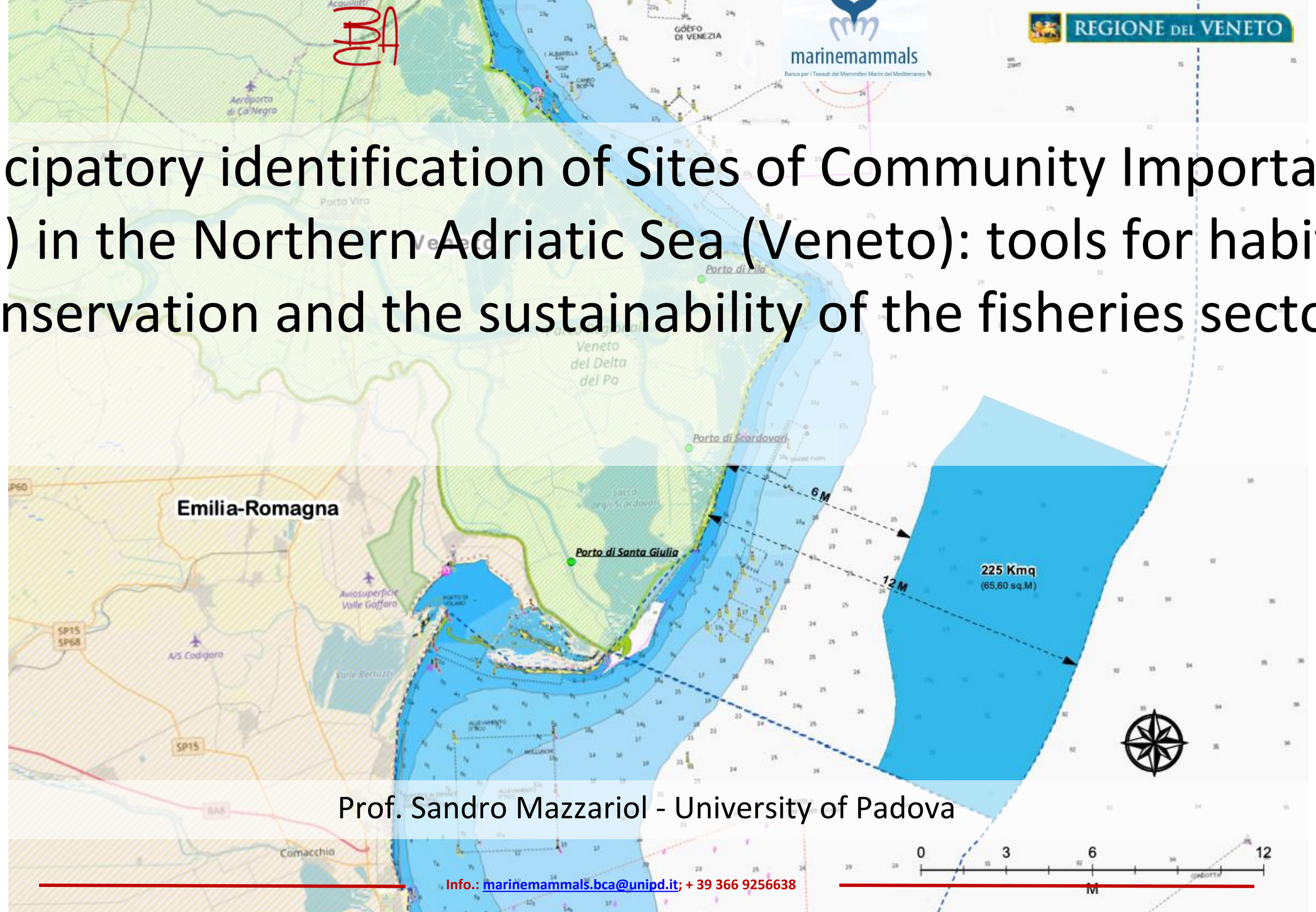
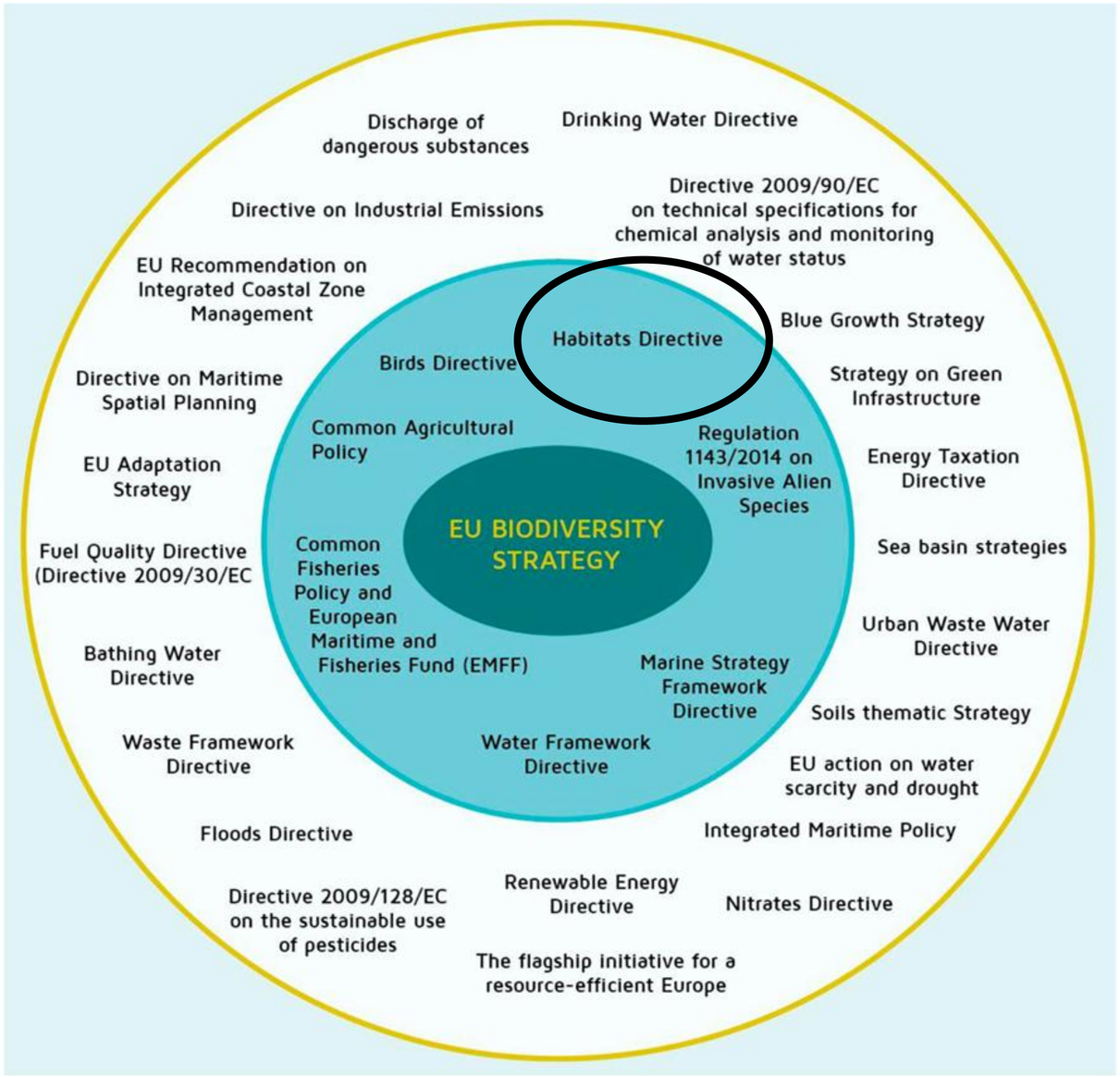
Participatory identification of Sites of Community Importance (SCI) in the Northern Adriatic Sea (Veneto): tools for habitat conservation and the sustainability of the fisheries sector



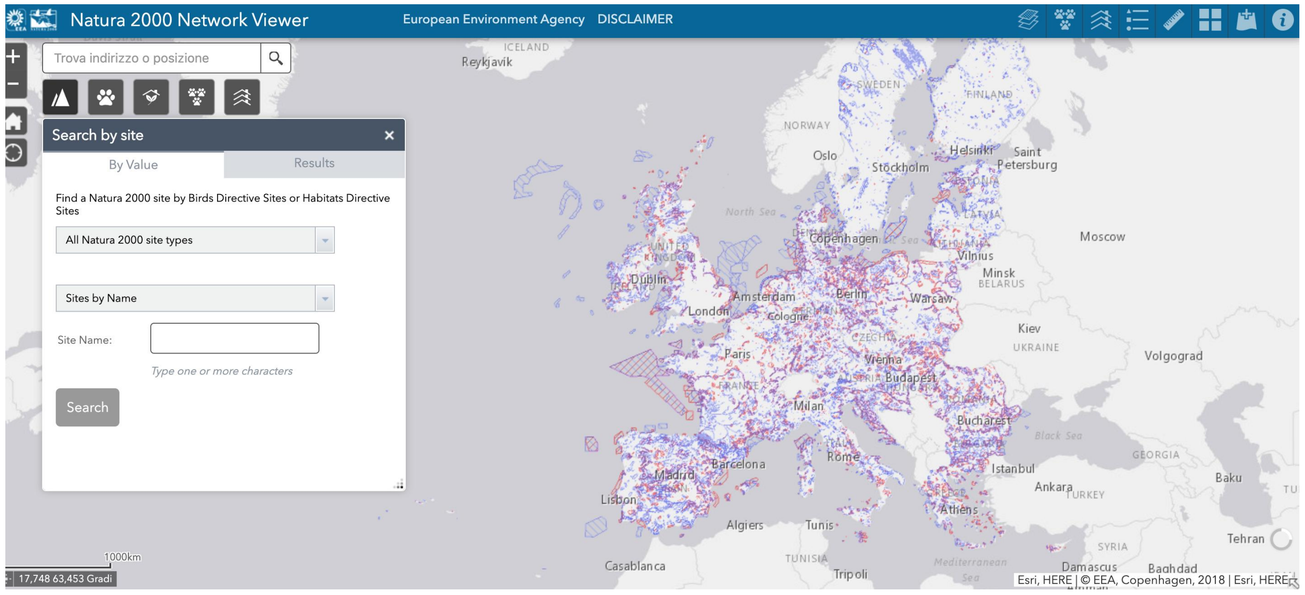
Prof. Sandro Mazzariol - University of Padova

Info.: marinemammals.bca@unipd.it; + 39 366 9256638

Habitat Directive (Dir. EU 92/43/CEE)



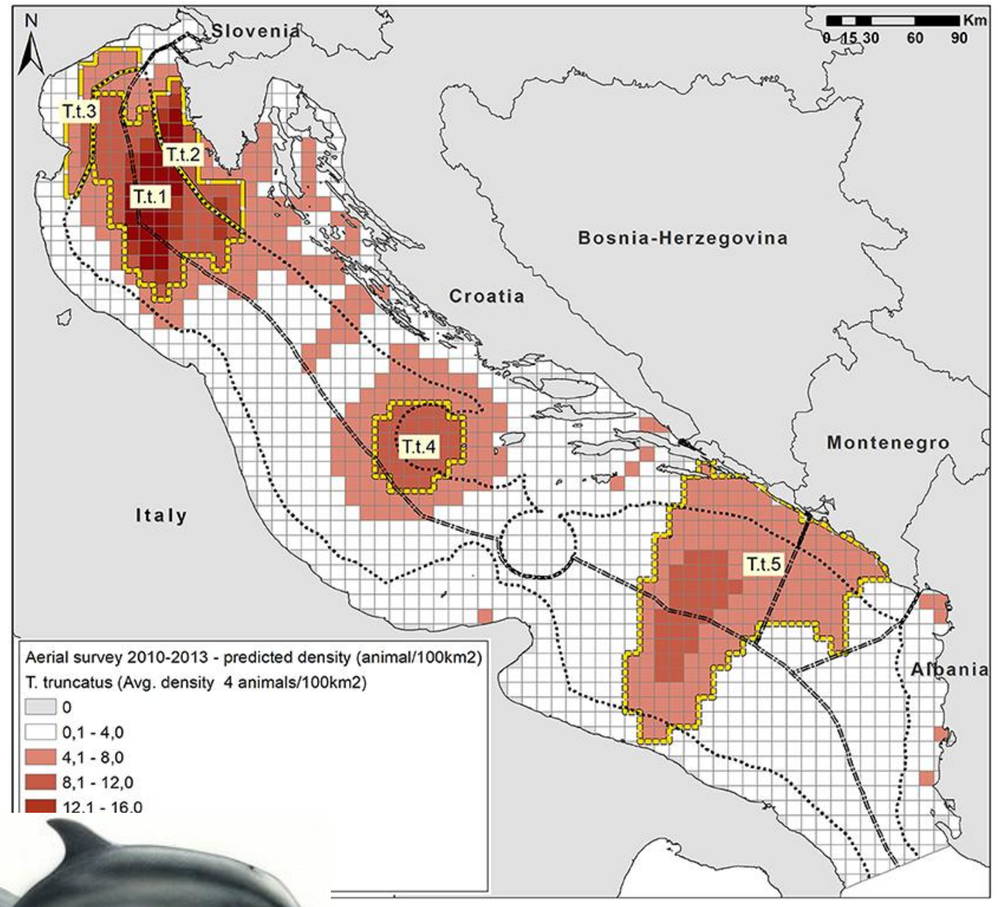
NATURA 2000

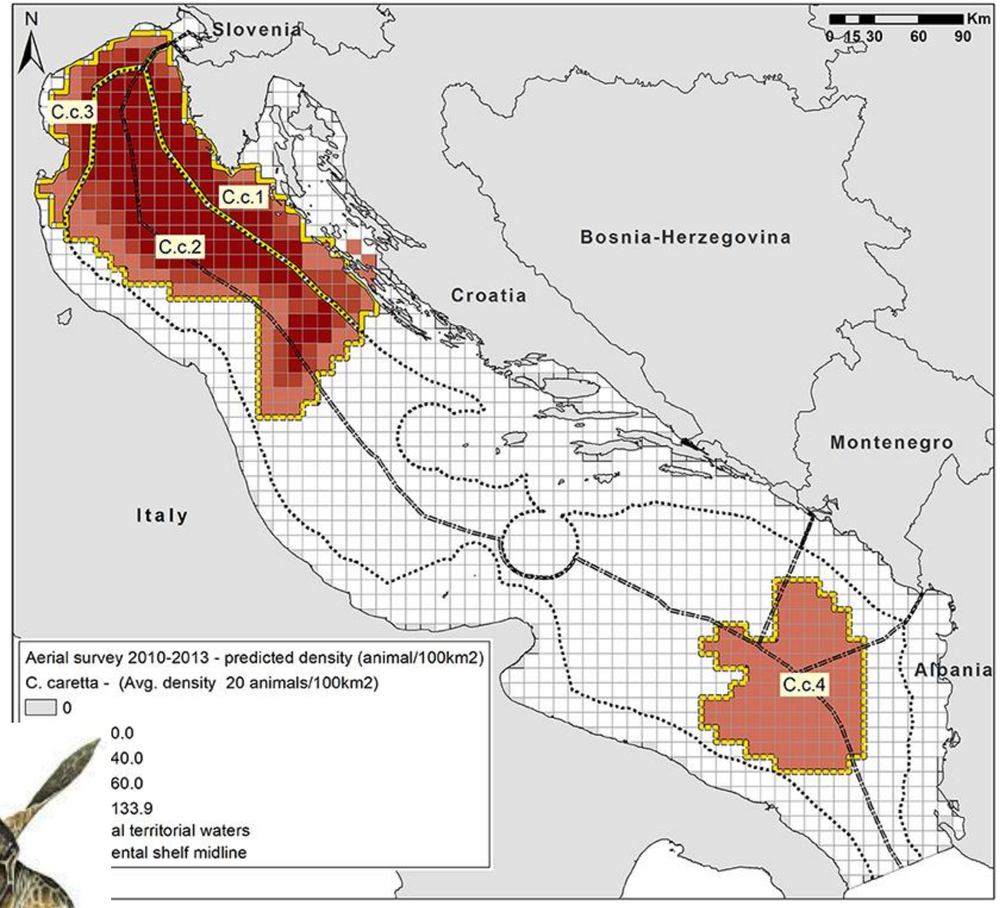


TURIN 2025 ESVP-ECVP CONGRESS

EU PILOT 8348/16/ENVI
NOT ENOUGH SACS FOR TURSIOPS TRUNCATUS IN ITALIAN WATERS

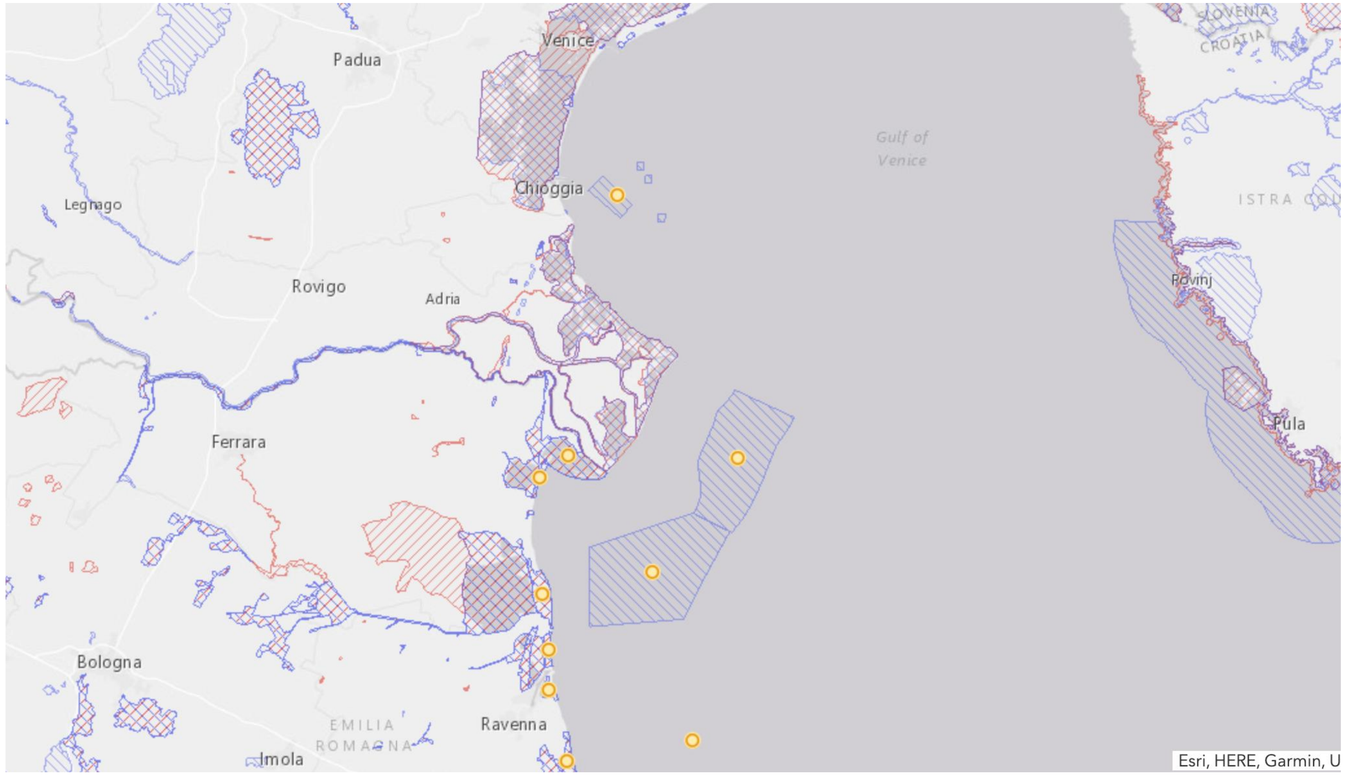
Bottlenose dolphin & Loggerhead Sea Turtle





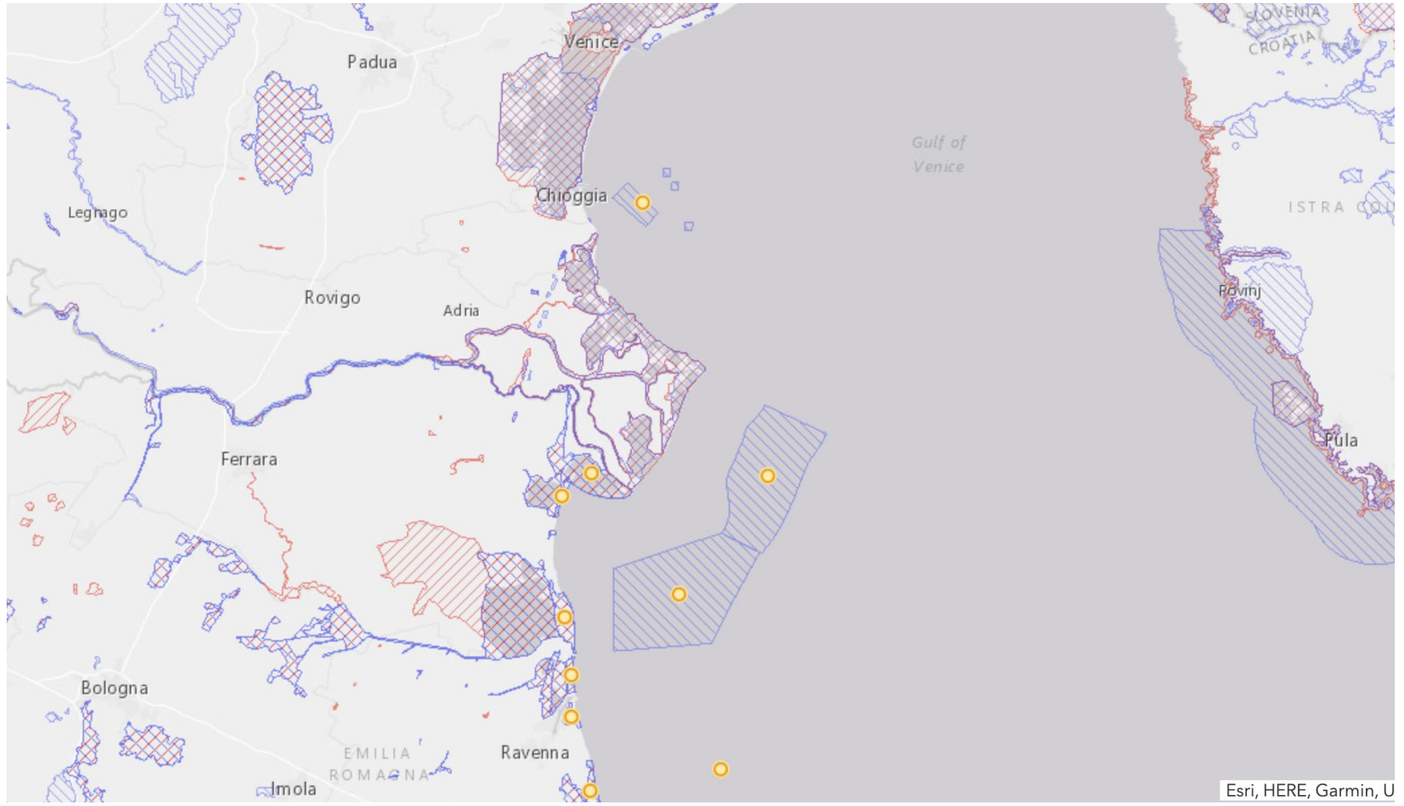
Identify a SCI with a bottom-up process

- **Identified an area to protect species based on current literature**
- Identify main gaps & threats for species conservation
- Define conservation measures to reduce threats



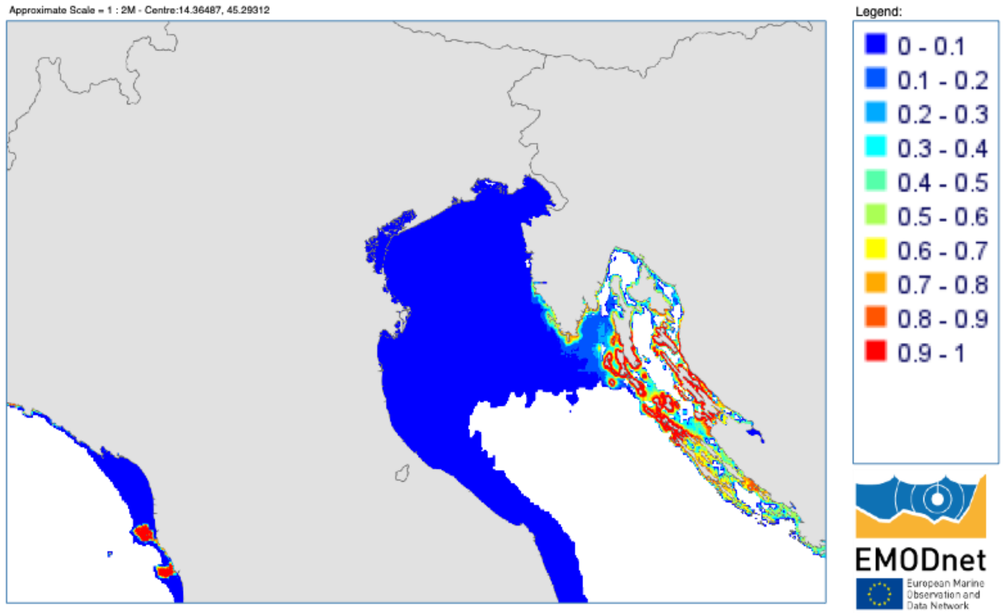
SITE LOCATION

1. Site Center Location: lat & long
2. Area: kmq
3. Marine area: %
4. Region name
5. Biogeographical Region

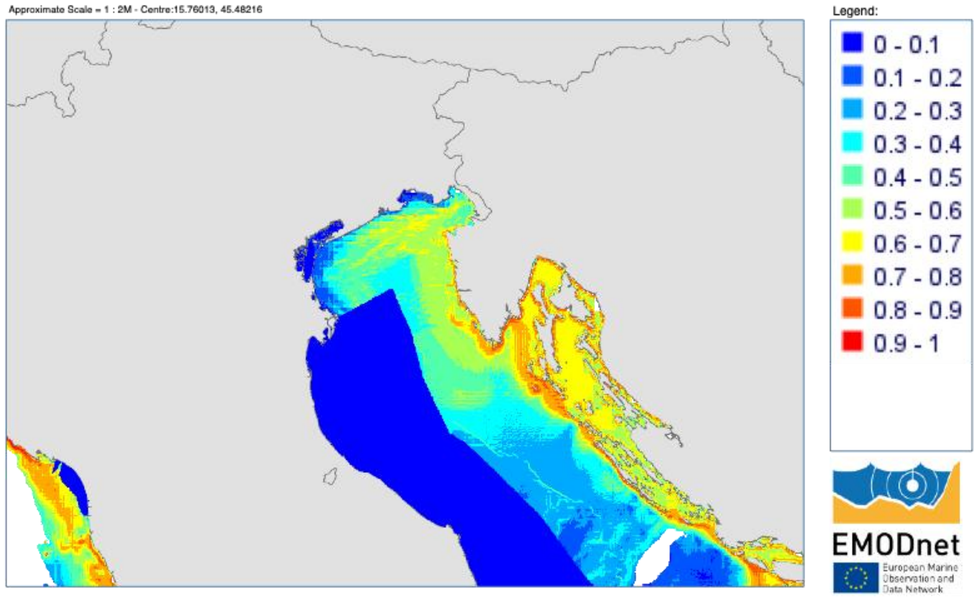


Reg. CE 1967/2006 - art. 4

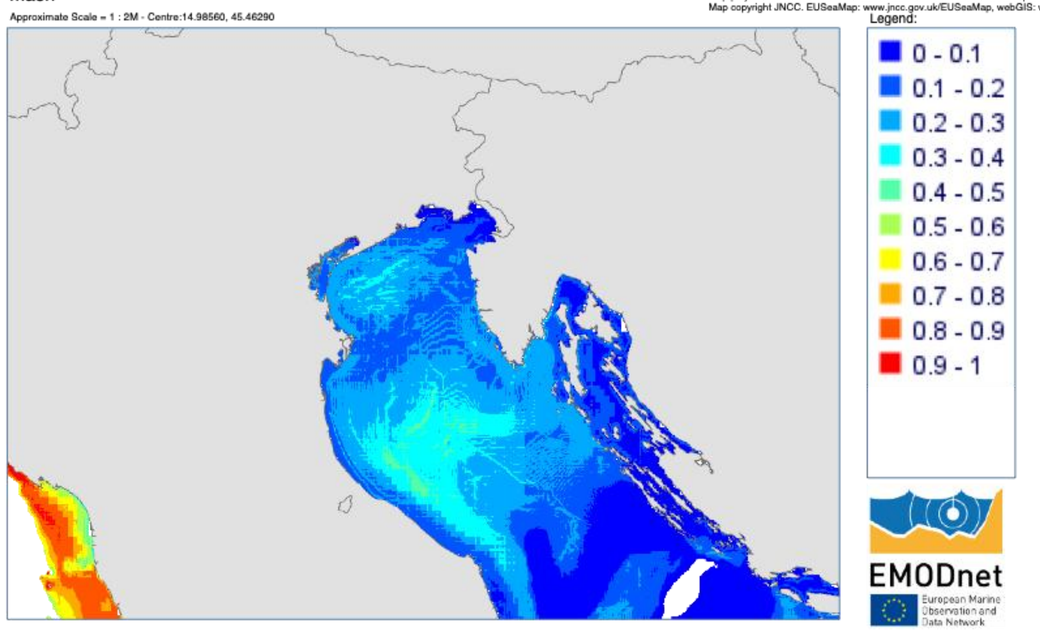
posidonia

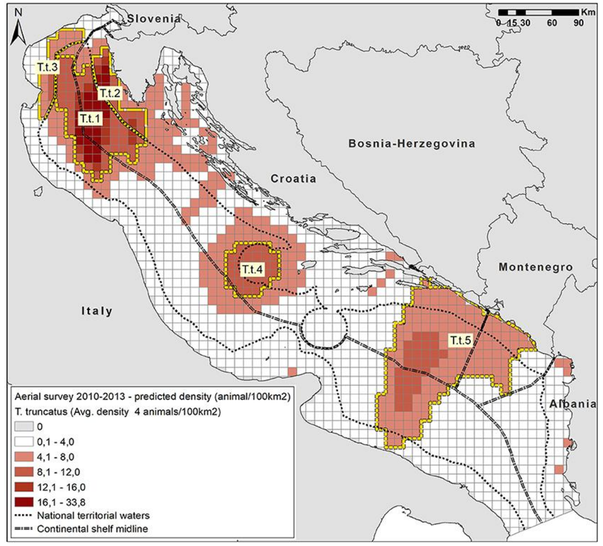


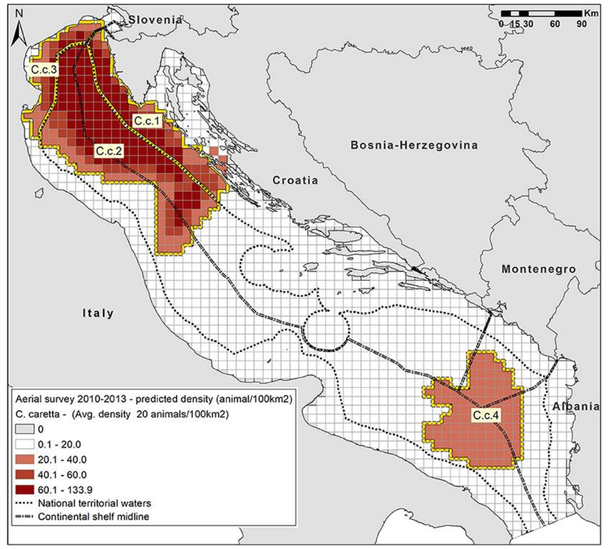
coralligenous



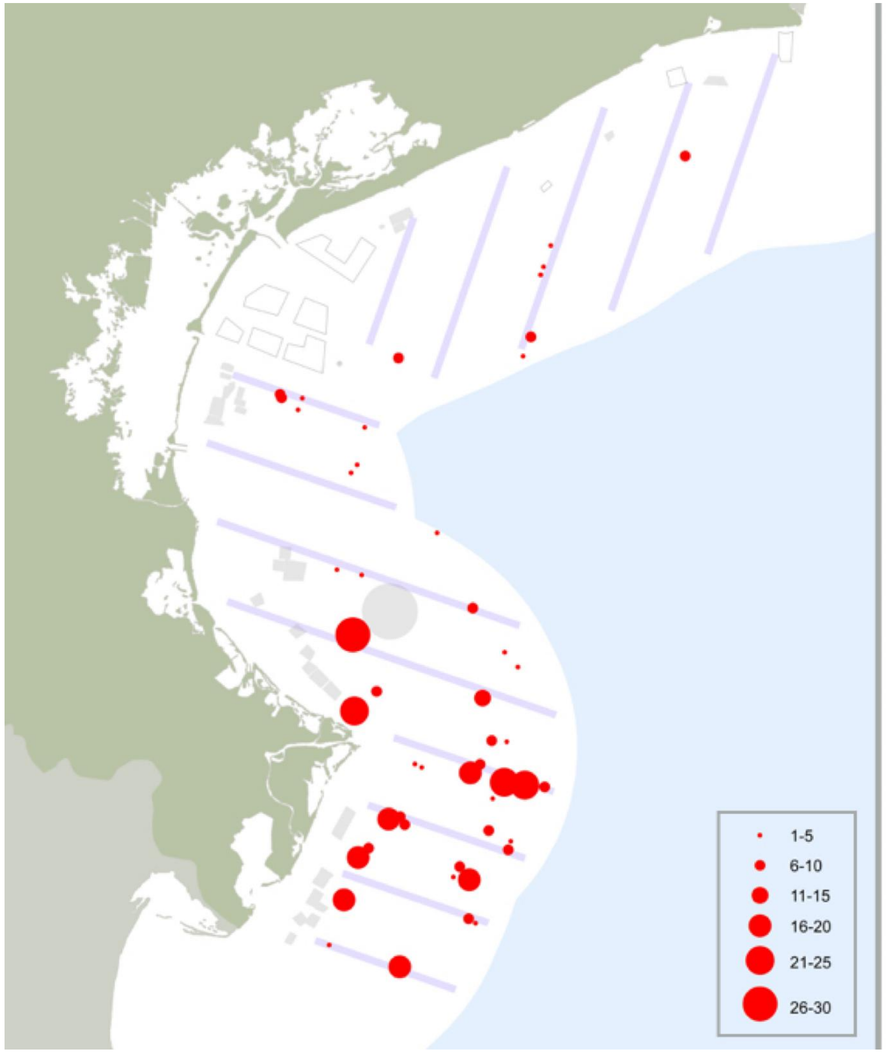
maerl

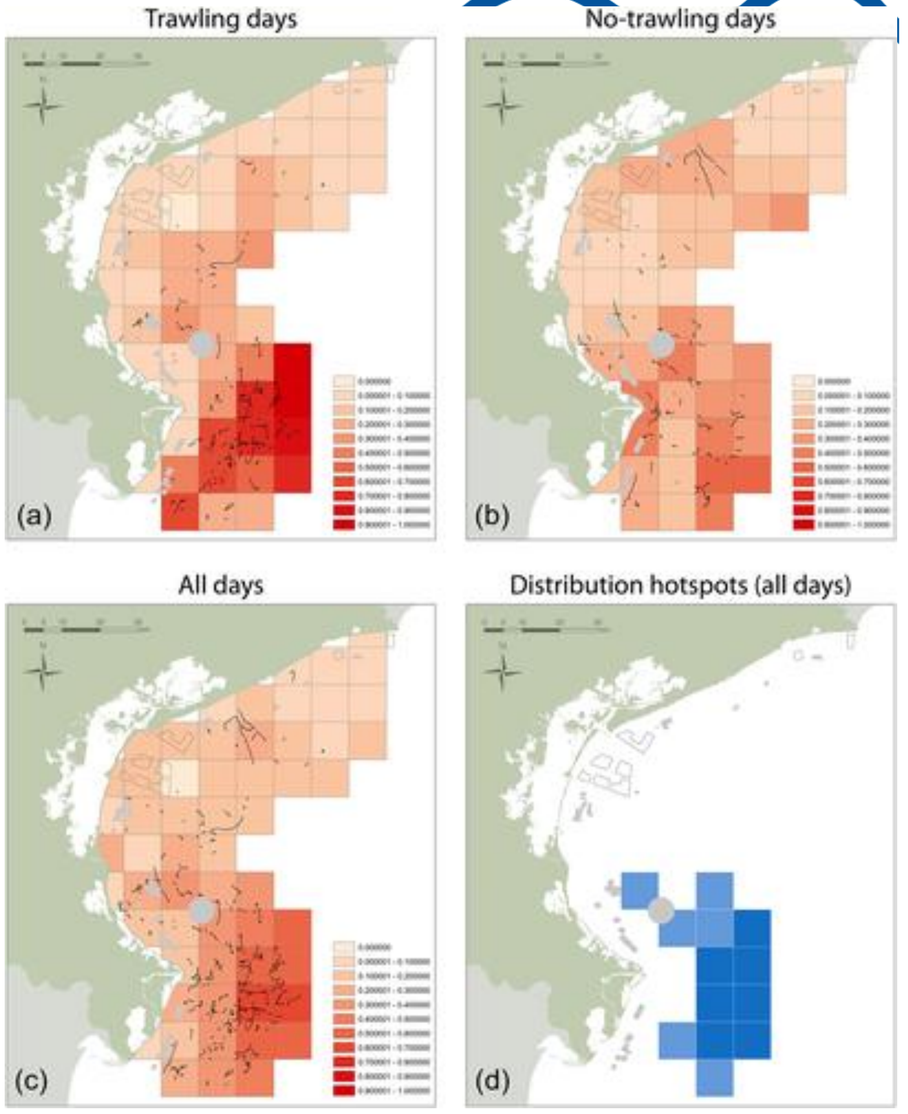




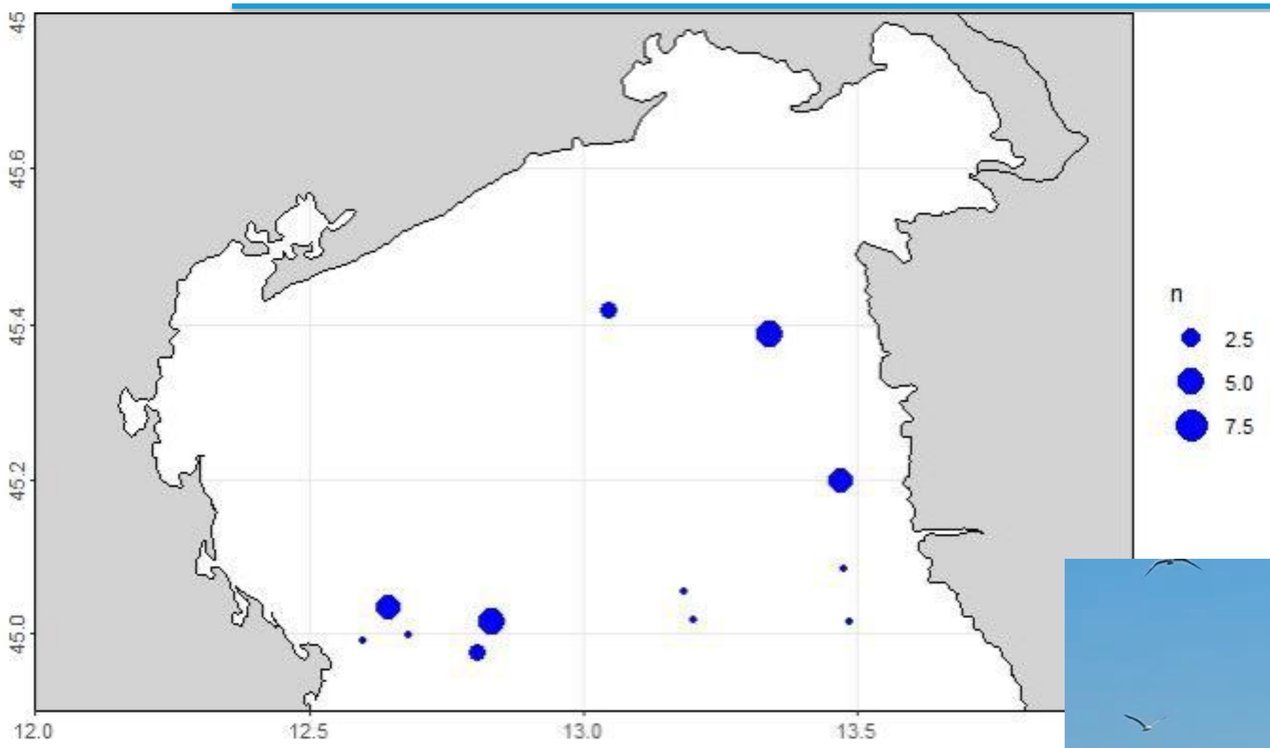


Do we need additional data?



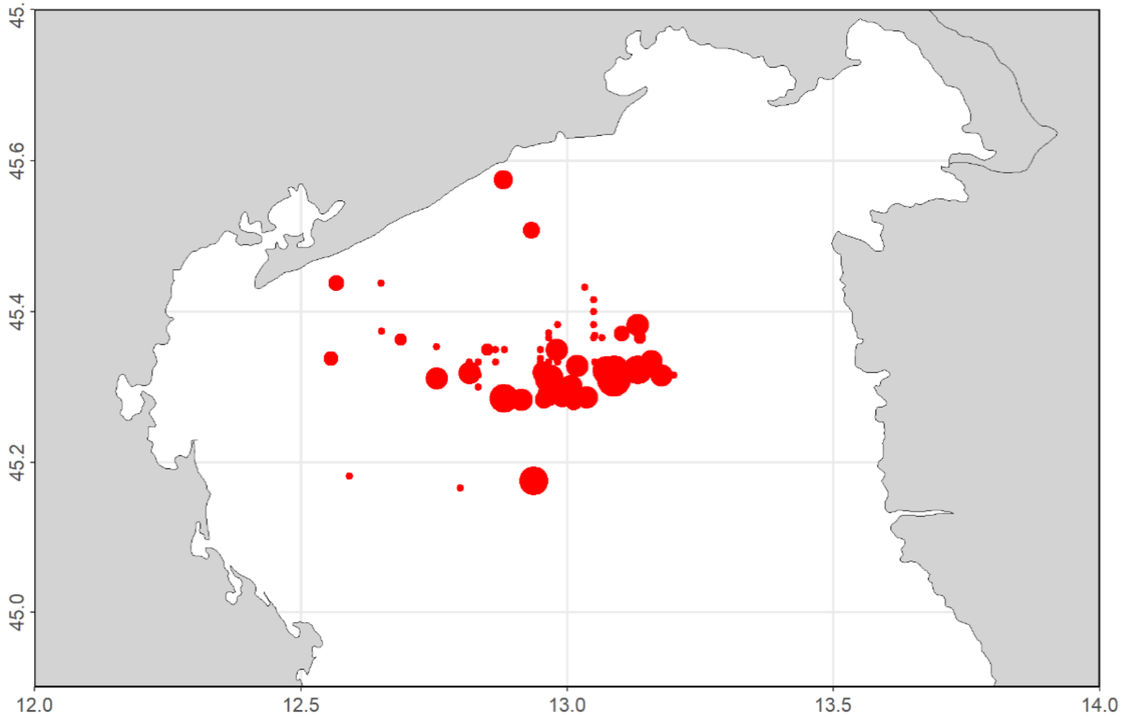


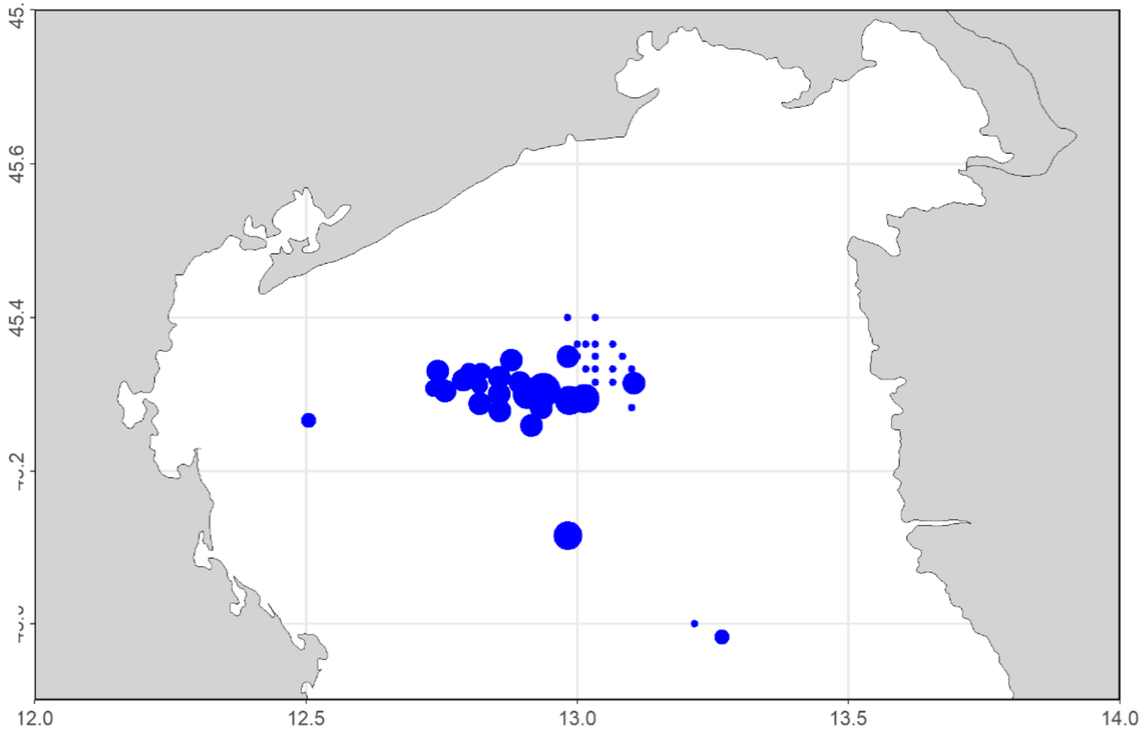
TARTA-TUR - DOLPHINS SIGHTINGS FROM FISHING BOATS



TARTA-TUR - DOLPHIN SIGHTINGS REPORTED BY FISHERMEN

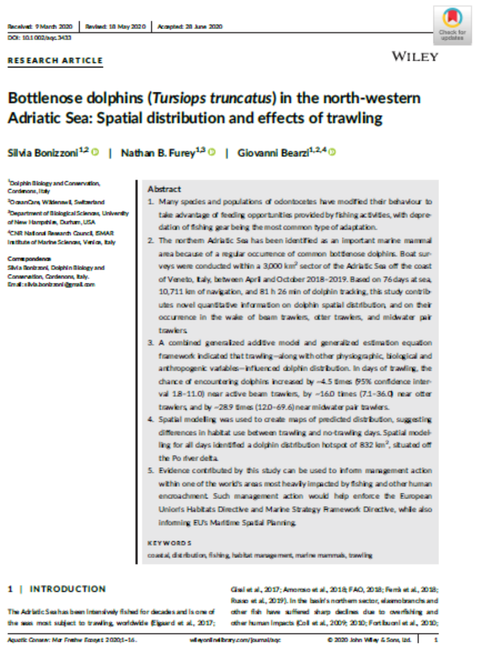
Autumn/Winter





Spring/Summer

DOLPHINS ABUNDANCE & DISTRIBUTION



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DOI: 10.1002/aqc.3433

RESEARCH ARTICLE

WILEY

Bottlenose dolphins (*Tursiops truncatus*) in the north-western Adriatic Sea: Spatial distribution and effects of trawling

Silvia Bonizzoni[1,2] | Nathan B. Furey[1,3] | Giovanni Bearzi[1,2,4]

[1]Dolphin Biology and Conservation, Cordenons, Italy
[2]OceanCare, Wädenswil, Switzerland
[3]Department of Biological Sciences, University of New Hampshire, Durham, USA
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Abstract

1. Many species and populations of odontocetes have modified their behaviour to take advantage of feeding opportunities provided by fishing activities, with depredation of fishing gear being the most common type of adaptation.
2. The northern Adriatic Sea has been identified as an important marine mammal area because of a regular occurrence of common bottlenose dolphins. Boat surveys were conducted within a 3,000 km² sector of the Adriatic Sea off the coast of Veneto, Italy, between April and October 2018–2019. Based on 76 days at sea, 10,711 km of navigation, and 81 h 26 min of dolphin tracking, this study contributes novel quantitative information on dolphin spatial distribution, and on their occurrence in the wake of beam trawlers, otter trawlers, and midwater pair trawlers.
3. A combined generalized additive model and generalized estimation equation framework indicated that trawling–along with other physiographic, biological and anthropogenic variables–influenced dolphin distribution. In days of trawling, the chance of encountering dolphins increased by ~4.5 times (95% confidence interval 1.8–11.0) near active beam trawlers, by ~16.0 times (7.1–36.0) near otter trawlers, and by ~28.9 times (12.0–69.6) near midwater pair trawlers.
4. Spatial modelling was used to create maps of predicted distribution, suggesting differences in habitat use between trawling and no-trawling days. Spatial modelling for all days identified a dolphin distribution hotspot of 832 km², situated off the Po river delta.
5. Evidence contributed by this study can be used to inform management action within one of the world's areas most heavily impacted by fishing and other human encroachment. Such management action would help enforce the European Union's Habitats Directive and Marine Strategy Framework Directive, while also informing EU's Maritime Spatial Planning.

KEYWORDS
coastal, distribution, fishing, habitat management, marine mammals, trawling

1 | INTRODUCTION

The Adriatic Sea has been intensively fished for decades and is one of the seas most subject to trawling, worldwide (Elgvard et al., 2017; Giovi et al., 2017; Amoroso et al., 2018; FAO, 2018; Ferri et al., 2018; Russo et al., 2019). In the basin's northern sector, elasmobranchs and other fish have suffered sharp declines due to overfishing and other human impacts (Coll et al., 2009, 2010; Fortibuoni et al., 2010;

RESEARCH ARTICLE

WILEY

Bottlenose dolphins in the north-western Adriatic Sea: Abundance and management implications

Giovanni Bearzi[1,2,3] | Silvia Bonizzoni[1,3] | Melissa A. Riley[1] | Nina Luisa Santostasi[1,4,5]

[1]Dolphin Biology and Conservation, Cordenons, Italy
[2]Institute of Marine Science (ISMAR), CNR National Research Council, Venice, Italy
[3]OceanCare, Wädenswil, Switzerland
[4]Department of Biology and Biotechnologies, University of Rome La Sapienza, Rome, Italy
[5]Centre d'Ecologie Fonctionnelle et Evolutive (CEFE), Centre National de la Recherche Scientifique (CNRS), Université de Montpellier, Université Paul-Valéry Montpellier III, EPHE, IRD, Montpellier, France

Correspondence
Giovanni Bearzi, Dolphin Biology and Conservation, Cordenons, Italy.
Email: giovanni.bearzi@gmail.com

Abstract

1. The Adriatic Sea is one of the Mediterranean areas most heavily impacted by fishing and other human stressors. The northern part of the basin has been certified as an important Marine Mammal Area because of the regular occurrence of common bottlenose dolphins, *Tursiops truncatus*.
2. Boat surveys, totalling 76 days at sea and 10,711 km of navigation, were conducted between April 2018 and October 2019 to assess cetacean abundance within a 3,000-km² area off Veneto, Italy. Bottlenose dolphins – the only marine mammal species observed – were encountered on 52 days and were tracked for 81 h and 26 min, resulting in 15,066 dorsal fin photographs of high quality and resolution.
3. Various capture–recapture models were applied on individual photo-identification datasets. Model-based estimates indicate that approximately 600 individuals occurred within the study area during the sampling period in both years. Abundance varied monthly: minimum estimates were obtained in May 2018 (291 individuals; 95% CI 134–638) and May 2019 (121; 95% CI 20–721), whereas maximum estimates were obtained in September 2018 (385; 95% CI 330–477) and October 2019 (494; 95% CI 378–645).
4. Evidence provided by this study can be used to complement and validate coarse 'snapshot' information from recent aerial surveys of the entire Adriatic Sea, and to enforce management action mandated by the European Community (EC) Habitats Directive and Marine Strategy Framework Directive, as well as guiding the EC's Maritime Spatial Planning.

KEYWORDS
coastal, fishing, mammals, protected species, surveys

1 | INTRODUCTION

The northern Adriatic Sea is one of the few Mediterranean areas with historical information on cetaceans (Bearzi et al., 2004, 2008b, 2011a; Pleasantonio & Bearzi, 2012). Two delphinids used to be abundant in these waters: the common dolphin, *Delphinus delphis*, and the common bottlenose dolphin, *Tursiops truncatus* (hereafter 'bottlenose dolphin'). Individual dolphin killings as well as systematic extermination campaigns were carried out for more than a century, until the 1960s, in an attempt to reduce conflict with fisheries. Intentional killings are thought to have triggered the eradication of common dolphins, the recovery of which was later compromised by prey depletion caused by overfishing and habitat degradation (Bearzi et al., 2003, 2004). Records of common dolphins have become rare

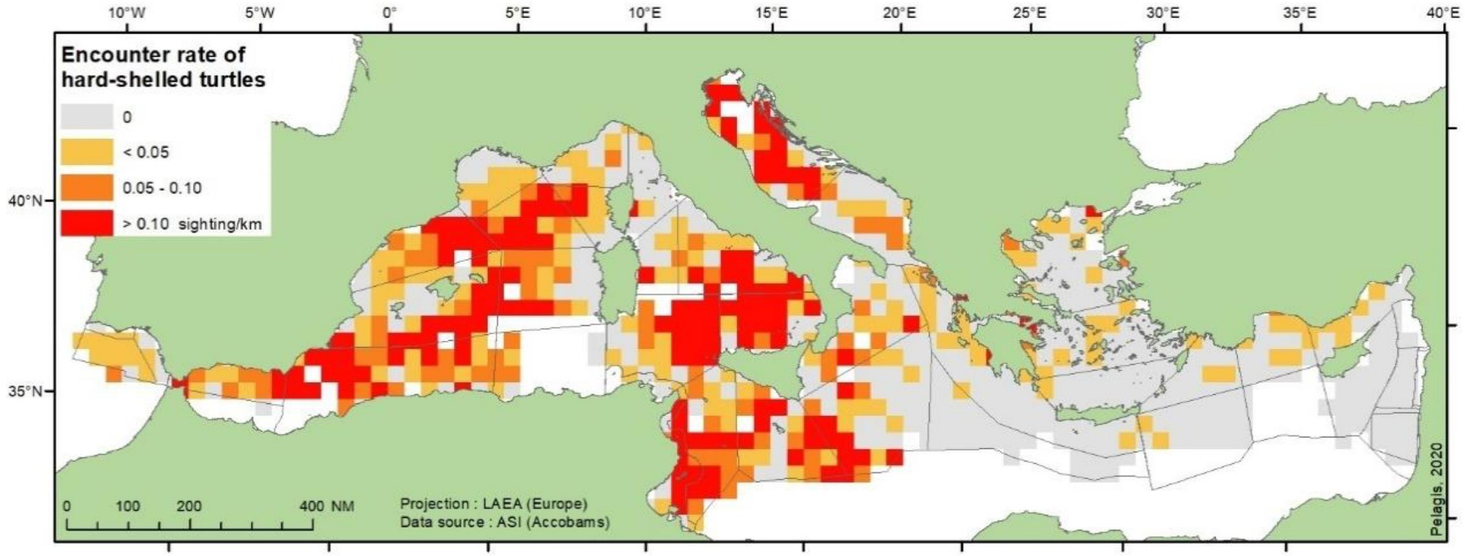
- **95 groups**
- **> 6000 pictures**
- about 600 individuals (100-500)
- **830 km2 area of critical importance** > S.I.C.
- interaction with con **bottom trawlers** (> **rapido**)

TARTA-TUR

Caretta caretta:

25.692 (CV 21,6%) – 73.406 Adriatico

18.008 (CV 15,1%) – 51.451 Adriatico settentrionale (Fortuna et al., 2010a).



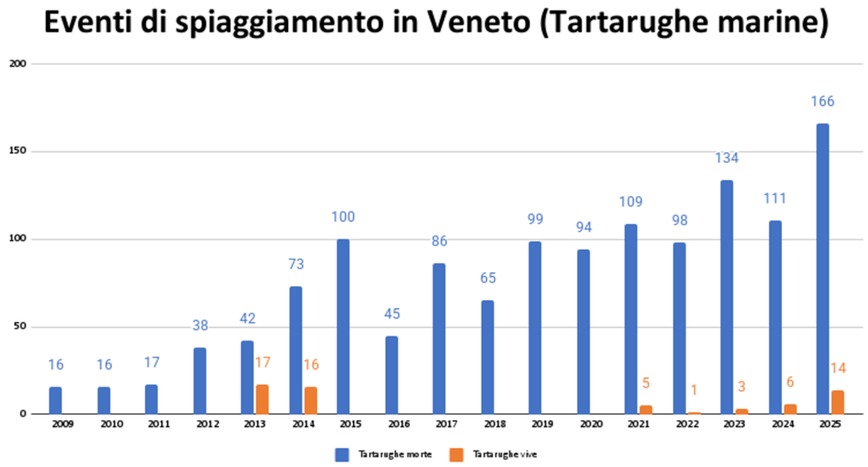
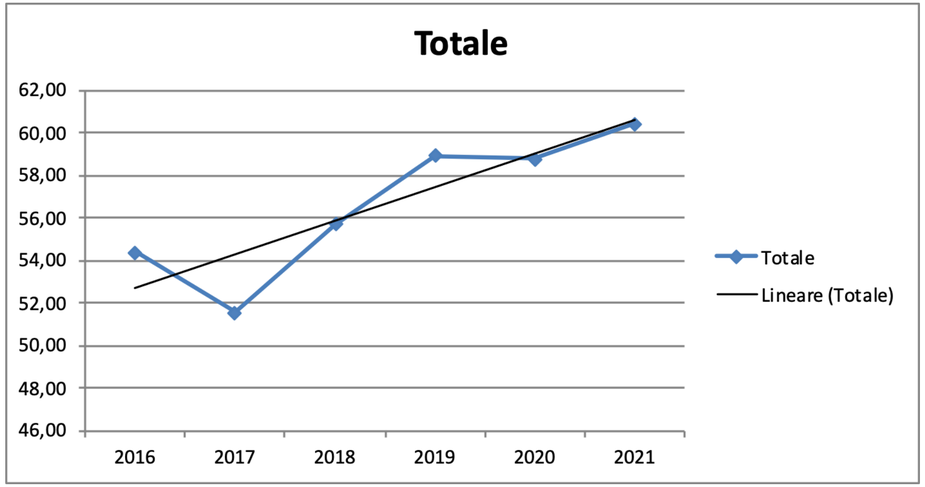
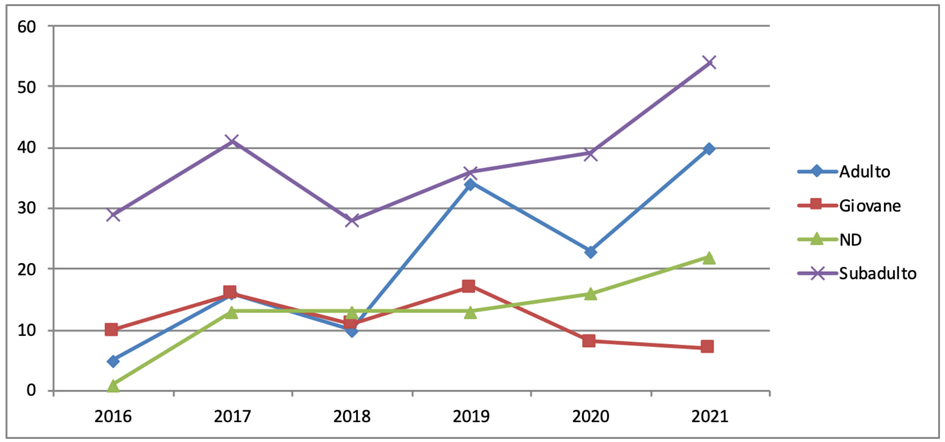


Figure 20. Encounter rate of hard-shelled turtles (sighting per km) on a grid of 50x50 km.

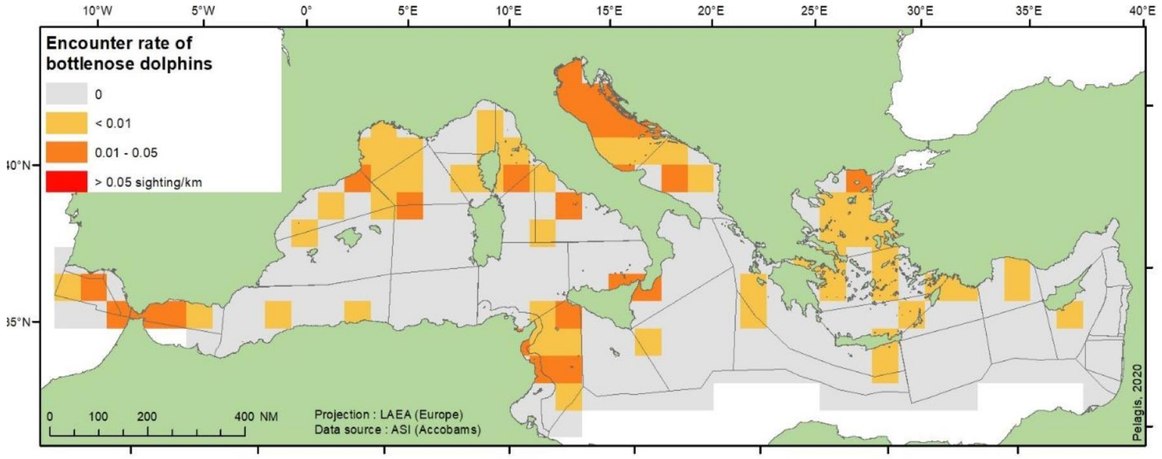

Jesolo (VE)

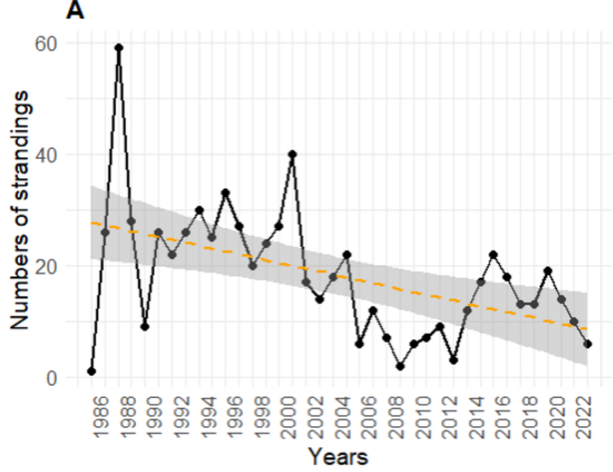

Totale
62,00
60,00
58,00
56,00
54,00
52,00
50,00
48,00
46,00
2016
2017
2018
2019
2020
2021
Totale
Lineare (Totale)

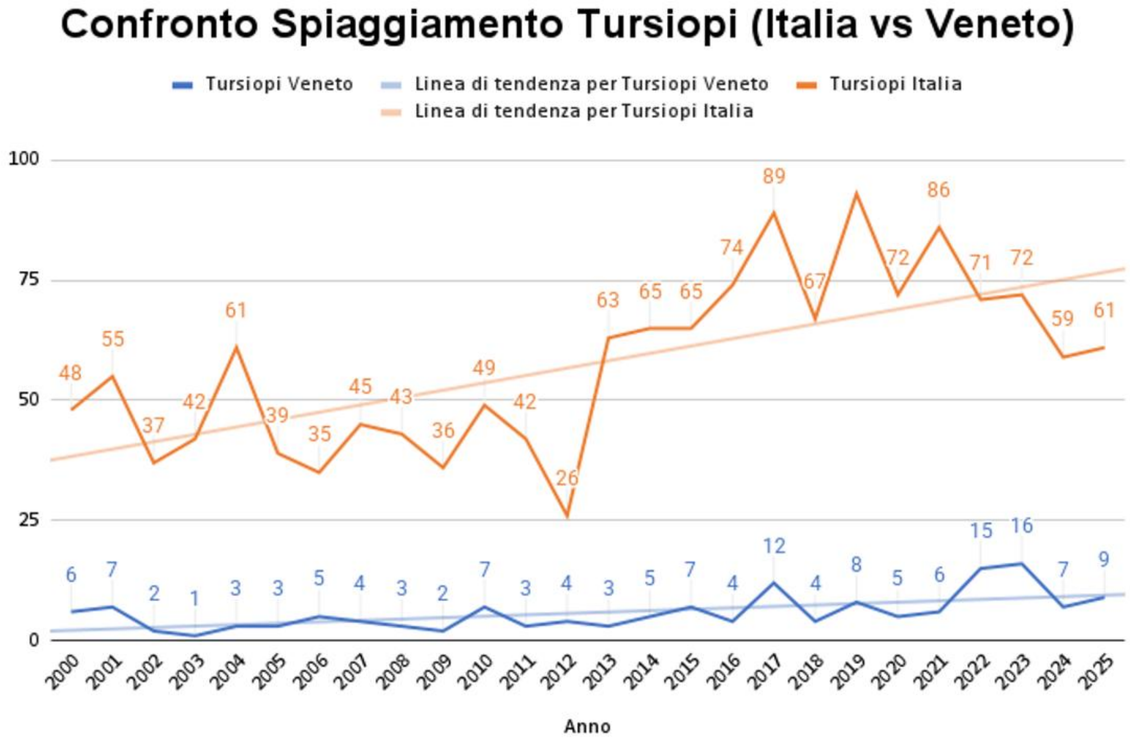

Scano Boa (RO)


60
50
40
30
20
10
0
2016
2017
2018
2019
2020
2021
Adulto
Giovane
ND
Subadulto

TARTA-TUR


10°W
5°W
0°
5°E
10°E
15°E
20°E
25°E
30°E
35°E
40°E
Encounter rate of bottlenose dolphins
0
< 0.01
0.01 - 0.05
> 0.05 sighting/km
0
100
200
400 NM
Projection : LAEA (Europe)
Data source : ASI (Accobams)
Pelagis, 2020


A
Numbers of strandings
60
40
20
0
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
Years


Confronto Spiaggiamento Tursiopi (Italia vs Veneto)
Tursiopi Veneto
Linea di tendenza per Tursiopi Veneto
Tursiopi Italia
Linea di tendenza per Tursiopi Italia
100
75
50
25
0
48
55
37
42
61
39
35
45
43
36
49
42
26
63
65
65
74
89
67
72
86
71
72
59
61
6
7
2
1
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2000
2001
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2010
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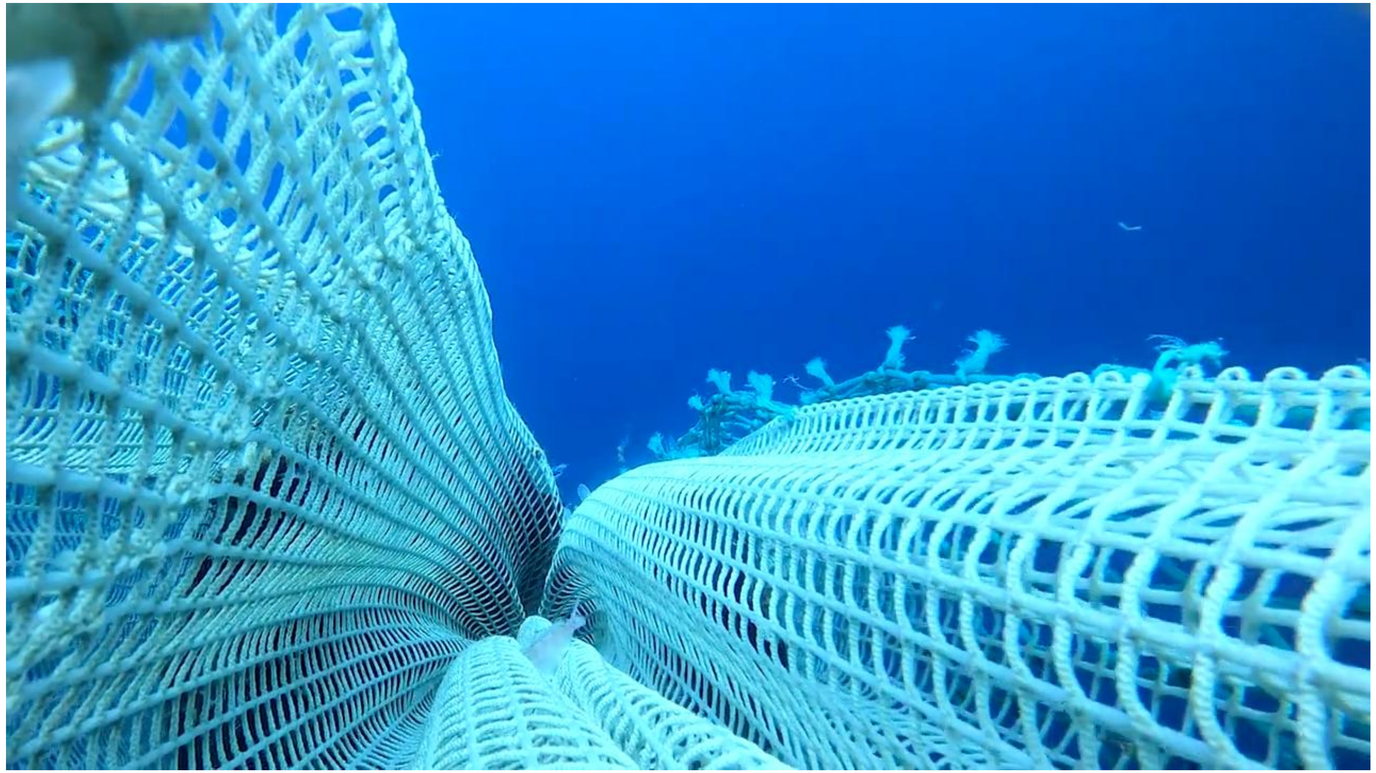
2020
2021
2022
2023
2024
2025
Anno

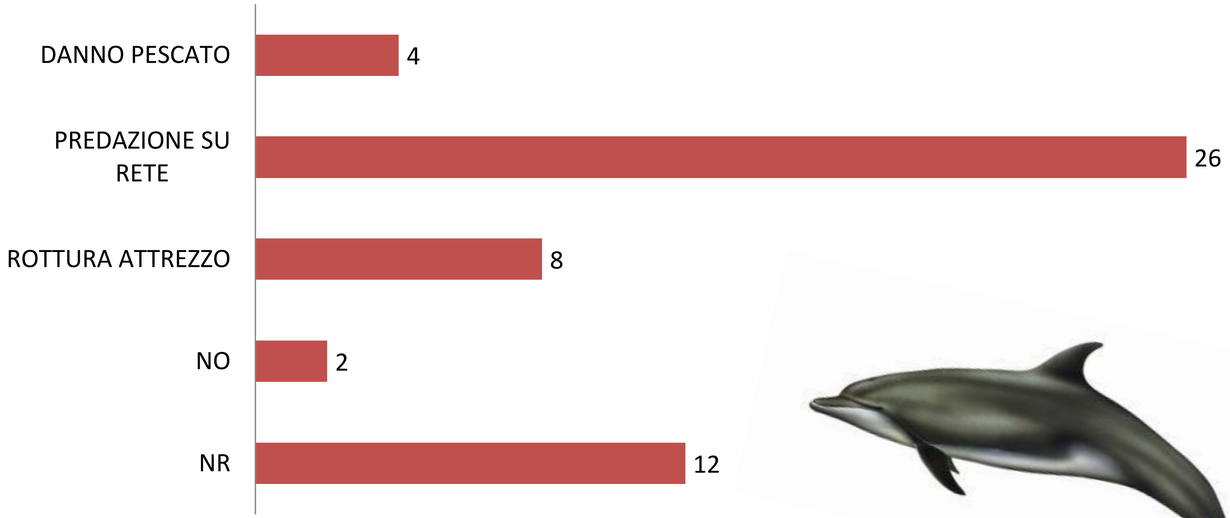
Objectives

- **Identified an area to protect species based on current literature**
- **Identify main gaps & threats for species conservation**
- Define conservation measures to reduce threats



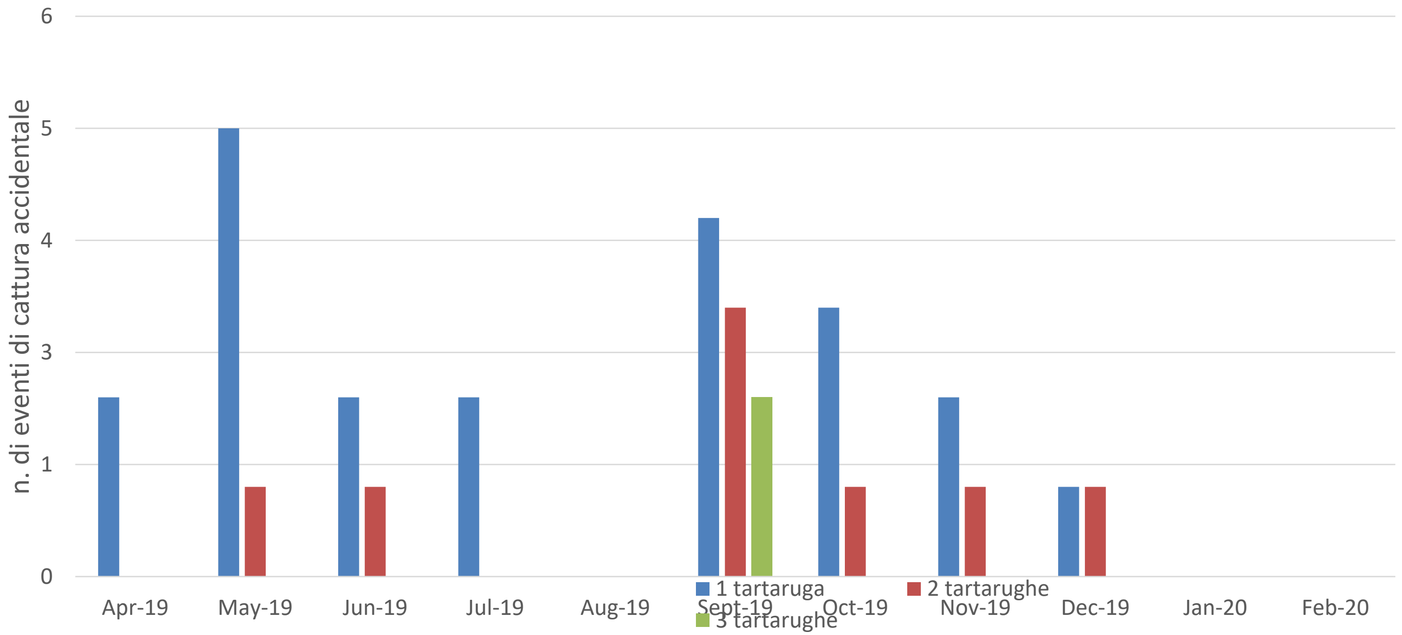
Identification of possible conflicts

- What do we know
- What do we don’t know
- What do we need to fill knowledge gaps
- Who should we involve?
- Which were the previous efforts?



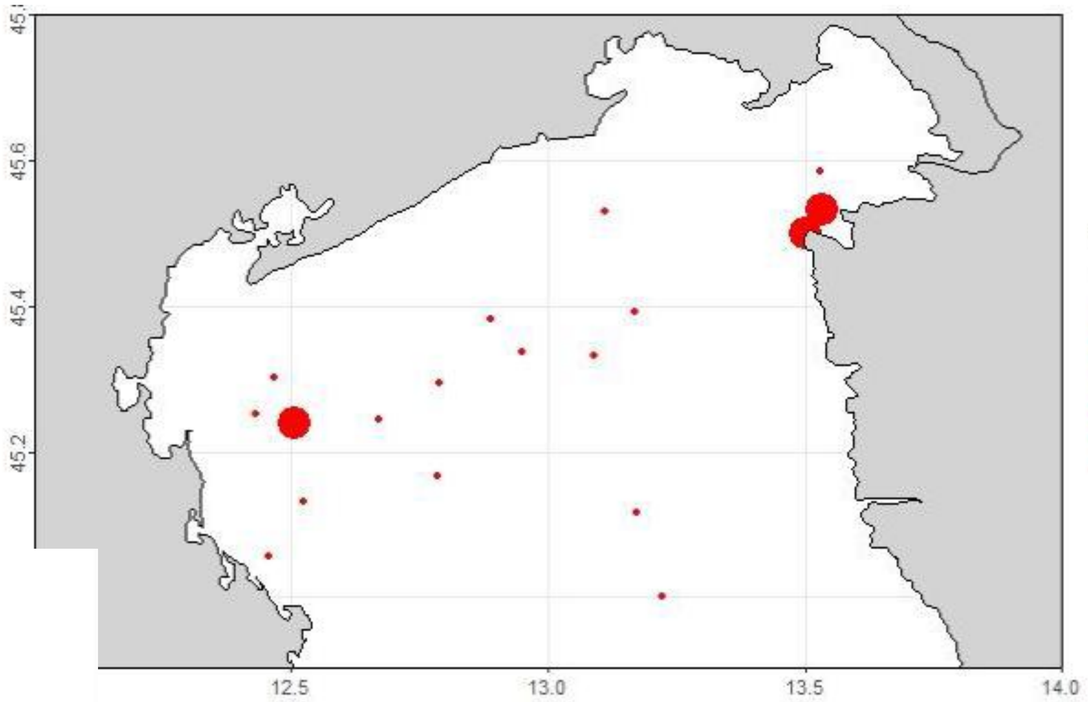
TARTA-TUR - bycatch from observer

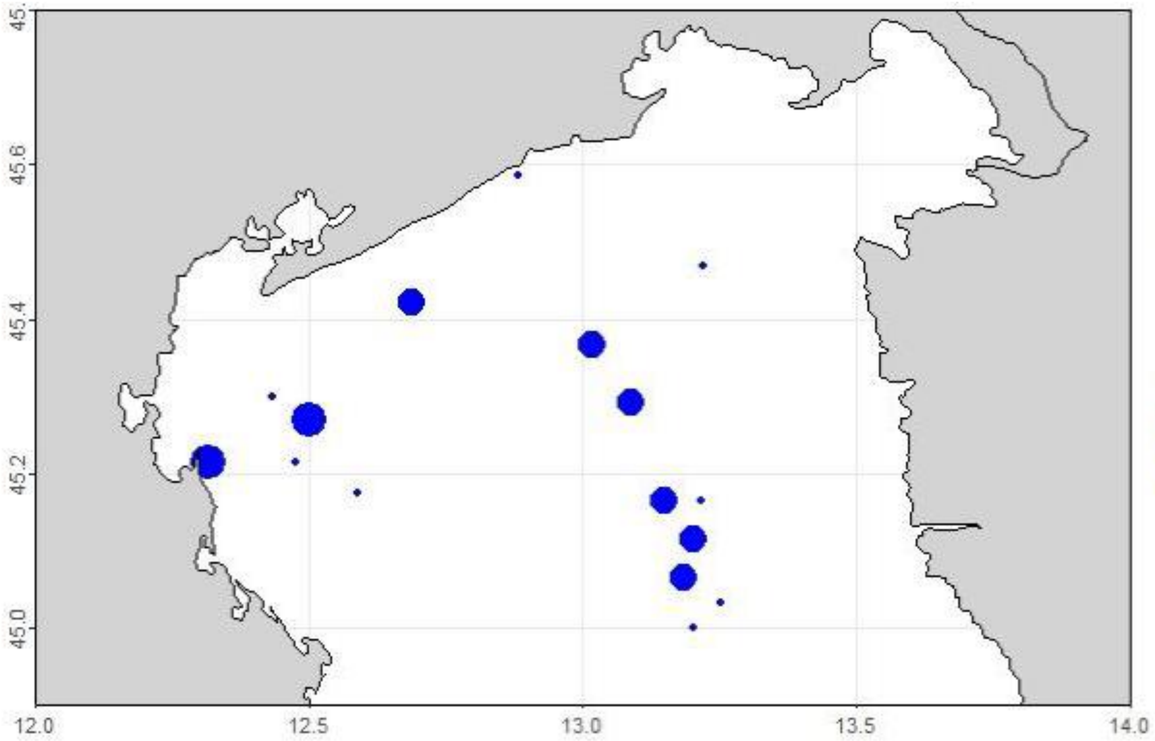
- **48** sea turtles bycatch in less than 1 year
- **0** dolphins' bycatch



TARTA-TUR - bycatch from fishermen

Autumn/Winter





Spring/Summer

Main post-mortem findings (cetaceans)

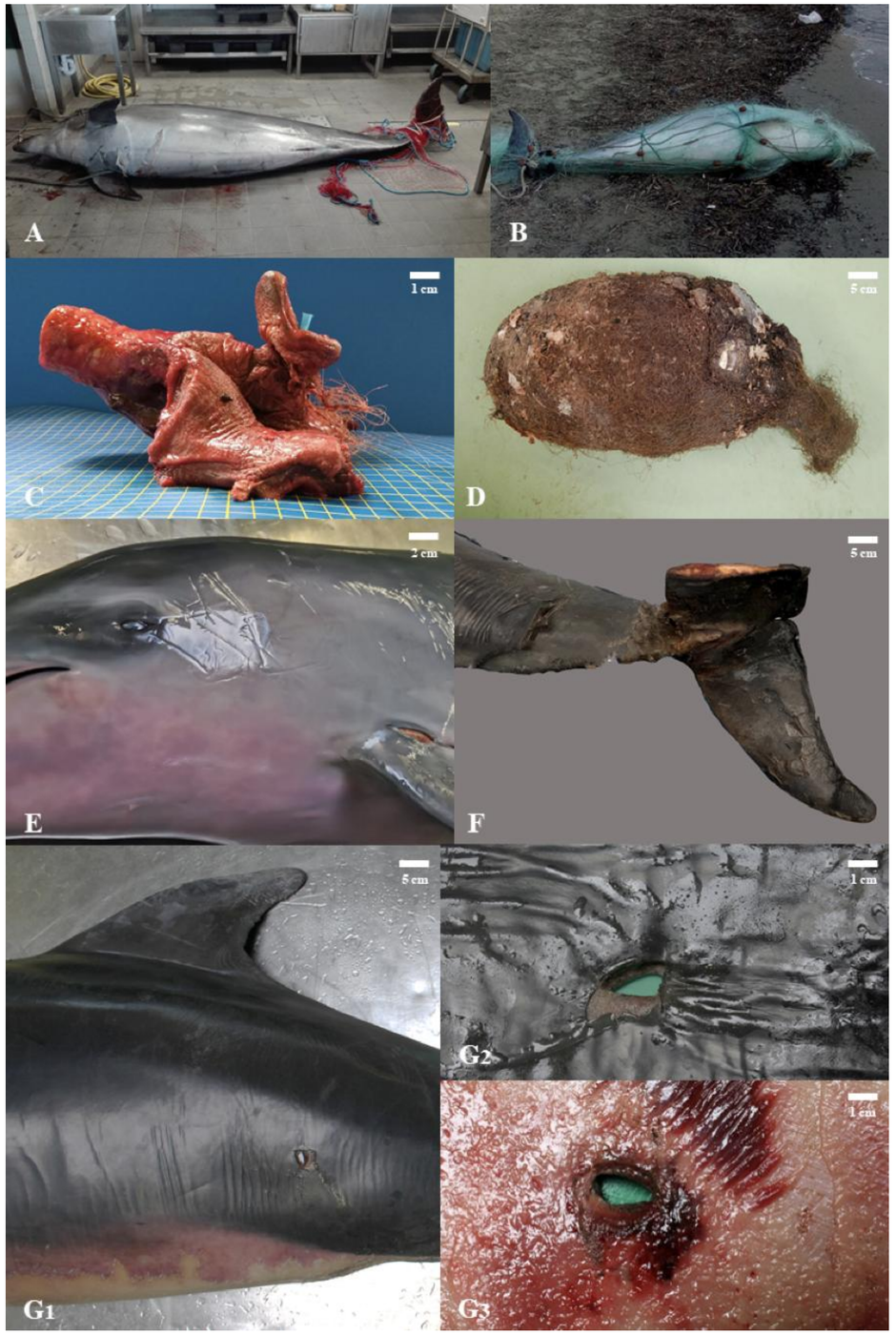
Pathogens

- *Cetacean morbillivirus*
- *Herpesvirus*
- *Brucella spp.*
- ***Toxoplasma gondii.***
- ***Bacteria from anthropic activities***

Plastic in the **2,9%** dolphins stranded in the Adriatic

Evidence of fishery interaction

- **12,89%** of examined animals
- Cause of death in **10,32%**



FRAMEWORK FOR FISHERY INTERACTION FROM LITERATURE

www.lifedelfi.eu

LIFE DELFI

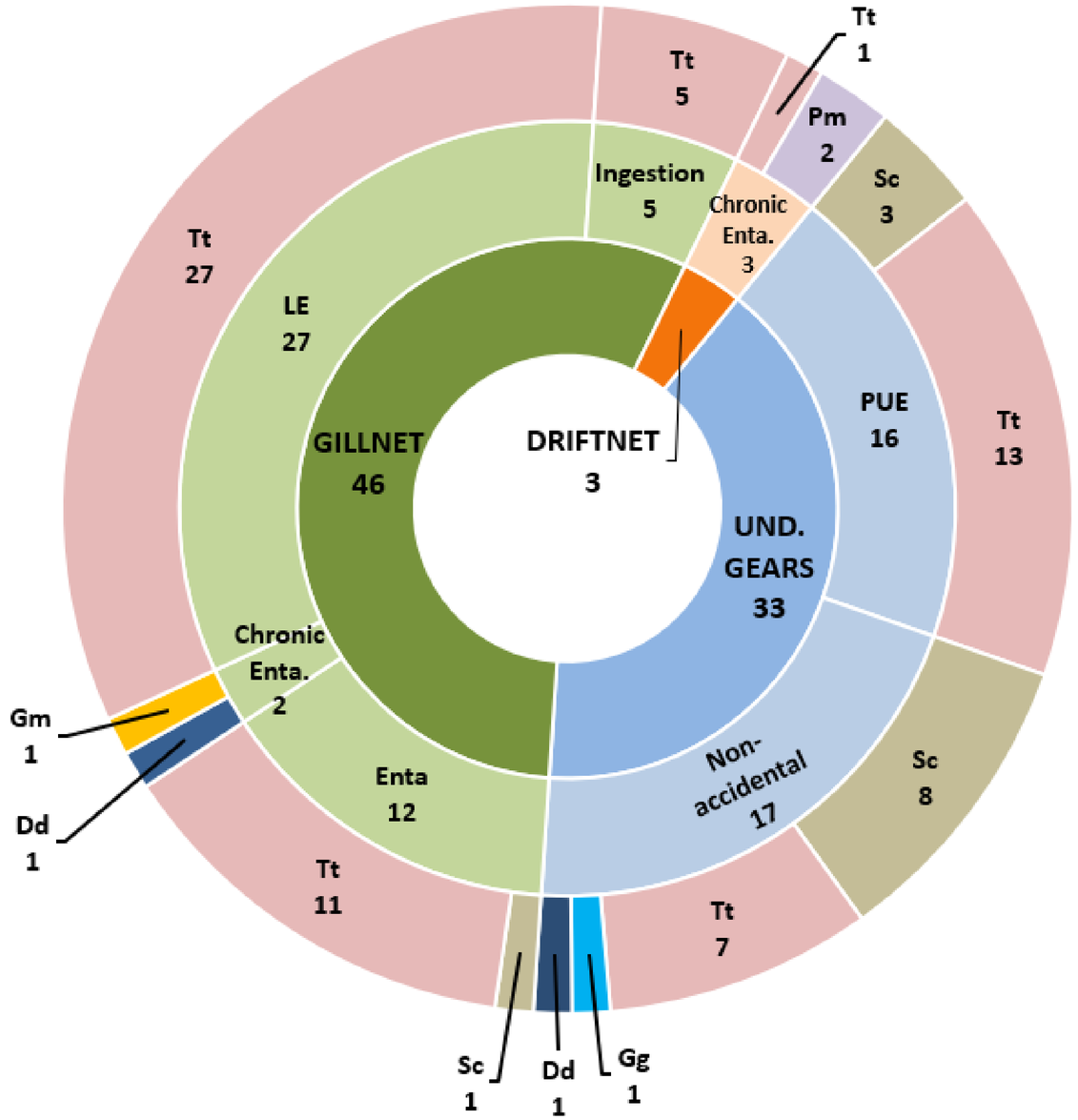
Dolphin Experience: Lowering Fishing Interactions

LIFE18 NAT/IT/000942

Action A3

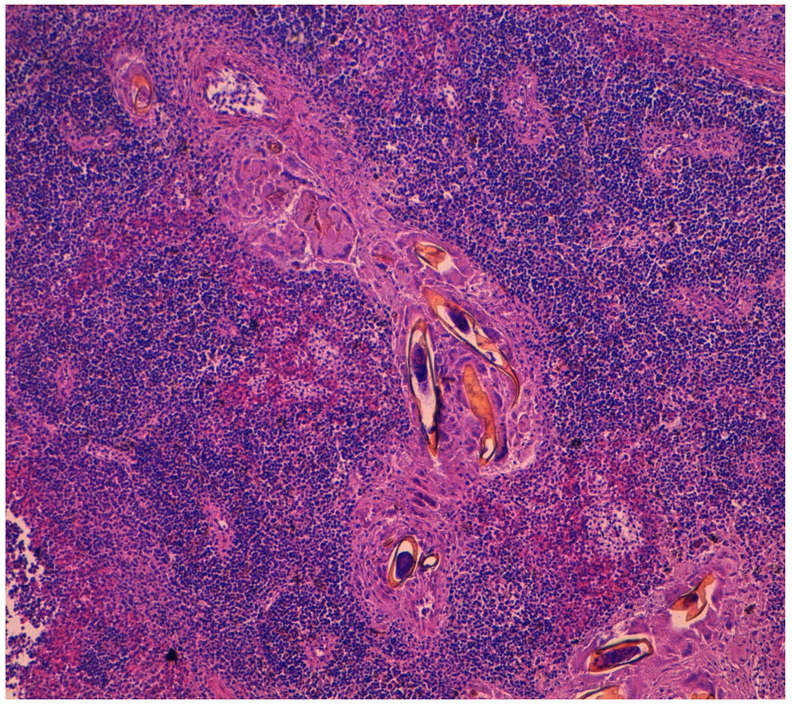
Harmonized necropsy protocol including diagnostic framework for by-catch

Framework for fishery interaction



Main post-mortem findings (sea turtles)

Dati degli spiaggiamenti tartarughe 2023-2025



Natural causes
- Parasites
- Bacteria from anthropic origins

Human interaction
- Amputations
- Ship strikes
- Plastic ingestion (33%)

Interaction with fisheries
- Gas embolism
- Entanglement and hooks
- Net marks

Environmental Pollution 291 (2021) 118188

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Evaluation of per- and poly-fluorinated alkyl substances (PFAS) in livers of bottlenose dolphins (*Tursiops truncatus)* found stranded along the northern Adriatic Sea.☆

Giuseppe Sciancalepore [a], Guido Pietroluongo [a], Cinzia Centelleghe [a,*], Massimo Milan [a], Marco Bonato [b], Giorgia Corazzola [a], Sandro Mazzariol [a]

[a] Department of Comparative Biomedicine and Food Science BCA, University of Padova, Agripolis, Viale Dell'Università, 16, 35020, Legnaro, PD, Italy

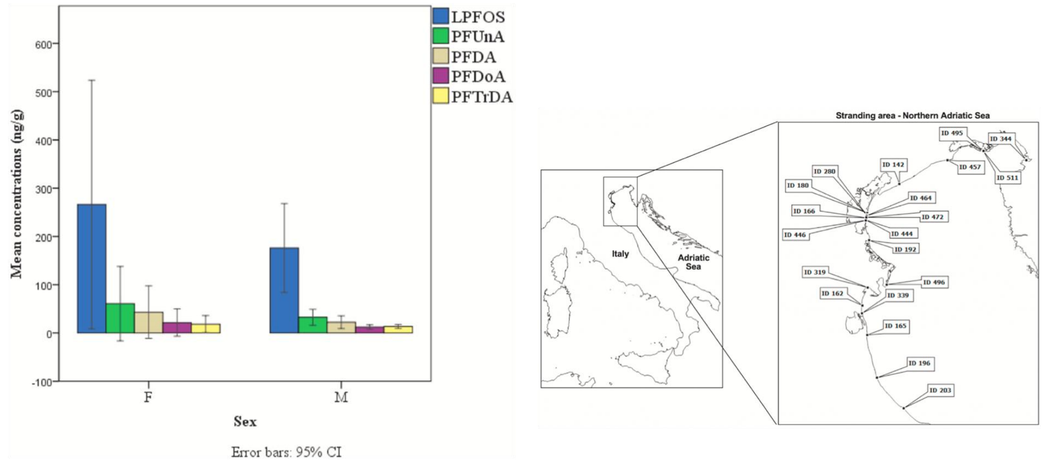


Fig. 3. PFOS, PFUnA, PFDA, PFDoA and PFTrDA concentrations in males and female bottlenose dolphins (error bars represent standard deviation).

Objectives

- Identified an area to protect species based on current literature
- Identify main gaps & threats for species conservation
- Define conservation measures to reduce threats: management plan

CORRIERE DI BOLOGNA / CRONACA

LA SCOPERTA

Adriatico, le tartarughe marine mangiano i granchi blu: «Tracce nelle feci di un esemplare»

Ravenna, il biologo Simone D'Acunto (Chesta): «Non è corretto che il granchio blu non abbia predatori naturali, bisogna aspettare. Anche il gambero della Louisiana all'inizio proliferava incontrollato»

di Enea Conti

CHIOGGIA. I DATI DELL'OPERAZIONE «FISHING FOR LITTER»

Cala il numero dei rifiuti trovati in mare

A

CHIOGGIA

Meno rifiuti in mare rispetto all'anno scorso: merito del Po e dei pescatori. È il primo bilancio dell'operazione «Fishing for litter» (recupero «Pesca dei rifiuti») il progetto pilota portato ma europeo DeFishGear. L'operazione si è svolta, quest'anno, nell'arco di cinque mesi, da marzo a luglio, ha impiegato 6 barche (2 rapidi e 4 cocci) che hanno raccolto oltre 23 tonnellate di rifiuti. In un triglaio di sacchi, poi conferiti a reti durante le normali battute di pesca e i ricercatori li hanno pesati, misurati e classificati. I rifiuti sono stati pescati al ritmo di 1,7 chilogrammi all'ora, contro i 2,4 del 2014 e incidono per il 5% sul prodotto commerciale pescato (13% l'anno scor-

la Nuova

Dir. Resp.: Pierangelo Fiorani

Tiratura: 19.865 Diffusione: 15.064 Lettori: 95.000

LA RICERCA DELL'ISPRA E IL LAVORO CON I PESCHERECCI

Chioggia pioniera nella raccolta

Sul fondale dell'Adriatico 700 rifiuti ogni chilometro quadrato

Main points

- Prohibition

- Good practices

- Mitigation tools & measures

- Interaction with Authorities

- Dialogue between research and stakeholders

- Stakeholders part of the management

- All pressures should be addressed

- International coordination

Fishing limitation

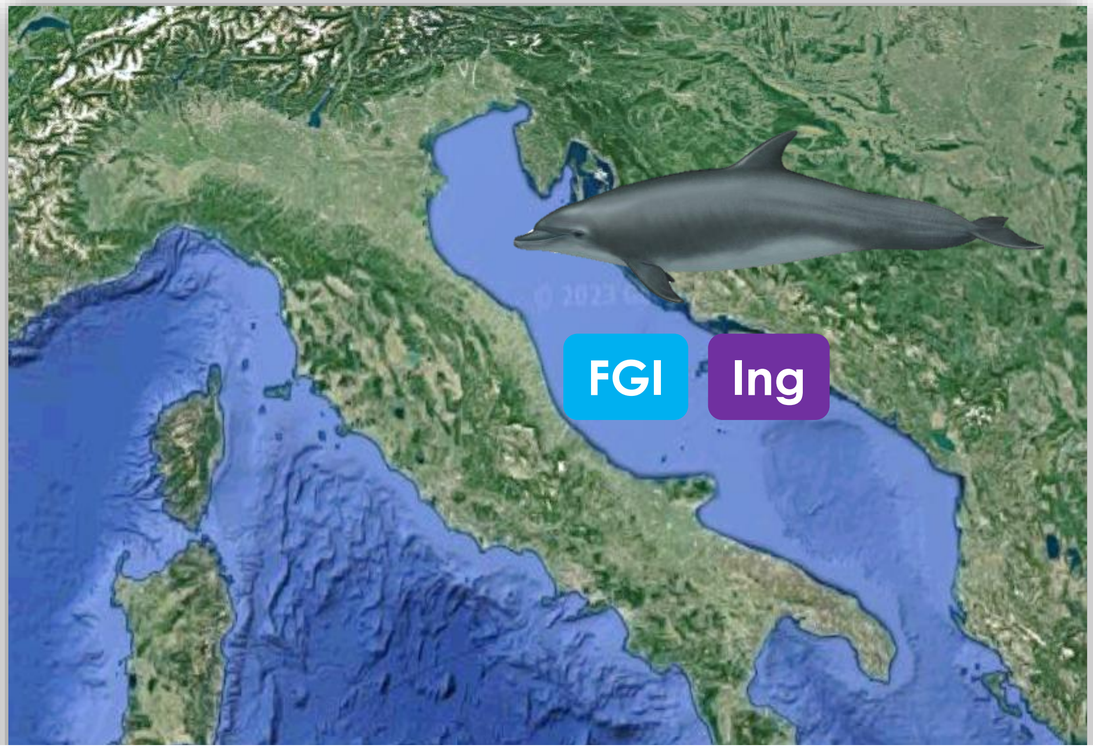
-Technical stops

- Biological stops

- Weekly limitations

- Spatial limitations

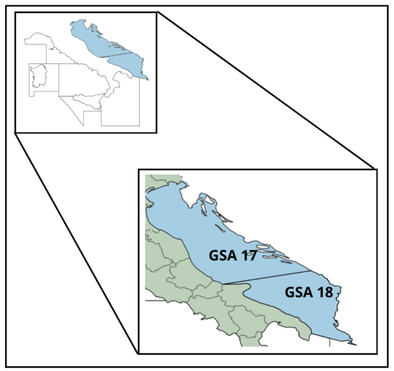
TARGETING MITIGATION MEASURES

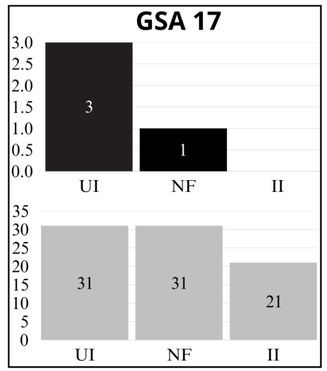


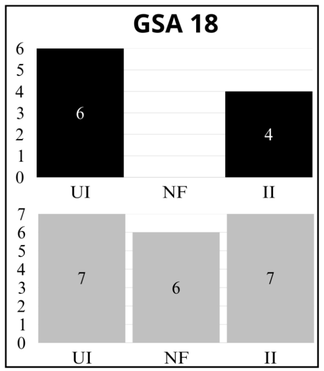
GSA 17/18 - ADRIATIC SEA

Bottlenose dolphins adults healthy male

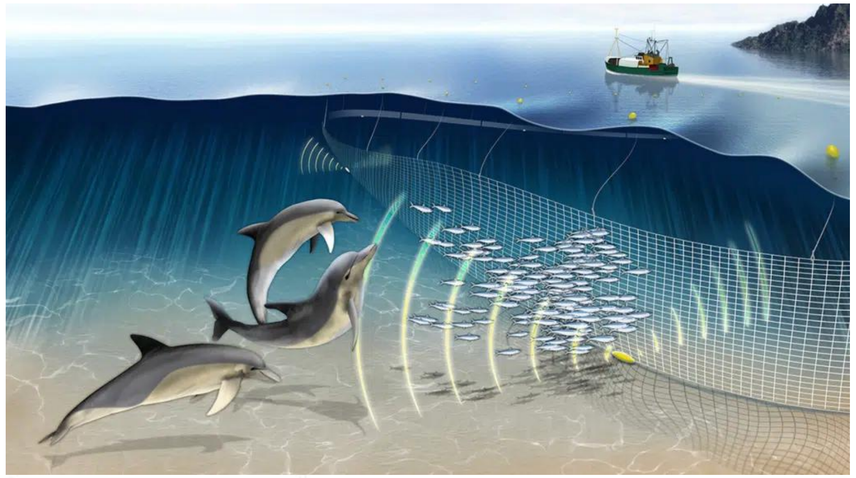
Larynx entanglement + ingestion = behavioral related mortality (56%)

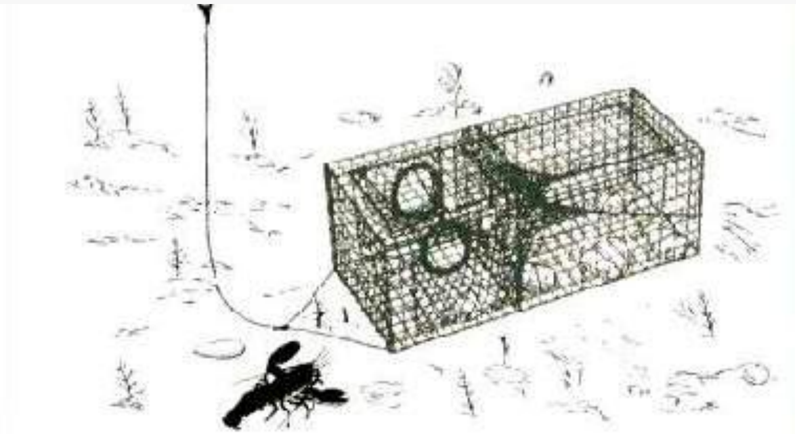




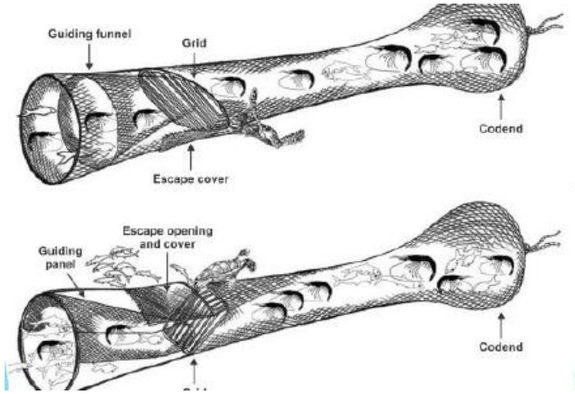


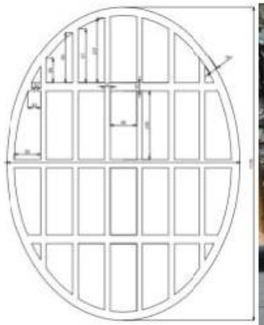
TARGETING MITIGATION MEASURES - GILLNETS

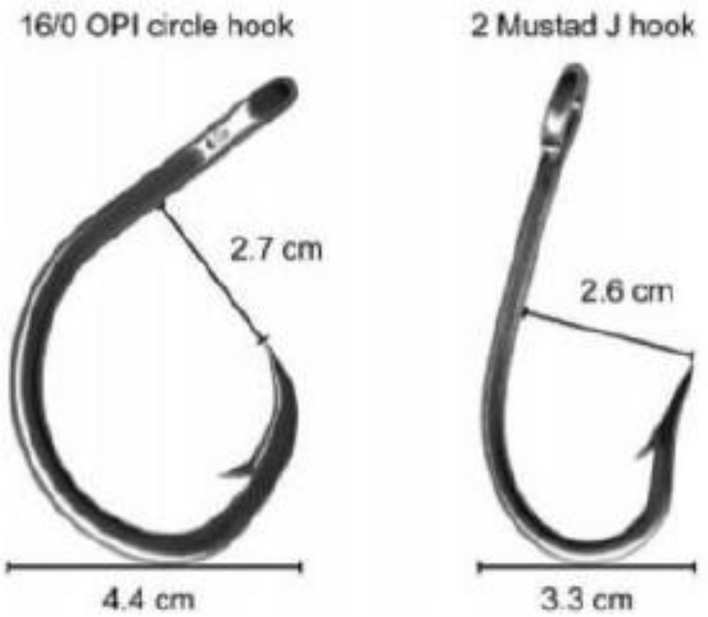




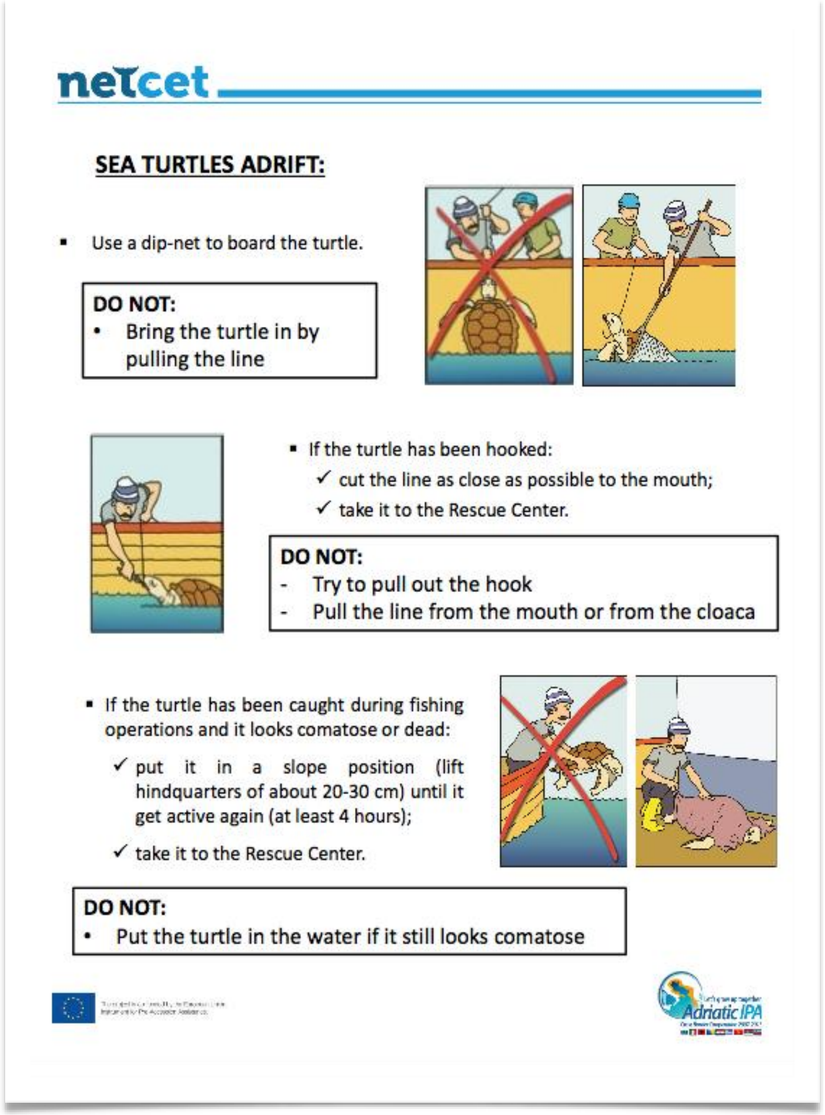
TARGETING MITIGATION MEASURES







Trainings and communication



Sharing of protocols

ACCOBAMS

Food and Agriculture Organization of the United Nations

General Fisheries Commission for the Mediterranean
Commission générale des pêches pour la Méditerranée

GOOD PRACTICE GUIDE FOR THE HANDLING OF CETACEANS CAUGHT INCIDENTALLY IN MEDITERRANEAN FISHERIES

In collaboration with

UN environment

MAP

SPA/RAC

Financed by

MAVA
FONDATION POUR LA NATURE

GUIDELINES FOR THE SAFE AND HUMANE HANDLING AND RELEASE OF BYCAUGHT SMALL CETACEANS FROM FISHING GEAR

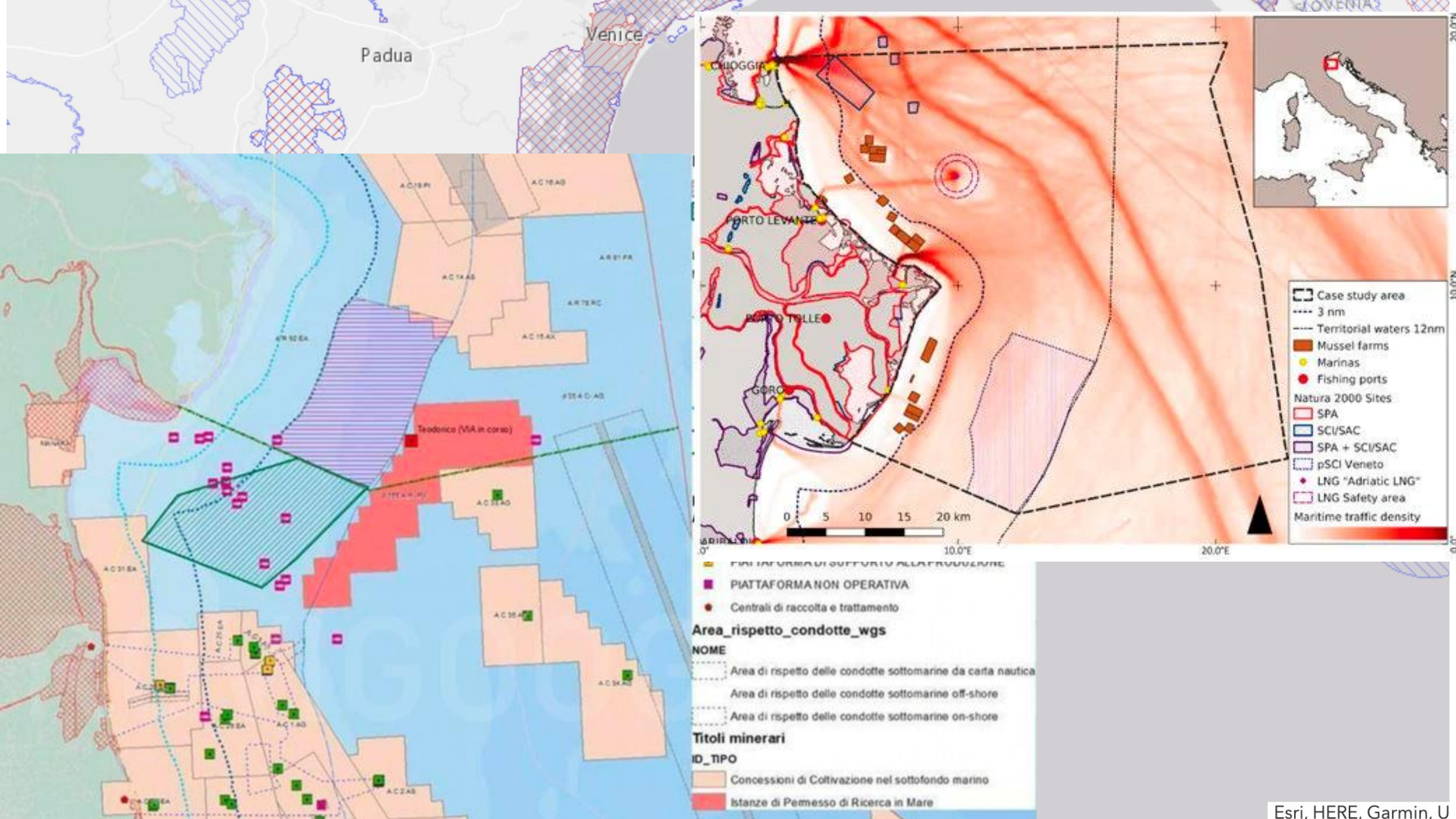
CMS Technical Series Publication No. 43

UN environment programme

CMS

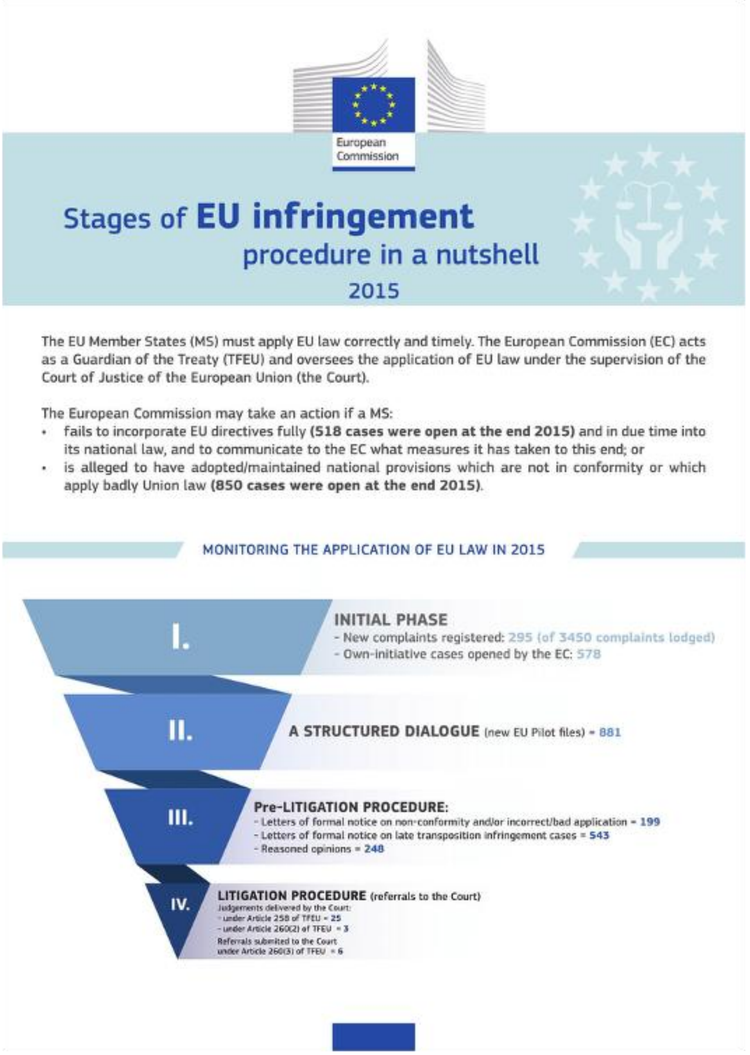
WWF

Rescue & Release


Padua
Venice
CHIOGGIA
PORTO LEVANTE
PORTO TOLLE
GORO
Teodorico (VIA in corso)
Case study area
3 nm
Territorial waters 12nm
Mussel farms
Marinas
Fishing ports
Natura 2000 Sites
SPA
SCI/SAC
SPA + SCI/SAC
pSCI Veneto
LNG "Adriatic LNG"
LNG Safety area
Maritime traffic density
0 5 10 15 20 km
10.0°E
20.0°E
PIATTAFORMA NON OPERATIVA
Centrali di raccolta e trattamento
Area_rispetto_condotte_wgs
NOME
Area di rispetto delle condotte sottomarine da carta nautica
Area di rispetto delle condotte sottomarine off-shore
Area di rispetto delle condotte sottomarine on-shore
Titoli minerari
ID_TIPO
Concessioni di Coltivazione nel sottofondo marino
Istanze di Permesso di Ricerca in Mare
Esri, HERE, Garmin, U

Habitat Directive (Dir. EU 92/43/CEE)

INFRINGEMENT PROCEDURES 2023/2181
Failure to prevent incidental capture of marine species


European Commission

Stages of **EU infringement** procedure in a nutshell

2015

The EU Member States (MS) must apply EU law correctly and timely. The European Commission (EC) acts as a Guardian of the Treaty (TFEU) and oversees the application of EU law under the supervision of the Court of Justice of the European Union (the Court).

The European Commission may take an action if a MS:

- fails to incorporate EU directives fully **(518 cases were open at the end 2015)** and in due time into its national law, and to communicate to the EC what measures it has taken to this end; or
- is alleged to have adopted/maintained national provisions which are not in conformity or which apply badly Union law **(850 cases were open at the end 2015)**.

MONITORING THE APPLICATION OF EU LAW IN 2015

I. **INITIAL PHASE**
- New complaints registered: 295 (of 3450 complaints lodged)
- Own-initiative cases opened by the EC: 578

II. **A STRUCTURED DIALOGUE** (new EU Pilot files) = 881

III. **Pre-LITIGATION PROCEDURE:**
- Letters of formal notice on non-conformity and/or incorrect/bad application = 199
- Letters of formal notice on late transposition infringement cases = 543
- Reasoned opinions = 248

IV. **LITIGATION PROCEDURE** (referrals to the Court)
Judgements delivered by the Court:
- under Article 258 of TFEU = 25
- under Article 260(2) of TFEU = 3
Referrals submitted to the Court under Article 260(3) of TFEU = 6

PLOS One

RESEARCH ARTICLE

Assessing fishery interaction on cetaceans stranded along the Italian coastline between 1986 and 2023

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THANKS...QUESTIONS?

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