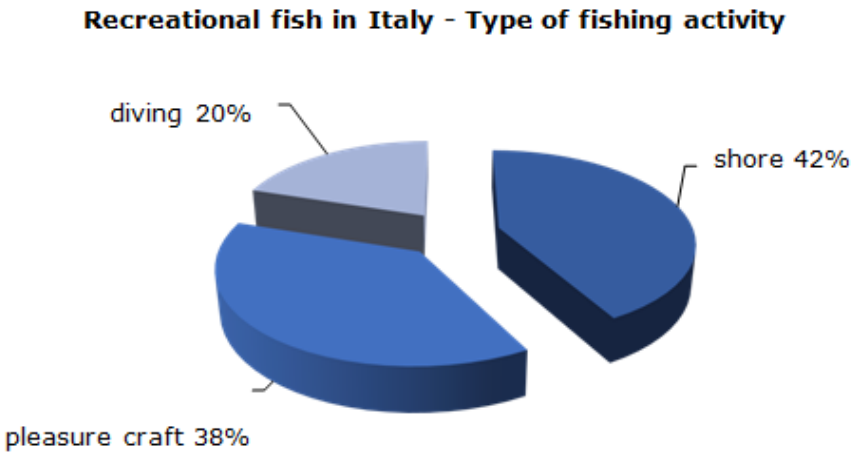
Sport/recreational fishing in national maritime waters, whether by hook and line or by apnea, is estimated to be practised today by around 500,000 operators (Tartatur, 2020), a figure substantially confirmed by the MIPAAF database. Especially in the summer months, reefs, beaches, jetties and dams are crowded with fishermen, a good percentage of whom also use boats for recreational fishing.



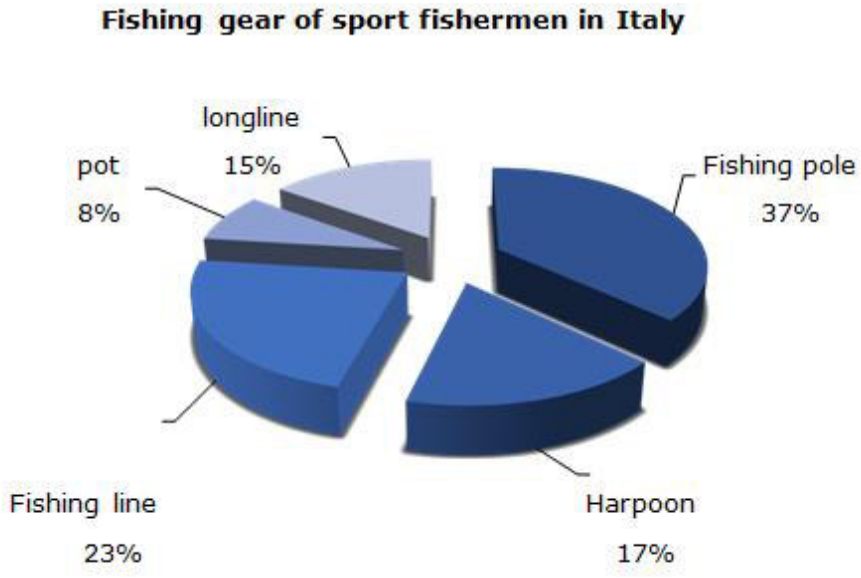
Graph 6.1: Sport fishermen in Italy (source: Tartatur, 2020).

The SIC area, which also for this type of activity can be considered a single overall area between Veneto and Emilia Romagna, could potentially involve the approximately 40,000 fishermen who gravitate around the two regions.

Recreational fishing compared to professional fishing focuses on high-value species and usually involves catching them with rods, hooks or lines. Nationally, 42% of recreational fishermen fish from the shore or pier, while those who use a boat to fish are 38%, with the remaining 20% practice underwater fishing. In terms of fishing gear, 37% of operators use rods and 38% use hooks, broken down into 23% using lines and 15% using longlines (Tartatur, 2020).



Graph 6.2: Type of recreational fishing in Italy (source: Tartatur, 2020).



Graph 6.3: Fishing gear used by recreational fishermen on national territory (source: Tartatur, 2020).

From the data collected, it has been estimated that the annual catch from the fish stock by recreational fishermen in the Italian seas is around 1,000-1,100 tonnes, with an incidence of 2% on the quantity of sea fishing. The average number of sea trips per year is around 27-30 days per operator, with an estimated catch of 2.0-2.2 kg/day.

The numbers of recreational fishermen in Veneto amount to approximately 23,800, i.e. 4.9% of the national total. Analyzing and processing the available data, it is estimated that the recreational fishing catch in the regional waters amounts to about 1,400-1,500 t/year, with an incidence of 7.5% compared to the quantities of local fish resources delivered to the fish markets. This figure is significantly higher than the national average (Tartatur, 2020).

According to MIPAAF data, sport fishermen in Veneto are 5% of the national total, equal to about 25,000 units, with a rather significant relative incidence on fish resources. At the same time, the probability of interaction with some protected species can be considered significant, especially in relation to the gear used among those allowed by the regulations.

Recreational fishing may interfere with protected species in marine SCI areas in relation to:

- Hooked catch of specimens of the species *C. caretta*

- Hook ingestion (without capture) by *C. caretta* specimens
- Collision between pleasure boats (high speed) and *C. caretta* specimens and subsequent damage to the carapace

There is no evidence of any adverse events involving specimens of *T. truncatus* in relation to recreational fishing and, in particular, with hooks (Sandro Mazzariol, com pers)

All these situations can pose a risk to protected species because:

- unhooking operations could lead to tissue damage resulting in increased exposure to pathogens
- ingestion of a hook could lead to damage of the digestive system or difficulty in feeding due to the presence of the foreign body
- damage to the carapace with wounds that can lead to life-threatening infections.

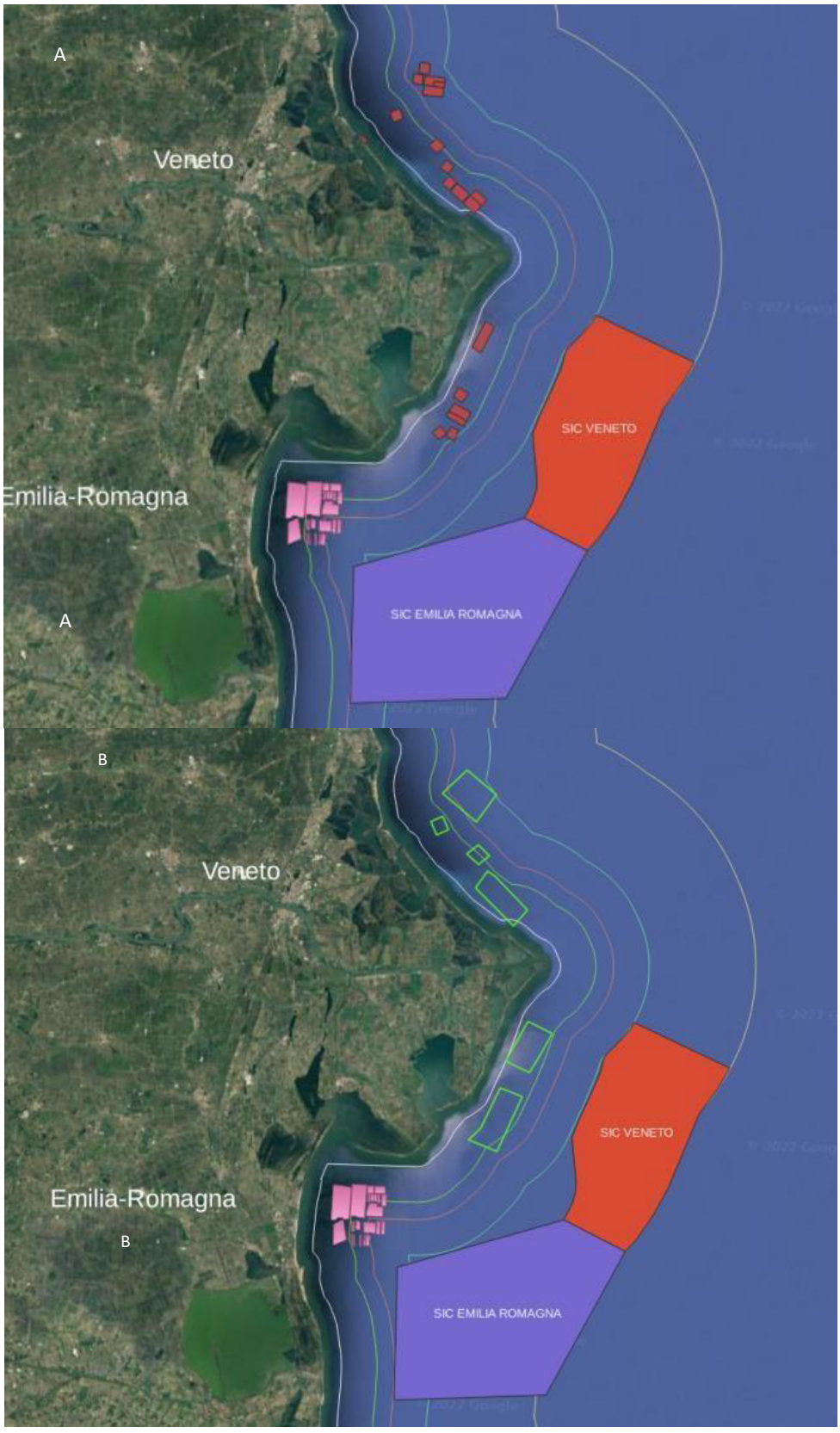
Photo 6.1: (A) Specimen of *Caretta caretta* found with hook and line swallowed (Source Coastal Guard). (B) Dead *Caretta caretta* specimen found on the beach with damaged carapace (Web source).

7 Interference with aquaculture activities and azas

The aquaculture areas in Veneto are currently almost entirely located within the 3-mile limit; the exceptions are few and are located in areas in front of the mouth of Porto Levante within the 6 NM limit, and are therefore irrelevant with respect to the SCI area.

Concessions for aquaculture in the Emilia Romagna region, for the sector potentially in conflict with the marine SCI, are located close to the Goro basin at a maximum distance of 4 miles. Figure 7.1 (A) shows the current concessions for aquaculture (mussel farming) with respect to the Veneto and Emilia Romagna marine SCIs. The Figure 7.1 (B) instead shows the output presented by the Veneto Region regarding the definition of AZAs (allocated zone for aquaculture) in the Maritime Compartment of Chioggia during General States of Fisheries (July 2022), which should give the territorial planning the areas for the expansion of aquaculture. Emilia Romagna Region is in the process of defining these areas.

The establishment of AZAs is a task that each EU member state is called upon to perform for its territorial waters as part of maritime spatial planning. The Italian State has delegated the perimeter of these areas to the Regions, encouraging a determination of the areas developed with a bottom-up strategy and not imposed at a centralised level. The Veneto Region, after consulting all the main stakeholders, drew up, for the Chioggia Maritime Compartment, the proposal reported in Figure 7.1 (B).


A
Veneto
SIC VENETO
Emilia-Romagna
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A
B
Veneto
SIC VENETO
Emilia-Romagna
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SIC EMILIA ROMAGNA

Figure 7.1: (A): Location of current aquaculture concessions in the Chioggia and Goro area; (B): Location of AZAs in the Chioggia Maritime Compartment.

At present, there is no possibility that aquaculture will interfere with the SCI area IT3270025 or with the SCI area IT4060018, but the evolution of aquaculture techniques and equipment could, in the future, allow safe operation also in the open sea, thus implying the need to analyze possible interferences.

The International Union for Conservation of Nature (IUCN) has prepared a classification of the different types of protected areas, also defining whether or not coexistence with aquaculture activities is possible. **Although this classification does not concern the management of Natura 2000 sites**, it does provide an indication of how aquaculture activities can be integrated with the different levels of protection of natural areas. The IUCN categorisation and description of permitted activities is therefore given below:

- Category Ia Integral Natural Reserve
- Category Ib Wild Area
- Category II National Park
- Category III Natural Monument
- Category IV Area of Habitat/Species conservation
- Category V Protected terrestrial/marine landscape
- Category VI A Protected area for sustainable resource management

Category Ia - Integral Nature Reserve

An integral nature reserve (IUCN Category Ia) is an area protected from all but light human use in order to preserve the geological and geomorphic features of the region and its biodiversity. These areas are often home to dense native ecosystems that are restricted from all human disturbance outside of scientific studies, environmental monitoring and education. Because these areas are so strictly protected, they provide ideal pristine environments against which external human influence can be measured.

In some cases, strict nature reserves have a spiritual significance for the surrounding communities and areas are also protected for this reason. People engaged in the practice of their faith within the region have the right to continue to do so, provided it is in line with the conservation and management objectives of the area.

It is increasingly difficult to defend against human impacts on strict nature reserves as air and climate pollution and emerging diseases threaten to penetrate the boundaries of protected areas. If perpetual intervention is required to maintain these strict guidelines, the area will often fall into category IV or V.

Category Ib - Wild Area

The Serengeti National Park in Tanzania is a designated wild area

A wild area (IUCN Category Ib) is similar to an integral nature reserve, but generally larger and slightly less strictly protected.

These areas are a protected domain where biodiversity and ecosystem processes (including evolution) are allowed to flourish or experience restoration if previously disturbed by human activity. These are areas that can buffer the effects of climate change and protect threatened species and ecological communities.

Human visitation is kept to a minimum, often only allowing those willing to travel with their own devices (on foot, on skis or by boat), but this offers a unique opportunity to experience wilderness that has not been interfered with. Wilderness areas can only be classified as such if they are devoid of modern infrastructure, although they allow human activity at the level of supporting indigenous groups and their cultural and spiritual values within their wilderness-based lifestyles.

Category II - National Park

A National Park (IUCN Category II) is similar to a wilderness area in its size and its main objective of protecting functioning ecosystems. However, national parks tend to be more lenient with human visitation and its supporting infrastructure. National parks are managed in a way that can contribute to local economies through the promotion of educational and recreational tourism on a scale that will not reduce the effectiveness of conservation efforts.

The surrounding areas of a national park can be for consumptive or non-consumptive use, but should still act as a barrier for the defence of the protected area's native species and communities to enable them to sustain themselves in the long term.

Category III - Monument

A natural monument or feature (IUCN Category III) is a relatively smaller area that is specifically allocated to protect a natural monument and its habitat environment. These monuments may be natural in the fullest sense or include features that have been influenced or introduced by man. The latter should hold associations of biodiversity or may otherwise be classified as historical or spiritual sites, although this distinction may be quite difficult to ascertain.

To be classified as a natural monument or feature by the IUCN guidelines, the protected area could include natural geological or geomorphological features, culturally influenced natural features, natural cultural sites, or cultural sites with associated ecology.

The classification thus falls into two sub-categories: those in which biodiversity is uniquely related to the conditions of the natural feature, and those in which current levels of biodiversity are dependent on the presence of sacred sites that have created a substantially altered ecosystem.

Monuments or natural features often play a minor but fundamental ecological role in the operations of broader conservation objectives. They have a high cultural or spiritual value that can be used to gain support for conservation challenges by allowing higher visitation or recreational rights, thus providing an incentive for site conservation.

Category IV - Area of Habitat/Species conservation

The Galápagos Islands in Ecuador are managed under Category IV to preserve the native flora and fauna of the islands.

A habitat or species management area (IUCN Category IV) is similar to a monument or natural feature, but focuses on more specific conservation areas (although size is not necessarily a distinguishing feature), such as an identifiable species or habitat that requires ongoing protection rather than that of a natural feature. These protected areas will be sufficiently controlled to ensure the maintenance, conservation and restoration of particular species and habitats, possibly through traditional means, and public education of such areas is widely encouraged as part of the management objectives.

Habitat or species management areas may exist as a fraction of a larger ecosystem or protected area and may require different levels of active protection. Management

measures may include (but are not limited to) the prevention of poaching, the creation of artificial habitats, the arrest of natural succession and additional feeding practices.

Category V - Landscape / Seascape / Protected area

A protected landscape or seascape (IUCN Category V) covers an entire body of land or ocean with an explicit natural conservation plan.

The main objective is to safeguard regions that have developed a distinct and valuable ecological, biological, cultural or landscape character. In contrast to the previous categories, Category V allows surrounding communities to interact more with the area, contributing to the sustainable management of the area and engaging with its natural and cultural heritage.

Landscapes and seascapes that fall into this category should represent an integral balance between people and nature and can support activities such as traditional agricultural and forestry systems under conditions that ensure the continued protection or ecological restoration of the area.

Category V is one of the most flexible classifications of protected areas. As a result, protected landscapes and seascapes may be able to accommodate contemporary developments, such as ecotourism, while at the same time maintaining historical management practices that can provide for the sustainability of agrobiodiversity and aquatic biodiversity.

Category VI - Protected area with sustainable use of natural resources

Although human involvement is an important factor in the management of these protected areas, developments are not intended to allow large-scale industrial production. The IUCN recommends that a part of the land mass remain in its natural condition, a decision to be made at the national level, usually with specificities for each protected area. Governance needs to be developed to accommodate the diverse and possibly growing range of interests arising from the production of sustainable natural resources.

Category VI may be particularly suitable for large areas that already have a low level of human occupation or where local communities and their traditional practices have had little permanent impact on the environmental health of the region. This differs from

Category V in that it is not the result of long-term human interaction that has had a transformative effect on surrounding ecosystems.

The following table shows the possible interferences with respect to the IUCN classification with aquaculture activities.

Categories	Ia	Ib	II	III	IV	V	VI
High density fish cage culture	N	N	N	N	*	*	*
High density on-land close system fish culture	N	N	N	N	*	*	Y
Medium density on-land circulating system fish pond culture	N	N	N	N	*	Y	Y
High density shell fish culture (table, long-lines)	N	N	N	N	*	*	Y
Low density pond /lagoon fish culture	N	N	N	N	*	Y	Y
High density seaweed culture	N	N	N	N	*	*	Y
Low density shellfish culture	N	N	N	N	*	Y	Y
Medium density invertebrate (e.g. sea cucumber) culture	N	N	N	N	*	Y	Y
Integrated Multi-trophic culture	N	N	N	N	*	Y	Y
Restoration purpose aquaculture *	*	*	*	*	*	Y	Y

Figure 7.2: Potential interference between aquaculture and protected areas

The first three categories (from Ia to III) forbid all forms of marine farming for greater protection of the ecosystem; category IV allow with attention aquaculture activity and category V permit without problems the coexistence of aquaculture and protected areas, while category VI, on protected areas with sustainable use of natural resources, allows all aquaculture activities with exception of floating cages for fish farming in the intensive form (that should be analyze on specific case). Both SCI areas could be assimilated to category IV, thus requiring a careful assessment of the aquaculture activities to be implemented with respect to the protection objectives but not precluding the possibility of developing them.

Should new technical-engineering knowledge make it possible to operate also at distances greater than the current ones, reaching the 6 to 12-mile band, the impact of mariculture will have to be considered both at the level of a single concession (internal area) that of an external area of respect. The GFCM issued an explanatory guide for the

establishment of AZAs where it reiterated the importance of environmental monitoring to be carried out inside these aquaculture areas and also outside. It indicated how there should be a partnership between the user of the concession space and the public body that has to protect the environment.

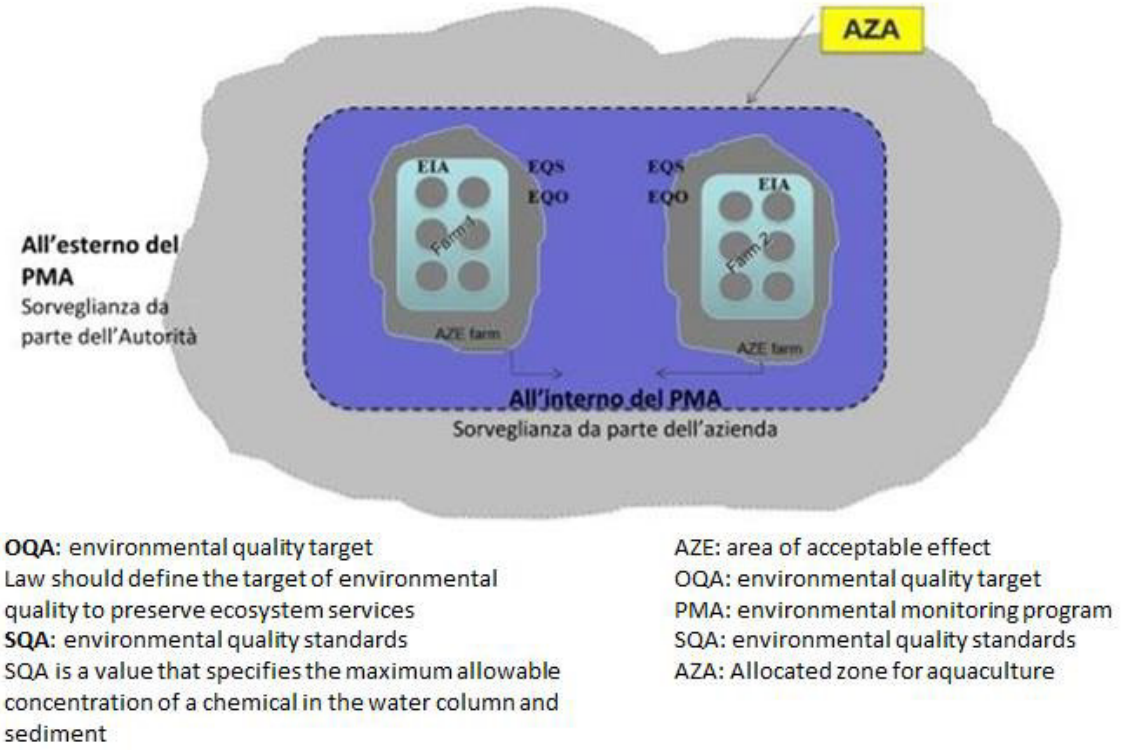


Figure 7.3: Example of AZA and the various monitoring areas.

The GFCM basically identified four sub-environments around aquaculture concessions to be investigated:

1. Concession areas
2. The AZA area
3. The area outside the AZAs but included within the environmental monitoring programme
4. The area outside the scope of the environmental monitoring programme

Concession areas and a buffer around them are considered to be areas where a change in natural environmental conditions is inevitable, both in the case of shellfish farms, where there is no input of organic matter, and in the case of fish farms, where the input

of organic matter (food) and the faecal components of fish could create deposits on the seabed. Constant monitoring is essential both in the concession areas and in the entire AZA perimeter by verifying that Environmental Quality Objectives (EQOs) and Environmental Quality Standards (EQSs) are met. This data must be collected by the holders of the concessions and AZA areas; furthermore, the effects on areas outside the AZAs but included within an environmental monitoring programme that the concession manager must follow must be evaluated. Finally, the public supervisory body has the task of monitoring outside the area of the environmental monitoring programme, the purpose of which is to oversee that there are no hazardous 'spills' outside the AZs and that the data monitored by the concession holder(s) of the aquaculture activities are consistent with the EQOs and EQSs.

8 Interferences with other trade sectors

Maritime spatial planning is a necessity linked to the multiple uses of marine space and resources; whereas the sea was once seen exclusively as a land for fishing and transport, now the potential uses of marine areas are diversified and the planning of protective actions requires knowledge of the maritime traffic of all the main categories of users

The MarineTraffic website, catalogues each group of vessels within a specific category and thus it was possible to verify how different types of vessels interact with the SCI area in very different ways.

8.1 Cargo vessel

A cargo vessel is a merchant ship that transports commodities, containers or materials from one port to another; these ships are often equipped with cranes and other mechanisms for loading and unloading materials, or have to make use of port logistics. The cargo vessel category also includes rubber-tyre ferries connecting several ports in the Adriatic Sea.

As can be seen from the Figure 8.1 interference by these types of ships is minimal as the main shipping lanes follow other routes. In the 2020-2021 comparison, it is evident how the pandemic has played an important role in the decrease of commercial maritime traffic.

Figure 8.1: Cargo passage routes and SCI area - 2020/2021.

8.2 Container Ship

This particular category includes vessels that carry containers from one port to another. Over time, as the size of cargo ships has increased, so have their capacities, and a unit of measurement has been adopted to define the maximum capacity of a container ship, the TEU. TEU, or Twenty (foot) Equivalent Unit, is a standard measurement in maritime transport that corresponds to the size of the 20-foot ISO container, to be precise:

- Feet - 20’ (length) x 8’ (width) x 8.6’ (height);
- Meters - 6.058 (length) x 2.438 (width) x 2.591 (height).

The external volume of this container is approximately 1,360 cubic feet, equivalent to just over 38m³, while its capacity is 1,165 cubic feet, equivalent to 33m³. Most of the containers currently used have a standard length of 20 or 40 feet respectively. The 20-foot container (6.1 m approx.) corresponds to 1 TEU, the 40-foot container (12.2 m approx.) corresponds to 2 TEU. Ships and land-based logistics consider the TEU for design and management activities.

Compared to other types of cargo for container ships, it is possible to define a preferential route that intersects the two marine SCI areas. No particular differences are observed between 2020 and 2021 and the interaction with the SCI sites is limited as most routes are outside the two areas.

Figure 8.2: Container ship passage routes and SCI area - 2020/2021.

8.3 Tankers

The Marine Traffic website associates tankers with the purpose of transporting or storing liquids or gases (other than LPG or LNG); the main types of tankers include oil tankers, chemical tankers, or those transporting commodities such as vegetable oils, molasses and wine.

The behavior of these vessels is very similar to cargo ships, with main directives along which the vessels move. Compared to the year 2020, it seems that in 2021 there were fewer passages within the perimeter of the marine SCIs; this change could be due to the study of new, more efficient routes and will have to be evaluated in the following years to verify the actual changes.

Figure 8.3: Tanker passage routes and SCI area - 2020/2021.

8.4 LPG Carriers - LNG Carriers

These types of ships are the so-called gas and LNG carriers, vessels used to transport liquefied petroleum gas (LPG) and methane, also known as liquefied natural gas (LNG). They are among the most complex and sophisticated transport vessels since they have to keep the gaseous elements in liquid form at temperatures as low as -163°C for LNG. These vessels go directly to ports on land in the case of LPG or dock at regasification plants at sea in the case of methane.

Interactions with the SIC areas are related to LPG carriers; the routes of these ships leave and enter the Emilian ports towards the Veneto areas, crossing the two sites. For LNG carriers, on the other hand, having the regasifier in Porto Viro as their only destination point, there is no overlap with the two SIC areas, with the exception of rare deviations probably linked to particular approach or departure maneuvers.

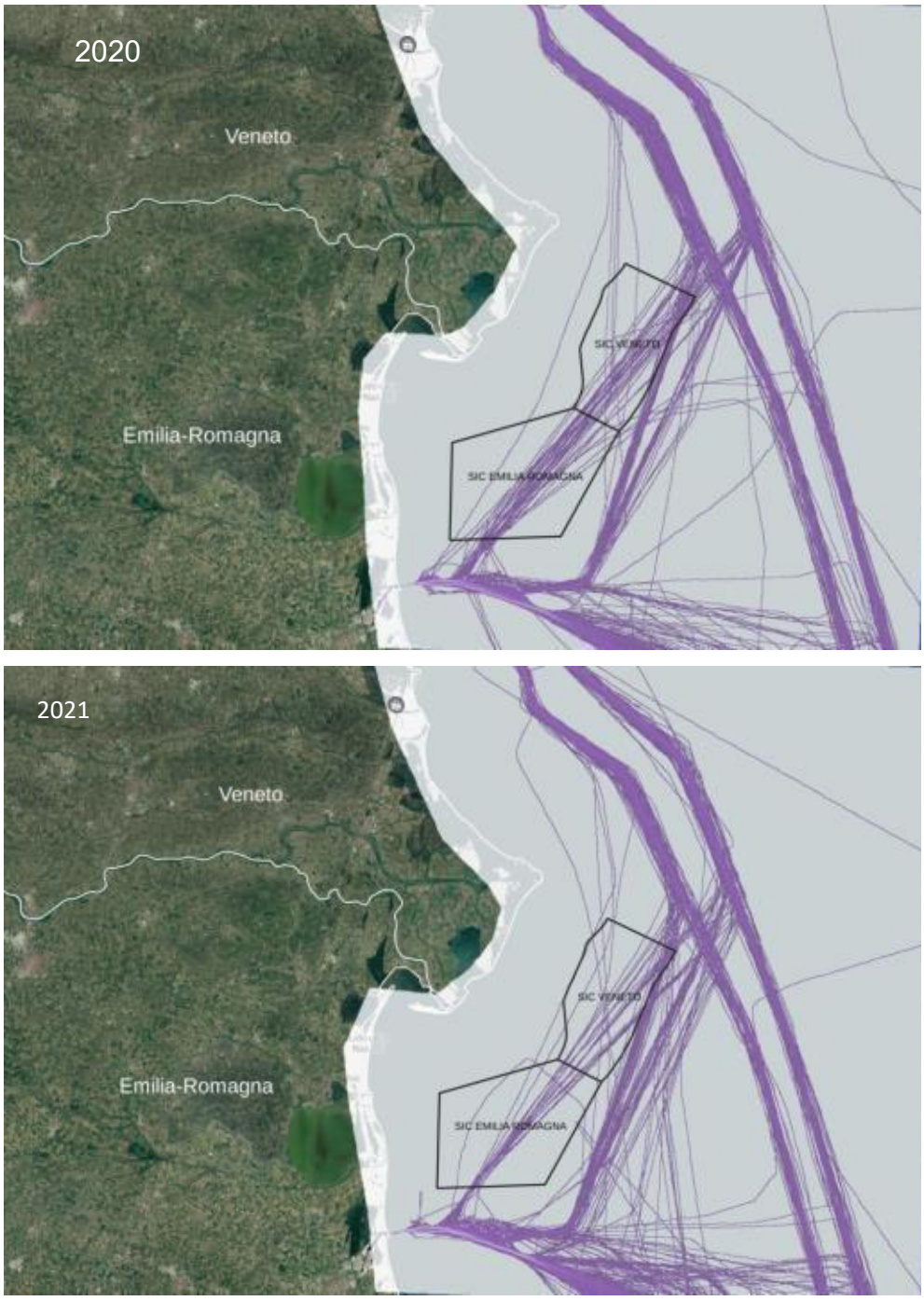


Figure 8.4: LPG carrier passage routes and SCI area - 2020/2021.

Figure 8.5: LNG carrier passage routes and SCI area - 2020/2021.

8.5 Tugs and Special Craft

To this category belong tugs, pilot boats and other specialized vessels (e.g. regasifier passenger ships). The tug is a highly specialized vessel for towing and pushing even very large floating vessels. Depending on its construction (hull, propulsion, engine power) and outfitting, the tug has different functions: harbour towage, offshore service, deep-sea, salvage and ship recovery.

Pilothouses are vessels used to transport the port pilot to incoming ships and vice versa to bring him ashore when ships are leaving port. The pilot is a member of the Port Authority with the task of advising the captain and guiding the ship inside the port to the quay, or from the quay to outside the port, as he is familiar with the morphology, seabed and local weather conditions.

Even for tugs, pilot boats and special vessels, passages within SIC areas are very limited. The special nature of these vessels can be observed by the concentration of traffic along the regasifier-Porto Levante or regasifier-Chioggia routes and to the south where there is a transport service to and from the Emilian offshore facilities.

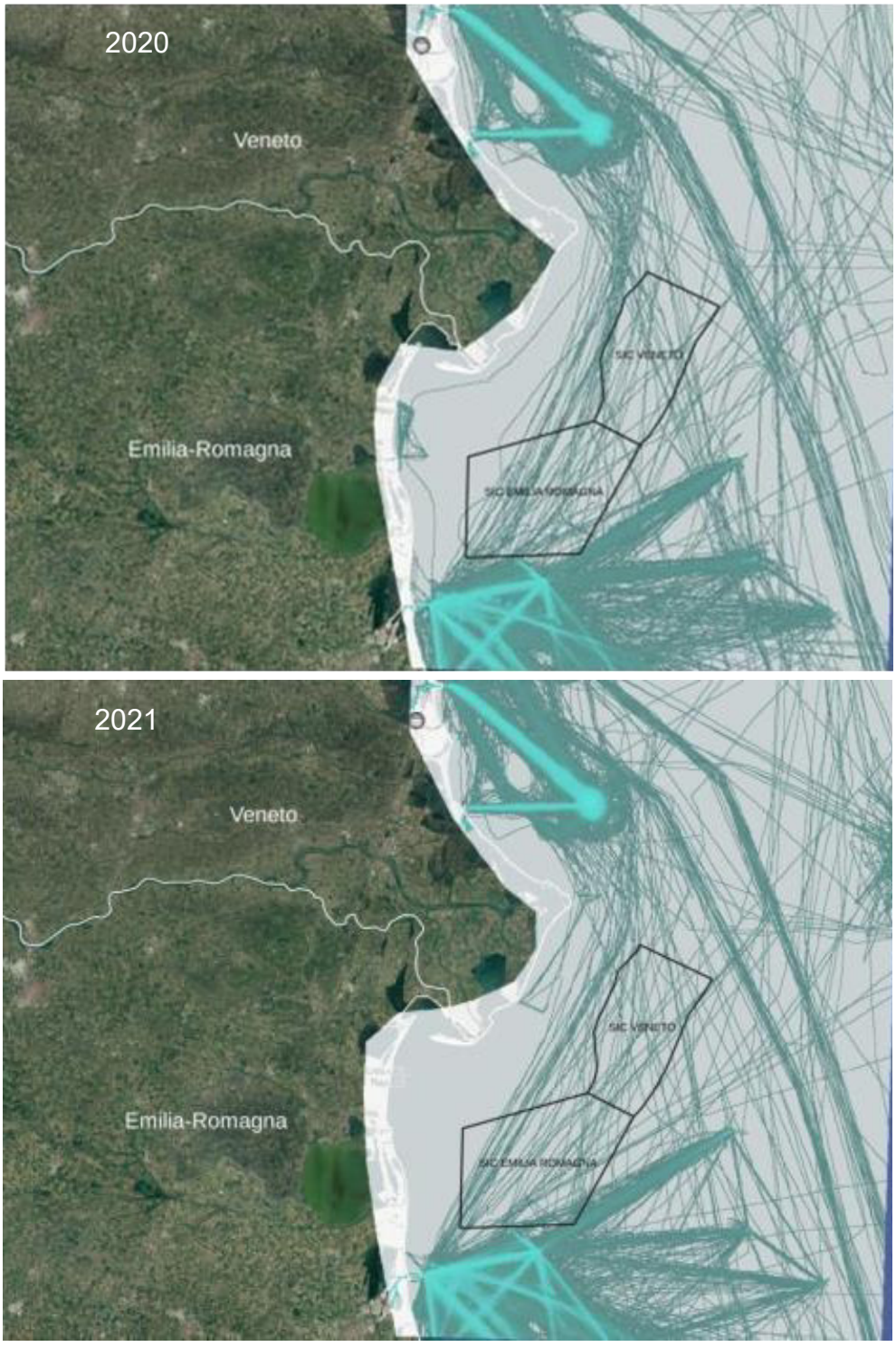


Figure 8.6: Tugs and special craft passage routes and SCI area - 2020/2021.

8.6 Passenger vessels

Passenger ships are for the nautical code merchant vessels in all respects used to transport passengers or travelers on domestic or international voyages. They can be as small as yachts or as large as cruise ships and must have more than 12 passengers.

Passenger ships usually do not have routes that intersect the SCI areas under consideration, although in 2021 there seems to have been a greater flow from the Porto Levante area than in 2020, resulting in a greater passage through the protected areas. As with cargo vessels, these passenger boats also usually travel on well-planned routes, having to optimize costs as much as possible.

Figure 8.7: Passenger vessel route and SCI area - 2020/2021.

8.7 Pleasure Craft

This category covers pleasure boats that have an AIS device installed. As it is installed on a voluntary basis, the route analysis only provides an indication of traffic flows within the SCI areas. Both motorized and sailing boats belong to this category.

Being pleasure boats, used by private individuals, they have no preferential route. The routes show more passages close to the coast than are observed within the SCI areas.

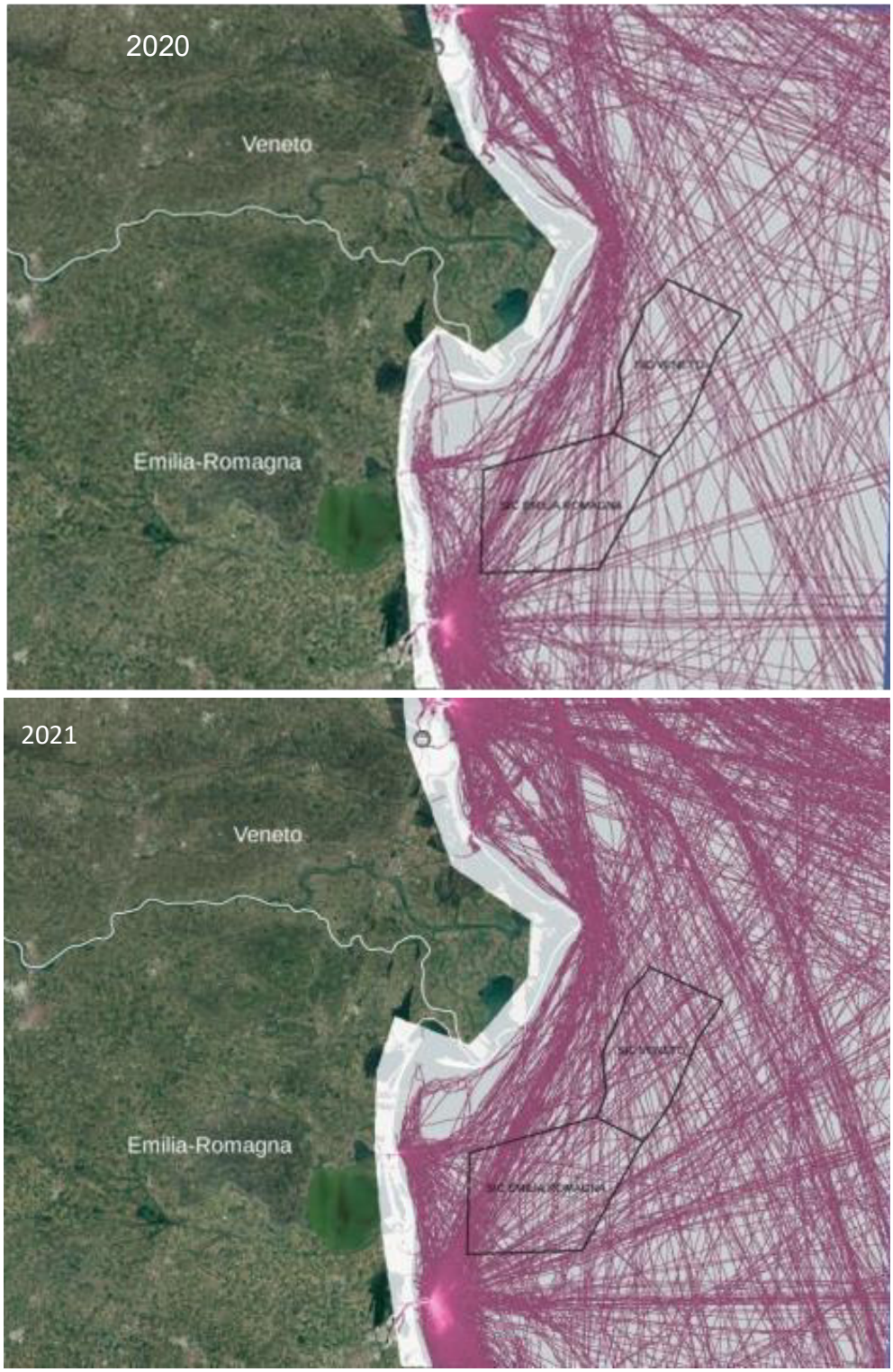


Figure 8.8: Pleasure craft route and SCI area

9 Best practices to be encouraged

The TartaTur project and the TartaLife project have suggested Good Practices to be implemented in the Professional Fishing Sector, which could be extended to the whole Sector of sea-related activities with the necessary adaptations.

As far as the fishing sector is concerned, particularly for professional fishing but for certain gear types the same considerations also apply to recreational fishing, the use of bollards has been observed to have changing results over time.

9.1 Acoustic bollards

For dolphins, in fact, in the short term they are highly functional by serving as deterrents and keeping them away; unfortunately, it has been observed that, given their intelligence, over time they learn that they are not dangerous. Off the Italian coast of the north-central Adriatic, acoustic deterrents have been tested in recent years as part of the BYCATCH project to reduce interactions with flying nets. An initial perception of success of devices characterized by emissions up to 500 kHz stimulated the interest of fishermen (De Carlo et al. 2012). However, further experimentation showed a decrease in the performance of these devices, which proved to be ineffective in driving dolphins away. The authors of the study observed that the effectiveness of the deterrents gradually decreased over time as the dolphins got used to or became less sensitive to these noises. The bollards, therefore, do not appear to have substantial effectiveness in driving dolphins away during flying net fishing operations (Sala et al. 2014, 2016).

For turtles, anatomical, physiological and ethological studies on the reaction to acoustic stimuli suggest that the intensity of the sound to drive these animals away from gillnets should be so high as to be non-selective, also influencing the behaviour of the target species. Other studies have found that sea turtles habituate to acoustic stimuli emitted by bollards, just as dolphins habituate to sounds emitted by pingers.

9.2 Lighted bollards

The main problem for sea turtles is getting caught in fishing nets and not being able to return to the surface to breathe, they drown.

Biologists at the University of Exeter (England), have experimented with a system of light beacons to alert turtles to the presence of nets. In their experiment on the same area, they had seen a decrease of over 50% in turtle drowning deaths due to entanglement. When studying these special fishing nets, they initially used the same LEDs that are commonly used in modern chandeliers, for economic reasons.

In the TARTALIFE project, ultraviolet-emitting LED bollards were tested which, while they appear to completely eliminate net bycatch, the current much higher costs per net make them much more difficult for operators to use.

9.3 Devices to be placed inside nets to facilitate the release of turtles or other animals

The Turtle Excluder Device (TED) is a device mounted on a net that allows turtles to escape immediately upon entering the net, preventing them from entering the terminal bag. TEDs were originally designed to exclude turtles or other large animals from being caught in shrimp nets in order to provide protection for this endangered species from capture (Source: FAO).

Unwanted catches can be anything from turtles to sharks, larger fish species as well as rocks and boulders that can cause untold damage to trawls.

Removing unwanted catches while trawling can also improve the quality of the catch.

The greatest difficulty in using TED lies in the need to adapt, modify and calibrate the grids to the characteristics of the nets in use. In fact, for a technical solution to be positively accepted by fishermen, it must be easy to use and must not result in significant commercial catch losses. To do this, different types of grids have been designed, manufactured and tested at sea by varying their design, materials used and inclination (Fortuna et al. 2010; Lucchetti and Sala, 2008, 2010; Sala et al. 2011).

The main objective of a TED is to eliminate unwanted catches without adversely affecting target catch rates.

9.4 Hooks for longlines or sport fishing rods

Hooks and lines are often objects found in stranded or recovered and tended tortoises,

indicating that these types of objects are very dangerous for *Caretta caretta* specimens.

This type of intervention can affect both professional and recreational fishing, as both longlines and fishing rods use lines and hooks as fishing methods; actions to be encouraged include

- Hook shape: changing from a traditional J-hook to a circle hook increases the likelihood that the hook will hook externally in the mandible or jaw, or in the mouth, rather than being swallowed and lodged in the deeper portions of the turtle's gastro-enteric tract. Some studies report that circle hooks only reduce mortality in certain areas and types of seabed, and also in some cases reduce fishing of target species. In Italy, it seems that, on the contrary, the circle hook may be a valid mitigation system.
- Hook size: decreasing the size of the hook reduces the likelihood of it being swallowed and getting stuck in the turtle's gastro-enteric tract.
- Bait type: using mackerel instead of squid as bait has been found to reduce sea turtle bycatch. This is because the turtle is able to snatch the mackerel pieces with small bites, as opposed to the squid, which remains more firmly attached to the hook, requiring larger bites that increase the chance of getting hooked.
- Hook depth: Results obtained in the Ionian Sea from the Life Nature-2003-NAT/IT/000163 project indicate that hooks set at a depth between 10 and 15 m increase the probability of turtle bycatch. Other studies indicate that the probability of catch depends not only on the depth of the hooks, but also on the distance between the coast and the fishing grounds.

9.5 5.5 Operational Protocol

UNIPD has prepared 'what to do if' sheets outlining the procedures to be adopted and the numbers to contact in the event of an accidental capture or sighting of turtles or dolphins. These procedures should be provided to all persons working at sea and in particular to both fishing and aquaculture professionals and also to those who use the sea for recreational-sports activities.

What to do if a turtle is accidentally caught...

TURTLE ALIVE AND ACTIVE

- Moves spontaneously
- Raises its head to breathe
- When lifted from the carapace it shakes its fins
- If stimulated by pulling its fins, it responds by retracting them forcefully

RELEASE THE TURTLE INTO THE SEA

- from the stern of the boat, with the engines off
- bringing it closer to the water with its head downwards
- REPORT THE CATCH TO WWF Dune Alberoni (tel 3482626472)

TURTLE IN COMATOSOUS STATE OR WOUNDED

- If lifted from the carapace, it does not shake its fins
- If stimulated by pulling the fins retracts them weakly or not at all
- Turtle appears dead (but may still be alive!)

PLACE IT IN A QUIET ENCLOSED SPACE (E.G. A CONTAINER), IN THE SHADE IF IT IS SUMMER, INDOORS IF IT IS WINTER, WITH THE BACK RAISED ABOUT 20 CM ABOVE THE GROUND FOR AT LEAST 4 HOURS, COVER ITS EYES, LEAVING THE NOSTRILS FREE

TURTLE REACTIVATES ITSELF

TURTLE REMAINS WEAK, IS INJURED OR DOES NOT REACTIVATE

BRING THE TURTLE TO THE LAND

CALL

Capitaneria di Porto: **1530**

WWF Dune Alberoni: **3482686472**

Università di Padova: **3669256638**
("DEAD TURTLES") **049/8272549**
049/8272963

- Lift the turtle by the carapace (upper part of the shell), taking it by the sides or the two rapiers, but not by the fins (Fig. 1). If this is not possible lift it by the armpits.
- Place the turtle on something soft (rolled up towels, mat...).
- n In summer cover it with a wet cloth (Fig. 2) and keep its head and eyes moist, keep it in the shade to prevent it from overheating.
- In winter keep it indoors to prevent loss of body heat and cover with a dry cloth if necessary
- If the turtle has foreign wounds or obvious fractures, try to protect them with bandages or cloths, move it carefully and notify WWF Dune Alberoni (tel. 34132685472)
- If you feel that the turtle has not fully recovered, call WWF Dune Alberoni (tel, 34826854725)


Fig. 1


Fig.2

- Do not place the turtle on its stomach (Fig. 3) Keep the turtle resting on its back and always avoid placing it the other way round, as this makes breathing difficult.
- Do not detach the baleen from the turtle's body, even if there are many of them. You could create serious injuries to the skin.
- Do not throw the turtle into the sea if it has not fully recovered or if it appears dead (it may still be alive). It could drown.
- Do not put your hands near the turtle's mouth! Always keep your hands away to avoid being bitten, the turtle will be frightened.
- Do not put the turtle near excessive noise. Keep the animal in a quiet place, stress must always be kept to a minimum. Cover his orcs by leaving his nostrils free so he will calm down.
- Do not place the animal's head in abnormal positions, this may make breathing difficult (Fig. 4).
- Always place the tortoise in a place large enough to allow it to lie with its neck stretched out.

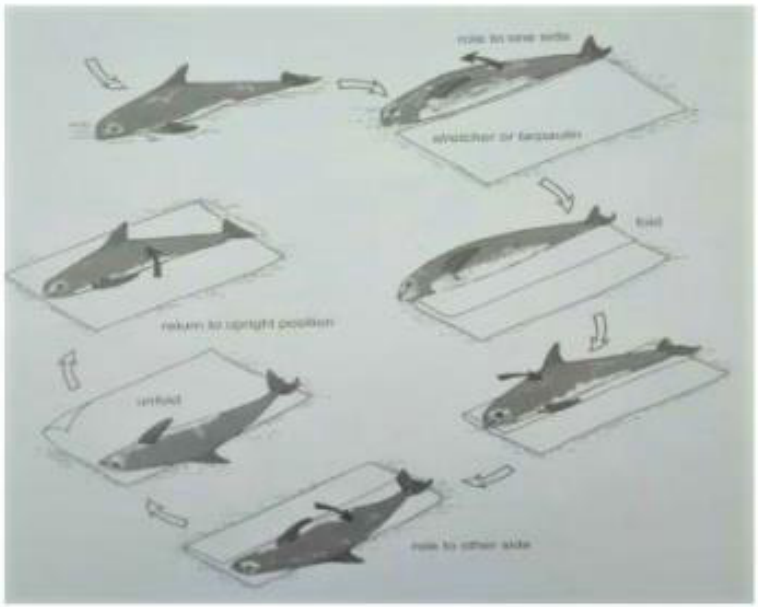

Fig.3


Fig. 4

What to do if a dolphin is accidentally caught

THE DOLPHIN IS ALIVE

- Minimize stress (reduce noise and confusion as much as possible).
  - For your own safety pay attention to the mouth and tail!
  - Release the animal as soon as possible, following these instructions:
  - DO NOT pull the animal by the tail and/or fins;
  - DO NOT use ropes;
- If possible, place the animal on a towel or large towel so that the whole body from the fins to the genital slit is suspended (see Fig. 1). If there are no towels or cloths: available, lift the animal in 2-4 persons by passing the arms gently under the animal and sliding it gently over a smooth surface in the sea or gently accompanying it towards the water.



- Delicate points to watch out for are:
  - Eyes: do not touch them to avoid abrasions;
  - Fins: they can fracture if mishandled, always keep them close to the animal's body;
  - Venting: water and foreign bodies must not enter;
- If immediate release is not possible, contact your vet (University of Padua, 3669256638) and follow the steps below:
- Avoid overheating (even on cloudy days) by covering the animal with wet cloths, leaving the dorsal fin uncovered;
- Cover eyes with seawater and keep the vent moist but free;
- In winter, avoid cooling (cover dorsal fin and tail with a cloth). dorsal fin and tail);

THE DOLPHIN IS DEAD → **LAND THE ANIMAL**

CALLING (for both live and dead dolphins)
Capitaneria di Porto: 1530
or
Università di Padova: 3669256638

10 Conclusions

The establishment of a marine SCI area may be to protect one or more habitats, one or more species, or both, but it requires appropriate studies to highlight the correct behaviour to be adopted.

In North Adriatic the period of establishment of marine SCIs has been too short to have an objective assessment of intra-sectorial interactions. The evolution of interactions will have to be constantly monitored to understand in the medium and long term what the actual spillovers may be.

Two documents issued by the Veneto and ER regions contain the first significant measures for SCI management.

Measure for conservation of *Caretta caretta* and *Tursiops truncatus*

- Avoid deliberately approaching the species in question, unless they are approach the boats.
- Report the discovery of dead and/or stranded specimens to the Harbour Offices territorially competent.
- Maintain a straight course when trawls and trawl nets are in operation.
- Mark gillnets and other gillnetting equipment with TAGs.
- Apply any mitigation measures to fishing equipment currently in use that will be provided, if effective, in order to reduce bycatch for turtles within the of the application of good practices.

Prohibitions

- Prohibition of the use of longlines and single and multiple hooked lines.
- Prohibition of new wind power plants, according to Art. 5 paragraph l) of the Decree of 17 October 2007.
- Prohibition of windsurfing, kitesurfing, water skiing, jet skiing, motorised towing

of flying equipment (kites, ascending parachutes and similar devices), events motorboats.

- Prohibition of close interaction with animals including voluntary approach, capture, feeding, swimming in the presence of animals

Some points that might be added to the measures for SCI area management:

- access to the area is only allowed after a training course explaining the procedures to be adopted, which are proposed in the sheets
- access to the protected area is only allowed to boats (professional or sports) equipped with an AIS tracking device
- sports boats must notify the local Port Authority of their intention to enter the area
- Use of biodegradable hooks for those entering the SCI area

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